

Intermediary role of mood in the way music affects emotional reception of visual stimuli in adolescents

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Summary

Aim. The role of music in everyone's, especially a young person's life is greatly important in their emotional perception of reality. The aim of this study was to determine the intermediary function of mood in the way music affects emotional reception of visual stimuli among adolescents.

Method. The experiment involved 388 adolescents (13–15 years old). We used a non-verbal tool to measure emotion and attention (*The International Affective Picture System – IAPS*), the Mood Chart and *the Youth Questionnaire*. Furthermore, we utilized recordings representing three various music genres (hip-hop, pop and heavy metal).

Results. Our results indicate that the participants' mood determined their emotional reception of presented visual material. Good mood was linked to lower emotional arousal during exposure to neutral images (after listening to pop and heavy metal music), and induced greater pleasure from looking at positive and neutral pictures. Viewing negative images while experiencing average or good mood caused less pleasure than looking at them in low mood. Hip-hop music and low mood correlated with higher emotional arousal in response to neutral pictures. None of the results indicated a correlation between adolescents' listening to heavy metal or hip-hop music (while experiencing low mood) and positive reception of visual stimuli.

Conclusions. The study was an attempt to describe the link between the intangible factors that are mood, music and emotional reception of visual images by adolescents. Despite the methodological difficulties, this relationship was determined.

Key words: mood, adolescents, role of music

Introduction

Music is an important element in every person's life, constituting the background to their daily activity, both academic and professional, as well as in their leisure time. Through the development of new technologies and modern sound carriers, such as mp3 players or smartphones, music has become widely available and omnipresent [1].

The relationship of music, emotions and mood

Music may have important effects on human cognitive and emotional function as well as one's behavior. Due to the aim of our original research, in the theoretical part of this paper we have decided to focus on the analysis of the relationship between popular music and emotions, together with the role of the listener's current mood. Such research area requires defining and distinguishing between the notions of emotions and mood, as there may appear different interrelations between them. Emotions are intense, though short reactions to occurring events, which mobilize the body to take particular action, depending on the nature of the event in question [2]. They may constitute a way to communicate one's needs and be defined as specific behaviors directed at something – a particular situation or person. It is noteworthy that emotions play a key role in the evaluation of reality, as they give personal meaning to a particular stimulus, enable cognitive evaluation of that stimulus and, in consequence, trigger a change in one's behavior towards it. Emotional expression is usually accompanied by high activity of the autonomic nervous system. Emotion is a specific and coherent system of psychological and physiological response linked to one's needs, objectives and adaptive skills. Both emotions and mood contain the so-called core affect, a state that can be characterized along two dimensions: pleasure–displeasure and high arousal–low arousal. An individual experiences emotions as pleasure or displeasure and fatigue or high energy. Emotions emerge in response to a specific object, they are short-lived, intense and associated with strong arousal and high energy consumption [3].

Mood, on the other hand, is much more long-lasting and less intense. It usually lowers the threshold for excitation, influences selection of information to be processed, and might also change its content, the result of which may be either strengthening or weakening of memory. Just as in the case of emotions, mood includes affect, but it is not associated with any particular object and is characterized by low energy consumption, as well as regularity and cyclic variation [4, 5].

The psychology of music often refers to the three-dimensional model of mood by Matthews, Jones and Chamberlain, according to which mood is an affective experience consisting of three interconnected bipolar dimensions: hedonic tone, energetic arousal and tense arousal. Hedonic tone describes the feeling of pleasantness–unpleasantness, tense arousal (associated with anxiety) is the dimension of tension–relaxation, while energetic arousal is characterized along the dimension of energy–fatigue and is linked to an individual's energy level [6]. The dimensional approach to emotions is postulated by many researchers, including Wundt, Mehrabian and Russell and Tellegen [6, 7]. Such perspective involves describing emotions by determining the compatibility of

subsequent evaluations on important dimensions. According to Osgood, variability in emotional evaluations can be determined along three basic dimensions: arousal (from calmness to excitement), affective valence (assessed on a pleasure–displeasure scale), and dominance/submissiveness [7].

