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Characteristics of Spontaneous Musical Imagery

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Abstract

This study follows upon Steven Brown's 2006 article in *The Journal of Consciousness Studies* about the "perpetual music track," a form of constant musical imagery. With Brown's assistance, a Musical Imagery Questionnaire was developed and administered to 67 participants with the intention of establishing relevant scales for quantifying the presence and extent of spontaneous musical imagery in individuals. In addition to the Musical Imagery Questionnaire, the Six Factor Personality Questionnaire, as well as the Transliminality Scale, which is a measure of openness to psychological material, was used in order to explore the correlations of spontaneous musical imagery to personality constructs. Factor analysis of the responses to the Musical Imagery Questionnaire revealed six meaningful dimensions of spontaneous musical imagery that were labeled as Unconscious, Persistent, Entertainment, Completeness, Musicianship, and Distraction. Participants who scored high on Transliminality also tended to have more persistent, distracting, and unconscious musical imagery. There were also some smaller correlations with other personality variables.

The apparently common experience of having a tune “stuck in one’s head” is the characteristic of one’s stream of consciousness that prompted this study. The first author has had a great deal of personal experience with this phenomenon. Not only has he experienced songs in his head that he had not heard in months or years, but sometimes there have been songs present that he had never before heard in his life; in other words, songs that were, to the best of his knowledge, original musical material.

The effortless and unpremeditated experience of unconstrained mental music falls along a dimension that is here referred to as “spontaneous musical imagery.” Considering that many people have, at some time, experienced having a song “stuck in their head,” it seems logical to suppose that the extent to which one experiences musical imagery can be placed along a continuum. At one extreme, one might not experience any musical imagery at all, whereas, at the other extreme, a person could hear inner music constantly. This latter phenomenon has been identified as the “Perpetual Music Track” by Steven Brown, a trained musician and professor.

In an article in an earlier issue of the *Journal of Consciousness Studies*, Brown (2006) analyzed the music in his own head according to pitch, timbre, note quality, chord progression, and other theoretical qualities that would be less familiar to non-specialist music-listening audiences. Brown also noted whether this music was perpetual. Two difficulties with Brown’s study, however, are its musically technical nature and the limitations of its scope. Brown neither explored potential origins of this imagery nor did he attempt to quantify it. For a musician, his article is interesting to read, but it lacks generalizability.

Aside from Brown, however, not much research has been done in this area. Lipson (2006), like Brown, analyzed his own musical imagery. His article, while intriguing, relies heavily on personal analysis and Freudian interpretations of the characteristics of his imagery. In a study by Kopacz (2005), researchers administered a 16-factor personality questionnaire to participants and asked them to indicate their favourite piece of music. These pieces were put on compact discs and given to professional musicians and music professors who scrutinized the pitch, timbre, chord progressions, and other technical features of the pieces in a similar fashion to Brown’s analysis. The relations of these features to each participant’s personality scores were then examined. It was discovered that individuals who scored higher in the personality factors Social Boldness, Liveliness, Extraversion, and Openness to Change also seemed to prefer music pieces with a fast tempo and a great number of melodic themes. It was also shown that individuals who scored high in Vigilance preferred fewer melodic themes. As is the case with Brown’s study as well, however, technical language that would be lost on non-specialists is used to describe the music by the participants.

In relevant literature, most previous research regarding the interaction between personality variables and music focused on musical preference. Research involving both music and personality includes everything from studies of music preference in relation to personality factors, to the effectiveness of certain personalities of music teachers and the use of music therapy on different personality types. In a more recent study of its kind, Renfrow and Gosling (2003) studied the personality correlates of music preference. Renfrow and Gosling found that, among other findings, individuals who score higher on scales for agreeableness, conscientiousness, and extraversion, and lower on openness are more likely to prefer conventional and upbeat music. Other studies’ findings range from the specific and entertaining – personalities and preferences for certain types of rock music, for example – to more broad and applicable findings, for example, types of music associated with depression or a preoccupation with suicidal ideation. While this previous research is interesting and certainly valuable, it is not

directly relevant to the focus of this study, that is, spontaneous, inwardly-generated musical imagery.

The purpose of this study was to determine the extent and characteristics of spontaneous musical imagery (SMI) of both musicians and non-musicians in musically non-technical terms and to attempt to qualitatively understand how people experience musical imagery by making attributions about its probable source. Furthermore, an effort was made to establish any relationships of musical preferences and personality traits with the presence and extent of musical imagery. With the help of Steven Brown, the Musical Imagery Questionnaire (MIQ) was developed to measure the presence and extent of spontaneous musical imagery. The quantitative scores and qualitative descriptions obtained from this questionnaire were compared to scores on a standard personality test as well as on a particular trait known as Transliminality.

Transliminality is a psychological construct that was proposed by Michael Thalbourne (1991) and is based on the idea that, just as there is a membrane between human organs, there is a psychological membrane between conscious and unconscious parts of the psyche that has varying degrees of permeability that depend on the individual person. In developing a measure of Transliminality, Thalbourne and Delin (1994) defined Transliminality as “a largely involuntary susceptibility to and awareness of large volumes of inwardly generated psychological phenomena of an ideational and affective kind” (p. 25). Transliminality is the single construct underlying six variables: Belief in, and experience of, the paranormal; magical ideation; creative personality; mystical experience; manic-like experience; and depressive experience (Houran, Thalbourne, & Lange, 2003). If the presence of these other phenomena is an indication of a higher degree of communication between the unconscious and conscious, that is, a higher degree of permeability of a psychological membrane, then perhaps spontaneous musical imagery also arises from the unconscious, with the extent to which individuals experience it depending on the degree of Transliminality. One of the purposes of this study is to explore this relationship.

