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Temperament traits and preferences of music works with specific musical elements

Streszczenie

Celem badania było sprawdzenie związków pomiędzy cechami temperamentu wyodrębnionymi przez Pawłowa a preferencjami utworów składających się z określonych elementów muzycznych. W badaniu wzięło udział 145 studentów, w wieku 19-26 lat. W celu określenia cech temperamentu badani wypełnili Kwestionariusz Temperamentu PTS. W celu określenia preferowanego utworu badani wypełnili Kwestionariusz Preferencji Muzycznych. Analiza statystyczna wykazała, że wszystkie cechy temperamentu wyodrębnione przez Pawłowa wykazują związek z określonymi elementami zawartymi w utworach muzycznych preferowanych przez badanych. Elementy, które okazały się istotne w badaniu to: tempo, zmiany tempa, wartości rytmiczne w stosunku do podstawy metrycznej, liczba tematów melodycznych, obsada wykonawcza i metrum. Uzyskane wyniki są zgodne z badaniami pokazującymi wpływ cech temperamentu (związanych z zapotrzebowaniem na stymulację) na preferencje muzyczne.

Słowa kluczowe

cechy temperamentu, zapotrzebowanie na stymulację, preferencje muzyczne, elementy muzyczne

Abstract

The objective of the research was to check the relationship between temperament traits as classified by Pavlov and preferences for works of music containing specified musical elements. 145 students aged 19-26 took part in the study. The respondents completed the Pavlovian Temperament Survey and a Music Preferences Form. Statistical analysis showed that all the temperament traits classified by Pavlov were related to musical elements contained in the subjects' chosen pieces of music. The following proved to be significant in regard to the subjects' musical preferences: Tempo, Changes in Tempo, Rhythm Values in Relation to Metrical Basis, Number of Melodic Themes, Scale of Performance, and Meter. The results are consistent with studies indicating the impact of temperament traits (related to the need for stimulation) on music preferences.

Key words

temperament traits, need for stimulation, music preferences, musical elements

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Introduction

Temperament traits play an important role in the psychic life of the individual; they constitute the biological basis for the development of the personality, and also determine formal characteristics of behavior (Strelau, 2001). In several of the concepts of temperament (see Eysenck & Eysenck, 1985; Strelau, 2001; Strelau & Angleitner, 1991, 1994; Zuckerman, 1979, 1984, 1994), it is emphasized that temperament traits determine an individual's need for stimulation and are responsible for regulating stimulation. Studies have shown that individuals who have a high need for stimulation prefer highly stimulative actions and situations, while those with a low need for stimulation prefer actions and situations of low stimulative value (Strelau, 2001; Strelau & Zawadzki, 1998; Zuckerman, 1979, 1984, 1994). Studies on the relationship of temperament traits (linked with the need for stimulation) and musical preferences show similar relationships. Research into Eysenck's extraversion dimension (1970) shows that extroverts (who have a greater need for stimulation) compared to introverts (who have a lesser need for stimulation), more frequently prefer kinds and dimensions of music that are highly rhythmic, energetic, gregarious, and socially exciting (Dollinger, 1993; Miranda & Claes, 2008; Miranda, Morizot & Gaudreaut, 2010), and thus pop, country, electronica/dance, rap, hip hop, and R&B music (Delsing, Ter Bogt, Engels & Meeus, 2008; Miranda & Cleas, 2008; Rawlings & Ciancarelli, 1997; Rentfrow & Gosling, 2003, Zweigenhaft, 2008). Extroverts also prefer listening to music with an exaggerated bass (McCown, Keiser, Mulhearn & Williamson, 1997). Music as a stimulative medium may support the cognitive functioning of extroverts and depress the cognitive functioning of introverts (Furnham, Trew & Sneade, 1999). Many studies show that, while listening to music, extroverts perform cognitive tasks (Daoussis & McKelvie, 1986; Furnham & Allass, 1999) and creative tasks (Chamorro-Premuzic, Swami, Terrado & Furnham, 2009) better than introverts. Research by Crawford & Strapp (1994) also shows that individuals who more frequently listen to music while studying are in fact extroverts.

