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Research Reports

Attentive and Emotional Listening to Music: The Role of Positive and Negative Affect

Aufmerksames und emotionales Musikhören: Die Rolle positiven und negativen Affekts

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Abstract

In a cross-sectional study, associations of global affect with two ways of listening to music – attentive-analytical listening (AL) and emotional listening (EL) – were examined. Based on a two-dimensional model of general affect, we focused on the degrees to which AL and EL are differentially correlated with positive and negative affect. In addition to bivariate relationships, the interactions between different states of general affect were tested. In Study 1, a sample of 1,291 individuals responded to questionnaires on listening to music, positive affect (PA), and negative affect (NA). We used the PANAS, which measures PA and NA as high arousal dimensions. AL was positively correlated with PA, EL with NA. Moderation analyses showed stronger associations between PA and AL when NA was low. Study 2 (N = 499 participants) differentiated between three facets of affect and focused, in addition to PA and NA, on the role of relaxation. Similar to the findings of Study 1, AL was correlated with PA, EL with NA and PA. Moderation analyses indicated that the degree to which PA was associated with an individual´s tendency to listen to music attentively depended on their degree of relaxation. In addition, the correlation between PA and EL was stronger for individuals who were more relaxed; for individuals who were less relaxed, the correlation between NA and EL was stronger. In sum, the results demonstrate not only simple bivariate correlations, but also that the expected associations vary, depending on the different affective states. We argue that the results reflect a dual function of listening to music, which includes emotional regulation and information processing.

Keywords: attentive-analytical listening, emotional listening, negative affect, positive affect, relaxation

Zusammenfassung

In einer Querschnittstudie wurden Zusammenhänge zwischen generellem Affekt und zwei Formen des Musikhörens – aufmerksam-analytisches Musikhören (AL) und emotionales Musikhören (EL) untersucht. Ausgehend von einem zweidimensionalen Modell des Affekts wurde untersucht, inwieweit AL und EL unterschiedlich mit positivem und negativem Affekt assoziiert sind. Neben den bivariaten Zusammenhängen wurden insbesondere die Interaktionen genauer analysiert. In Studie 1 beantworteten 1,291 Personen Fragen zum Musikhören, positivem Affekt (PA) und negativem Affekt (NA). Wir verwendeten den PANAS, welcher PA und NA als Erregungsdimensionen erfasst. AL korrelierte positiv mit PA, EL mit NA. Moderationsanalysen zeigten stärkere Zusammenhänge zwischen PA und AL, wenn NA niedrig war. Studie 2 (N = 499) unterschied drei Facetten der emotionalen Befindlichkeit und beleuchtete noch die Rolle der Entspannung. Wie in Studie 1 korrelierte PA mit AL, EL mit NA und PA. Moderationsanalysen zeigten, dass das Ausmaß des Zusammenhangs zwischen PA und der Tendenz, Musik aufmerksam zu hören, von dem Grad der Entspannung der Befragten abhängt. Die Korrelation zwischen positivem Affekt und EL war stärker für entspanntere Individuen; für weniger Entspannte die zwischen unangenehmer Aktivierung und EL. Wir diskutieren die Ergebnisse auf der Basis von Modellen, die Emotionsregulation und Informationsverarbeitung miteinander verbinden.

Schlüsselwörter: aufmerksam-analytisches Hören, emotionales Hören, negativer Affekt, positiver Affekt, Entspannung

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The relationship between affect and listening to music has become a focal issue in a variety of ways in musical practice and research. Affect can be the subject of song lyrics, or be marked in scores, or it can illustrate specific goals in musical interpretations (*appassionato e con molto sentimento*). On the one hand, affect is reflected in the abilities and interpretation of the musician (musical expression); on the other, affect is valued by the listener as a quality of the musical performance. Both aspects are related to emotional reactions that can be triggered by a piece of music. The emotion-regulative role of music has led to numerous studies in music psychology research (Garrido, 2014). Models that focus on the mechanisms underlying emotional reactions to music (e.g., Juslin, & Västfjäll, 2008) or on music-related regulation strategies (Baltazar & Saarikallio, 2019; van Goethem & Sloboda, 2011) have been developed. The interplay of processes (psychological, physiological, social) that specifically mediate the connection between music and affect is complex, and the empirical approaches to emotion in musical research are correspondingly diverse. Baltazar and Saarikallio (2019), in their model of affect self-regulation, recently emphasized the underlying processes – the interconnection between strategies and mechanisms – by which music impacts emotions and provided an integrative review of the different levels of affect regulation through music.

In contrast to studies on specific emotional reactions in listening situations or planned emotion regulation, the focus of the present study is on global positive affect (PA) and negative affect (NA; Watson et al., 1988), that is, how individuals feel in general and how this is associated with two forms of listening (attentive-analytical [AL] and emotional listening [EL]; Getz et al., 2012; Kreutz et al., 2008; Leipold & Loepthien, 2015). It is about the relationship between affect and cognition, which has received much attention in musicology (Eggebrecht, 2010; Hargreaves & Colman, 1981; Krumhansl, 2002) and general psychological research (Labouvie-Vief, 2015; Zajonc & Markus, 1982). More specifically, we investigate whether AL and EL are associated with PA and NA. Only a few studies have devoted their attention to the relationship between global affect and ways of listening to music. Although AL and EL often co-occur (i.e., are correlated; Getz et al., 2012; Leipold & Loepthien, 2015), we propose that they differ in their function with regard to emotion regulation and information processing. Although ways of listening can be manifold, we concentrate first on two forms of listening: AL and EL. We argue that AL and EL correlate with general affect and see a need to examine interactions with general affect that have not been considered in previous studies.