In order to provide some basis for comparison and some background, other instances where Transliminality was measured and analyzed are useful. In a 2005 study, Thalbourne, Keough, & Witt, gave 186 participants in both Australia and the United Kingdom the Transliminality Form B and the Oxford-Liverpool Inventory of Feelings and Experiences. The Oxford-Liverpool Inventory of Feelings and Experiences is a measure of Schizotypal dimensions and was found to correlate 0.78 with Transliminality scores, suggesting that the questionnaires may measure the same phenomena, or that the phenomena all come from the same underlying process.

Another study by Sherwood and Milner (2004-05) found positive and significant correlations ranging from $r = 0.38$ to $r = 0.62$ between scores on the Transliminality Form B and three specific subscales of a questionnaire called Hartman’s Boundary Structure Questionnaire. The boundaries measured by the three subscales that yielded the significant correlations are the boundaries between sleep, waking and dreaming; the boundary between usual and unusual experiences; and the boundaries between thoughts, feelings, and moods, again suggesting that the different questionnaires are measuring similar phenomena.

Thalbourne (1999) also attempted to show a relationship between experienced vividness of visual images and Transliminality using the Transliminality Form B and the Vividness of Visual Imagery Questionnaire. A positive correlation was found but it was not significant, which may, according to Thalbourne, suggest that either the Visual Imagery Questionnaire is flawed, or that Transliminality does not necessarily entail visual imagery at all. This study will explore a similar proposed relationship, only with musical imagery.

Two hypotheses are proposed. First, it is believed that those with a higher degree of Transliminality, as measured by the Transliminality Form B (Thalbourne, 1998), will experience more musical imagery as measured by the Musical Imagery Questionnaire designed for this study. It is also believed that individuals high on the personality factors Openness and Independence will have a higher degree of Transliminality and experience more musical imagery. It is important to note, though, that notwithstanding these hypotheses, this is a pilot study whose main purpose is simply to establish relevant scales for quantifying the presence of musical imagery in individuals.

Method

Participants

Participants were primarily recruited from three groups. Twenty-nine students taking introductory psychology at King's University College at The University of Western Ontario were recruited via a sign-up poster outside of their classroom. Seven individual musicians known to the first author were also recruited, via e-mail, and asked to come to the lab to complete the necessary questionnaires. Finally, data were also collected from 31 students in a second-year business class in the Music Industry Arts program at Fanshawe College in London, Ontario, as well as from their teacher. One of the participants in the Music Industry Arts class was also a musician previously known to the first author. One of the participants from the Music Industry Arts class did not complete all of the necessary questions in his research participation package, and his data were omitted from analysis. Of the 67 participants who completed the questionnaires, 24 (36%) were female, 47 (70%) were musicians, and 21 (31%) identified themselves as singers. Participants' mean age was 21.8 ($SD = 5.3$). All participants were recruited on a volunteer basis and were informed that they were free to withdraw from the study without punishment or prejudice if at any point in time they felt uncomfortable. The introductory psychology students could receive up to 2.5% bonus marks for completing an assignment related to the research, but were also free to withdraw from the study at any time and still receive credit for the written assignment.

Materials

For the introductory psychology students and the musicians that were acquaintances of the researcher, the materials were almost identical. As for the Music Industry Arts students, certain details on the questionnaires needed to be changed due to the nature of the location where the questionnaires were completed and the number of participants who were completing the questionnaires at a given time. Because the introductory psychology students and the musician acquaintances never completed the questionnaires in groups larger than six individuals, it was possible to administer the questionnaires one at a time and collect them before the next questionnaire in the procedure was distributed. The Music Industry Arts class, however, required that the 31 participants complete the questionnaires all at once. It was presumed that like any large classroom, the speed of completion would likely vary from student to student. To accommodate this likelihood, the procedure was adjusted so that instead of verbal directions between each step, participants were given an information sheet with written step-by-step instructions to follow in their completion of the study. Other mundane details were adjusted

within the Musical Imagery Questionnaire to make it relevant across all situations and easily understandable.

Before the study could begin, it was necessary to have participants sign a consent form that indicated that they understood the nature of the study and what would be required of them, with the knowledge that they could withdraw from the study at any time. After giving informed consent, participants were required to complete a brief demographics questionnaire that also contained a few questions referring to their musical imagery at the end. The participants were asked to give information about their sex, age, religious affiliation, languages, and educational history. They were also asked to explain to the best of their ability the music they had listened to in the last half hour (if any), the music that was in their head at the moment (if any) and what sort of relevance they believed this particular music to have to their lives.

After the demographics questionnaire, the participants completed the Six Factor Personality Questionnaire (SFPQ) created by Jackson, Paunonen, and Tremblay (2000). This questionnaire is based on the well known big five factors of personality and the features underlying each of these factors. Jackson, Paunonen, and Tremblay (2000) split one of the five factors (Conscientiousness) into two separate factors (Methodicalness and Industriousness) allowing for a total of six factors. The 108 items on the scale are comprised of three subscales for each of the six factors, with each of the three subscales containing six statement-items.