Aside from the research into extroversion, several studies have been carried out into the relationship between Zuckerman's Sensation Seeking dimension (1979)² and music preferences. Studies have shown that this trait is positively correlated with preferences for rock, heavy metal and punk music, while being negatively correlated with preferences for film music and religious music (Litle & Zuckerman, 1986). Sensation Seeking is therefore positively correlated with highly arousing music (McNamara & Ballard, 1999).

² Sensation Seeking is a "*trait characterized by the need for varied, novel and complex sensation and experience, and the willingness to take physical and social risks for the sake of such experience*" (Zuckerman, 1979, p. 313).

Research undertaken by the author of this article (Kopacz, 2005) has shown that links also exist between personality traits isolated by Cattell (mainly those classified by Cattell as temperament traits), and preferences for works with a specific stimulative value. Individuals who have higher scores on the following scales: C (Emotional Stability), E (Dominance), F (Liveliness), H (Social Boldness), I (Sensitivity), L (Vigilance), O (Apprehension), Q3 (Perfectionism), Q4 (Tension), and Extroversion (second-order factor), prefer works of music with faster tempos, shorter rhythm values in relation to the metrical basis, containing a greater number of melodic themes, a greater scale of performance and with a more irregular meter. The musical elements described above possess stimulative value and are capable of regulating the individual's need for stimulation.

In the current study, the intention was to check the influence of Pavlovian temperament traits on music preferences. Although Pavlov's concept arose about 75 years ago, it continues to enjoy popularity among biologically-oriented researchers into personality (Claridge, 1985; Eysenck, 1970; Managan, 1982; Strelau, 2006; Zuckerman, 1979, 1991). Some researchers emphasize (Strelau & Zawadzki, 1998) that in the process of an individual's adaptation to his or her environment a significant role is played by those temperament traits classified by Pavlov, namely: Strength of Excitation (SE), Strength of Inhibition (SI) and Mobility of Nervous Processes (MP). The theoretical basis, together with a precise description of the traits mentioned can be found in "The Pavlovian Temperament Survey (PTS)" (Strelau & Zawadzki, 1998; Strelau, Angleitner & Newberry, 1999). This article provides only a short functional description of these traits. People with high SE have a tendency towards activity in highly stimulative conditions. They prefer to undertake risky, demanding activities and, in situations where they undertake longterm or intensive activity, they are characterized by high resistance to fatigue. For them, social and physical strain does not give rise to emotional disturbance; under conditions of emotional strain, their reaction is appropriate to the needs of the situation. Such people are emotionally balanced, and are characterized by low levels of fear and dissatisfaction. They are active, social and they show a tendency to seek out experiences. People with low SE have precisely the opposite characteristics. People with high SI are characterized by increased self-control. They abstain with ease from behaviors that are not in accordance with societal expectations and also have no difficulty in postponing task fulfillment, if this proves necessary. They have the ability not to reveal their emotions, should this be required. They are conciliatory, conventional in their behavior and conformist. They also display considerable conscientiousness and task orientation. They are not prone to rivalry nor to irascibility. People with low SI have precisely the opposite characteristics. People with high MP react appropriately to unexpected changes in their environment and are characterized by rapid adaptation to new surroundings (physical and social). They

move easily from one activity to another and function effectively under conditions requiring variable types of reaction; they easily make new acquaintances. They seek variety as opposed to monotony and, in this sense, they look for stimulation. Their mood can easily change from positive to negative and vice versa. People with low MP have precisely the opposite characteristics to these (Strelau & Zawadzki, 1998; Strelau et al., 1999).

From the theoretical point of view, and also for practical reasons, it is important to show which of the temperament traits isolated by Pavlov are associated with other constructs of temperament. Research using EPQ-R (Eysenck, Eysenck & Barret, 1985) showed that Extroversion is moderately positively correlated with SE and MO, but does not display a link with SI. Neuroticism displays weak negative correlations with SE, SI and MO. On the other hand, Psychoticism shows weak correlations with SE and SI, and also a lack of correlation with MO (Strelau & Zawadzki, 1998; Strelau et al., 1999). A further construct, Sensation Seeking, measured using the Sensation Seeking Scale – Form V (SSS-V, Zuckerman, 1979), is also correlated with Pavlov's constructs. All the SSS-V scales correlate moderately positively with SE and to a slightly lesser degree with MO. On the other hand, the SI scale displays a very weak negative correlation with all the SSS-V scales (Strelau & Zawadzki, 1998; Strelau et al., 1999).

