Looking at Life Through Rose-Colored Glasses: Dispositional Positive Affect is Related to the Intensity of Aesthetic Experiences

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Individuals with a tendency to experience more positive affect have been shown to preferentially attend to positive stimuli. Anecdotal evidence even holds that individuals perceive more beauty when positive affect prevails. In two studies, we investigated the role of dispositional affect in predicting the frequency and intensity of aesthetic experiences. In Study 1, we examined experience sampling method (ESM) data on 99 students' aesthetic experiences. In Study 2, we used an intensive ESM investigation over the course of two weeks to collect data on aesthetic emotions (N = 97), and then associated the ESM data with dispositional affect questionnaires. The results of both studies showed a positive association between dispositional positive affect and the intensity of aesthetic experiences. However, dispositional affect and the frequency of aesthetic experiences were found to be unrelated. These findings suggest that dispositional affect does not predict how much beauty we see, but rather how much we enjoy it.

Keywords: positive affect; dispositional affect; aesthetic experience; savoring; aesthetic emotions; beauty

Introduction

The idiom 'rose-colored glasses' implies that individuals who have optimistic dispositions and positive thinking see the world differently and look for a silver lining in all things. The notion that individuals 'see' the world a certain way alludes to the interaction between emotion and cognition. Emotions color, prioritize, and motivate every aspect of our experiences (e.g., Jertberg et al., 2019). Aesthetic experiences are a ubiquitous yet special kind of experience that can be differentiated from other experiences based on stimulus processing. Specifically, the sensation-based evaluation of a stimulus with respect to a relevant concept (such as beauty) is referred to as aesthetic processing (e.g., Brattico et al., 2013; Jacobsen, 2006; Leder et al., 2004; Shelley, 2012). Although anecdotal evidence suggests that positive affect (PA) makes

individuals perceive more beauty around us, scant literature provides insight into whether positive 'glasses' affect our aesthetic experiences. In the present research, we investigate how aesthetic experiences are affected by dispositional affect in order to determine whether beauty lies not only in the eyes of beholders, but more specifically in the coloring of their glasses.

Since humans are constantly confronted with more information than we can process, our perception must be selective. This selectivity depends on the process of attention (for a review see, e.g., Pashler, 1998), and when and how stimuli are attended to can be crucially influenced by emotion (e.g., LeDoux, 1986). According to Fredrickson (2000), positive emotions serve to broaden our momentary thought–action repertoire, while negative emotions narrow it toward specific, possibly survival-related actions. Consistent with this notion, individuals in a positive mood have been found to fixate more on peripheral stimuli and display a broader attentional distribution than individuals in a neutral mood (Baas et al., 2008; Wadlinger & Isaacowitz, 2006). Additionally, positive moods enhance the attention that is paid to positive stimuli (e.g., Becker & Leineger, 2011; Ford et al., 2010). Connections between dispositional negative affect (NA) and attention have also been firmly established. For example, highly dysphoric people preferentially attend to dysphoric stimuli (e.g., Peckham et al., 2010). Cunningham and Kirkland (2014) were the first to investigate whether dispositionally positive individuals attend to the world differently. They observed that happier people showed stronger amygdala responses to positive stimuli than people who were less happy. Similarly, dispositional happiness and life satisfaction have been found to correlate significantly with selective attention paid to positive stimuli (achievement, social, and primary rewards) in various domains (Raila et al., 2015).

In contrast to other rewarding experiences, aesthetic experiences are intrinsically gratifying; they do not necessarily lead to an urge to acquire, possess, use, or consume. They are characterized by a 'disinterested' pleasure (Kant, 1964). In general, the emotions that are evoked in response to aesthetic experiences may be labelled 'aesthetic emotions' (e.g., Menninghaus et al., 2019). Such emotions include an evaluative component, are associated with pleasure or displeasure, and are predictive of liking. In the state domain, aesthetic emotions have been shown to be instrumental for short-term mood regulation and also to promote mid- and long-term emotional capacities and dispositions (Menninghaus et al., 2019). In the trait domain, there is evidence that links affect-related traits (e.g., trait emotional intelligence, empathy, dispositional awe, absorption) to complexity judgements about aesthetic stimuli (Marin & Leder, 2018) and responsiveness to beauty (Güsewell & Ruch, 2012a). However, the question of whether dispositional affect influences aesthetic experiences remains relatively unexplored.

In the present study, we examined whether the attentional mechanisms that lead individuals to more readily perceive and engage with stimuli that are congruent with their dispositional affect also apply in the case of aesthetic experiences. The aim was to establish whether dispositional PA is linked to either more aesthetic experiences or more intense aesthetic experiences in everyday life. The aesthetic experience data were collected using the experience sampling method (ESM), a research procedure for studying individuals' experiences and/or behaviors during their daily lives by asking them to provide systematic self-reports at several (often random) times during their waking hours (Larson & Csikszentmihalyi, 2014). This method has been used to supplement previous research on aesthetic experiences (e.g., Brattico et al., 2013; Marin & Leder, 2018) and the relationship between dispositional affect and perception (e.g.,

Cunningham & Kirkland, 2014; Raila et al., 2015) that employed laboratory settings. ESM is particularly well suited for complementing laboratory studies on aesthetic experiences due to its ecological validity and high temporal and contextual resolution (Shoham et al., 2017). Ideally, the results of laboratory research and ESM will converge to triangulate the information and to correctly locate effects. We predicted that dispositional PA would increase the number of reported aesthetic experiences (Hypothesis 1) while dispositional NA would decrease the number (Hypothesis 2). We also hypothesized that dispositional PA would increase the intensity of aesthetic experiences (Hypothesis 3) while NA would decrease the intensity (Hypothesis 4).