The six factors and their underlying features are: Extraversion (EX), which consists of affiliation, dominance, and exhibition; Agreeableness (AG), which consists of abasement, even-temperedness, and good-naturedness; Independence (IP), which contains the subscales for autonomy, individualism, and self-reliance; Openness to Experience (OP), which consists of change, understanding, and breadth of interest; Methodicalness (ME), which contains items pertaining to cognitive structure, deliberateness, and order; and Industriousness (IT), which consists of achievement, endurance, and seriousness. The 108 statements are presented in paper form in the SFPQ Question Booklet and responses are recorded by participants on a separate bubble sheet. Participants were asked to respond by circling their response on a five-point Likert scale labeled Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree (Jackson, Paunonen, & Tremblay, 2000). By tearing off the perforated edges and separating the bubble sheet, a hand-scoring answer sheet is revealed on the second page and individuals' scores on all 18 subscales, 6 main scales, and also on Conscientiousness (CS) are easily computed through simple addition. Next, participants were given a paper copy of the Musical Imagery Questionnaire designed for the purpose of this study. The questionnaire begins by asking participants to describe any songs currently playing in their heads, and describe any relevance the songs may have to their lives. Following this subjective description, participants are asked a series of questions regarding their musical experience as fans of music, and as musicians, if applicable. Next, there is a series of 42 Likert-type statements designed to numerically quantify the extent to which an individual experiences musical imagery. Participants are asked to circle where they believe they fit in the seven-point rating scale from Strongly Disagree to Strongly Agree. This questionnaire was factor-analyzed for common themes and dimensions as discussed in detail in the Results section. The final version of the Musical Imagery Questionnaire is given in Appendix A.

Finally, participants were given Thalbourne's Transliminality Scale to discover the extent to which boundaries exist between the participants' conscious and unconscious mind. The Transliminality Scale consists of 29 items. Again, participants were given a paper copy of the questionnaire and required to circle either T (True) or F (False) in response to each of the 29

statements. False items are given no score, and True items are given a score of 1 (Thalbourne, 1998).

Procedure

The introductory psychology participants and the musician acquaintances were brought in groups of up to six into the experimental room where they were asked to sit anywhere they liked. A brief description of the study was given to the participants by the investigator (the first author), and they were asked to read the consent form, ask any questions they might have had, and then sign the consent form if they agreed to the conditions of the study. At each stage, the investigator gave verbal instructions to participants before they were to complete each part of the procedure.

Upon completion of the consent form, participants were asked to fill out a brief demographics questionnaire that also contained questions about their current musical imagery. When this was complete, the Six-Factor Personality Questionnaire (SFPQ) was administered to participants. Participants were instructed not to include any personal information on the bubble answer sheets for the SFPQ but rather to only circle their response to each of the 108 items. They were also instructed not to write inside the SFPQ Question Booklet. Next, they were asked to complete the Musical Imagery Questionnaire designed for this study. Finally, the participants completed the Transliminality Scale, Form B. Introductory psychology participants were then debriefed and thanked for their time and help, and given a letter of information to assist them in the completion of the bonus-related written assignment. Written assignments for bonus credit were collected by the researcher at the completion of the experiment, and a receipt was given in exchange.

For Music Industry Arts participants, the researcher explained the procedure in its entirety to students and went over the instruction sheet with them shortly after handing out the package containing all necessary materials. Participants were encouraged to ask questions throughout the session if anything about the questionnaires was confusing. Upon the completion of their questionnaires, participants handed in their package at the front of the classroom, were given a debriefing form, and were thanked for their participation as they left.

Results

The primary goal of this study was to analyze the characteristics of Spontaneous Musical Imagery (SMI) as experienced by the participants and to develop relevant scales within the psychological construct of SMI as measured by the Musical Imagery Questionnaire created for this study. In order to determine relevant dimensions of SMI, a factor analysis was calculated using principal components method of extraction with a varimax rotation. The factor analysis was run by specifying the number of factors in which questionnaire items were to be categorized. Six separate factor analyses were calculated with the specified number of factors being every number from two through seven. It was discovered that regardless of the number of factors, one group of items came together well, with a few others holding together less well. The analysis that yielded six factors was found to be the most meaningful. Table 1 lists these six factors and their component items.

Table 1. Factor Analysis of Musical Imagery Questionnaire

Item #	Loading	Item
UNCONSCIOUS (UCS)		
M41	.84	I visualize myself making music in my dreams.
M38	.79	Movements of my body corresponding to the music in my head are hard to control and seem to be unconscious.
M40	.75	I hear original music that seems to be new in my dreams.
M42	.71	The music in my dreams parallels my music taste in waking consciousness.
M37	.70	The music in my head is accompanied by movements of my body.
M17	.60	There is always music in my dreams.
M03	.54	Sometimes there is music in my head I have never heard before.
PERSISTENCE (PRS)		
M02	.80	I hear music in my head all the time.
M36	.74	The music in my head continues constantly no matter what I am doing.
M33	.70	I always hear the music in my head even when I am around other people.
M14	.70	The music in my head plays whether I want it to or not.
M01	.56	If I could listen to music at all times, I would.
M29	.55	Pieces of music always pop into my head out of nowhere.
M39	-.44	The music in my head stops when I am around other people.
M13	-.40	I have complete control over the music in my head.
M16	.41	I hear music in my head as soon as I wake up.
ENTERTAINMENT (ENT)		
M07	.71	I listen to the radio a lot of the time.
M08	.68	The music in my head is always upbeat and happy.
M05	.55	The music in my head has lyrical content (words).
M28	.50	The music in my head stops completely when I am occupied with verbal interactions in my daily life.
M39	.49	The music in my head stops when I am around other people.
M06	.46	The music in my head parallels my music taste.
M03	-.48	Sometimes there is music in my head that I have never heard before.
COMPLETENESS (CPT)		
M26	.66	I am good at memorizing lyrics to songs.
M34	.60	I always hear songs in their entirety when they are playing in my head.
M05	.53	The music in my head has lyrical content (words).
M30	-.52	I only hear fragments of songs in my head, never an entire piece of music.
M04	.48	The music in my head has relevance to current issues in my life.