Music fulfils different functions – from regulating emotions, through self-expression, to enabling social relationships [8]. It impacts biochemical parameters of the organism through the rhythm, tempo and melody, activating the autonomic nervous system (AUN) and the central nervous system (CNS) [9]. Music affects mood and may act as a stimulus that evokes a variety of emotions. It is worth stressing that those may be negative [10] as well as positive emotions – and the activity of listening to music may itself produce a feeling of satisfaction [11].

In the literature of the subject, there are numerous studies that show that music produces even very complex emotions [12]. Music's capacity to evoke emotions is considered to be the main reason for active involvement in listening to it [13]. By listening to certain pieces, one can enter a specific emotional state or deepen it, as well as name and express emotions, which is an important function in the process of emotion regulation [14]. That, in turn, is an important process, in which a person decides what emotions they are experiencing, as well as when and how to express them [15]. It is also closely associated with one's physiological and psychological functioning [16]. Listening to music can help to maintain a positive mood and reduce unpleasant or stressful experiences and tension or feelings of fear. Studies suggest that people often use music to uplift their mood or to raise the level of excitement [17]. Motivation to listen to different genres of music is also a desire to reduce feelings of loneliness as well as aggressive behaviors [18]. People experiencing negative mood are reluctant to choose music considered to be energetic and cheerful, as opposed to those reporting positive mood [19]. At the same time, studies confirm that music can help regulate mood and emotion, they also explain why people choose to listen to sad music, especially since it is known to cause a feeling of sadness. The choice of a particular song makes it possible to determine one's mood, as it thus becomes more apparent. Music also helps in maintaining a particular mood and lengthening the duration of a specific emotion. It is known that people prefer to stay in a certain mood rather than change it through listening to a different song, they also know what genre of music they do not want to listen to [20]. Researchers point out that perceived emotions are not always the same as the ones people really experience [21]. A study by Kawakami et al. [22] shows that experienced and perceived emotions may differ from each other: sad music may be perceived as sad, but at the same time the experience of listening to it can evoke positive emotions. In another study by Kawakami et al. [23] the subjects, regardless of whether they were professional musicians or not, felt ambivalent emotions while listening to music in minor key (both positive and negative), and although the sounds in minor key were perceived as sad, the listeners reported positive emotions. Music often evokes memories and associations, it has a great ability to trigger memory traces, especially those related to affective states.

Music can be helpful in regulating human emotions. It is also worth mentioning that it performs an extremely important role in adolescence – the period considered to

be the most paramount for the development of one's identity, in which the intensity of emotions and changeability of moods is linked to strong perception of and response to the surrounding reality.

The role of music in adolescence

Music, especially popular, fulfils a significant role during the period of adolescence. Listening to or playing it is a part of young people's daily after-school activity and accompanies them in most of their free time. According to a study by North et al. [24], which was carried out on a group of 2,465 British teenagers, 50% of them played a musical instrument or listened to music for about 2.5 hours a day. Music has a variety of roles that help teenagers in establishing relationships within their peer group, dealing with the crisis of identity, shaping their own self-image or even their sexuality. Listening to popular music may furthermore help teens cope with experienced internal conflicts [25].

For adolescents music is a kind of a symbol of belonging to a particular peer group [26]. The results of a study by Bakagiannis et al. [27] show that people with similar musical preferences evaluate their own group more positively than the control group. According to DeNora [28], music helps shape one's identity. Listening to music provides space in which a teenager is looking for answers to questions concerning who he or she is and what his or her preferences are, it also provides a range of musical genres (compatible with their self-image) that can either maintain a specific self-image or make it more realistic. Larson [29] believes that listening to music genres such as rock, hard rock, rap, punk or heavy metal can be helpful while experiencing a lack of consistency within one's identity. In turn, Gordon et al. [30] indicate a relationship between the taste for lighter music like soft rock and pop, and having more of a conformist attitude as well as an excessive sense of responsibility. Preference of punk, heavy metal and reggae, on the other hand, correlates with a high degree of sensation seeking [31].