Study 1

Method[1]

Participants

One hundred and sixteen participants from a previous ESM investigation (Weigand & Jacobsen, 2021a) were invited to participate in the present study in exchange for partial fulfillment of course requirements, and 100 agreed to participate. One participant's data set was excluded from further analysis because the participant entered an incorrect participant ID, so that his affect questionnaire could not be matched to the ESM data. We used boxplots for our relevant variables to detect unusual data points. Four participants displayed unusually high or low dispositional positive affect scores. Since removing this data did not substantially change our results and we did not have any substantive reason to remove those participants from our analyses, they remained in the sample. As a result, the final usable data sets came from a convenience sample of 99 students at the Helmut Schmidt University/University of the Federal Armed Forces Hamburg (47 female, 52 male), aged 20 to 34 years (M = 23.52, SD = 2.77). On average, the participants completed 136.02 (SD = 21.22, range = 39 to 164) usable experience

sampling questionnaires. Across the participants, ratings for 13,011 occasions were recorded. The study received ethics approval for human subject research from a university institutional review board (*Ethikkommission für Forschung in der Psychologie an der Helmut-Schmidt-Universität / Universität der Bundeswehr Hamburg*).

Materials

Experience Sampling Method Items

At each sampling time, participants answered up to 13 questions on the Participation in Everyday Life (P.I.E.L.) Survey app (Jessup et al., 2012). The study parameters (i.e., survey questions and sampling times) were specified in a control file. Participants took 14.6 seconds on average to answer the questionnaire. In addition to questions about their aesthetic experiences, participants were asked to indicate the context in which the experience occurred (alone, with company, at home, or outside) as well as the level of their cognitive load. In the following, only the items relevant for the present study are described (for a detailed description of the ESM questionnaire, see Weigand and Jacobsen, 2021a). These were questions regarding the participants' most recent aesthetic experience since the previous sampling time. Participants answered the question 'Have you had an aesthetic experience since the last sampling time?' using a binary *no/yes* scale, and they were asked to indicate the content of the aesthetic experience by choosing one of eight categories (visual art, performing art, music, literature, nature, humans, inanimate object, other). The criterion variable *savoring* was assessed with three items following the phrase 'During the aesthetic experience...' ('I savored the present moment', 'I was thinking about things that make me feel happy', 'I was thinking about things that make me feel pleasure') using a 7-point Likert scale ranging from 1 (*not at all*) to 7 (*very much*). Table 1 shows the Cronbach's alpha

reliability coefficients for the *savoring* scale, which indicate good internal consistency. To verify that the *savoring* items measured the same underlying construct, we conducted a principal component factor analysis (PCA). First, we examined the factorability of the three *savoring* items. We observed that all items had a correlation of at least .6 with at least one of the other two items, suggesting good factorability. Secondly, the Kaiser-Meyer-Olkin measure for the sampling adequacy was .69, which is higher than the commonly recommended value of .6, and Bartlett's test of sphericity was significant, $\chi 2\ (3) = 8134.75$, $p < .001$. Finally, the communalities were all above .6, further confirming that each item shared common variance with the other items. Given these overall indicators, factor analysis was deemed to be suitable for all three items. We then conducted the PCA, using varimax rotation, and one factor explained 78% of the variance.

Dispositional Affect

To measure dispositional PA and NA, two scales were administered to participants six months after the ESM collection. The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) consists of ten PA and ten NA attributes. Participants were asked to indicate the extent to which they generally experienced each mood state on a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*extremely*). The reliability analysis revealed good internal consistency for both PA and NA.

The Dispositional Positive Emotions Scales (DPES; Shiota et al., 2006) measures the subject's general disposition to experience seven distinct positive emotions (joy, contentment, pride, love, compassion, amusement, and awe). It consists of 38 items (5 or 6 items per scale) and uses a 7-point rating format ranging from 1 = *strongly disagree* to 7 = *strongly agree*. A sample item (for joy) is 'I often feel bursts of joy'. We used a German version of the scale (Güsewell & Ruch, 2012b). Cronbach's

alpha for the subscales ranged between .58 (awe) and .92 (contentment), indicating that the reliability of the overall scale was good.

Procedure

Prior to the ESM investigation, a 3-day pilot test with three volunteers was conducted to assure feasibility. Following the pilot test, the ESM data were collected in Germany in June 2020. All participants were provided with information about the procedure and gave their written informed consent and demographic information. They were then asked to download the P.I.E.L. Survey app to their own devices. Participants received a 30-min training session via telephone before the start of the study. During this training, a research assistant defined the concept of aesthetic experience in line with previous work (e.g., Brattico et al., 2013; Jacobsen, 2006; Leder et al., 2004), as follows: 'An aesthetic experience is the reception and evaluation of an object or sensorial entity with respect to one or more relevant concepts (such as beauty, elegance, rhythm, and so forth)'. The research assistant also provided an example of an aesthetic experience. Then, in order to verify whether the definition was understood correctly, the research assistant asked the participants to provide an example of an aesthetic experience that they had during the last 24 hours. Next, the research assistant explained the entire procedure and all items in detail. Finally, participants were asked to complete a sample questionnaire for practice.

During the 14 days that followed, participants were randomly prompted by the mobile app twelve times a day during 60-min time blocks of their choice to fill out the questionnaire. The participants then had up to 20 min to initiate their response and up to 15 min to complete each question. Six months after the ESM investigation, the participants were approached via email to fill out the dispositional affect questionnaires, which were administered online. Participants were randomly assigned to the two

questionnaire sequences.