M09	-.44	The music in my head is always down and depressing.
MUSICIANSHIP (MUS)		
M23	.84	I can read music very well.
M24	.80	I have a very extensive background in musical theory.
M25	.62	I am good at memorizing music.
M13	.46	I have complete control over the music in my head.
DISTRACTION (DST)		
M20	.74	The music in my head is often very distracting.
M21	.69	I often find it hard to concentrate at school or work because of the music in my head.
M19	.60	The music in my head is different from the music I listen to in my every day life.
M32	.47	The music in my head is on a continuous and unchanging loop.
M27	.41	The music in my head is at a much higher volume than verbal interactions in my daily life.

Table 1 Note: Factor analysis calculated using principal components method of extraction with a varimax rotation. The rotated factors accounted for 50.76% of the variance.

The first of the six factors contains seven items and seemed to be the most reliable across a number of different factor analyses that yielded different numbers of factors. This factor was titled Unconscious, due to the fact that all of the items grouped in this factor seem to indicate that the individual’s musical imagery either penetrates, or perhaps originates in, her unconscious (more particularly, her dreams). While the item M37 “The music in my head is accompanied by movements of my body” makes no reference to either dreams or to the unconscious, it is important to note that this item did not turn up in any of the other five factors; nor did item M38, which indicates that the bodily movements are hard to control and seem to be unconscious. In other words, only those individuals that claimed to experience unconscious movements even experienced movements at all, and as such, the movements they experience as a result of their imagery seem to be originating from somewhere outside of their conscious awareness. The item that states that some of the music in the individual’s head is music she has never heard before also ended up grouped within this factor. If an individual hears music in her head that she has never heard before, it is reasonable to suppose that it originates from an aspect of herself of which she is unaware.

The second of the six factors was called Persistence, due to the fact that each item describes a property of the participants’ musical imagery that would allow for it to be constant and uncontrollable. This factor contains seven positively correlated items. Two items appearing in this factor as negatively correlated, and they are: “The music in my head stops when I am around other people” (M39) and “I have complete control over the music in my head” (M13). In other words, the individuals that score high on Persistence not only have constant musical imagery, but they are also not in control of it.

The third factor determined by the factor analysis contains six positively correlated items and one negatively correlated item. The first two items are “I listen to the radio a lot of the time” (M07) and “The music in my head is always upbeat and happy” (M08). When one needs to attend to other matters, the music stops, as indicated by the fourth (M28) and fifth (M39) items.

This combination of items suggests that this factor could pertain to the presence of music in one's life as a source of entertainment. Hence this factor was labeled Entertainment.

The positively correlated items of the fourth factor refer to the wholeness of a song, lyrical content, and relevance to an individual's life. Negatively correlated items refer to wholeness of the song, but also to the mood of the song. In other words, it appears that individuals scoring high on this dimension experience entire songs, lyrics included, that have relevance to their life and are happy or upbeat. These individuals are good at memorizing lyrics, so it makes sense that the songs in their head contain lyrics as well. This factor was referred to as Completeness, not only because it seems that the songs are present in the individuals' head in their entirety, lyrics included, but also because the songs seem to have meaning in the context of the individual's life.

The fifth factor discriminated by the factor analysis contains only four items, three of which refer to musical ability and training and a fourth that refers to the extent to which that individual claims to be in control of the music in her head. It seems that individuals who score high on this dimension have a firm grasp and affinity for controlling and manipulating music both in their lives and in their minds. In other words, it would seem that individuals who are musicians are largely able to control the music in their minds as well. This dimension was labeled as Musicianship.

The sixth and final factor was called the Distraction factor since it includes items that both refer directly to the distracting nature of the music in an individual's head, but also to other characteristics of the music that could allow it to be distracting. While M20 and M21 indicate literally that the music is distracting, one could also assume that music stuck in one's head that is contrary to one's musical taste (M19) would be quite distracting, music that keeps looping without every reaching a climax or conclusion would be quite distracting (M32), and finally, music that is louder in one's mind than most other things in their daily interactions (M27) would also be distracting.

After completing the factor analysis, new variables were created by regarding the factors as scales with unit weight given to each item of a factor. A global scale (SMI) was created by taking each item once that appeared in the factor analysis. It became clear by scrutinizing the items that appeared in more than one scale that some scales were opposing each other. Thus, the items in the Entertainment and Completeness scales were reverse scored before they were added to the global scale. In addition, an item analysis was done on the global scale and items reversed as necessary to ensure all items had a positive correlation with the total score. Reliability analysis resulted in the following values for Cronbach's alpha: Unconscious, .87; Persistence, .81; Entertainment, .71; Completeness, .66; Musicianship, .73; and Distraction, .74. The global scale had an alpha value of .85.