Considering the studies presented above, it was assumed that the Pavlovian temperament traits are associated with preferences for music of a certain stimulation value through which an individual can regulate their need for stimulation. This assumption was initially confirmed in an unpublished study conducted by Rudak (1995).

The present musical-preferences research has been based on the premises of cognitive psychology in the field of the recognition and perception of music. Sloboda (1985) emphasizes that music perception is dependent on the perception of musical elements and takes place according to specific rules, similarly to speech perception according to psycholinguistic theories. "*Music is built in accordance with certain rules of grammar. Concepts such as tonality, meter, rhythm, used by musicians, exist in our mind, and we use them to give meaning to the music. Communication capability exists because of the fact that the various processes associated with the composition, and the perception embodiment, refer to the same representation*" (Sloboda, 1999, p. 41). If we wish to understand a work of music, we must subject it to structural analysis in accordance with the rules of representation theory, which are common to composers, performers and listeners (Sloboda, 1985).

In the present study it was also posited that the specified musical elements possess a particular stimulative value, and that their appropriate configuration gives rise to the stimulative value of the entire work of music. These musical elements include (Chominski & Wilkowska–Chominska, 1983; Rudak, 1995; Sadie & Tyrrell, 2001): Tempo, Changes in Tempo, Rhythm Values in Relation to Metrical Basis, Number of Melodic Themes, Scale of Performance, Meter, Changes in Dynamics, Musical Scale, and Melodic-Line Instrument Timbre³. Summing up, the stimulative value of a piece of music is determined by: faster tempos, greater changes in tempo, smaller rhythmic values in relation to the metrical basis, a larger number of melodic themes, a greater scale of performance, irregular meter, more rapid changes in dynamics, and the specific musical scale and timbre of the instrument leading the melodic line⁴.

On the basis of the above considerations, hypotheses were formulated regarding the relationships between Pavlovian temperament traits and preferences for works containing specific musical elements. It was assumed that higher SE individuals prefer works of music with faster tempos, greater changes in tempo, smaller rhythmic values in relation to the metrical basis, a larger number of melodic themes, a greater scale of performance, irregular meter, more rapid changes in dynamics, and the specific musical scale and timbre of the instrument leading the melodic line. Since SE is correlated with MO (Strelau & Zawadzki, 1998), it was assumed that MO has a similar relationship with music preferences.

Method

Participants

145 randomly chosen students in higher education in Poland (Wrocław University, Wrocław University of Economics, Wrocław University of Science and Technology, Rzeszów University of Science and Technology) participated in this study. The age range was 19-26 (M = 21,16; SD = 1,54), and the sample consisted of 85 female and 60 male subjects. The participants declared that they enjoyed listening to music and that they did not possess a professional musical education. The emphasis in the selection regarding musical education was designed to create a group that was homogenous with regard to their overall perception of music, and so to eliminate the analytical music listening abilities characteristic of those who have had a professional education in music. The participants also declared that they did not identify with any subculture group (e.g. rave or punk). This

³ In the analysis of musical pieces, many musical elements and their configuration can be defined. However, in the current study only those elements that may be associated with the stimulation value of music were selected.

⁴ It was assumed that musical scales and the timbre of instruments which are rarely used in popular music have a greater stimulation value than scales and instruments that are known. This may probably be because the presence of a new stimuli enhances cognitive activity required for their perception.

is significant since in such groups music can fulfill a specific role – one which is not the subject of this research.

Measurement

The Pavlovian Temperament Survey (PTS; Strelau & Zawadzki, 1998) was used to measure temperament traits. The questionnaire consists of 57 statements to which the respondent provides answers on afour point scale (from "definitely agree" to "definitely disagree"). The PTS includes three basic scales: Strength of Excitation (SE), Strength of Inhibition (SI) and Mobility of Nervous Processes (MO). On the basis of the SE and SI scores, it is possible to designate a score on the Balance of Nervous Processes (BA) scale. Since BA is a second-order trait and one which can only be arrived at through a comparison of the SE and SI scores, it was not included in the research. The reliability of the PTS scales are: $\alpha = .8$ for the SE, $\alpha = .71$ for the SI, and $\alpha = .83$ for the MO. The high validity of the questionnaire was demonstrated based on the correlation of the PTS results with other tools used to measure temperament and personality, based on research on genetic predisposition traits measured by the PTS and factor analyses.