To clarify our use of affect and emotion: Affect and emotion refer to changes in subjective experience with cognitive and neurophysiological components as well as motoric expression. According to classifications that concentrate on defining characteristics of affective states (Ekkekakis, 2012; Juslin & Sloboda, 2010; Scherer, 2005), emotions include the evaluation of a stimulus event; the emotional experience is relatively high, compared to moods. Moods are considered to be (diffuse) affective states that are not clearly linked to specific events, but last longer and are experienced less intensely than emotions. In the following, affect is used to denote the general affective state of a person. Emotions refer to reactions specifically in response to listening to music, as described in studies on emotional listening or emotion regulation through music (Juslin & Västfjäll, 2008).

The Emotion-Regulative Function of AL and EL

When people listen to music, they perceive the music, evaluate it, process the information, and can sometimes experience a variety of emotional states (for an overview see Egermann & Kreutz, 2018; Müller & Jacobsen,

2009). Many facets of music reception that accompany listening to music have been described (Bonneville-Roussy & Rust, 2018; Gardikiotis & Baltzis, 2012; Groarke & Hogan, 2018). For many individuals, listening to music is an important domain of life which unfolds its richness of experience in emotional or aesthetic states, social identity, or behavioral expressions (Behne, 1997; Wolvin, 2010; Worthington & Fitch-Hauser, 2012). We focus on two general listening forms that have often been distinguished to illustrate "cognitive" and "emotional" approaches to music (e.g., the link between expectations and emotional tension, Krumhansl, 2002; the dimensions of empathizing and systemizing music, Kreutz et al., 2008; Linnemann et al., 2018; non-cognitive vs. cognitive emotion regulation, Schramm et al., 2012). In the present study, we focus on AL and EL. AL is characterized by cognitive processes of music reception. The listener concentrates on the musical structures (melody, rhythm, dynamic, and harmony). EL denotes the emotion of the listener, the activation of feelings through music – that one is touched emotionally in some way (the *internal locus of emotion*, Schubert, 2013).

The distinction between cognitive and emotional components of listening has a long tradition in empirical research. Apart from studies that distinguish between AL and EL functions in the above-mentioned sense (e.g., Kreutz et al., 2008; Leipold & Loepthien, 2015; Linnemann et al., 2018, Schramm et al., 2012), there are other approaches that differ in 1) the degree of intentionality, 2) the degree to which facets of cognitive and emotional reception and/or additional domains are mentioned, and 3) the methods. Hargreaves and Colman (1981) suggested five dimensions of *aesthetic reactions* to music and used a content analysis as their empirical basis. Behne (1997) introduced nine listening styles that also include motoric reactions (stimulative listening) and diffuse listening. He used a questionnaire and cluster-analytical techniques to distinguish the dimensions; the similarities between the dimensions are not reported. Chamorro-Premuzic and colleagues proposed a three-dimensional view of music (cognitive, emotional, and background or social use of music; Chamorro-Premuzic et al., 2009, 2012). The authors provided evidence from student samples that AL and EL were moderately positively correlated (r = .15 and .20). Stronger correlations were found by Getz et al. (2012; r = .29) and in studies with similar constructs with adolescents and adults (r = .45; .56; Leipold & Loepthien, 2015). Studies that differentiate mainly between cognitive and emotional listening dimensions were not intended to provide a comprehensive listening picture, but rather to emphasize differences in the relationships to other variables.

Research on forms of listening has provided evidence that AL and EL are associated with different processes of information processing, emotional regulation, personality traits, and music preferences (e.g., Getz et al., 2012; Groarke & Hogan, 2018). We concentrate here on studies that focused on associations with emotional regulation. It is noteworthy that AL was found to be correlated with rather "positively" valued variables such as openness (Chamorro-Premuzic et al., 2009, 2012) or accommodative coping (cognitive reappraisal; Leipold & Loepthien, 2015). EL or related constructs, on the other hand, were associated with neuroticism (Chamorro-Premuzic et al., 2009, 2012), rumination, or the enjoyment of sadness-inducing music (Garrido & Schubert, 2011). Linnemann and colleagues (2018) demonstrated that EL was more often associated with experiencing relaxation while listening to music. On the other hand, Groarke and Hogan (2018) provided evidence that the affective experience through music listening is associated positively with both higher PA and NA and supports the assumption that a higher emotional sensitivity is a prerequisite for EL. In a study by Getz and colleagues (2012), PA predicted cognitive and NA emotional use of music. To explain these patterns of results, Getz and colleagues focused on personality differences. Thus, the positive correlation between NA and EL could be explained in that individuals higher in neuroticism tend to experience a higher intensity of negative affect,

whereas the PA-AL contingency could be explained by openness, which has been linked to PA in previous research (Chamorro-Premuzic et al., 2012).

We propose another line of argumentation that stresses the influence of mental processing (e.g., mental set) and appraisals for the relationship between global affect and music listening. Whereas models on emotion regulation emphasize the direction from listening to music to emotions, we emphasize that general affect can influence how we listen to music. According to the broaden-and-build theory of positive emotions (Fredrickson, 2013), positive emotions broaden the scope of attention and facilitate cognitive processes, which are important for listening attentively to music. Thus, AL and PA should be correlated. EL, on the other hand, and its correlations with NA, can be explained from the perspective of the transactional stress theory (Lazarus & Folkman, 1984). Since NA could be a result of subjective stress experiences in everyday life – a state of increased tension could also be reflected in EL (see also the results of Taruffi, Pehrs et al., 2017, who demonstrated that listening to sad music is associated with mind-wandering). EL may be more pronounced in people who experience negative affect more frequently.