These new variables representing the six new scales and the global SMI scale were then correlated with the measures of personality. The correlations are shown in Table 2.

Table 2. Correlations of Spontaneous Musical Imagery Scales with Personality Scales

	TRN	EX	AG	IP	OP	ME	IT	CS	UCS	PRS	ENT	CPT	MUS	DST	SMI
TRN		-.19	.00	.16	.15	.15	.09	.14	.49**	.27*	-.36**	-.16	-.07	.42**	.46**
EX	-.19		-.10	-.29*	.17	-.10	-.01	-.07	-.21	-.02	.32**	.32**	-.02	-.05	-.16
AG	.00	-.10		.18	.04	-.10	.06	-.03	.15	-.19	-.14	-.33**	-.09	-.11	-.09
IP	.16	-.29*	.18		.20	-.28*	-.13	-.24*	.23	-.05	-.45**	-.35**	.10	.10	.18
OP	.15	.17	.04	.20		-.17	.24	.02	.01	-.23	-.18	.04	.10	.00	.00
ME	.15	-.10	-.10	-.28*	-.17		.47**	.89**	.08	.10	.00	.18	.08	.07	.13
IT	.09	-.01	.06	-.13	.24	.47**		.83**	-.07	.08	-.09	.02	.20	.00	.13
CS	.14	-.07	-.03	-.24*	.02	.89**	.83**		.09	.11	-.05	.12	.16	.04	.15
UCS	.49**	-.21	.15	.23	.01	.08	-.07	.09		.41**	-.25*	-.05	.21	.36**	.76**
PRS	.27*	-.02	-.19	-.05	-.23	.10	.08	.11	.41**		-.22	.12	.17	.44**	.77**
ENT	-.36**	.32**	-.14	-.45**	-.18	.00	-.09	-.05	-.25*	-.22		.62**	-.04	-.10	-.34**
CPT	-.16	.32**	-.33**	-.35**	.04	.18	.02	.12	-.05	.12	.62**		.06	.04	.10
MUS	-.07	-.02	-.09	.10	.10	.08	.20	.16	.21	.17	-.04	.06		.13	.42**
DST	.42**	-.05	-.11	.10	.00	.07	.00	.04	.36**	.44**	-.10	.04	.13		.65**
SMI	.46**	-.16	-.09	.18	.00	.13	.13	.15	.76**	.77**	-.34**	.10	.42**	.65**	

Table 2 Note: Correlations marked with two asterisks are statistically significant at $p < .01$ (two-tailed); correlations marked with one asterisk are statistically significant at $p < .05$ (two-tailed).

The highest correlation of spontaneous musical imagery scales with personality scales occurred between the Unconscious and Transliminality scales ($r(65) = .49, p < .001$). Transliminality was also significantly correlated with the global scale ($r(65) = .46, p < .001$), Distraction ($r(65) = .42, p < .001$), and Persistence of musical imagery ($r(65) = .27, p < .05$). A negative correlation ($r(65) = -.36, p < .005$) was found between Entertainment and Transliminality. Smaller correlations were found between musical imagery scales and some of the standard personality scales and, not surprisingly, there were numerous intercorrelations between the scales of spontaneous musical imagery.

A multivariate analysis of variance (MANOVA) was computed to determine if there were any differences due to individual independent dichotomous factors such as sex, instrumental musicianship, or being a singer. The only significant difference was found for instrumental musicianship ($F_{6,54} = 3.21, p < 0.01$), although sex was close to being significant as well ($F_{6,54} = 1.74, p = 0.13$). Upon closer inspection, the differences for instrumental musicianship lie on the Musicianship dimension of spontaneous musical imagery. Instrumental musicians scored significantly higher ($M = 16.3, SD = 5.0$) on Musicianship than non-musicians ($M = 10.5, SD = 3.8; F_{1,59} = 14.98, p < .001$). This finding is not surprising, as the Musicianship dimension contains items that refer to training in music and control over one’s musical imagery – characteristics that are likely to be possessed by musicians. Other than these findings, there were no significant differences between sexes, instrumental musicians and non-musicians, or singers and non-singers.

Discussion

The factor analysis for the items on the Musical Imagery Questionnaire yielded some interesting results. The Unconscious dimension is quite straightforward, in that all of the items that fell within that category have something to do with the unconscious. Similarly, the

Persistence dimension is also a logical collection of items pulled together from the questionnaire. The data become interesting for the middle two factors of the six.

The Entertainment factor is intriguing because it seems that the individuals who score high on this dimension only experience musical imagery in the absence of any other stimuli requiring cognitive attention. Moreover, the musical imagery that they experience in these instances consists of songs they have heard before and songs that they like. Perhaps this musical imagery simply serves to keep the mind occupied and entertained in the absence of other tasks requiring concentration.