For the measurement of elements comprising the structure of the works of music, the Music Preferences Form (Appendix 1) – developed for the purposes of this research – was used, together with descriptive musical analysis. The Music Preferences Form consists of instructions together with a section where the subject filled in details of his or her favorite piece of music: title, performer, composer (in the case of classical music), as well as the title of the CD on which it could be found. The Form also contained a list of factors which potentially influenced the selection of the favorite work. The subject indicated those factors which they considered to have had an influence on their selection of that work.

Descriptive musical analysis was also employed in the research. It was based on the assignment of specific parameters from each of nine musical categories to each work selected by the subjects, and was carried out by three competent judges (professionally trained musicians). The musical categories were isolated by the author on the basis of her own research and also on the literature from the field (Chomiński, & Wilkowska–Chomińska, 1983; Kopacz, 2005; Rudak, 1995; Sadie & Tyrrell, 2001). Some of the categories emerged following the collection of all the works chosen by the subjects and were modified in such a way as to be appropriate for the analysis of those works. The following categories were isolated:

1. Tempo (measured using a metronome): (a) slow (less than 60 beats per minute), (b) moderate 60 – 100 beats per minute), (c) fast (more than 101 beats per minute);

- Changes in Tempo (based on increases or decreases within individual musical phrases or sections): (a) no changes in tempo, (b) moderate changes (changes within sections of the work), (c) frequent changes (changes within musical phrases);
- 3. Rhythm Values in Relation to Metrical Basis: (a) predominance of rhythm values longer than the metrical basis, (b) predominance of rhythm values equal to the metrical basis, (c) predominance of rhythm value shorter than the metrical basis;
- Number of Melodic Themes over the course of the work: (a) small number and distribution of melodic themes approximating to the structure of the main sections of the work (e.g. stanzas, refrains), (b) large – a variety of melodic themes within individual sections of the work;
- 5. Scale of Performance: (a) small (one or two instruments/voices, excluding those such as a piano, an organ or electronic instruments, if employing a broad sound spectrum within the work in question), (b) medium (ranging from three instruments/voices playing together to the sound spectrum characteristic of a chamber orchestra), (c) large (characteristic of groups of electrical, electronic instruments and loud mass percussion, and also a symphony orchestra, piano or organ employing the full sound spectrum of those instruments);
- 6. Meter: (a) triple time, (b) duple or quadruple time, (c) asymmetric time (e.g. 5/4, 7/4), (d) lack of meter (free time), (e) polymetric and other;
- 7. Changes in Dynamics over the course of the work⁵: (a) lack of change, (b) gradual increases or decreases in volume over the course of the work, (c) use of fixed levels of dynamics for individual sections of the work, with changes in levels of dynamics occurring abruptly between one section and another;
- Musical Scale: (a) modal, (b) chromatic major or/and minor, (c) whole-tone, twelvetone scale, (d) other scales (gypsy scale, blues scale, etc.);
- Melodic-Line Instrument Timbre (instruments/voices selected by the participants were included in this category, as a result of which the composition of this category emerged after the collection and analysis of the pieces)⁶.

As a result of the musical analysis carried out, each of the pieces of music was described in terms of a combination of nine musical elements: Tempo, Changes in Tempo, Rhythm Values in Relation to Metrical Basis, Number of Melodic Themes, Scale of Performance, Meter, Changes in Dynamics, Musical Scale, Melodic-Line Instrument Timbre.

⁵ It was not possible to objectively determine the volume level of the piece being listened to for each subject, since subjects only entered information regarding their favorite work of music on the Form.

⁶ Establishing the composition of the category prior to undertaking the musical analysis was problematic due to the vast numbers of instruments occurring in the musical literature.