Preferred music genres may reflect emotional states and affect the behavior of teenagers. Older research often points out negative consequences of listening to so-called hard music. However, it is worth noting that drawing clear conclusions concerning the impact of music is difficult due to the methodology of the research process. The relationship between listening to a specific music genre and displayed negative behaviors does not have to be synonymous with the adverse effects of music itself, but may represent a determinant of particular preferences associated with a specific lifestyle among teenagers. A study by Martin et al. [32], indicates the existence of a relationship between the preference of 'hard music' and exhibiting suicidal ideation or tendencies to self-injury. Listening to heavy metal could also sustain and foster the attitude of rebellion and negation, which are typical in adolescence. Teenage participants of the study who report listening to heavy metal believe that their behaviors such as vandalism, assaulting others or associative behaviors may be linked to listening to that music genre [33].

Interestingly enough, modern research seems to indicate the opposite relationship. According to available results, boys and men between the ages of 13 and 44

listening to heavy metal tend to exhibit lower levels of anxiety and fewer symptoms of depression as opposed to people who do not listen to this music genre [34]. Dickinson et al. [35] point out that fascination with death related to heavy metal music can lead to some adjustment to this topic and may prove helpful in dealing with one's own mortality. People can even draw positive energy from listening to heavy metal music: it can motivate or energize them and help build their self-confidence as well as self-acceptance [36].

Some studies continue to reveal the existence of a negative relationship between listening to heavier or aggressive music and young people's behavior. Studies by Miranda et al. [37] revealed the existence of a positive correlation between listening to rap music and negative behaviors such as theft, drug use, gang affiliation or violence. A study carried out among young people (15–25 years of age) suggests that the use of marijuana is significantly higher among people who listen to punk, rock or reggae, whereas drug abuse while going out to clubs is associated with those who listen to techno and rap music [38]. To sum up, music in the everyday life of teenagers plays a very important role in the regulation of emotion and emotional perception of reality, which is, in turn, associated with young people's behavior and quality of their developing personality.

The aim of this study was to determine the intermediary role of mood in the way music affects emotional perception of visual material among adolescents. To investigate it we have formulated the following research questions:

1. Does mood serve as a mediator in the way music affects emotional reception of visual stimuli among adolescents?
2. How does mood mediate the relationship between music and emotional reception of visual stimuli among adolescents?

Method

Study procedure

The study was experimental in its nature and carried out across junior secondary schools in the north-western Poland. Prior to the implementation of the project the headmasters of selected schools were asked to give their permission for conducting research within their premises. In addition, parents of potential participants were informed about the purpose and procedure of the study and asked to provide their consent to the participation of their children in the experiment. Both participants and their guardians gave their written consent to participate in the study.

The experiment consisted in one-off meetings with each of the 17 participating classes, each lasting one school period. They took place in the classrooms, without the presence of the teacher. The participants were informed that the experiment involved assessment of photos (with no further details on the subject), and subsequently asked for their consent to participate in the study. All of the children expressed such consent. At the end of each meeting the students were briefed about the exact purpose of the experiment in which they had participated.

The experiment was carried out as follows: (1) students were provided with instructions; (2) they determined their mood on the Mood Chart; (3) experimental group subjects listened to a 3-minute musical piece (hip-hop, pop, metal, depending on the group). The control group did not carry out this step; (4) all the subjects (three experimental groups and the control group) were shown a multimedia presentation of 21 photos from The International Affective Picture System (IAPS); (5) they carried out emotional evaluation of the non-verbal material (SAM); (6) students filled out *the Youth Questionnaire*.

Research methods

In the experiment we used a non-verbal international psychological tool for the study of emotions and attention – the International Affective Picture System (IAPS) [7], with non-verbal evaluation cards – the Self-Assessment Manikin (SAM). Independent expert judges selected 21 photos from a pool of images available in the IAPS, thematically appropriate for the age group of 13–14. There were 3 groups of photos, seven in each one: positive, neutral and negative. The photos were colorful, providing a wide collection of emotional stimuli with clearly marked, easy-to-identify and evaluate content and were to quickly evoke affect. They were evaluated on three dimensions: pleasure, arousal and dominance within the framework of the affective assessment system (SAM) [7]. The task was to put a cross next to three characters (i.e., their graphic representations) – one on each dimension and thus express the subjects' emotional reactions to the photos. The dimension of pleasure was represented in the form of five images – from a smiley face to a sad, unhappy one; arousal (also five images) from an excited character (wide open eyes, storm in the stomach) to a calm, sleepy one; dominance was represented by five characters from a small one, indicating a sense of external control to a large, domineering one.

In the study, we also used two self-designed tools. The first one was the Mood Chart, including a question about the participant's current mood. The subjects were to evaluate their emotional state on a scale from 1 to 5 (from very good to lowered) at the beginning of the experiment. The second tool was *the Youth Questionnaire* containing questions about demographic data, music preferences and hearing problems, based on which we prepared the description of our sample and conducted detailed analyzes.

The songs used in the experiment represented three music genres (hip-hop, pop and heavy metal), popular among and regularly listened to by Polish youth. All analyses and choice of songs were conducted based on the assessment of competent judges after consultations with professional musicians. In order to reduce the significant variable, which is the verbal message (lyrics), the songs were presented in their instrumental versions: *Miałem to rzucić* (Małpa), *POP RnB instruMental Beat* (FL Studio) and *Angel Of Death* (Slayer).

Research subjects

The study involved 388 adolescents aged 13–15 years, who at the time of the experiment were students of second and third grade of the selected secondary schools. The choice of schools was purposeful – they were selected to best represent the cross-section of the Polish student population. What is important is that the participants reported varied music preferences and did not differ regarding the degree of their preference for music presented during the experiment.

The subjects were randomly divided into four groups. The first group were students who listened to a hip-hop song before they were asked to evaluate the presented images, the second group listened to a pop song, the third one – to a metal track, while the fourth one – the control group – did not listen to any musical piece before being presented with the visual stimuli. The groups did not differ in size: there were 93 persons in group I, 97 people in group II, 93 in group III, and 105 in group IV. The investigated groups exhibited no statistical differences in terms of demographic variables or any other variables relevant to the experiment. The groups did not differ in terms of gender distribution (group I – 43 girls and 50 boys, group II – 52 girls and 45 boys, group III – 50 girls and 43 boys, and the control group – 49 girls and 56 boys). In *the Youth Questionnaire*, due to the nature of the study, we included a question about hearing problems. Also in this respect there were no significant differences between the groups, and the results of 21 persons declaring such problems were eliminated during the statistical analyses. The total number of analyzed data amounted to responses of 365 students (two subjects with normal hearing did not provide the majority of answers).

Results

In order to answer the first question: “Does mood serve as a mediator in the way music affects emotional reception of visual stimuli among adolescents?” we measured differences in levels of experienced pleasure, arousal and dominance in response to positive, neutral and negative images with regard to the interaction between the participants’ mood and their exposure to a particular music genre. The results obtained in the course of statistical analyses indicated the existence of a trend for mood being a mediator in arousal as measured on the SAM scale (regardless of the investigated group) while looking at neutral pictures from the IAPS (Table 1). They also revealed a correlation between mood and pleasure experienced when viewing these images at a level similar to a statistical tendency.

Table 1. **Interaction between music (metal/pop/hip-hop/control) and mood (low/medium/good) in the evaluation of the IAPS pictures**

Picture evaluation after listening to a musical piece	F	df	p
Pleasure level while looking at positive pictures	1.396	6	0.215
Pleasure level while looking at negative pictures	1.091	6	0.367
Pleasure level while looking at neutral pictures	1.724	6	0.114

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Arousal level while looking at positive pictures	1.136	6	0.341
Arousal level while looking at negative pictures	1.496	6	0.178
Arousal level while looking at neutral pictures	1.932	6	0.075
Dominance level while looking at positive pictures	1.045	6	0.396
Dominance level while looking at negative pictures	1.458	6	0.192
Dominance level while looking at neutral pictures	1.612	6	0.143

F – F test; result of the analysis of variance; df – degrees of freedom; p – significance level

Inter-group differences in arousal level while looking at neutral pictures depending on the reported initial mood were measured by means of the *post-hoc* Fisher's LSD test. The results of the analyses are presented in Table 2.

Table 2. Inter-group arousal level differences during exposure to neutral pictures depending on the initial mood

Group	Mood	M	SD	N	Group: hip-hop			Group: pop			Group: metal			Control group	
					low	average	good	low	average	good	low	average	good	low	average
Hip-hop	low	31.00	3.94	8											
Hip-hop	average	25.52	2.23	25	0.23										
Hip-hop	good	22.55	1.49	56	0.05	0.27									
Pop	low	25.67	2.87	15	0.27	0.97	0.34								
Pop	average	21.22	2.14	27	0.03	0.17	0.61	0.22							
Pop	good	24.50	1.57	50	0.13	0.71	0.37	0.72	0.22						
Metal	low	21.57	4.21	7	0.10	0.41	0.83	0.42	0.94	0.51					
Metal	average	28.91	2.37	22	0.65	0.30	0.02	0.39	0.02	0.12	0.13				
Metal	Good	22.89	1.52	54	0.06	0.33	0.87	0.39	0.53	0.46	0.77	0.03			
Control	low	21.38	3.94	8	0.08	0.36	0.78	0.38	0.97	0.46	0.97	0.10	0.72		
Control	average	21.48	2.32	23	0.04	0.21	0.70	0.26	0.94	0.28	0.98	0.03	0.61	0.98	
Control	good	23.64	1.33	70	0.08	0.47	0.59	0.52	0.34	0.68	0.64	0.05	0.71	0.59	0.42

Probability for post-hoc tests Error: MS inter-group = 123.98; df = 353.00; p < 0.05 marked in bold

Two of the groups clearly stood out among others. The first one was the group reporting low mood listening to hip-hop, the members of which assessed their arousal level as higher than the group with good mood listening to hip-hop, the group with so-called average mood listening to pop or the control group with so-called average mood. The second interesting relationship was observed in the group with average mood listening to metal, the members of which assessed their arousal level as higher than the group with good mood listening to hip-hop, the group with so-called average

mood listening to pop, the control group with so-called average mood, or the group with good mood listening to heavy metal. Those relationships are graphically presented in Figure 1.

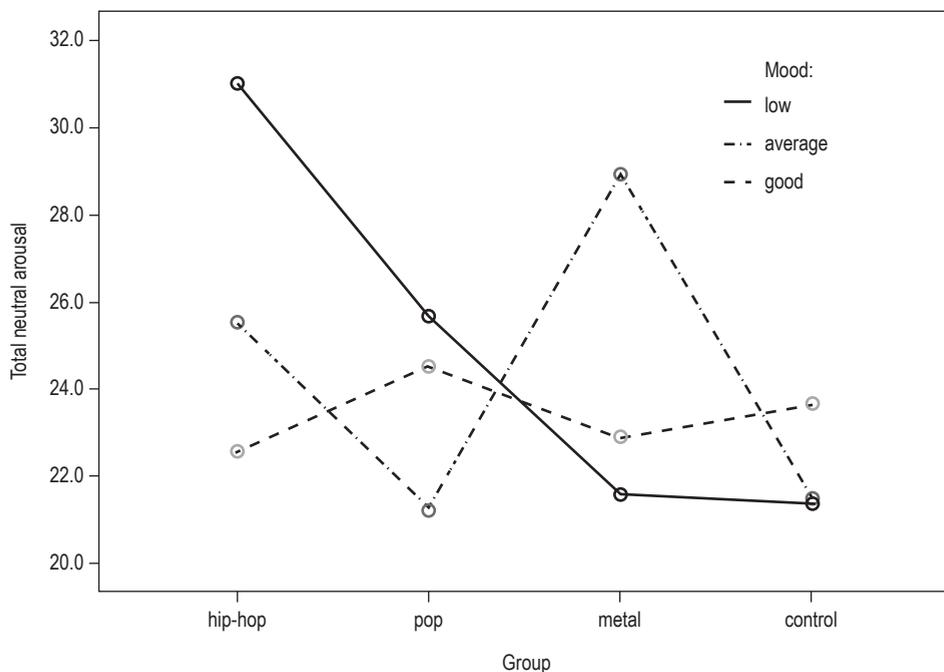


Figure 1. IAPS arousal levels during exposure to neutral pictures in subjects with different mood

To sum up, listening to hip-hop increased arousal level while looking at neutral photos in participants reporting initial low mood. A similar effect has been observed in participants in so-called average mood when listening to heavy metal. Lower arousal was associated with listening to hip-hop or heavy metal by participants in good mood, and pop or no music in students in so-called average mood.

To answer the question: “How does mood mediate the relationship between music and emotional reception of visual stimuli among adolescents?” we compared the average levels of pleasure, arousal and dominance while looking at positive, negative and neutral images in subjects reporting different initial levels of mood. The results of the analyses are presented in Table 3.

Table 3. Differences between mean IAPS results in the evaluation of positive, negative and neutral images in groups reporting different mood

	Anova results			Mean results in groups of different mood			Post hoc Fisher's LSD tests			
	df	F	Significance	Mood	M	Standard Error	*Mood	Mean Difference (I-J)	Standard Error	p
Pleasure level while looking at positive pictures	2.00	17.54	0.00		45.19	1.48	average	-3.347*	1.67	0.05
							good	-7.833*	1.52	0.00
				average	48.49	0.89	low	3.347*	1.67	0.05
							good	-4.486*	1.05	0.00
				good	52.97	0.58	low	7.833*	1.52	0.00
							average	4.486*	1.05	0.00
Pleasure level while looking at negative pictures	2.00	6.38	0.00	low	37.83	1.58	average	5.940*	1.78	0.00
							good	4.384*	1.63	0.01
				average	31.31	0.95	low	-5.940*	1.78	0.00
							good	-1.56	1.13	0.17
				good	32.64	0.62	low	-4.384*	1.63	0.01
							average	1.56	1.13	0.17
Pleasure level while looking at neutral pictures	2.00	7.72	0.00	low	35.66	1.30	average	-1.00	1.47	0.50
							good	-4.336*	1.34	0.00
				average	35.97	0.78	low	1.00	1.47	0.50
							good	-3.334*	0.93	0.00
				good	39.19	0.51	low	4.336*	1.34	0.00
							average	3.334*	0.93	0.00
Arousal level while looking at positive pictures	2.00	0.58	0.56	low	31.65	2.25	average	-1.74	2.54	0.49
							good	-2.37	2.32	0.31
				average	33.74	1.35	low	1.74	2.54	0.49
							good	-0.62	1.61	0.70
				good	34.24	0.88	low	2.37	2.32	0.31
							average	0.62	1.61	0.70

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Arousal level while looking at negative pictures	2.00	3.03	0.05	low	35.80	1.87	average	-4.460*	2.11	0.04
							good	-3.77	1.93	0.05
				average	40.94	1.12	low	4.460*	2.11	0.04
							good	0.69	1.33	0.61
				good	40.41	0.73	low	3.77	1.93	0.05
							average	-0.69	1.33	0.61
Arousal level while looking at neutral pictures	2.00	0.41	0.66	low	24.90	1.89	average	1.00	2.13	0.64
							good	1.74	1.95	0.37
				average	24.28	1.13	low	-1.00	2.13	0.64
							good	0.75	1.35	0.58
				good	23.40	0.74	low	-1.74	1.95	0.37
							average	-0.75	1.35	0.58
Dominance level while looking at positive pictures	2.00	5.65	0.00	low	38.23	1.94	average	-5.877*	2.19	0.01
							good	-7.344*	2.01	0.00
				average	43.74	1.17	low	5.877*	2.19	0.01
							good	-1.47	1.39	0.29
				good	45.20	0.76	low	7.344*	2.01	0.00
							average	1.47	1.39	0.29
Dominance level while looking at negative pictures	2.00	0.00	1.00	low	33.53	2.21	average	-0.50	2.49	0.84
							good	-0.65	2.28	0.78
				average	33.55	1.33	low	0.50	2.49	0.84
							good	-0.15	1.58	0.92
				good	33.55	0.87	low	0.65	2.28	0.78
							average	0.15	1.58	0.92
Dominance level while looking at neutral pictures	2.00	1.69	0.19	low	36.77	1.97	average	-4.481*	2.23	0.04
							good	-4.683*	2.04	0.02
				average	40.31	1.18	low	4.481*	2.23	0.04
							good	-0.20	1.41	0.89
				good	40.65	0.77	low	4.683*	2.04	0.02
							average	0.20	1.41	0.89

* statistically significant dependence, $p < 0.05$

While looking at positive images, teenagers reporting different mood tended to assess their affect differently on the pleasure and dominance scales, whilst their results were similar on the arousal scale. The subjects whose initial mood was low presented their emotional reactions (pleasure and dominance) as the lowest (on the pleasure scale the difference between low and so-called average mood at the limit of statistical significance, all the other differences were statistically significant). Top pleasure ratings while viewing positive images were reported by persons in good mood. On the other hand, young people in low mood perceived negative images as more pleasant than those in so-called average or good mood (significance at the limit of statistical significance level 0.05). Adolescents with so-called average mood did not significantly differ in their pleasure levels from subjects in good mood. People in low mood reported the lowest level of arousal while presented with negative visual material. In youth groups exhibiting average and good mood the arousal levels were of similar size (there were

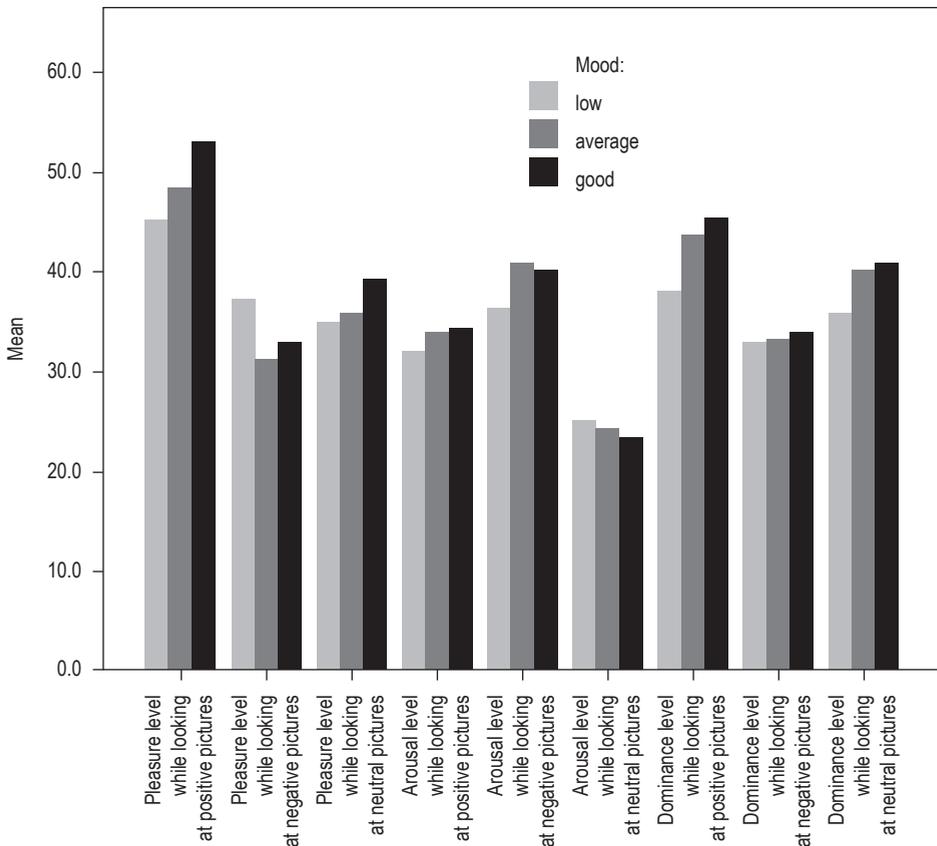


Figure 2. Mean IAPS results for the evaluation of positive, negative and neutral images in groups with different mood

no statistically significant differences). Mood did not influence the dominance level in the subjects' reaction to negative images.

Emotional reactions to neutral images were also different in individuals with different mood. The lowest levels of pleasure were reported by teenagers in low mood, while the highest by the ones in good mood. Such results were thus similar to those obtained in the assessment of positive images, but here the differences between groups were smaller, and no statistically significant differences occurred between groups with low and so-called average mood. The groups did not differ in their arousal. Upon viewing neutral photos the group reporting low mood assessed dominance as lower than the rest of the investigated groups. The difference between so-called average and good mood groups was not statistically significant.

To summarize the results presented in Table 3, it can be concluded that the subjects with initial low mood reported lower pleasure and dominance in the assessment of positive images. They also exhibited greater pleasure and lower arousal in the evaluation of negative images. Low mood reduced the pleasure from looking at neutral images. The group in good mood displayed greater pleasure and dominance than any other group while viewing positive images, they also reported higher pleasure looking at the neutral ones. However, exposure to negative images correlated with lower level of pleasure and lower arousal than in the other groups. These differences are presented graphically in Figure 2.