Statistical analyses

IBM Statistics SPSS for Mac, version 27 (IBM Corp., Armonk, NY, USA), and R Statistical Software, version 4.0.5 (Foundation for Statistical Computing, Vienna, Austria), were used to analyze the data. Due to the hierarchical structure of the ESM data (daily questionnaire responses at level 1 are nested within subjects at level 2), we employed multilevel modeling (MLM). In contrast to ordinary least squares (OLS) regression, MLM uses multiple error terms to partition the variance between the different levels of the data (Snijders & Bosker, 1999). This makes it possible to analyze relationships both within and between levels without violating standard independence assumptions. The multilevel models are fitted to the data using maximum likelihood estimation. This approach can handle missing and unbalanced data. In the analyses, the level-1 variables were group-mean centered, while the level-2 variables were grand-mean centered. To estimate the minimally detectable effect size, we used the powerSim function of the SIMR R package (Green & MacLeod, 2016) to conduct a sensitivity power analysis with the effect size as the outcome. SIMR uses Monte Carlo simulation for power analyses in two-level models. The package does not include a specific function for conducting sensitivity analyses, but it does provide power estimates for fixed effects in multilevel regression models. The effects of interest in the present study's models were varied, and the power was calculated at each level to determine which effect size could be detected with 80% power. All analyses employed the conventional .05 alpha level.

Results

The sequence of the questionnaires did not influence the DPES scores, $t(97) = .16$, $p =$

.873, or the PA/NA scores, $t(97) = -.93$, $p = .352$; $t(97) = -.66$, $p = .507$. Also, the number of usable experience sampling questionnaires for each participant was not related to dispositional affect or aesthetic experiences (all $p > .354$). Table 2 shows the means, standard deviations, and correlations between the predictors. The difference between the mean PA scores for our sample ($M = 33.75$, $SD = 5.94$) and the validation sample ($M = 35.00$, $SD = 6.40$; Watson et al., 1988) was not statistically significant, $t(760) = 1.83$, $p = .068$; neither was the difference between the mean NA scores for our sample ($M = 18.00$, $SD = 5.27$) and the validation sample ($M = 18.10$, $SD = 5.90$), $t(760) = 0.16$, $p = .873$. Due to multicollinearity between the PA and the DPES, separate models were computed for the predictors DPES and PA/NA.

Prior to testing our hypotheses, we examined whether the passage of time affected the frequency and/or intensity of aesthetic experiences over the course of the study. We found a negative relationship between time and the frequency of aesthetic experiences, $\beta = -.08$, $exp(\beta) = OR = .92$, 95% confidence interval (CI) = [.91, .93]. This implies that as the study progressed, fewer aesthetic experiences were reported, probably reflecting a slight loss of motivation. Regarding the intensity of aesthetic experiences, there was neither a linear effect ($\beta_{stand} = .01$, $p = .115$) nor a quadratic effect ($\beta_{stand} = .00$, $p = .357$) of time, implying that the intensity of aesthetic experiences was constant over the course of the study. Due to the significant relationship between time and frequency of aesthetic experiences, time was included as a covariate in the testing of Hypotheses 1 and 2.

Hypotheses 1 & 2: Associations between dispositional affect and the probability of reporting an aesthetic experience

First, we determined how much variation there was at each level in the savoring of aesthetic experiences. This is quantified by the intraclass correlation coefficient (ICC),

which for a two-level model is defined as

$$ICC = \frac{\sigma^2}{\sigma^2 + \frac{\pi^2}{3}} = \frac{1.00}{1.00 + 3.29} = 0.23, \quad (1)$$

where σ^2 is the random intercept variance—that is, the level-2 variance component, and π^2 = 3.29 is the standard logistic distribution—that is, the assumed level-1 variance component. We used the assumed value because the logistic regression model does not include a level-1 residual. The result showed that 23% of the chances of having an aesthetic experience were explained by between-person differences.

To test the assumption that higher levels of dispositional PA would be positively related to the probability of reporting an aesthetic experience and higher levels of dispositional NA would be negatively related to the probability, we constructed a two-level model for the binary outcome variables. To interpret the coefficient β, we raised e (a constant with a value of 2.72) to the power β to obtain an odds ratio (OR). Formally, the OR indicates the multiplicative factor by which the predicted probability of reporting an aesthetic experience changes when the predictor increases by one unit.

For PA, the results showed that β = .01, $OR = exp(\beta)$ = 1.01, and 95% CI = [.98, 1.05]. Since the 95% CI for the OR included 1, this effect was not statistically significant. When time was entered into the model, only the main effect for time reached significance; β = -.10, OR = .91, and 95% CI = [.86, .96]. For the DPES, the total score was computed by averaging all items and was included as the predictor variable, and the results showed that β = .12, $OR = exp(\beta)$ = 1.13, and 95% CI = [.79, 1.62]. When time was entered as a covariate, neither the main effects nor the interaction between time and DPES reached significance. For NA, the results showed that $\beta = -.03$, $OR = exp(\beta)$ =.97, and 95% CI = [.93, 1.01]. When time was entered, only the main effect for time reached significance; β = -.15, OR = .86, and 95% CI = [.83, .89]. The

predictor variables did not buffer the negative effect of time on the reported frequency of aesthetic experiences. In sum, the present findings did not support Hypotheses 1 and 2.

Hypotheses 3 & 4: Associations between dispositional affect and the savoring of aesthetic experiences

To test whether dispositional PA would be positively related to the savoring of aesthetic experiences and dispositional NA would be negatively related to it, we constructed two random coefficient models (one including the PANAS scores and one including the DPES scores). For both analyses, a null model (i.e., a model with no predictors) was computed to determine whether there was sufficient variability in the sample in the intercepts at level 2 (across participants). In a second step, the predictor(s) were added. To assess whether the addition of the predictors improved the fit of our model, we employed the likelihood ratio (LR) chi-square difference test. LR tests are used to compare nested models, wherein a reduced model is compared to another model with additional parameters of interest.