Procedure

The study was carried out over a one-month period at the following Polish universities: Wroclaw University, Wroclaw Technical University, Wroclaw School of Economics, and Rzeszów Technical University. The testing took place in lecture rooms of the above academic institutions, in the morning hours and in daylight. Testing was carried out in groups, with each group numbering about 20 people.

A few days before the start of testing, the participants were informed of its objective, and also how it would be done. The subjects received the following information: The objective of the research is to check whether a person's personality influences the type of music he or she likes to listen to. The testing consists of choosing a favorite piece, one that is listened to very often and in a wide variety of situations - irrespective of music fashions – and providing information regarding it (title, performer or composer – in the case of classical music - or even a recording of the piece, if no information whatsoever is known about it) and also completing a personality questionnaire. Those taking part in the research expressed their agreement to do so. Prior to the start of testing, the students were also asked whether they identified with or belonged to any subculture group (e.g. rave or punk). None of the participants stated that they belonged to such a group. On the day of testing, the participants completed the Pavlovian Temperament Survey and also the Music Preferences Form. Following the collection of the completed questionnaires, analysis of the results was begun. On the basis of the Pavlovian Temperament Survey, the participants' temperament traits were established. Then, on the basis of the Music Preferences Form, a complete, 115 item list of works of music was compiled. All the works, collected on CDs, were then subjected to music analysis. This was carried out independently by three competent judges – musicologists and university lecturers – whom the author had asked for help in the research. They received the works recorded on CD, together with instructions to listen to each work and describe it using a list of musical elements. The last element, Instrument Timbre – did not contain a listing of instruments; the judges themselves wrote in the instrument leading the melodic line.

Results

ANOVA statistics were used to check the relationship between Pavlovian temperamental traits and musical elements (Table 1).

M 1 1 1	Pavlovian temperament traits		
Musical elements	SE	SI	MP
Tempo	<i>F</i> (2,142) = 59.53***	F(2,142) = 7.71***	<i>F</i> (2,142) = 18.44***
Changes in Tempo	<i>F</i> (2,142) = 15.05***	F(2,142) = 1.33	$F(2,142) = 8.5^{***}$
Rhythm Values in Relation to Metrical Basis	F(2,142) = 4.31*	<i>F</i> (2,142) = 4.02*	F(2,142) = 4.17*
Number of Melodic Themes	$F(1, 143) = 30.79^{***}$	F(1, 143) = 3.0	$F(1, 143) = 64.85^{***}$
Scale of Performance	F(2,142) = 7.07**	F(2,142) = 5.12 **	F(2,142) = 2.97
Meter	F(3, 141) = 4.64*	F(3, 141) = 2.0	F(3, 141) = 2.85*
Changes in Dynamics	F(2,142) = .88	F(2,142) = 2.86	F(2,142) = .2
Musical Scale	F(2,142) = 1.37	F(2,142) = 1.22	F(2,142) = .23
Melodic-Line Instrument Timbre	F(5,139) = 1.15	F(5,139) = .93	F(5,139) = .91

Table 1 ANOVA statistics for Pavlovian temperament traits and musical elements

*p<.05, **p<.01, ***p<.001

Statistical analysis showed that the Strength of Excitation is associated with six musical elements. namely: Tempo, Changes in Tempo, Rhythm Values in Relation to Metrical Basis, Number of Melodic Themes, Scale of Performance, and Meter. The mean analysis showed that individuals with higher SE prefer music with faster tempos (Figure 1), greater changes in tempo (Figure 2), smaller rhythmic values in relation to the metrical basis (Figure 3), a larger number of melodic themes (Figure 4), a greater scale of performance (Figure 5) and a more complicated and irregular meter (Figure 6).



Tempo

Figure 1 Means of SE for the element Tempo.



Figure 2 Means of SE for the element Changes in Tempo.



Rhythm Values in Relation to Metrical Basis

Figure 3 Means of SE for the element Rhythm Values in Relation to Metrical Basis.



Number of Melodic Themes

Figure 4 Means of SE for the element Number of Melodic Themes.





Figure 5 Means of SE for the element Scale of Performance.



Figure 6 Means of SE for the element Meter.

The next trait, Strength of Inhibition, achieved statistically significant associations with three elements, namely: Tempo, Rhythm Values in Relation to Metrical Basis, and Scale of Performance (Table 1). The mean analysis indicated that respondents with higher SI prefer music with faster tempos (Figure 7), smaller rhythmic values in relation to the metrical basis (Figure 8), and a greater scale of performance (Figure 9).









Rhythm Values in Relation to Metrical Basis

Figure 8 Means of SI for the element Rhythm Values in Relation to Metrical Basis.



Scale of Performance

Figure 9 Means of SI for the element Scale Performance.

Mobility of Nervous Processes resulted in associations with six elements, namely: Tempo, Changes in Tempo, Rhythm Values in Relation to Metrical Basis, Number of Melodic Themes, and Meter (Table 1). People with higher scores on MP prefer music with faster tempos (Figure 10), greater changes in tempo (Figure 11), smaller rhythmic values in relation to the metrical basis (Figure 12), a larger number of melodic themes (Figure 13) and a more complicated and irregular meter (Figure 14).





Figure 10 Means of MP for the element Tempo.



Figure 11 Means of MP for the element Changes in Tempo.



Rhythm Values in Relation to Metrical Basis

Figure 12 Means of MP for the element Rhythm Values in Relation to Metrical Basis.



Number of Melodic Themes

Figure 13 Means of MP for the element Number of Melodic Themes.



Meter

Figure 14 Means of MP for the element Meter.

The analysis does not incorporate a portion of the results derived from the Music Preference Form, namely the factors influencing the choice of the favorite piece of music. This is due to the fact that a large portion of the participants (about 65%) failed to indicate any factor, simply omitting this section of the form.

Discussion

The objective of the study was to check the relationships between Pavlovian temperament traits and preferences for works of music characterized by specified musical elements. The hypothesis has been confirmed that higher SE individuals prefer works of music with faster tempos, greater changes in tempo, smaller rhythmic values in relation to the metrical basis, a larger number of melodic themes, a greater scale of performance, and irregular meter. The musical elements which proved non-significant in the study were: Changes in Dynamics, Musical Scale and Melodic-Line Instrument Timbre. These components of a work probably determine other factors (e.g. emotions arising during listening), which were not the subject of the study. On the basis of the results obtained, an attempt can be made to create a general model for a work of music satisfying the stimulation needs of an individual with high SE scores. This music work should have: (1) a fast tempo, (2) frequent changes in tempo, (3) rhythm values smaller than its metrical basis, (4) a large number of melodic themes, (5) a large scale of performance, and (6) irregular meter (e.g. asymmetric meter or changing meter during the composition or free rhythm, which is not included in the regular bars).

The hypothesis regarding the MO scale was also confirmed. Individuals with higher MO scores preferred works of music which have faster tempos, more changes in tempo, rhythm values smaller than the metrical basis, a greater number of melodic themes, and irregular meter. For MO, the elements that proved to be non-significant were: Scale of Performance, Changes in Dynamics, Musical Scale, and Melodic-Line Instrument Timbre. A general model of a work of music satisfying the stimulation needs of a high-MO individual would be: (1) a fast tempo, (2) frequent changes in tempo, (3) rhythm values smaller than its metrical basis, (4) a large number of melodic themes, and (5) irregular meter.

The fact that the SE and MO traits display a similar (yet not identical) relationship with the musical elements contained in favorite works of music is worthy of note. Both traits are associated with the preference for works with specific tempos, changes in tempo, rhythm values in relation to the metrical basis, number of melodic themes and also meter. This result seems self-evident, due to the fact that the two traits are mutually correlated. The SI trait is also associated with preferences for music works with specific musical elements. Individuals with higher SI scores preferred works of music with faster tempos, smaller rhythmic values in relation to the metrical basis, and a greater scale of performance. On the basis of the characteristics of this trait (enhanced control of behavior, the ability to inhibit, the ability to postpone or interrupt activities adequately to the situation), it is difficult to explain its relationships with the preferences of music containing elements related to the need for stimulation. The only explanation is Pavlov's statement that excitation and inhibition are strongly associated (Strelau, 2001), and the fact that SE and SI strongly correlated with each other in the present study.

The results obtained accord with the results of the research into the functional significance of temperament traits cited at the beginning of the article. I It can be seen from those results that individuals with high SE and high MO prefer situations that have high stimulative value (Strelau, 2001; Strelau & Zawadzki, 1998). Individuals with high scores on those scales also prefer works of music with greater stimulative value. It is worth bearing in mind that the SE and MO scales are moderately correlated with extroversion and the seeking of sensation (Strelau & Zawadzki, 1998). The results obtained also accord with those of the research into extroversion and sensation-seeking presented at the beginning of the article (see Daoussis & McKelvie, 1986; Litle & Zuckerman, 1986; Mc-Cown et al., 1997; McNamara & Ballard, 1999; Rentfrow & Gosling, 2003). From these results it can be seen that high-extroversion and sensation-seeking individuals prefer music that is more arousing – and therefore of greater stimulative value – similarly to individuals with high scores on the SE and MO scales.

It also seems to be the case that the preference for music with a specific stimulative value is not something of which the individual is conscious. The participants, not being formally educated in music , did not consider either its stimulative value or the elements occurring within it when choosing the music. They chose music that appealed to them, music that they felt good listening to. Similarly, individuals who prefer stimulating activities do not consider the stimulative value of those activities – they simply enjoy doing them. Therefore, it seems that the need for stimulation may be one of the important unconscious factors determining music preferences in individuals without a formal education in music. It would be of interest to check what influence a formal musical education has on musical preferences. It is clear that individuals educated in music have better developed and more frequently activated cognitive structures connected with the perception of music, and have the capability of listening to music in an analytical manner. It is likely that all these characteristics will have an influence on music preferences, and that individuals educated in music will follow something other than their unconscious need for stimulation – needs such as the desire to hear original performances or interest-

ing musical forms. They may also pay more attention to musical elements contained in works of music. It may equally be of interest to check what influence subculture membership has on preferences for elements contained in works of music. It seems that in different subculture groups, music may play a different role. Such factors as the wish to belong to a given group, to submit to its norms – including those norms regarding the types of musiclistened to – may have a particular influence on music preferences. Therefore individuals belonging to certain subcultures may in their music preferences be subject to factors other than an unconscious need for the stimulation provided by the music.

From the research conducted, important conclusions can also be drawn related to the selection of music for therapy. In selecting music for a specified individual, that individual's temperament traits, and particularly his need for stimulation, should be taken into account. It emerges from research into the need for stimulation that exceeding, or else failing to reach, the optimal dose of stimulation gives rise to symptoms of stress (Strelau, 2001, Strelau & Zawadzki, 1998). A similar situation may occur in the case of musical stimulation. Music that is preferred by individuals with high SE and MO scores can give rise to a state of stress in individuals with low scores on those scales. In turn, music with low stimulative value, preferred by individuals having low scores, may constitute a stressor for individuals with high scores. The results of the research may also be useful as an indicator to composers involved in the creation of music for therapy.

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MUSICAL PREFERENCES FORM

Developed by Małgorzata Gocman

Gende	er: Fei	nale/]	Male [*]
Age:			

This form has been compiled in order to investigate musical preferences. Consider for a moment and try to determine what music you listen to most often. Then select from your area of musical preference one favorite piece (it is important that the piece in question is one that is characteristic of your musical tastes, irrespective of what is currently "in fashion" in musical terms). Please give answers that are in accordance with your real musical tastes. There are no "good" or "bad" answers - none of them will be evaluated. The goal is to obtain information regarding the music you like. Fill in the following information regarding the piece you have chosen: Title Composer (for classical music)..... Performer Name of the recording where the piece can be found (if you remember it)..... Why have you chosen this piece? (Several possible answers are given below. If you agree with them, please check the box by the relevant answer.) \Box stimulates me to action/ gives me energy to act □ relaxes me \Box lifts my mood \Box enables me to get rid of excess energy □ associated with pleasant events / reminds me of "good times" \Box connects me with other people □ allows me to emphasize my individuality \Box gives rise to pleasant feelings \Box it is well put together from a musical point of view \Box it helps me solve problems \Box it excites my imagination \Box it provides me with many and varied experiences \Box the words of the piece are very important to me Space for own thoughts.....

Thank you for your help

^{*)} delete as applicable