Discussion

Looking at the results obtained in the study, it is possible to conclude that among the investigated adolescents, regardless of their preferred music genre, the emotional reception of the presented visual stimuli is determined by their current mood. Good mood tends to be linked to decreased arousal upon exposure to neutral images, which is particularly noticeable after listening to 'heavier', more aggressive music (metal) or pop. After listening to hip-hop, low mood is mainly associated with higher level of emotional arousal while looking at neutral images. Low mood also results in decreased arousal caused by negative pictures. Quality of mood seems to affect the assessment of pleasure experienced during exposure to all visual stimuli. Good mood results in greater, and low mood in lower pleasure from looking at both positive and neutral images. Young people describing their mood as so-called average or good while looking at negative visual material exhibit lower levels of pleasure than those in low mood. Low mood also seems to result in decreased dominance levels associated with viewing positive and neutral pictures.

The results of the study seem to, therefore, constitute confirmation of earlier global research indicating the existence of a link between the emotional state of the listener, their current mood, the reception of music and its influence upon young people's behavior (through a particular perception of reality and reaction to it). They have shown, especially in the case of heavy metal or hip-hop pieces, that listening to music while experiencing lower mood might cause greater emotional arousal during exposure to neutral images. Such results are in line with earlier findings [17, 36]. This phenome-

non might, on the one hand, be beneficial to one's behavior, as the increase of arousal (up to a certain level) is accompanied by increase in motivation, as well as greater facility in performing a particular action (the first Yerkes–Dodson law) [39]. On the other, however, depending on one's individual personality traits, it may contribute to the occurrence of a too rapid or too strong of a reaction to an objectively neutral stimulus, which may be associated with displaying certain negative behaviors (e.g., greater irritability or aggression). Low mood and high arousal are especially linked to a stronger feeling of anger and negative behaviors.

Interestingly enough, none of the results of the study indicates that there is a relationship between young people's listening to heavy metal or hip-hop music (while reporting lower mood) and their more positive perception of visual stimuli. It is, therefore, possible to conclude that music which could be described as quite congruent with their mood did not uplift their spirit – an observation which has been made by Kallinen and Ravaja [21]. It could, however, serve as a kind of catharsis – where the feeling of sadness triggered by listening to music constituted detachment from reality and a state of relaxation [40].

This study confirms the existence of a strong influence of music on the overall arousal level, i.e., the dimension that is associated with the activation of the autonomic nervous system [41].

Our study is yet an attempt made to determine the link between the intangible factors that are mood, music and emotional reception of visual images by young people in the period of adolescence. Despite some methodological difficulties, we have managed to reach that goal. The weakness of this project is the lack of a more profound formal analysis of the songs that were used in the study (e.g., to determine the tempo, tonality, etc.). It should also be noted that emotional reception of music is an individualized process dependent on many variables that are difficult to control. Subsequent studies should therefore be based on the use of standardized tools to measure the investigated variables.

The strength of the study is the sample composed of adolescents, as well as the applied music genres, which are popular among the investigated population.

It could be concluded that the obtained results are thus not only of purely theoretical value, but that they also reflect the real world. We have therefore managed, up to a certain degree, to explain the role of music in the lives of young people. Our results could be applied both in therapeutic work as well as in prevention or education, where proper choice of music could lead to improvement (and not deterioration) within an adolescent's emotional functioning.

Conclusions

1. Mood mediates between the influence of music and the emotional reception of visual material presented to adolescents.
2. In adolescents, good mood is associated with a reduction in emotional arousal while looking at neutral images (especially after listening to metal and pop music) and greater pleasure from looking at both positive and neutral images.

3. Lowered mood leads to less pleasure from looking at both positive and neutral images, and combined with hip-hop music raises emotional arousal while looking at neutral pictures.
4. Lowered mood reduces adolescents' arousal caused by negative images and dominance associated with looking at positive and neutral images.
5. In adolescents, there is no relationship between listening to metal or hip-hop music (while experiencing lower mood) and a more positive perception of visual stimuli.

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