PA (β = .02, p = .072) and NA (β = −.03, p = .077) were both found to be nonsignificant with a trend toward significance. Inclusion of the predictors significantly improved the model fit, with a reduction in the log-likelihood, χ^2 = 289.04, df = 2, p < .001. The results suggest that a higher DPES score was associated with higher savoring values (β = .48, p = .001). Inclusion of this predictor significantly improved the model fit, with a reduction in the log-likelihood, χ^2 = 1054.75, df = 1, p < .001. Due to multicollinearity, we conducted separate random coefficient models for each DPES subscale. *P*-values were adjusted in accordance with the Benjamini-Hochberg procedure in order to decrease the false discovery rate. Table 3 presents the results. In line with Hypothesis 3, dispositional joy (β = .30, SE = .08, t = 3.62, p = .007), contentment (β =

.18, *SE* = .07, *t* = 2.53, *p* = .046), and compassion (*β* = .17, *SE* = .07, *t* = 2.36, *p* = .049) were associated with higher savoring of aesthetic experiences. The relationships between savoring and humor (*β* = .12, *SE* = .09, *t* = 1.43, *p* = .182), love (*β* = .14, *SE* = .07, *t* = 1.90, *p* = .085), pride (*β* = .20, *SE* = .09, *t* = 2.19, *p* = .054), and awe (*β* = −.00, *SE* = .10, *t* = −.02, *p* = .980) did not reach significance. In sum, the results supported Hypothesis 3, but not Hypothesis 4.

Effect-size sensitivity analysis

We conducted sensitivity analyses for the non-significant results in order to determine the smallest effect size that could be detected with 80% power based on 1,000 Monte Carlo samples. For the relationship between DPES and the probability of an aesthetic experience, a large effect of *β* = .50 could be detected with 80% power. A medium effect (*β* = .30) could be detected with a power of 35%. For the predictors PA and NA, even effects as small as *β* = .06 could be detected with a power of 80%.

Discussion

In Study 1, dispositional affect questionnaires were related to previously collected ESM data in an ecologically valid first investigation of the role that dispositional affect plays in predicting the frequency and intensity of aesthetic experiences in everyday life. The results showed a positive relationship between dispositional PA and the intensity of aesthetic experiences, with dispositional positive emotions significantly predicting the savoring of aesthetic experiences. More specifically, individuals with a tendency to experience more positive emotions (especially joy, contentment, and compassion) reported higher savoring of their everyday aesthetic experiences. In contrast, the frequency of aesthetic experiences in everyday life did not appear to be related to dispositional PA, even though an effect-size sensitivity analysis indicated that small to

medium effects could be missed in the case of the DPES.

Study 2

The findings in Study 1 support our claim that dispositional PA would increase the intensity of aesthetic experiences. However, the study's design limited the potential sharpness of the conclusion because we related dispositional affect questionnaires to ESM data that were previously collected. As a consequence, the assumed predictor was assessed after the criterion, and any variance associated with the participants' current positive and negative state affect could not be removed. Given that a large proportion of the variance in the frequency and intensity of aesthetic experiences was accounted for independently of individual differences, we wanted to include at least some state affect measurements to disentangle whether the relationship between dispositional affect and aesthetic experiences might have been impacted by variance in state affect. Also, although aesthetic savoring as a 'time-tested model of aesthetic emotion' (Sundararajan, 2010, p. 1) is a direct indicator of the intensity of an aesthetic experience, we wanted to complement our findings with an assessment of more prototypical aesthetic emotions (e.g., the feeling of beauty, being moved). To overcome these limitations, we conceptually replicated our findings in Study 2.

Method

Participants

Ninety-eight individuals participated in Study 2. One data set was excluded from further analysis because the ESM file was unreadable. The final usable data came from a convenience sample of 87 students at the Helmut Schmidt University/University of the Federal Armed Forces Hamburg and ten participants from other professions. The student participants received course credit as compensation for their participation. The

participants (40 female, 57 male) were aged between 15 and 55 years (M = 24.06, SD = 4.36). The participants completed 48.06 (SD = 12.06, range = 18 to 106) usable experience sampling questionnaires on average. In total, the participants recorded ratings for 4,662 occasions. Again, the study received ethics approval for human subject research from a university institutional review board.

Materials

Experience Sampling Method Items

At each sampling time, participants responded to questions on the P.I.E.L. Survey app regarding their most recent aesthetic experience since the previous sampling time. They answered the question 'Have you had an aesthetic experience since the last sampling time?' using a binary *no/yes* scale. If they responded affirmatively, they were asked to specify the content of the aesthetic experience by choosing one of eight categories (visual art, performing art, music, literature, nature, humans, inanimate object, other). To assess the intensity of the aesthetic experience, we used ten items from the Aesthetic Emotions Scale (AESTHEMOS; Schindler et al., 2017). The purpose of this scale is to capture a spectrum of general aesthetic emotions which, in contrast to other instruments assessing aesthetic experience, are not specific to a certain aesthetic domain (Schindler et al., 2017). The original scale consists of 42 questions, 21 subscales, and seven superordinate subscales. In this study, we included the following subscales, based on the items' face validity and factor loadings: prototypical aesthetic emotions (seven items), epistemic aesthetic emotions (two items), and pleasing emotions (one item). Items were answered using a 5-point Likert-type scale ranging from 1 (*not at all*) to 5 (*very*). A reliability analysis showed that our selection of items had good internal consistency (see Table 1).

To minimize any incentive to take a shortcut, we developed 10 filler items that were presented to participants if they didn't report having an aesthetic experience. These items were unrelated to the research question. A sample item is 'I was busy with work'. All filler items were answered on a 7-point Likert scale ranging from 1 (*not at all*) to 7 (*very much*).