The next factor, Completeness, was initially going to be referred to as the Coping factor, because it was thought that if the music has relevance to the individual's life, and it is happy, it is likely that it is being played in that individual's head to compensate for something in her life. However, it is also quite possible that the music in the individual's head is happy in reaction to a positive life event, not necessarily a negative one. It was then briefly thought that this factor should be referred to as Reactionary, because it seems that the songs in these individuals' heads (and they *are* full songs) are there for a reason. The fact that the songs have lyrical content, are relevant, and the individuals are adept at noticing their lyrics leads one to believe that the message of the song is the reason for its presence in their minds. Regardless of these psychodynamic speculations, the only thing known for certain is that these individuals seem to experience entire songs – lyrics included – from start to finish; and it is for this reason that this dimension is referred to as Completeness.

It is interesting to note that in the factor analysis that yielded only five dimensions, select elements of both the Entertainment and Completeness factors were grouped into a single factor. It was eventually decided that six factors made more sense, primarily due to the items appearing in the other four factors. The nature of the musical imagery in both of the new dimensions (Entertainment and Completeness) appears to be purposive and at least slightly conscious. In other words, the particular song in the individual's head at any given moment seems to be there for a reason and the individual seems to be aware of that reason as indicated by her responses to the items on the questionnaire. Entertainment and Completeness correlated with each other positively and significantly as well.

Another interesting finding is that the higher an individual scored on Transliminality, the higher she scored on the Persistence and Distraction dimensions, and the lower she scored on the Entertainment dimension. In other words, the more permeable the “membrane” is between her conscious and unconscious, the more distracting and more persistent is her spontaneous musical imagery. This lends further credibility to the hypothesis that musical imagery such as that found in Steven Brown's Perpetual Music Track might be streaming from the unconscious, at least to a certain extent. The large positive correlation between Transliminality and the Unconscious scale of the Musical Imagery Questionnaire supports this hypothesis as well. This will be discussed in further detail below.

The less independent an individual is, or the more extroverted she is, the higher she scored on the Entertainment dimension. That is, the individuals that are extroverted, and those who not very independent seem to have purposive musical imagery present in the absence of other pressing cognitive stimuli. In addition, the less agreeable or less independent an individual is, or the more extroverted she is as determined by the SFPQ, the more likely she is to experience musical imagery characterized by Completeness, that is to say, musical imagery that seems to be both purposive and reactionary. It could be that the musical imagery that occurs for these individuals is elicited by the events in their lives.

It is important to note, however, that although the Musical Imagery Questionnaire was designed to help determine the extent to which an individual experiences SMI, its other purpose was simply to determine the characteristics of SMI. Thus, a number of the items in the questionnaire and the aforementioned dimensions reflect that purpose. For example, items “I am good at memorizing music” (M25) and “The music in my head has lyrical content (words)” (M05) do not necessarily have anything to do with the extent to which an individual experiences this imagery, at least in the traditional sense, whereas items such as “I hear music in my head all the time” (M02) and “The music in my head continues constantly no matter what I am doing” (M36) do. It is possible that “extent” could be used in a broader way, that is, being musically trained increases the extent to which musical imagery in general, and not necessarily just the spontaneous kind, permeates one’s life in a broad sense. Regardless of the specific interpretation of the word “extent,” due to the nature of these items, simply adding together all of an individual’s scores on the items of the Musical Imagery Questionnaire would yield a total SMI score that cannot be described in a concise fashion; it is about all aspects of spontaneous musical imagery addressed by the questionnaire. In some of the above analyses, scores on the individual scales were used, as were scores on the global measure of SMI. But while convenient, this global measure may not necessarily be meaningful; despite the fact that the Cronbach’s alpha is 0.85.

Some interesting findings were produced by this study, but as with any study there are limitations. The sample size was only 67 participants. That said, analyses were run when only 33 participants had completed the questionnaires, and at that time, the factor analysis grouped pretty much the same items together, yielding underlying dimensions that were titled the same as the ones that emerged in the final analysis. Thus, these dimensions appear to be fairly robust, but larger sample sizes are needed to confirm that speculation. While it could be argued that the ratio of participants to items was too small for factor analysis, hierarchical cluster analyses, which are not subject to the same constraints, yielded nearly identical results. Furthermore, the selection of the scales of the MIQ could have been arbitrary but are nonetheless determined to be identifiable psychological constructs because of their good internal consistency as measured by Cronbach’s alpha.

In addition to the sample size being relatively small, the sample was also comprised of undergraduate university and college students; hardly a sample representative of the general population. The small sample size was due to both time constraints, and the fact that it was an undergraduate research thesis that primarily relied on a pool of first year psychology students that was split between all of the honours students compiling data for a thesis. The high percentage of musicians may be due to the fact that those who are already musically inclined would be more likely to choose to volunteer for a study that focused on musical imagery. The high percentage is also due to the convenience sampling that took place, that is, researchers were granted access to the students of a music program for which musicianship is a great asset, although not a prerequisite. Perhaps in further studies with the MIQ with more participants, differing factor structures between musicians and non-musicians could be found.

Suggestibility and honesty are two further concerns. It could be argued that by simply asking participants to describe the music in their heads, researchers were unintentionally putting music into the heads of more suggestible individuals that was not there in the first place. Researchers were careful to emphasize the importance of honesty, but this would not account for nonconscious suggestibility. Two participants, showing great insight and honesty, actually responded that they did not have music in their heads until they read the question. Interestingly, and to the contrary, one participant actually responded that “by thinking about [the music in my

head], i.e., ‘noticing it’, it went away.” In addition, 27% of participants responded that they had absolutely no music in their heads, and 21% of participants stated that they had music in their heads, but admitted that it was music that they had heard within the last thirty minutes. The remaining 52% of participants are those who, presumably, had unprovoked musical imagery at the time of questioning. However, in any questionnaire it is difficult to control for the suggestibility of individuals when reading certain questions short of excluding the questions. The way people are naturally as individuals is our baseline and perhaps suggestibility (and more specifically suggestibility to music) is something that needs to be measured and correlated with the scales of the MIQ in future studies of spontaneous musical imagery.