The effect sizes of the correlations that have been found in previous studies were, however, rather weak. One explanation could be that tendencies towards attentive and emotional listening depend on other factors, such as previous experience, musical expertise, and music preferences (Kreutz et al., 2008; Taruffi, Allen et al., 2017). On the other hand, one should mention that positive and negative emotions are not mutually exclusive, and that individuals may tend to have both to a greater or lesser extent. Van den Tol and Edwards (2015) provided evidence on how listening to sad music contributes to mood enhancement after adverse emotional events. Cognitive processes such as re-appraisal and distraction from an adverse event were found to be important for mood change. It thus seemed useful to consider the interaction effects that could be expected in the interplay of global affect and different tendencies in listening to music.

Interactions Between PA, NA, and Relaxation

To date, the relationship between listening forms and global positive and negative affect has been investigated mainly with the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) in questionnaire studies, using bivariate correlations, but without attention being paid to interaction effects. The PANAS is based on a bi-dimensional model and measures PA (positive affect as a pleasant activation: enthusiasm, interest, activity, alertness) and NA (negative affect as unpleasant activation: distress, anger, fear, guilt) as two dimensions, which were intended to be orthogonal. Most of the items refer to high arousal, with the assumption that people can experience both directions. Given that a high degree of NA is experienced as unpleasant, difficult to control, intruding unintentionally into consciousness, and demanding attention (Allen et al., 2014; Nolen-Hoeksema et al., 2008), it is conceivable that the positive relationship between PA and AL could be neutralized or interrupted. Thus, NA may interfere with the effects of PA that are involved in concentrated hearing. On the other hand, a low degree of NA may be a favourable condition for the PA-AL contingency.

Another facet of affect that has become a focal issue in music psychology is relaxation. Relaxation describes an affective state of low arousal that has been found to be negatively correlated with measures of NA and positively with measures of PA (Burke et al., 1989; Sonnentag et al., 2008). The second goal of the present study focuses on relaxation to investigate in more detail whether the correlations between listening forms and global affect depend on the degree of arousal. On the basis of empirical results to date, one can expect and

argue that relaxation moderates the correlation between PA, NA, and listening forms. In studies on emotion regulation, mental states such as relaxation or also mindfulness have been the goals of musical interventions (Lecuona de la Cruz & Rodríguez-Carvajal, 2014; Thoma et al., 2012). Relaxation has been considered not only to be an ideal state in stressful life episodes, but also to be a regulation process (Larsen, 2000) or a function of music listening (Laukka, 2007). It has proven beneficial for activities requiring cognitive processes such as concentration, attention, and memory (Schmalzl et al., 2015) as well for positive mood enhancement (Lindsay et al., 2018).

We are interested in whether the associations between PA and AL, NA and EL, and PA and EL hinge on the degree of relaxation. Given the results found for relaxation, the positive affect system should be enhanced when individuals experience a high degree of relaxation: AL and EL should be particularly pronounced when individuals have experienced a high degree of PA and relaxation. In contrast, the negative affect system possibly dominates when individuals are less relaxed; in this case, a low degree of relaxation and a high degree of NA should be associated with EL.

Objectives and Hypotheses

To test these propositions, we conducted two cross-sectional studies: Study 1 examined these relationships when positive and negative affect is characterized by high arousal. Study 2 considers the relaxation component of positive affect in addition to PA and NA. Both studies concentrate on how individuals felt in general (Study 1) or felt in general during the two previous weeks (Study 2), and the respective correlations with AL and EL.

Bivariate hypotheses – Study 1: On the basis of previous studies and our arguments, we expect that AL is associated with PA (Hypothesis 1) and EL with NA (Hypothesis 2). Third, we test whether EL is associated with PA (Hypothesis 3). In previous research, this correlation was not consistent. Moderation hypothesis – Study 1: If one assumes that NA is a condition associated with stress and unwanted cognitions, it seems plausible that the PA-AL relationship would be moderated by NA (Hypothesis 4). We predict that the relationship between PA and AL is more pronounced in persons who are not very strongly affected by NA.

Bivariate hypotheses – Study 2: On the basis of previous studies investigating the impact of relaxation on cognition (for an overview, see Schmalzl et al., 2015), we expect a positive association between relaxation and AL (Hypothesis 5). Moderation hypotheses – Study 2: Our moderation hypotheses refer to the relationships formulated in Hypotheses 1 to 3 that are moderated by relaxation. Increased relaxation enhances the positive association between PA and AL, that is, AL should be more pronounced when relaxation and PA are strongly pronounced (Hypothesis 6). Our two final interaction hypotheses (Hypotheses 7 and 8) concern the functional role of relaxation with regard to high levels of EL. If we take the previous findings and arguments on relaxation into consideration, that is, that EL is differentially correlated with PA and NA depending on the degree of relaxation (see Lindsay et al., 2018 and Schmalzl et al., 2015 for further arguments), we need to examine specifically whether a high degree of EL is found among individuals with high PA and higher relaxation or among individuals with high NA and lower relaxation.

Both studies are part of a larger project on music listening, resources, and subjective well-being. The project investigates the associations between musical reception, listening forms, and indicators of positive adaptation in an age-heterogeneous sample of adults in Germany. We have focused in cross-sectional studies on the associations between musical reception, coping, and global well-being.

Study 1

Participants and Procedure

A questionnaire study was conducted with a sample consisting of 1,291 adults from 18 to 90 years (M_{age} = 48.38, SD_{age} = 20.76). Participants were recruited among university students and online-platforms for social research in Germany. Gender ratio was balanced (49.9% female). Fourteen percent of the participants had a lower educational level, with nine or fewer years of schooling, 31% had a medium educational level with 10 years of schooling, and 54% had a high level of education with 12 or more years of education (German Abitur). The study did not particularly address participants with a higher musical education. Thirty-seven percent of the participants had learned (at least) one musical instrument. Forty-one percent can read music notation. Participants received either course credit or financial compensation. Participation was voluntary.