We used a six-item short scale (Wilhelm & Schoebi, 2007) to measure the basic mood dimensions valence (V), calmness (C), and energy (E) that people experience in everyday life. At each sampling time, irrespective of whether they reported an aesthetic experience, participants responded to the statement 'At this moment I feel:' in terms of six bipolar items, which were presented in the following order: tired–awake (E+), content–discontent (V–), agitated–calm (C+), full of energy–without energy (E–), unwell–well (V+), relaxed–tense (C–). Participants were asked to indicate their answers on a 7-point scale ranging from 0 (e.g., *very tired*) to 6 (e.g., *very awake*). Prior to the analyses, the data for three of the items were reverse coded, to ensure that higher scores indicated higher positive V, higher E, or higher C. The mood scale and each subscale showed good internal consistency values.

Dispositional Affect

Prior to the ESM investigation, participants completed the PANAS and DPES. Table 1 shows good Cronbach's alpha values for PA, NA, and DPES.

Procedure

As for the previous study, a 3-day pilot test with three volunteers was conducted prior to the ESM investigation to assure feasibility. Before the start of the study, all participants were provided with information about the procedure and gave their written informed consent and demographic information. The dispositional affect questionnaires were administered online. Participants were randomly assigned to the two questionnaire

sequences. After completing the questionnaires, participants were asked to download the P.I.E.L. Survey app to their own devices As in Study 1, they received a 30-min training session via telephone before the start of the study in which the concept of aesthetic experience was defined, an example of an aesthetic experience was provided, and they were asked for an example of an aesthetic experience that had occurred during the last 24 hours. The entire procedure and all items were also explained in detail, and participants completed a practice sample questionnaire.

During the 14 days that followed, participants were randomly prompted by the mobile app four times a day during individually chosen 60-min time blocks to fill out the questionnaire. The participants then had up to 15 min to initiate their response and up to 15 min to complete each question. At the end of the 14 days, the research assistant made a final phone call to the participants. They were asked about how their motivation to fill out the questionnaires might have changed during the 14 days. This call was also intended to ensure the quality of the data and to uncover participants' reasons for missing data and omitted questionnaires.

Results

The sequence of the questionnaires did not influence the DPES scores, $t(43) = .79$, $p = .436$, or the PA/NA scores, $t(43) = -.47$, $p = .640$; $t(43) = -1.75$, $p = .087$. Also, the number of usable experience sampling questionnaires for each participant was not related to dispositional affect or aesthetic experiences (all $p > .573$). Table 2 shows the means, standard deviations, and correlations between the predictors. Due to multicollinearity, we computed separate models for the three predictors. The ICC showed that 18% of the chances of having an aesthetic experience and 33% of the variance in the intensity of aesthetic experiences were explained by between-person differences. As in Study 1, we examined whether the passage of time had an effect on

the aesthetic experiences and found that there was a negative relationship between time and the frequency of aesthetic experiences, $\beta = -.01$, *exp(β)* = OR = .99, 95% CI= [.99, .99]. As in Study 1, there was neither a linear effect, $\beta_{stand} = .00$, $p = .292$, nor a quadratic effect of time, $\beta_{stand} = .00$, $p = .236$, on the intensity of the aesthetic experiences.

Consistent with Study 1, neither PA, $\beta = -.01$, *OR* = .99, 95% CI = [.95, 1.03], NA, $\beta = -.02$, *OR* = .98, 95% CI = [.95, 1.02], nor DPES, $\beta = .17$, OR = 1.19, 95% CI = [.92, 1.54], was associated with the frequency of aesthetic experiences. The findings therefore did not support Hypotheses 1 and 2. When entering time as a covariate in the respective models, neither the main effects of time and trait affect nor the interactions reached significance (all CI contained 1). Again, the predictor variables did not buffer the negative effect of time on the reported frequency of aesthetic experiences.

Also consistent with Study 1, PA, $\beta = .01$, $p = .170$, and NA, $\beta = -.00$, $p = .685$, were not associated with the intensity of the aesthetic experiences. Inclusion of the predictors did not improve the model fit, $\chi^2 = 1.89$, $df = 1$, $p = .170$; $\chi^2 = 0.17$, $df = 1$, $p = .685$. The findings suggest that higher DPES scores were associated with higher AESTHEMOS values, $\beta = .17$, $p = .012$. Inclusion of this predictor significantly improved the model fit, with a reduction in the log-likelihood, $\chi^2 = 6.35$, $df = 1$, $p = .012$. Figure 1 depicts the relationship between the DPES and the intensity of aesthetic experiences. Due to multicollinearity, we conducted separate random coefficient models for each DPES subscale. Table 4 shows the results. After the *p*-values were adjusted in accordance with the Benjamini-Hochberg procedure, none of the DPES subscales were significantly associated with higher AESTHEMOS scores, although there was a trend towards significance for compassion and awe ($p = .060$). In sum, the results partially supported Hypothesis 3, but not Hypothesis 4.

In the next step, we assessed the relationship between state affect and aesthetic experiences and whether state affect changes were involved in the relationship between trait affect and aesthetic experiences. We wanted to rule out the possibility that differences in state affect could override the relationship between trait affect and aesthetic experiences.The state affect measures of valence, β = .59, OR = 1.79, CI = [1.63, .1.97], energy, β = .49, OR = 1.63, CI = [1.50, 1.77], and calmness, β = .40, OR = 1.49, CI = [1.37, 1.62], were positively related to the probability of reporting an aesthetic experience. Also, valence, β = .16, SE = .01, t = 12.31, p < .001, energy, β = .09, SE = .01, t = 7.68, p < .001, and calmness, β = .09, SE = .01, t = 7.28, p < .001, were positively associated with the intensity of the aesthetic experiences. To determine whether the state affect moderated the relationship between dispositional affect and aesthetic experiences, we conducted moderation analyses. Table 5 shows the results. The analyses suggest that the relationship between NA and the probability of reporting an aesthetic experience was not moderated by mood (after applying Bonferroni correction, all *p*s > .216). However, the relationship between PA and the probability of reporting an aesthetic experience was moderated (after Bonferroni correction) by current valence, energy, and calmness. When they were in a bad mood, participants with higher dispositional PA tended to have more frequent aesthetic experiences than those with lower dispositional PA. Also, the relationship between DPES and the probability of reporting an aesthetic experience was significantly moderated (after Bonferroni correction) by energy; the lower their current energy level, the more likely it was for participants with high DPES scores to report an aesthetic experience. In sum, the lower a participant scored on the respective mood measure, the stronger was the association between dispositional PA and the frequency of aesthetic experiences. The relationship between NA/PA/DPES and the intensity of aesthetic experiences was not

moderated by state affect (after applying the Bonferroni correction, all *p*s > .063). However, valence was a significant moderator for both the relationship between PA and the AESTHEMOS, $\beta = -.08$, $SE = .02$, $t = -3.49$, $p < .001$, and the relationship between DPES and the AESTHEMOS, $\beta = -.06$, SE = .02, $t = -2.91$, $p = .016$. This indicates that when experiencing low-valenced affect, dispositionally positive participants had more intense aesthetic experiences.

Again, we conducted sensitivity analyses for the non-significant results to determine the smallest effect size that could be detected with 80% power based on 1,000 Monte Carlo samples. For the relationship between the predictors DPES, PA, and NA and the probability of reporting an aesthetic experience, a medium effect of $\beta_{stand} = .25$ (corresponding to $r = 0.30$; Peterson & Brown, 2005) could be detected with 80% power. For the probability of having an aesthetic experience, the results suggest that with 80% power a moderation effect of $\beta_{stand} = .20$ (corresponding to $r = 0.25$) could be detected. For the moderation analyses with the AESTHEMOS as the criterion, effects as small as $\beta_{stand} = .05$ (corresponding to $r = 0.10$) could be detected.

Discussion

As hypothesized, the results of Study 2 suggest that higher dispositional PA goes along with more intense aesthetic emotions in response to everyday aesthetic experiences. This study strengthens the notion that dispositional PA is associated with more intense aesthetic experiences and implies that this relationship is not specific to savoring, but also applies to other measures of aesthetic experience. The design of Study 2 made it possible to also investigate how an individual's current state affect was involved in the relationship between dispositional affect and aesthetic experiences. It appeared that when they were in a bad mood, participants with higher dispositional PA reported more

frequent aesthetic experiences in everyday life than those with lower dispositional PA.

General Discussion

This investigation examined the role of dispositional affect in predicting the frequency and intensity of aesthetic experiences in everyday life. Dispositional affect questionnaires were related to ESM data in an ecologically valid first investigation. The findings were then replicated in a second intensive ESM study.

In both studies, as hypothesized, dispositional PA significantly predicted the intensity of aesthetic experiences. Participants with a tendency to experience more positive emotions reported both higher savoring of aesthetic experiences and higher levels of aesthetic emotions. In the research on aesthetics, intense, profound, and memorable aesthetic experiences have received less attention than milder aesthetic experiences associated with pleasure, liking, or interest (Silvia et al., 2015). Wanzer et al. (2020) found that intense and engaging aesthetic experiences are associated with flow experiences. The present findings are therefore in line with evidence that negatively relates flow proneness to dispositional NA (Gray & McNaughton, 2000; Ullén et al., 2012) and positively to intrinsic enjoyment (Hamilton et al., 1984). A possible explanation of these findings could lie in the broader attentional distribution typically found when experiencing PA (e.g., Baas et al., 2008). When individuals are able to more completely integrate features of an aesthetic experience (e.g., different sensual information), the experience is likely to be more holistic, profound, and intense. In addition, Gross and John (2003) showed that PA negatively relates to a tendency to suppress positive emotions. Assuming that this also applies to aesthetic emotions, individuals high in dispositional PA might not dampen these emotions, which would in turn intensify the experience. In Study 1, dispositional joy, contentment, and compassion were associated with higher savoring ratings. Joy is a high-activation

emotion associated with a sense of the proximity of a reward (e.g., Dixson et al., 2018). People high in dispositional joy might therefore more readily focus on possibly rewarding experiences, such as the intrinsically gratifying experience of the aesthetic. In the same vein, there is evidence suggesting that the more individuals are able to focus their mental resources on an aesthetic experience, the more intense the experience will be (Weigand & Jacobsen, 2021a, 2021c). The emotion of contentment is characterized by a feeling that all of one's needs have been met (Cordaro et al., 2016) and a sense of security, satiety, and appreciation of the present moment (Campos et al., 2013). Maslow's classic hierarchy of needs (1943) posits that individuals must first meet physiological and safety needs before seeking additional opportunities. Unfulfilled primary needs receive the most attention (Tay & Diener, 2011). Therefore, it is not surprising that dispositionally content individuals are more prone to savor aesthetic experiences. The emotion of compassion is characterized by a motivation to relieve the suffering of others (Goetz et al., 2010). Compassion includes mindful attention to the present moment (Halifax, 2011). This state minimizes distractions and enhances one's ability to focus on the aesthetic features of a situation, which increases savoring (Weigand & Jacobsen, 2021a).

In contrast, dispositional affect did not predict the frequency of aesthetic experiences. Evidence suggests that aesthetic experiences require little time since aesthetic judgments can be formed based on very brief glances at information (e.g., Verhavert et al., 2018). At the same time, to elicit an aesthetic experience, a stimulus must exceed the beholder's aesthetic threshold (Fechner, 1876; Jacobsen et al., 2006). In our study, it appears that dispositional affect did not alter the beholder's aesthetic threshold, although—at least for the DPES in Study 1—this result could have been the consequence of insufficient power.

The results of Study 2 allow removing the variance associated with the state affect. Associations were found between PA and both the probability and intensity of aesthetic experiences. Interestingly, the relationship between dispositional PA and the frequency of aesthetic experiences was moderated by the participant's state affect. In the case of participants whose moods were less positive, those with higher dispositional PA scores appeared to have more frequent aesthetic experiences than those with lower scores. This is especially interesting because we did not find any relationship between dispositional affect and the frequency of aesthetic experiences. Consequently, it appears that when individuals are in a positive mood, dispositional affect differences might not be relevant in accounting for the variance in their frequency of aesthetic experiences; but when individuals are in a bad mood, those higher in dispositional PA might be more likely to have aesthetic experiences. It is important to note that the present findings cannot establish cause-and-effect relationships between individuals' state affect and aesthetic experiences since both were measured at the same sampling time. Future studies focusing on this research question should capture the two variables at different time points.

The findings of the present research have several practical implications. First, if individuals' dispositional affect does not change the odds of their having aesthetic experiences, but only impairs the intensity of such experiences, this may lay the ground for approaching the topic from a positive psychology point of view. In general, positive emotions are known to enhance various personal resources, such as resilience (Fredrickson, 2013). The savoring of aesthetic experiences, in particular, has been associated with higher levels of well-being and life satisfaction, as well as less negative affect and depression (Jose et al., 2012; Weytens et al., 2014). Therefore, if practitioners can implement strategies to intensify aesthetic experiences, people could benefit from

various positive health outcomes. For example, learning strategies for savoring could intensify aesthetic experiences (Quoidbach et al., 2010): Individuals could express positive emotions using nonverbal behaviors and deliberately direct their attention to the present experience. Also, they could communicate and celebrate these experiences. Accordingly, regardless of their dispositional affect, individuals could learn to make better use of their aesthetic experiences. This may be especially relevant for individuals who have less access to other forms of positive experiences, such as social or financial rewards. The advantage of the aesthetic experience approach lies in its ubiquity and relative independence from other people, success, and, generally, 'earthly matters'.

Several limitations[2] of this research should be mentioned. First, the sample in Study 1 was drawn from a university population. Even though the dispositional affect measures resembled the values found in the validation sample and Study 2 also included individuals from other professions, future studies might consider a more diverse sample. Second, the data for this research do not allow drawing any conclusions about samples with extreme dispositional affect scores. In future studies, it would be interesting to specifically target clinical subgroups in order to examine the extent to which depressed individuals are able to have aesthetic experiences. If they still possess this capacity, it might provide an important starting point for interventions that are targeted at intensifying those experiences. A third limitation is that the data on dispositional affect were collected through self-reports, and even though two different scales were used to measure dispositional affect, the present research does not fully take into account the breadth of the construct. For example, despite the wide use of the PANAS, the scales only measure the high-activation ends of the affective dimensions (Russell & Carroll, 1999). Also, there exist other types of positive emotions, for example, gratitude, interest, and hope (e.g., Güsewell & Ruch, 2012b). Despite the correlation between PA

as identified by the PANAS and the DPES, only the latter is related to aesthetic experiences, emphasizing the differences between the instruments. The present investigation is based on a maximally open and uncontrolled measurement of aesthetic experiences, focusing neither on specific situations (such as a museum or a concert) nor on certain aesthetic domains (such as art). Despite the noisy measurement conditions, a significant effect was observed and replicated in a conceptually altered design with another criterion variable. It is reasonable to expect an even larger effect under more controlled conditions. Therefore, to establish a cause-and-effect relationship, careful replication under more controlled and restricted, albeit valid, conditions will be required.

In conclusion, the present research offers new and ecologically valid insights into the relationship between dispositional affect and aesthetic experiences. It appears that dispositional PA is associated with the intensity of aesthetic experiences. This research sheds light on meaningful individual differences in aesthetic experiences. All in all, wearing rose-colored glasses may not change the amount of beauty we see, but rather what we make of it.

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Disclosure Statement

The authors declare that there is no conflict of interest.

Data Availability Statement

The experience sampling data for Study 1 are available on PsychData at https://doi.org/10.5160/psychdata.wdre20pr28, and the data for Study 2 are available on PsychData at https://doi.org/10.5160/psychdata.wdre21pr16. Requests for the materials can be sent via email to the lead author.

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Footnotes

[1]The ESM data described in Study 1 were originally collected as part of another research project (Weigand & Jacobsen, 2021a; for the data, see Weigand & Jacobsen, 2021b). For the reader's convenience, there is some duplication here in reporting the methodological details of the studies.

[2]We note that our sensitivity analyses indicated that for the relationship between DPES and the probability of an aesthetic experience in Study 1, a medium effect could only be detected with a power of 35%. In Study 2, for the probability of having an aesthetic experience, small moderation effects could have been missed. Future studies should aim at a larger sample size to overcome these power issues.

Table 1

Cronbach's Alphas for the Scales and Subscales in Study 1 and Study 2

Scale	*N*	Number of items	Cronbach's alpha
	Study 1		
Savoring	5089	3	.86
DPES	99	38	.88
joy	99	6	.86
contentment	99	5	.92
compassion	99	5	.91
pride	99	5	.86
love	99	6	.85
humor	99	5	.79
awe	99	6	.58
PANAS - PA	99	10	.83
PANAS - NA	99	10	.82
	Study 2		
AESTHEMOS	1931	10	.79
Mood	4638	6	.87
valence	4639	2	.86
calmness	4638	2	.82
energy	4639	2	.80
DPES	97	38	.91
joy	97	6	.87
contentment	97	5	.93
compassion	97	5	.84
pride	97	5	.80
love	97	6	.81
humor	97	5	.77
awe	97	6	.72
PANAS - PA	97	10	.83
PANAS - NA	97	10	.85

Table 2

Summary Statistics and Bivariate Correlations for Studies 1 and 2

	Study 1					Study 2	
Variable	*M*	*SD*	1	2	3	*M*	*SD*
1 PA	33.75	5.94	-	-.264**	.566**	35.95	5.66
2 NA	18.00	5.27	.059	-	-.396**	18.15	5.71
3 DPES	4.77	0.53	.492**	-.029	-	4.77	0.67

Note. The results for Study 1 are reported below the diagonal ($N = 99$) and the results for Study 2 are reported above the diagonal ($N = 97$); *M* and *SD* denote the mean and standard deviation, respectively. * $p < .05$; ** $p < .01$.

Table 3

Study 1: General Linear Mixed Models for the Savoring and DPES Subscales After Applying Benjamini-Hochberg Correction

	joy	contentment	compassion	humor	love	pride	awe
Estimate	.30**	.18*	.17*	.12	.14	.20	-.00
CI lower	.13	.04	.03	-.05	-.01	.02	-.20
CI upper	.46	.33	.32	.29	.29	.38	.20
SE	.08	.07	.07	.09	.07	.09	.10
t-value	3.62	2.53	2.36	1.43	1.90	2.19	-.02

Note. Dependent variable: *savoring*. * $p < .05$; ** $p < .01$.

Table 4

Study 2: General Linear Mixed Models for the AESTHEMOS and DPES Subscales After Applying Benjamini-Hochberg Correction

	joy	contentment	compassion	humor	love	pride	awe
Estimate	.09	.06	.13	-.04	.08	.11	.11
CI lower	-.00	-.01	.03	-.13	-.00	.00	.02
CI upper	.18	.14	.22	.05	.16	.22	.20
SE	.04	.04	.05	.04	.04	.05	.05
t-value	1.96	1.67	2.67	-.96	1.90	2.10	2.44

Note. Dependent variable: *AESTHEMOS*. *$p < .05$; **$p < .01$.

Table 5

Moderation of State Affect Analyses With Bonferroni-corrected P-values

Dependent variable: Frequency of aesthetic experiences					
	Coeff	*OR*	*p*	CI_L	CI_U
PA × Valence	-.13**	.87	.000	-.21	-.06
PA × Calmness	-.13**	.88	.009	.82	.95
PA × Energy	-.12**	.89	.009	.82	.95
NA × Valence	.03	1.03	.999	.96	1.11
NA × Calmness	.09	1.09	.216	1.01	1.17
NA × Energy	.07	1.08	.405	1.00	1.16
DPES × Valence	-.07	.93	.279	.87	.99
DPES × Calmness	-.08	.93	.279	.86	.99
DPES × Energy	-.13**	.88	.000	.82	.94
Dependent variable: Intensity of aesthetic experiences					
	Coeff	*OR*	*t*	*p*	CI_L	CI_U
PA × Valence	-.05	.02	-2.72	.063	-.08	-.01
PA × Calmness	-.01	.02	-.78	.999	-.05	.02
PA × Energy	-.01	.02	-.39	.999	-.04	.03
NA × Valence	.00	.02	.17	.999	-.03	.04
NA × Calmness	.00	.02	.03	.999	-.03	.04
NA × Energy	.02	.02	1.08	.999	-.02	.05
DPES × Valence	-.04	.02	-2.43	.135	-.08	-.01
DPES × Calmness	-.03	.02	-1.82	.999	-.06	.00
DPES × Energy	-.01	.02	-.31	.999	-.04	.03

Note. *$p < .05$; **$p < .01$.

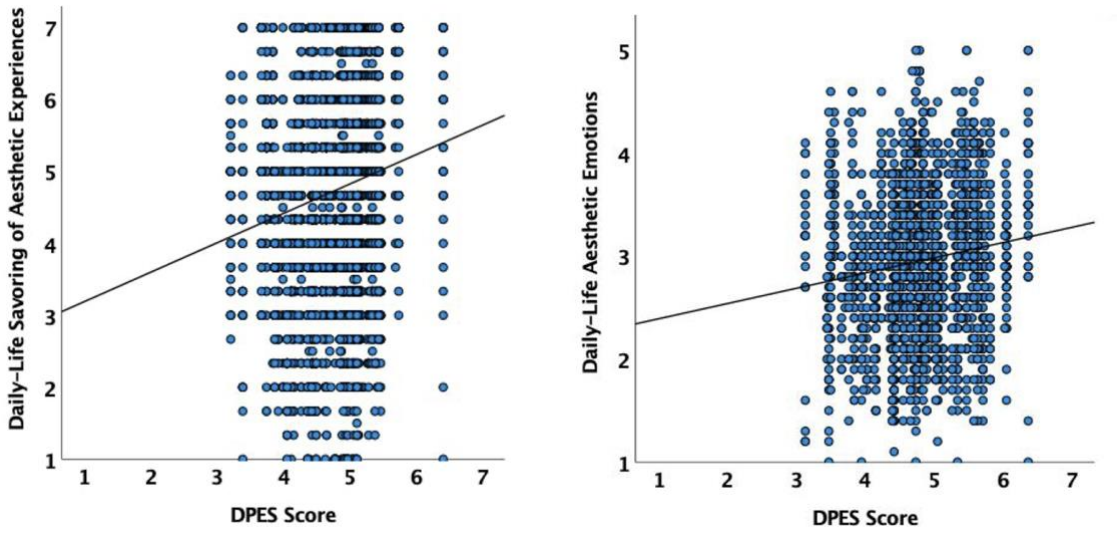

Figure 1. The relations between the dispositional propensity to experience positive emotions and both everyday-life savoring of aesthetic experiences (left) and everyday-life experiences of aesthetic emotions (right). Values on the y-axes represent the average savoring values (left panel) and the average AESTHEMOS values (right panel). Values on the x-axis represent the average DPES scores.