As with any study, there is also the likelihood of individuals not answering questionnaires as truthfully as possible. In this study the main concern is regarding the Transliminality Form B. Due to the out-of-the-ordinary nature of the items, one can see how college and university students might be tempted to respond to these items in a joking fashion. Perhaps in future studies on this topic, other means of measuring one’s relationship with her unconscious would be less sensitive to this type of problem. Questionnaires assessing daydreaming styles, suggestibility, or even hypnotic susceptibility, for example, could be more valid.

Furthermore, there were some problems inherent in the questionnaire that may have skewed the data and affected the MANOVA. More significant differences were expected between musicians and non-musicians and perhaps the reason that the expected differences were not observed is that, when coding for instrumental musicianship, the researcher did not take into consideration the extent to which participants were musicians. That is, a number of individuals indicated that they were musicians, but when asked how often per week they practiced, they indicated that they did not practice at all.

The ambiguity of all three of the “Musician”, “Singer”, and “Fan of Music” titles that participants were asked to assign (or not assign as the case may be) to themselves is a concern. Participants often questioned what their responses should be if they were classically trained in a certain instrument but no longer played or owned that instrument, or how they should respond if they took voice lessons but currently only sing in Karaoke bars when out with friends, for example. In each instance, researchers responded by asking participants to respond positively if they still felt like a musician or singer and negatively if they no longer felt as though they were a musician or singer. Perhaps in future revisions of the MIQ, a more comprehensive series of questions and scales to ascertain individuals’ skill levels and frequencies of practice could be implemented. For the present study, however, these data were not used as exclusionary criteria to omit any other data gathered from participants. Aside from the finding that individuals who identified themselves as musicians tended to score higher on the Musicianship dimension of the MIQ (a finding that was easily predicted), these data were not critical in any way. In future studies, clarifications like this would need to be made and perhaps instrumental musicianship and singing should become ordinal variables rather than dichotomous Yes or No response items.

Transliminality, as described above, encapsulates a wide variety of phenomena including superstition, imagination, altered states of consciousness, precognition and other apparent psychic abilities, mystical experiences, and dreams. The hypothesis that higher levels of Transliminality could be related to a greater amount of musical imagery is partially supported by the correlations between Transliminality and the Unconscious dimension of the MIQ. It was also partially supported by similar correlations that both of these measures have with the Persistence, Entertainment, and Distraction dimensions. If, as the evidence suggests, spontaneous musical imagery is associated with music crossing a “membrane” into conscious awareness, it follows

logically that SMI could be coming from the same unconscious part of our psyche as the phenomena comprising the Transliminality Scale.

Undoubtedly, more research needs to be done to confirm these ideas. However, not only did Transliminality and the Unconscious dimension of the MIQ correlate positively and significantly with each other, but they each also correlated significantly with all three dimensions of Persistence, Entertainment (negatively), and Distraction. This means that both individuals who scored high on the unconscious dimension, and individuals who scored high on Transliminality are more likely to experience constant, uncontrollable, often undesirable, and spontaneous musical imagery that is loud, continuous, often contrary to one's music taste, and distracting to the point that it is hard to concentrate. Both Transliminality and the Unconscious dimension of the MIQ correlated negatively with the Entertainment dimension of the MIQ, a dimension that is possessed by radio-listeners and characterized by an upbeat nature, lyrical content, familiarity, enjoyment, and a degree of control.

Without allowing this discussion to become too eccentric, it seems plausible that individuals who scored high on both Transliminality and the Unconscious dimension of SMI have some access to their unconscious. It is at least conceivable that if it is possible to experience musical imagery emanating from the unconscious, it is also possible to experience all of the other phenomena that comprise Transliminality. Perhaps all human beings' consciousnesses have the capacity to experience such phenomena, but some individuals, whether innately or purposefully, are more susceptible to them than others.

In sum, in this study the authors were able to find what seem to be six relatively robust dimensions underlying the psychological construct of spontaneous musical imagery. Although the predicted findings regarding personality dimensions of Independence and Openness to Experience were not validated, the other hypothesis did receive some support. It seems that the more interaction an individual has with her unconscious, the more distracting, persistent, and unconscious her spontaneous musical imagery is. Further testing of these hypotheses, using a larger sample size and a more specific version of the Musical Imagery Questionnaire, is recommended to build on these data.