Measures

Positive and Negative Affect (PA, NA)

The PANAS (Watson et al., 1988) consists of two 10-item scales that measure positive and negative affect. Participants were asked how often they "feel ... in general", with a 5-point scale from (1 = *not at all*) to (5 = *very often*). Cronbach's alpha was .82 for PA and .86 for NA.

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After the introduction: "In the following, we are interested in the manner in which you listen to music...", participants were asked to rate on a seven-point Likert scale (1 = *not at all*, 7 = *exactly*) how well each item applied to them in general, when they listen to music. We used a questionnaire containing two dimensions of music reception that have been described in previous studies (e.g., Leipold & Loepthien, 2015). In a previous part of the project, a questionnaire with several facets of music reception had been developed. On the basis of confirmatory factor analyses and structural equation models, it has been shown that four intercorrelated facets (AL, EL, social function of music, distraction) can be distinguished. Here we concentrate on two of the facets.

Attentive-analytical listening to music (AL) — This function of listening to music pertains to the more cognitive processes of music reception. Attentive-analytical listening is a rather complex listening form that requires attentive processes and a controlled focus on the musical piece. Five items were used to measure this dimension: "I try to understand the formal structure of a piece"; "If I listen to music, I concentrate on the music."; "I listen attentively to the progression of a song"; "I try to understand the music"; "I concentrate on the progression of a musical piece" (α = .86).

Emotional listening to music (EL) — This scale on listening consists of four items: "If I listen to sad music, it often makes me cry"; "Music is a matter of feelings"; "Music often touches me emotionally"; "My mood can easily be changed through music" (α = .79).

Control Variables

Previous musical training was used as a control variable because several studies have indicated significant differences in AL and EL, depending on previous training and practice (Kreutz et al., 2008). Due to time restrictions in the online assessment, participants were asked to complete three items of the subscale 'musical

training' of the German version of the Gold-MSI (years of instrument training, regular daily practice, and the number of instruments played; Schaal et al., 2014). Age and gender were included as control variables because several studies had indicated significant differences in affect (e.g., the age-related positivity effect, Charles & Carstensen, 2010).

Results

Data were analysed in three steps. In the first step, we tested the first three hypotheses at the level of bivariate correlations (see Table 1, which includes the mean values and standard deviations of variables and the correlations with the age and gender variable for descriptive purposes). Because rather small effect sizes could be expected on the basis of previous research, we conducted partial correlations (Cohen et al., 2003) to test whether the bivariate associations would remain stable under controlled conditions. In the third step, we tested the interaction between PA and NA on AL using a moderated regression analysis.

Table 1

Mean Values, Standard Deviations, and Intercorrelations of Attentive-Analytical Listening, Emotional Listening, Affect, Musical Training, and Sociodemographic Variables

Variable	*M*	*SD*	1.	2.	3.	4.	5.	6.
1. Age	48.38	20.77						
2. Gender (0 = female, 1 = male)	0.50	0.50	.11***					
3. Positive affect	3.63	0.49	.00	-.06*				
4. Negative affect	2.50	0.61	-.31***	-.11***	-.19***			
5. Attentive-analytical listening	4.28	1.27	.09**	.02	.16***	.00		
6. Emotional listening	4.55	1.26	-.09*	-.20***	.06*	.25***	.54***	
7. Musical training	2.14	1.71	-.28***	-.01	.11***	.06*	.22***	.15***

Note. N = 1,291.

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

As expected, PA correlated with AL and NA with EL (see Table 1). The results were statistically significant, but the effect sizes were rather small. The relationship between PA and EL was also significant, however, one should mention that in large samples, even very small effects reach the conventional level of significance. Both listening forms were positively associated with previous musical training.

In the next step, we performed control analyses to check whether these results remained stable. Partial correlations were calculated in which the association between each type of listening form and affect was examined while statistically controlling for the other measure of music listening, the other measure of affect, the musical experience variable, age, and gender. Table 2 shows the results. The hypotheses regarding the correlations between PA and AL and NA and EL were supported. We have calculated six coefficients for each of the four affect-music listening combinations (AL-PA, AL-NA, EL-PA, EL-NA; five, if the control variables were individually partialized out, and the sixth if one controls all five simultaneously). The point here was not to test whether the single partial correlations differ from each other. Rather, considering that the bivariate significant correlations were rather small, it was important to examine whether the significance also remained under controlled conditions. In the cases of Hypotheses 1 and 2, the control analyses showed a consistent significant pattern. PA, however, failed to remain significantly associated with EL in three control analyses (Hypothesis 3).

Table 2

Partial Correlations Between Listening Forms and Affect in Study 1

Control variable	Partial correlation	Control variable	Partial correlation
$r_{PA,AL}$		$r_{PA,EL}$	
EL	.15***	AL	-.02
NA	.16***	NA	.11***
Musical training	.14***	Musical training	.05
Age	.16***	Age	.06*
Gender	.16***	Gender	.05
Age, gender, musical training, EL, NA	.12***	Age, gender, musical training, AL, NA	.01
$r_{NA,AL}$		$r_{NA,EL}$	
EL	-.16***	AL	.29***
PA	.03	PA	.26***
Musical training	-.01	Musical training	.24***
Age	.03	Age	.23***
Gender	.01	Gender	.23***
Age, gender, musical training, EL, PA	-.08**	Age, gender, musical training, AL, PA	.24***

Note. N = 1,291. PA = positive affect; NA = negative affect; AL = attentive-analytical listening; EL = emotional listening. For each correlation, the variables in columns were statistically controlled (one after the other, then all together).
*p < .05. **p < .01. ***p < .001.

On the basis of theoretical considerations, we suspected that it would be worth considering the interactions, that is, testing whether NA moderated the relationship between PA and AL. We used a moderated regression analysis (Cohen et al., 2003) in which the variables PA and NA were entered first into a regression model (Step 1), followed by the interaction term PA x NA (Step 2; We used *z*-standardized variables to compute the interaction term). The predicted interaction term reached significance with $\beta_{PA \times NA \rightarrow AL}$ = -.09, F_{change} (1, 1286) = 10.73, p = .001. Figure 1 shows the result. As expected in Hypothesis 4, the relationship between PA and AL is strong when the tendency towards NA is low. In case of a strong negative affect, the association drops to zero. The interaction for EL was not significant, $\beta_{PA \times NA \rightarrow EL}$ = -.04, F_{change} (1, 1287) = 2.59, p > .10).

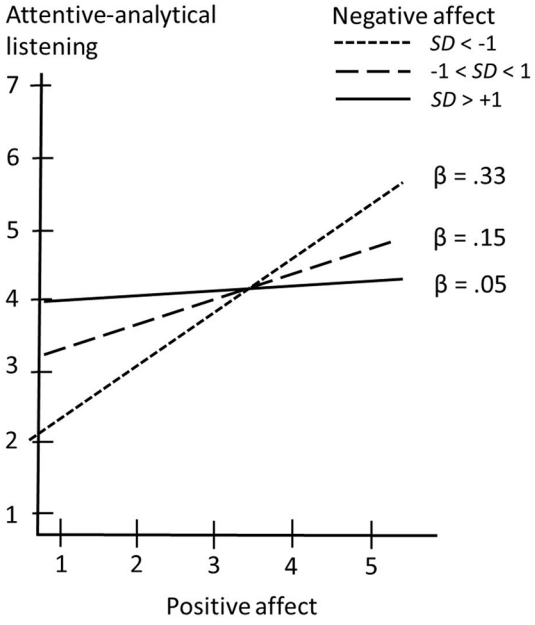
In sum, the results of Study 1 are in line with previous studies and provided evidence that both listening forms are associated with affect. Although AL and EL were highly intercorrelated, different predictive patterns resulted. Control analyses revealed that the results hold when partialing out the influence of the previous musical experience, suggesting that these effects are above and beyond the contribution of domain-specific experience in instrumental instruction. The interaction analysis revealed that NA moderates the PA-AL association and demonstrated that both, PA and NA, are involved, but that among people with high NA, the relationship between PA and AL failed to remain significant.

Study 2

The aim of the second study is first to examine whether the associations between global affect and listening forms in Study 1 (Hypotheses 1 to 4) can be found with slightly modified measures. We investigated the role of relaxation, a facet of affect, which is, in contrast to PA and NA of the PANAS, characterized by low arousal.

Figure 1

Attentive-Analytical Listening as a Function of Negative and Positive Affect



Note. Depicted are the moderating effects of negative affect. We used standard deviations to categorize negative affect.

We have argued that the relation between PA, NA, and listening forms are moderated by relaxation. Because relaxation is a mental state that has been found to increase concentrated thinking and attention, we expect a significant correlation with AL (Hypothesis 5), but also a stronger correlation between PA and AL, if the persons report a high degree of relaxation (Hypothesis 6). We also tested whether relaxation moderates the relationship between affect and EL (Hypotheses 7 and 8).

Participants and Procedure

The recruitment of participants followed via social networks and online-platforms for social research. In contrast to Study 1, participants of Study 2 were recruited with the information that the study is addressed to individuals who are interested in listening to music and music in general. The 499 (48% female) participants ranged in age from 17-83 years, with an average of 47.44 years (*SD* = 17.06). Eleven percent had a low educational level with nine years or fewer years of schooling, 25% had a medium educational level with 10 years of education, and 64% had a high level of education with 12 or 13 years of education. Sixty-nine percent played one or more instruments (maximum = 7 instruments), with *M* = 2.9 (*SD* = 4.2) years of music lessons.

Measures

PA, NA, and Relaxation

In contrast to Study 1, we applied a measure of affect that differed slightly in dimensionality. The Job Affect Scale (Burke et al., 1989) measures positive activation (feelings of excitement: strong, excited, active, enthusiastic, elated, peppy) and negative activation (feelings of distress: fearful, nervous, jittery, hostile, scornful, distressed) which are quite similar to the PA and NA scale of the PANAS (Watson et al., 1988). In addition,

relaxation, a low arousal state, is also measured. We used the adjectives from the Job Affect Scale (without referring to the work context) and asked for each item "How often did you feel …. within the last two weeks". Cronbach´s alpha was .86 for PA (six adjectives), .81 for NA (six adjectives), and .86 for relaxation (four adjectives: calm, relaxed, at rest, placid). Because most of the activation items of the JAS are part of the PANAS and the correlations between both questionnaires are > .70 (Huelsman et al., 2003), we keep the names PA and NA.

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We used the same measures as described in Study 1. Cronbach´s alpha was for AL = .89 and for EL = .85.

Control Variables

To measure musical training, we used the subscale from the German version of the Gold-MSI inventory (Schaal et al., 2014; α = .85). Similar to Study 1, we used the age and gender variable in control analyses.

Results

With regard to the first three hypotheses, one can see from the correlation matrix that, similar to the previous results, PA was associated with AL and EL, whereas NA significantly correlated with EL (Table 3). The correlation between relaxation and PA reached significance, as expected in Hypothesis 4; all of these variables were, however, marginally correlated, ranging from .10 ($p < .05$) to .23 ($p < .001$).

Table 3

Mean Values, Standard Deviations, and Intercorrelations of Attentive-Analytical Listening, Emotional Listening, Affect, Musical Training, and Sociodemographic Variables in Study 2

Variable	*M*	*SD*	1.	2.	3.	4.	5.	6.	7.
1. Age	47.45	17.04							
2. Gender (0 = female, 1 = male)	0.51	0.50	.18***						
3. Positive affect	3.28	0.78	.02	.01					
4. Relaxation	3.37	0.89	.22***	.19***	.41***				
5. Negative affect	2.07	0.80	-.35***	-.10**	-.32***	-.48***			
6. Attentive-analytical listening	4.69	1.38	-.01	-.02	.23***	.10*	.04		
7. Emotional listening	4.92	1.39	.00	-.18***	.17***	-.04	.17***	.62***	
8. Musical training	3.18	1.53	-.14**	.01	.14**	-.03	.01	.29***	.13**

Note. $N = 499$.

*$p < .05$. **$p < .01$. ***$p < .001$.

In the second step of the analyses, we conducted control analyses to check whether the effects, which were again small, remained significant under statistically controlled conditions. We performed partial correlation analyses for the possible associations (AL-PA, AL-NA, EL-PA, EL-NA, AL-relaxation, EL-relaxation), again by first controlling the control variables individually, then as a bundle (see Table 4). Similar to Study 1, the partial correlations supported the assumptions of the first two hypotheses; however, when all covariates were entered simultaneously, the correlation between PA and AL failed to reach significance. In contrast to the results of Study 1, PA was also significantly, but weakly, correlated with EL in Study 2 (Hypothesis 3). In particular, the

still significant but minor correlations between relaxation and AL (Hypothesis 5) raised the question of whether a link is actually present here.

Table 4

Partial Correlations Between Listening Forms and Affect in Study 2

Control variable	Partial correlation	Control variable	Partial correlation
$r_{PA,AL}$		$r_{PA,EL}$	
EL	.15***	AL	.04
NA	.25***	NA	.24***
Relaxation	.20***	Relaxation	.21***
Musical training	.20***	Musical training	.16***
Age	.23***	Age	.17***
Gender	.23***	Gender	.18***
Age, gender, musical training, EL, NA, relaxation	.06	Age, gender, musical training, AL, NA, relaxation	.14**
$r_{NA,AL}$		$r_{NA,EL}$	
EL	-.08	AL	.19***
PA	.12**	PA	.24***
Relaxation	.10*	Relaxation	.17***
Musical training	.04	Musical training	.17***
Age	.04	Age	.18***
Gender	.04	Gender	.15**
Age, gender, musical training, EL, PA, relaxation	-.01	Age, gender, musical training, AL, PA, relaxation	.19***
$r_{Relaxation,AL}$		$r_{Relaxation,EL}$	
EL	.16***	AL	-.13**
PA	.01	PA	-.12**
NA	.13**	NA	.05
Musical training	.11*	Musical training	-.03
Age	.11*	Age	-.04
Gender	.11*	Gender	.01
Age, gender, musical training, EL, PA, NA	.11*	Age, gender, musical training, AL, PA, NA	-.06

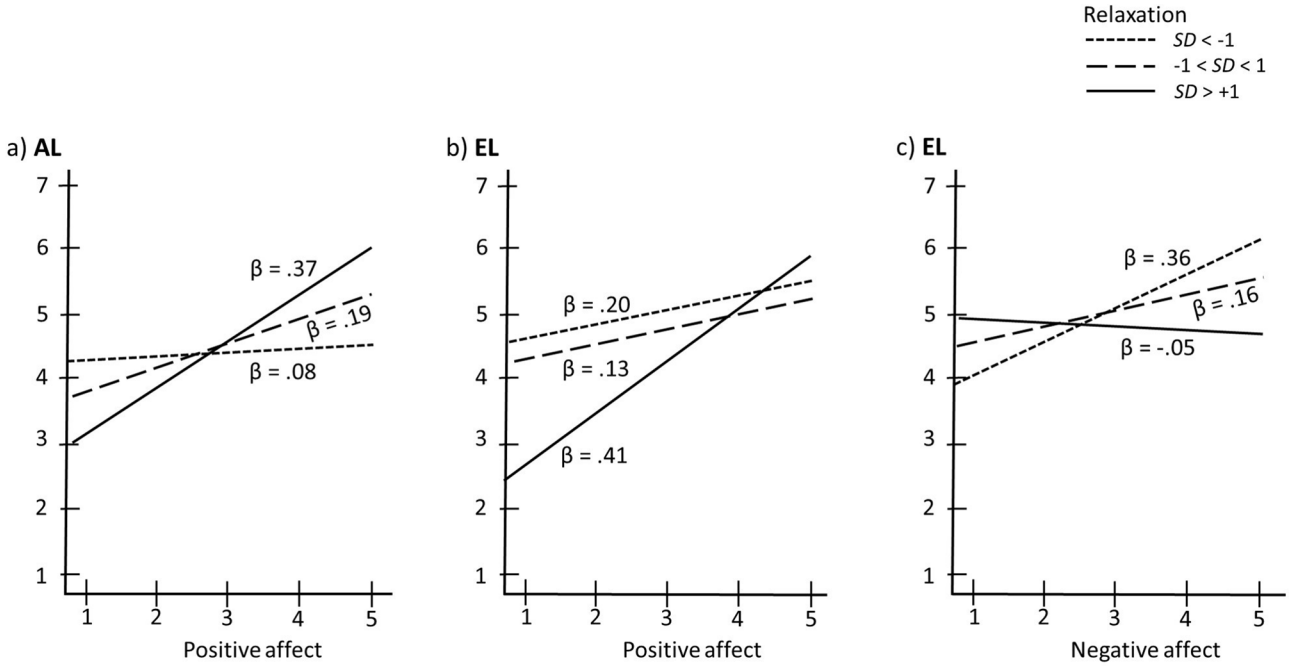
Note. N = 499. PA = positive affect; NA =negative affect; AL = attentive-analytical listening; EL = emotional listening. For each correlation, the variables in columns are statistically controlled (one after the other, then all together).
*p < .05. **p < .01. ***p < .001.

In the third step of the analyses, we examined several possible interactions between affect variables and listening forms and computed different interaction models (by using z-transformed scores). First, we tested whether the interaction effect of Study 1, that NA moderates the correlation between PA and AL, could be replicated. We controlled for the first-order terms of PA and NA and added the interaction term PA x NA to the regression equation. As expected in Hypothesis 4, the moderation-effect of NA could be demonstrated for PA ($\beta_{NA \times PA} \rightarrow$ AL = -.11; p < .01). The result was a similar pattern to that shown in Figure 1. For those people with a low degree of NA, the correlation between PA and AL was β = .37, whereas a high degree of NA resulted in a modest association (β = .20).

Moderated regression analyses were used to test the assumptions that individuals with high degrees of relaxation and PA experience music attentively and emotionally (Hypotheses 6 and 7). Both moderation effects were significant ($\beta_{PA \times relaxation} \rightarrow AL = .11$, $p < .01$ Figure 2A and $\beta_{PA \times relaxation} \rightarrow EL = .10$, $p < .05$ Figure 2B). Higher values for relaxation increased the associations between PA and both listening styles. In the final interaction analysis, we tested Hypothesis 8 – that the relationship between NA and EL depends on the degree of relaxation. The standardized Beta weight was significant ($\beta_{PA \times relaxation} \rightarrow AL = -.14$, $p < .01$). Among individuals with low relaxation, NA was strongly associated with EL (see Figure 2C).

Figure 2

Attentive-Analytical Listening (AL) as a Function of Positive Affect (A) and Emotional Listening (EL) as a Function of Positive and Negative Affect (B and C)



Note. Depicted are the moderating effects of relaxation. We used standard deviations to categorize relaxation.

In summary, the results of Study 2 agree with those of Study 1 in that PA is associated with AL and NA with EL. With regard to the correlations between PA and EL and between relaxation and AL, the partial correlations revealed significant results. The effect sizes again were small but significant. They varied, however, depending on relaxation, which makes it clear that affective states interact with each other and that forms of listening do not only covary with positive or negative affect, but are particularly distinct or strong, depending on whether relaxation was high or low. Similar to the results of Study 1, the association between PA and EL was moderated by NA and especially strong among individuals with low NA.

Discussion

We examined the correlations between global PA and NA and two forms of musical listening. One specific goal was to examine the interactions between general affect and two listening forms, which have not yet been

investigated. Supporting our first two hypotheses and prior research results (Getz et al., 2012; Groarke & Hogan, 2018), both studies provided evidence that AL was associated with PA, and EL with NA. One explanation for the association between AL and PA could be that PA also reflects underlying cognitive processes such as information processing, concentration, attention. These mental states are assumed to be enhanced through PA and are also a prerequisite for concentrated listening. Because PA is often experienced as a pleasant and desirable mental state that is possibly even amplified by interested and concentrated listening, the PA-AL link could also indicate a mutually amplifying system. Two expected interaction effects support this interpretation. They show that the relationship between PA and AL is even more pronounced in persons with lower NA (see Hypothesis 4) and higher relaxation (Hypothesis 6). Because NA often enters consciousness unintentionally (Nolen-Hoeksema et al., 2008), and detracts from concentration and experiencing PA, a high degree of NA provides an explanation for a reduction in the relationship between PA and AL, whereas a high degree of relaxation makes it plausible that concentrated listening would be accompanied by PA. In short, PA is associated more strongly with AL when NA is low, or relaxation is high. In Study 2, the interaction effect between PA and NA on AL was replicated. Due to the cross-sectional nature of the two studies, the causal direction of underlying processes must be left open.

Both studies showed that EL is correlated with NA. This could mean that emotional music listening is intensified particularly in negative emotional situations, be it in the sense that individuals wish to influence their affective experience and the listening situation through planned mood regulation (Baltazar & Saarikallio, 2019), or that the correspondence between general affect and emotional listening is automatically increased. Self-regulative strategies possibly enhance the probability of specific affects, but have been (in part controversially) discussed inasmuch they can be induced intentionally (Brandtstädter, 2000; see also the limitation section below in which we discuss the mutual dependency). It has been argued that people's motivation for listening to sad music when they feel sad reflects a form of coping (e.g., a distraction from problems after experiencing an adverse event or a means of reminiscence in order to think through and work out problems; Van den Tol & Edwards, 2015). The resulting mood enhancement that some people experience indicates that distraction or cognitive re-appraisal of the negative event was successful. A ruminative circuit (Nolen-Hoeksema et al., 2008) is possible too.

In the third hypothesis, we predicted that the link to EL is not limited to NA and that the degree of EL should also depend on PA. This relationship was already shown to be significant in some studies, but with small effect sizes (Getz et al., 2012; Groarke & Hogan, 2018). In the present investigation, confirmation of this relationship was most likely found in Study 2. The results of Study 2, however, also indicate that these are not just simple bivariate relationships, but rather that under certain conditions more concise correlations occur: As predicted by Hypothesis 6 and 7, for individuals with a strong tendency towards relaxation, the relationship between PA and EL and between PA and AL was higher than for those with less relaxation. The correlation between NA and EL becomes clearer for persons with a lower tendency to relax (see Hypothesis 8). Consequently, attentive and emotional musical experiences can be accompanied or influenced by intense positive and negative affective states or can, on the other hand, influence them. The role of relaxation, however, remained less clearly in the main effects than in moderation. The expected positive association between relaxation and AL (Hypothesis 5) was significant, but the raw and the partial correlations showed only small effect sizes.

Overall, the study has shown through the interaction analyses that the effect strength of the correlations is greater (i.e., no or less effect as well) when the states of general affect are contrasted. This indicates the clear

need to also investigate the processes reported here in the situational context in which they occur; in other words, what is the present affective state when a person is listening attentively or emotionally and are there specific affective goals present? In sum, both studies provide an understanding of how affective processes work in the context of listening to music. The results illustrate that both listening forms are interconnected with different combinations of affect – concentrated listening is linked with (or is more probable among individuals experiencing) a high degree of PA and relaxation; emotional listening is associated with PA, especially when relaxation was high, and NA, especially when relaxation was low.

We have presented and examined the two forms of musical listening separately, without describing their mutual relationships further. They are substantially correlated, which indicates that music listeners experience both, possibly because emotional significance enhances attention when listening to music. On the other hand, certain emotional nuances and qualities of music can only be recognized or differentiated through attentive listening. In addition, the results provide evidence that EL and in particular AL were correlated with previous musical experience, which emphasizes the role of learning and training. Despite the significant intercorrelation between AL and EL, a differential correlation pattern between AL, EL, and affect was found here, similar to the findings of a previous study on global emotion-regulating processes (Leipold & Loepthien, 2015).

Limitations and Further Thoughts

First of all, methodological issues need to be taken into account. The present results are based on cross-sectional, not on experimental or longitudinal data. This means that we cannot draw conclusions from the data about underlying short-term processes (e.g., whether listening forms can be induced by musical interventions) or long-term changes (developmental trajectories). In addition, our data was collected via participants´ self-report. The present study focused on global impressions, both in terms of mood and music listening, and is based on the assumption that individuals are able to recognize their listening habits and affect. To what extent the participants were actually trained to recognize and interpret musical structures (e.g., in the sense of a musical form analysis; Schönberg, 1967; Spring & Hutcheson, 2013) or their environment supported their listening habits was not investigated. Future studies using experience sampling methods for mood could provide additional evidence as to whether affective changes in listening situations depend on attentive and/or emotional listening.

Participation in the present study was not aimed specifically at musicians or persons with a special musical training. We did not ask about emotional nuances or facets of attentive-analytical listening that could only be distinguished by experienced listeners, but instead focused on general listening experience. Several interpretations are possible. We cannot be sure whether participants had in mind that music tells them something or whether they concentrated on tones, or intervals, or referred to a logical analysis based on motif or progressions of chords. From a cognitive information-processing approach to perception, individuals organize, structure, and re-structure their knowledge – they interpret according to these structures through processes of assimilation, accommodation, and integration (Piaget, 1977). The access to emotions underlines and completes a cognitive analysis in which one is touched by the music – instead of remaining neutral.

A related issue refers to interindividual differences in musical preferences. Although the interaction analyses have shown that under specific affective constellations, stronger correlations are possible as well; nonetheless even small correlations can become significant in large samples, so that questions arise as to further factors that could contribute to the explanation of the variance in listening forms. It is obvious that much of the variance

in the listening forms was not explained by general affect alone. Apart from one´s previous experience with music, it can be assumed that biographical aspects (e.g., learning history, preferences for specific musical genres) also play a role in how people listen to music. Whether individuals are more likely to experience strong emotions when listening to a powerful drum beat or a creative jazz improvisation, or when Bach lets the listener submerge into the depths of harmony, also depends on one's own value system and musical socialization. Such musical preferences have proven to be predictive of listening functions (Kreutz et al., 2008). Much is a matter of taste, and emotional experience also means that one can be very moved emotionally or react negatively. A central feature of affect is its volatility and presumably also its unpredictability. Musical feelings are not only difficult to control but can also not be induced intentionally because of the many unknown determinants (Brandtstädter, 2000; Leipold, 2020). We did not investigate whether the persons strategically or intentionally tried to induce certain affect in listening, as is of interest in studies on emotional regulation through music. This is, however, an important difference to studies that investigated the intention to influence feelings through music (Baltazar & Saarikallio, 2019; van Goethem & Sloboda, 2011).

Conclusion and Outlook

Our starting point was the differentiation of two facets of musical experience in which people differ in how they cognitively and emotionally perceive music in more depth. Both phenomena have a long tradition in musical research and remain fascinating; despite numerous studies, however, both are still insufficiently understood in their basis. One of the fundamental questions of musicological research is why and how music emotionally touches and binds attention. The search for structures in music (e.g., the interest in the interaction between technical prerequisites of a sound, to understand how it works, why they are playing, pausing, or changing instruments) and strong emotional effects (i.e., to capture the audience) have been discussed in musicological tradition with regard to their appropriateness and merit (Dahlhaus, 1989). An example is that EL is incomplete without analytical listening, but that too much searching for structure in music also possibly burdens the emotional sensation. In reality, they are not opposed pairs, but have different foci: AL implies a search for understanding (interest, concentration, awareness, pattern recognition), EL describes emotional reactions that happen to us. The question of how both listening forms interact touches general discussions of the interdependency of cognition and emotion (Labouvie-Vief, 2015).

In sum, the present study demonstrated that both listening forms are interconnected with general affect – but have different accents in the affective processes. In the more cognitive domain of AL, it was positive arousal and relaxation; in the domain of EL, it was negative arousal (especially when less relaxation was present) or positive arousal (with more relaxation), each of these being associated with strong manifestations of the listening forms. That listening to music is connected to feelings is not a new insight. The challenge is to understand the mechanisms, that is, the specific circumstances and general processes (rules, regularities) by which intensive listening experiences unfold and how they are involved in affect regulation. Experimental research is needed to show whether the present results can be supported in concrete listening situations.

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Competing Interests

The authors have declared that no competing interests exist.

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Ethics Approval

The present study was conducted in accordance with ethical principles and standards. It was reviewed and approved by the Universität der Bundeswehr München Ethics Committee.

Data Availability

The research data for this article (for Studies 1 and 2) are freely available (see the Supplementary Materials section).

Supplementary Materials

For this article the following Supplementary Materials are available via PsychArchives (for access see Index of Supplementary Materials below):

- Datasets for Studies 1 and 2.
- Codebooks for Studies 1 and 2.

Index of Supplementary Materials

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