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Appendix A

MUSICAL IMAGERY QUESTIONNAIRE

If there is any music in your head right now, please describe it. Please be as detailed as possible:

Describe any relevance (emotionally, thematically or lyrically) the music described above has to your life (if any). Again, please be as specific as possible:

I. MUSICAL HISTORY

1. I am an instrumental musician. YES NO

- IF NO, PROCEED TO QUESTION 2
- IF YES: Instruments I play:

i. I sometimes make unconscious movements that mimic those I make when playing my instrument(s) in the absence of my instrument(s). YES NO

Explain:

ii. I began playing my instrument(s) at age: _____

iii. I have had _____ years of formal training on my instrument(s).

iv. I compose my own music in my head in the absence of my instrument(s).

v. I play my instrument(s) _____ (time) per week (be sure to indicate hours and/or minutes).

vi. I have performed music publicly YES NO

Explain:

2. I am a singer. YES NO

- IF NO, PROCEED TO QUESTION 3
- IF YES:

i. I began singing at age: _____

ii. I have had _____ years of formal voice training:

iii. I sing _____ (time) per week (be sure to indicate hours and/or minutes).

iv. I have performed in public YES NO

Explain:

3. I am a fan of music YES NO

- IF YES: Genres I listen to (list):

i. I listen to music _____ (time) per day (be sure to indicate hours and/or minutes).

II. MUSICAL IMAGERY

RATE THE FOLLOWING ITEMS FROM (1) STRONGLY DISAGREE TO (7) STRONGLY AGREE: IF YOUR RESPONSE IS NEUTRAL, CIRCLE (4). Please CIRCLE the appropriate response

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		STRONGLY DISAGREE				STRONGLY AGREE			
1.	If I could listen to music at all times, I would.	1	2	3	4	5	6	7	
2.	I hear music in my head all the time.	1	2	3	4	5	6	7	
3.	Sometimes there is music in my head that I have never heard before.	1	2	3	4	5	6	7	
4.	The music in my head has relevance to current issues in my life.	1	2	3	4	5	6	7	
5.	The music in my head has lyrical content (words).	1	2	3	4	5	6	7	
6.	The music in my head parallels my music taste.	1	2	3	4	5	6	7	
7.	I listen to the radio a lot of the time.	1	2	3	4	5	6	7	
8.	The music in my head is always upbeat and happy.	1	2	3	4	5	6	7	
9.	The music in my head is always down and depressing.	1	2	3	4	5	6	7	
10.	The music in my head is largely high-pitched.	1	2	3	4	5	6	7	
11.	The music in my head is very low and heavily bass-dominated.	1	2	3	4	5	6	7	
12.	The music comes from somewhere outside my conscious awareness.	1	2	3	4	5	6	7	
13.	I have complete control over the music in my head.	1	2	3	4	5	6	7	
14.	The music in my head plays whether I want it to or not.	1	2	3	4	5	6	7	
15.	The music in my head is always songs that I have recently heard.	1	2	3	4	5	6	7	
16.	I hear music in my head as soon as I wake up.	1	2	3	4	5	6	7	
17.	There is always music in my dreams.	1	2	3	4	5	6	7	
18.	The music in my head is always triggered by something happening in the environment around me.	1	2	3	4	5	6	7	
19.	The music in my head is different from music that I listen to in my every day life.	1	2	3	4	5	6	7	
20.	The music in my head is often very distracting.	1	2	3	4	5	6	7	
21.	I often find it hard to concentrate at school or work because of the music in my head.	1	2	3	4	5	6	7	
22.	I daydream often.	1	2	3	4	5	6	7	
23.	I can read music very well.	1	2	3	4	5	6	7	
24.	I have a very extensive background in musical theory.	1	2	3	4	5	6	7	
25.	I am good at memorizing music	1	2	3	4	5	6	7	
26.	I am good at memorizing lyrics to songs.	1	2	3	4	5	6	7	
27.	The music in my head is at a much higher volume than verbal interactions in my daily life.	1	2	3	4	5	6	7	
28.	The music in my head stops completely when I am occupied with verbal interactions in my daily life.	1	2	3	4	5	6	7	
29.	Pieces of music always pop into my head out of nowhere.	1	2	3	4	5	6	7	
30.	I only hear fragments of songs in my head, never an entire piece of music.	1	2	3	4	5	6	7	
31.	If asked at any time, I could accurately describe the music playing in my	1	2	3	4	5	6	7	

	head.							
32.	The music in my head is on a continuous unchanging loop.	1	2	3	4	5	6	7
33.	I always hear the music in my head even when I am around other people.	1	2	3	4	5	6	7
34.	I always hear songs in their entirety when they are playing in my head.	1	2	3	4	5	6	7
35.	I sometimes find myself singing aloud the music that is playing in my head.	1	2	3	4	5	6	7
36.	The music in my head continues constantly no matter what I am doing.	1	2	3	4	5	6	7
37.	The music in my head is accompanied by movements of my body.	1	2	3	4	5	6	7
38.	Movements of my body corresponding to the music in my head are hard to control and seem to be unconscious.	1	2	3	4	5	6	7
39.	The music in my head stops when I am around other people.	1	2	3	4	5	6	7
40.	I hear original music that seems to be new in my dreams.	1	2	3	4	5	6	7
41.	I visualize myself making music in my dreams.	1	2	3	4	5	6	7
42.	The music in my dreams parallels my music taste in waking consciousness.	1	2	3	4	5	6	7

43. If any general conditions in your daily life enhance or disrupt the music in your head, please describe them in as much detail as possible:

44. If there is any music in your head right now, please describe it. Please be as detailed as possible. Please respond even if the response is the same as when you were previously asked, and do not flip back to the original question:

45. Describe any relevance (emotionally, thematically or lyrically) the music described above has to your life (if any). Please be as detailed as possible. Please respond even if the response is the same as when you were previously asked, and do not flip back to the previous questions:
