Interruption, Work Rumination, and Stress as Indicators of Reduced Working Memory Resources Affect Aesthetic Experiences

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Word count for the text: 8481 words

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Abstract

Do we savour aesthetic experiences less when distracted by interrupted tasks, work rumination or stress? Evidence suggests that the ability to concentrate on the aesthetic experience is crucial for initiating a processing mode of conscious aesthetic reception that results in more positive emotions. When working memory resources are otherwise occupied, people are less able to concentrate on aesthetic experiences. Aesthetic savouring, in particular—a cognitive form of emotion regulation that is used to maintain and extend aesthetic experiences—is thought to be impaired under those circumstances. We conducted three investigations to examine how conditions that are known to deplete working memory resources affect the savouring of aesthetic experiences. In Study 1, participants rated beauty and savouring felt from encounters with visual stimuli in a controlled laboratory setting after an interruption of a writing task. Aesthetic experience was hampered if participants were interrupted. In two field investigations, we demonstrated that work-related rumination (Study 2, $N = 329$) and stress (Study 3, $N = 368$) are inversely related to the savouring felt from opera, theater, or cabaret pieces. These findings highlight the importance of concentrating on aesthetic experiences so that the perceiver can fully benefit from them. We also discuss implications for cognitive models of working memory and for health and well-being.

Keywords: Interruption, rumination, stress, savouring, aesthetic experiences, unfinished tasks, concentration, working memory

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Aesthetic processing can be viewed as the sensation-based evaluation of an entity with respect to a relevant concept, such as the beauty dimension (Jacobsen, 2006), and can be divided into aesthetic production (e.g., painting, dancing) and *aesthetic appreciation (*e.g., Jacobsen & Höfel, 2003). There are different aesthetic appreciation qualities, for instance, aesthetic judgment, aesthetic contemplation, and aesthetic distraction (e.g., Höfel & Jacobsen, 2007). Aesthetic distraction refers to involuntarily switching attention to the aesthetic processing of a stimulus. Aesthetic contemplation involves reflective thinking about the aesthetic value of an object. Finally, aesthetic judgment refers to a decision about the object's aesthetic value (e.g., Jacobsen et al., 2004). Brattico et al. (2013) proposed that to fully realise an aesthetic experience, a particular (aesthetic) attitude, intentionality, attention, and an appropriate context are required. When those preconditions are present, the aesthetic experience may come to full fruition by inducing aesthetic emotions (e.g., being moved, joy, nostalgia; Menninghaus et al., 2019) and by laying the foundation for developing liking and a preference. Aesthetic experiences arise in response to a variety of domains, including not only artistic genres (e.g., fine art, performing art, applied art), but also architecture (Vartanian et al., 2013) and the objects of everyday life, such as nature or living beings (Jacobsen & Beudt, 2017).

In order to gain a comprehensive and domain-general understanding of aesthetic experiences, one that ranges from art reception to everyday aesthetic experiences and can account for different situations and interindividual differences, several researchers (e.g., Jacobsen, 2010b) stressed the importance of considering the mental mode of processing (i.e., how information is represented in working memory; MacInnis & Price, 1987) that is involved in aesthetic experiences. There is evidence suggesting a distinct mental mode of processing underlying all

qualities of aesthetic appreciation: This mode comprises a disinterested interest, which entails an attentional focus on the stimulus and an integration of context, memory, and sensory qualities while at the same time neglecting self-referred concerns or everyday life perceptions (Chatterjee & Vartanian, 2014; Cupchik et al., 2009; Menninghaus et al., 2017). Importantly, maintaining an accurate and high level of attention to a stimulus over a certain period of time—a process called sustained attention or *concentration* (Buehner et al., 2006; Geissler, 1909; Peak & Boring, 1926; Van Breukelen, 1989; Westhoff & Kluck, 1984)—should play a necessary role in the aesthetic mode of processing due to the multitude of memory processes to which the perceiver must attend during an aesthetic experience. For example, *procedural memory* contributes to differences in aesthetic appreciation, as suggested by Nodine et al. (1993), who found different visual scanning patterns in art experts versus laypersons. Moreover, the influence of *semantic memory* on aesthetic appreciation is reflected in the influence of expertise on art appreciation: Background information about an aesthetic stimulus has been shown to influence aesthetic appreciation (Leder et al., 2006). *Episodic memory* is also thought to play a fundamental role in the context of music, where it is considered conducive to aesthetic emotions (e.g., Konecni, 2008).

Upon encountering an aesthetic stimulus, processing in the aesthetic mode begins with a selection of these memory systems and objective features of the stimulus and the situation compete for limited *working memory resources*. Working memory is often described as a mental workspace where relevant information is kept in an active state, available for a variety of other cognitive processes (Baddeley & Hitch, 1974). One of the central limits of human cognition is the restricted amount of information that can be kept in working memory (e.g., Cowan, 2005, 2010). Variation in working memory resources is associated with variation in control of attention (Kane et al., 2007). Since aesthetic experience situations vary significantly in complexity (Jacobsen, 2010b), the complexity of the mental processing involved in aesthetic appreciation episodes also

varies to a great degree. For example, the level of processing (Craik & Lockhart, 1972) should vary with the different aesthetic appreciation qualities, with aesthetic contemplation and judgment requiring the highest level of mental processing (e.g., Jacobsen & Höfel, 2003; Leder et al., 2006). Some instances of aesthetic appreciation, like a glimpse at a pretty face, may engage only a few automatic mental processes, such as the activation of highly accessible prototypes and attitudes. Such instances may therefore require less concentration in the aesthetic mode. Other instances, like an evening at the opera, simultaneously engage a multitude of (automatic and controlled) processes.

In the present study, we investigated how settings or situations that have the potential to interfere with working memory resources affect aesthetic experience. Theoretical accounts imply that concentration on the aesthetic experience maximises the pleasure derived from the experience (Chatterjee, 2004; Leder et al., 2004; Menninghaus et al., 2017). Sarasso and coworkers (2020) even suggested that the instinct to attend to aesthetic stimuli is activated only when not otherwise involved in some goal-oriented behavior. However, during aesthetic experiences, even if there is no other external stimulation, there are typically other factors competing for attention, such as emotions or thoughts that are unrelated to the current experience. In those instances, we believe that aesthetic experience should be diminished because those factors divert the concentration that is necessary for the aesthetic mode of processing. In line with that, first laboratory investigations suggest that distraction via a working memory preload task reduced understanding of artworks (Mullennix et al., 2018) and the beauty felt from beautiful stimuli (Brielmann & Pelli, 2017).

Here, we focus on three phenomena that require working memory resources. We involved participants in an unrelated task which they had to leave unfinished before engaging in aesthetic experience (Study 1), and investigated how two mental states that deplete working memory

resources (i.e., work rumination and stress; Study 2 and Study 3) relate to the intensity of aesthetic experience.

We predicted that interruption, work rumination, and stress as indicators of depleted working memory resources will negatively affect aesthetic experiences because concentration in the aesthetic mode will be impaired. Specifically, we aimed to investigate how the *savouring* of aesthetic experiences is affected. The Chinese concept of *pin wei* (savouring; Sundararajan, 2010) is a time-tested model of aesthetic emotion that refers to the appreciation and extensive processing of personal emotional information in aesthetic contexts. Savouring includes clear focusing on the (aesthetic) experience (Bryant, 1989; Bryant & Veroff, 2007), thereby affording attentional capacity. On a cognitive level, savouring requires an engaged detachment, which is a combination of detachment from pragmatic concerns and action, on the one hand, and immersion in the current aesthetic experience, on the other (Sundararajan, 2015). Therefore, savouring can be considered a direct indicator of the intensity of the aesthetic processing mode.

We hypothesise that interruption, work rumination, and stress impair savouring of aesthetic experiences. The present article reports one laboratory experiment and two field surveys that tested this prediction. To assess the generality of our prediction and to maximise validity, we employed two different methodological approaches (experiment vs. survey) and settings (laboratory vs. field research). In addition, in order to make more domain-general predictions, we investigated different aesthetic domains. By combining those methods, we hoped to obtain a sharper and more convincing inference.

Study 1

In Study 1, we investigated whether a secondary, unfinished task affects aesthetic

experiences. Unfinished tasks are tasks that an individual aimed to finish, but were left unfinished in an unsatisfactory state when that person stopped working (Syrek et al., 2017). Perhaps the most well-known consequence of interruptions is the memory effect that unfinished tasks are remembered better than finished tasks (Zeigarnik, 1927). People tend to resume unfinished tasks, even when that action doesn't have any benefit for them (Ovsiankina, 1928). According to field theory (Lewin, 1935, 1939), motivational tensions and a need for closure exist for the purpose of reaching relevant goals and closing the gap between an actual and a desired state, leading to thoughts and behavior aimed towards task fulfillment. Due to this need for closure (Lewin, 1939), and in order to preserve the contents of a (yet unfinished) task, the task is continuously represented in working memory and therefore better recollected. Once a person feels committed to a task, (all) mental processes (such as attention, perception, or thoughts) are directed towards task completion (Masicampo & Baumeister, 2011). If the task remains unfinished, the tension is not reduced (Lewin, 1935), and the mind keeps the task active in order to be vigilant for opportunities to complete it (Masicampo & Baumeister, 2011; Moskowitz, 2002). Masicampo and Baumeister (2011) were able to demonstrate that thoughts of unfinished tasks intrude during subsequent tasks, remain highly accessible in memory, and interfere with performance in unrelated tasks. Consequently, individuals are less able to consciously or mindfully attend to their positive present experiences when they are mentally occupied with upcoming duties (Brown & Ryan, 2003). Based on this, it can be hypothesised that unfinished tasks impair concentration and will therefore affect the savouring of aesthetic experiences.

Prior to the actual study, a precursor experiment (Study 0) was conducted which is fully reported in the Supplementary Materials. During two sessions (i.e., T1 and T2) that were spaced one week apart, a sample of 45 students rated pictures of art and landscape in the laboratory. In one of those two sessions, participants were interrupted during a previous, personally meaningful

task. Study 0 offered evidence that art stimuli were savoured less and rated as less beautiful after the perceiver has been interrupted in a previous writing task—but only if the perceiver had already completed the task once before. That is, this effect was not observed if the interruption took place at T1. In contrast to the other participants, those who were interrupted at T1 had not previously had the experience of successfully finishing the writing task and therefore may not have been able to see what it would take to finish it. Probably, they did not perceive the writing task as relevant and even anticipated being interrupted again. The increased goal relevance of a stimulus or task causes it to be stored with enhanced precision and at the cost of poorer memory for other stimuli (Ma et al., 2014). Also, Oyama et al. (2018) stressed the importance of structured tasks for maximizing the motivation to reengage in a task. Therefore, when participants were interrupted, it might have been critical for them to understand what more was needed to successfully complete the task.

After Study 0, several small modifications were made to the study design. First, all participants were interrupted at T2 to ensure that every participant had already completed the writing task once before and knew what it would take to finish it. Second, in Study 1, only art stimuli were used. Possible explanations of why the effect might not have been observed for landscape pictures can be found in the General Discussion.

Method

Participants

An a priori power analysis using G Power (Buchner et al., 1992) was conducted in order to determine the necessary sample size for detecting the hypothesised main effect of task interruption. Other investigations (Mullennix et al., 2018; Brielmann & Pelli, 2017) reported medium to large effect sizes (e.g., partial $\eta^2 = .12$ for the effect of cognitive preload on aesthetic

experience in Mullennix et al., 2018). The power analysis indicated that a sample size of 21 was necessary to detect a medium size effect with a 80% probability ($\alpha = .05$). Based on the group size of the participants in Study 0, 28 Helmut Schmidt University students were invited to participate in the second experiment in exchange for partial fulfillment of course requirements. Four of these students were excluded from further analysis: One reported having been told about the interruption at T2 by another participant, two participants had already finished the writing task prior to the interruption, and one person was excluded from the analysis due to extreme values. Including this latter participant's data did not significantly alter the findings. The remaining 24 participants included 9 women and 15 men, and the mean age was 22.67 years (*SD* = 2.44, min = 19, max = 29). Prior to the experiment, all of the students received written information about the study procedure and gave their informed written consent. To assess the amount of art interest and knowledge possessed by the participants, we asked them to complete the German version of the Vienna Art Interest and Art Knowledge Questionnaire (VAIAK; Specker et al., 2018). We compared our VAIAK data with the data for the laypersons (psychology students) from the VAIAK validation sample. Art interest scores could range from 11 to 77. There was a significant difference between the means for art interest in this sample (M = 29.92, SD = 13.25) and in the laypersons from the validation sample (M = 42.46, SD = 13.14), $t(762) = 4.60$, $p < .001$, as well as a difference in art knowledge. The validation sample correctly answered 6.26 (SD = 3.14) questions (out of 26) on average, while our sample correctly answered 3.54 (SD = 2.77) questions on average, $t(762) = 4.19$, $p < .001$, indicating that our participants' overall interest in and knowledge of art were lower than the average of the VAIAK validation sample.

Measures

Writing task. Based on the work of Oyama et al. (2018), a short and structured

composition task was used to operationalise the independent variable. The task was chosen to be personally relevant, related to the work context, and high in ecological validity. Oyama et al. (2018) were able to show that interruption of a structured task leads to greater motivation to reengage in that task. Therefore, we used a structured task regarding which participants, when interrupted, were able to understand what more was needed to successfully complete the task. Due to the within-subject-design, we used two comparable writing tasks (A and B), each of which comprised two parts. In Part 1, participants were asked to write about (A) their basic training ("Grundausbildung") or (B) their officers' course ("Offizierslehrgang I") in the German Federal Armed Forces. We wanted Part 2 to be personally relevant because that is where the interruption took place. Participants were asked to write about (A) their first steps at the university, their military career plans, and how they imagined the next twenty years of their careers, or (B) their expectations regarding the study time in terms of their fears and the aspects they were looking forward to, their motivation to become an officer in the military, and the process that led to this decision.

Manipulation check. To assess the effectiveness of the interruption, we adopted a German version of a four-item scale developed by Schwörer et al. (2019) that assesses the well-roundedness of endings and a sense of closure. Participants rated the items "Considering the end of the writing task, to what degree does it feel well-rounded?," "When I think about the writing task, I feel that I have done everything I could have done," "When I think about the writing task, I have a feeling of completeness," and "When I think about the writing task, I have a feeling of closure" on a 7-point Likert scale ranging from 1 (*not at all*) to 7 (*very much*; McDonald's ω = .87).

Savouring and Beauty. To assess savouring, we used items from Schall et al. (2017). We asked participants to report their agreement with three items following the phrase "When I see

this picture ... ": "I am savouring the present moment," "I am thinking about things that make me feel happy," and "I am thinking about things that make me feel pleasure" on a 7-point Likert scale ranging from 1 (*not at all*) to 7 (*very much*). All savouring items were strongly correlated with one another and demonstrated high internal consistency (between $\omega = .91$ and $\omega = .96$). Beauty was measured using the question "Is this a beautiful picture?," which was rated on a 7-point Likert scale ranging from 1 (*not at all*) to 7 (*very much*).

Apparatus and Stimuli. Participants were seated at a distance of approximately 1.2 m from the front of a monitor that was placed at eye height when they were seated. Images were presented on a dark gray background in the center of the screen. To make a response judgment, participants were required to press one of seven response keys (labeled "1" to "7").

The visual stimuli consisted of 21 artworks (one for practice trial, 20 for experimental trials). With the kind permission of the authors, we were able to use the stimulus material originally used by Leder et al. (2014). In a pretest by Leder et al. (2014), psychology students rated 240 contemporary artworks according to valence, arousal, aesthetic quality, and liking (using 5-point scales). The authors selected 64 of these artworks. For our purpose, we computed the sum of the median ratings for aesthetic quality and liking. We chose 10 beautiful stimuli—positive-valenced (median rating of 4 or 5) pictures with a median sum of 7 or higher—and 10 not-so-beautiful stimuli—negative-valenced (median < 4) pictures with a median sum of 4 or lower. Images with high median arousal ratings (4 and 5) in the not-so-beautiful condition were excluded. All stimuli were adjusted to approximately the same dimensions.

Need for Closure. In line with Mark et al. (2008), we expected that disruption costs might be mitigated by personality factors. We expected that the lower the need for cognitive closure, the lower the disruption cost, and the less participants would be influenced in their

beauty and savouring ratings. We employed the German version of the Need for Cognitive Closure scale (NFCC; Collani, 2004; Webster & Kruglanski, 1994) to assess a possible moderating effect of NFCC. The NFCC scale (total 25 items, $\omega = .84$) has two subscales, denoted as Personal Need for Structure (PNS; 18 items, $\omega = .85$) and (Un-)decisiveness (seven items, $\omega = .72$). All items (e.g., "I hate to change my plans at the last minute") were rated on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). The scale was computed via sum scores (Webster & Kruglanski, 1994).

Mood. To control for mood effects, the self-report scales Positive and Negative Affect Schedule (PANAS; Krohne et al., 1996; Watson et al., 1988) and Self-Assessment Manikin (SAM; Bradley & Lang, 1994) were administered at the beginning and at the end of each experimental session in a paper-and-pencil format. The SAM assesses valence, dominance, and arousal ratings using 9-point scales with pictorial anchors. The PANAS consists of 10 positive and 10 negative affective states. Participants rated the intensity of each affective state during the experience on a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*extremely*). The reliability measure McDonald's omega ranged from .84 to .88 and from .60 to .85, respectively, for the Positive Affect (PA) and Negative Affect (NA) scales of the PANAS.

Research Design

We employed an experimental 2 × 2 factorial design with a within-subject variable interruption (interruption-yes vs. interruption-no) and a within-subject variable degree of beauty (not so beautiful vs. beautiful). Savouring and beauty were used as dependent variables.

Procedure

The experiment consisted of two sessions that were spaced one week apart. Each session took about 45 min, and participants were tested individually. In order to ensure that participants

had no urgent unfinished tasks in mind, the experimenter read the following in a neutral tone prior to the experiment: “You will now participate in a laboratory experiment. In order to assure your full concentration, please mute your mobile phones for the duration of the experiment. If you have any urgent thing to do (e.g., texting someone, going to the bathroom), please do it before the experiment begins.”

After filling out the PANAS and SAM, participants were given the written instructions for the writing task. Parts 1 and 2 of the writing task were written on two different sheets of paper. The experimenter read both parts to the participants prior to the start of the writing task, so that they could memorise what had to be done in both parts and probably prestructure the task in their heads. Participants were asked to hand the sheet for Part 1 of the writing task to the experimenter as soon as they had finished it. At T1, participants were given the time to finish both parts. At T2, they were interrupted three min after the start of Part 2. We chose this timing because a significant amount of literature indicates that an individual’s motivation to complete a goal-oriented activity critically depends on his/her perceived temporal distance from the desired end (Henderson et al., 2011; Kivetz et al., 2006; Touré-Tillery & Fishbach, 2011). Therefore, determination of the point of interruption was critical. González and Mark (2004) found that, on a typical day, people work three minutes on average on a single task before switching to another activity. By choosing three min as the point of interruption, we would be able to generalise our findings to the everyday work context. Also, after three min, participants should be able to understand what more was needed to complete the entire task while, at the same time, a sufficient amount of work remained to be done. The experimenter ended the writing task by saying: “May I interrupt you? We now have to continue with the next task.”

In each session, participants completed an aesthetic judgement task consisting of 20 trials. The order of trials was pseudo-randomised with the constraint that within each set of four trials,

two trials were based on beautiful and two on not-so-beautiful stimuli. The stimuli were presented using Presentation (Neurobehavioral Systems, Albany, CA, USA), which also registered the judgment responses and latencies. One practice trial preceded the main experiment. The practice stimulus was not included in the main experiment. Each experimental trial began with a centered fixation cross presented for 1000 ms on a gray background. The subsequent presentation of the stimulus lasted 4000 ms before the first item appeared under the stimulus picture. Each item remained on the screen until a response was given and was then followed by the next item. After the last response, the stimulus was followed by a 2000-ms interstimulus interval before the fixation cross appeared again. Following the experiment, the manipulation check as well as the PANAS and SAM were given to participants. At the end of T1, demographic data were obtained and participants were asked to fill out the VAIAK. At the end of T2, participants were asked to fill out the NFCC questionnaire and were fully debriefed.

Results

In all statistical analyses, a statistical significance criterion of .05 was employed.

Comparability of the Writing Task Versions

In a multivariate ANOVA, no differences were observed between the two versions of the writing tasks in terms of participants' post-task PA and NA, valence, arousal, and dominance, the number of written words, savouring and beauty ratings, or the perceived well-roundedness of the writing task (p = .149). This indicates that parallel versions of the writing task had indeed been developed.

Manipulation Check

A paired-samples t-test was conducted to compare the mean values of the well-roundedness scores for the writing task between the interruption-yes and interruption-no

conditions. There was a significant difference between the scores for the interruption-yes (M = 2.13, SD = 1.23) and interruption-no (M = 4.50, SD = 1.15) conditions; $t(23) = -7.28$, $p < .001$. This suggests that the interruption influenced participants' perception of the well-roundedness of the writing task—specifically, the interruption led to a feeling of less well-roundedness.

Savouring and Beauty

We computed two separate 2 (interruption) × 2 (degree of beauty) mixed repeated-measures analyses of variance (rmANOVAs) with beauty and savouring as the dependent variables to test our hypothesis. We found a significant main effect of interruption on savouring and beauty ratings, with higher savouring ratings in the interruption-no condition (M = 3.48, SD = .66) compared to the interruption-yes condition (M = 3.28, SD = .83), $F(1, 23) = 4.37$, $p = .048$, partial $\eta^2 = .16$, and higher beauty ratings in the interruption-no condition (M = 3.67, SD = .78) compared to the interruption-yes condition (M = 3.45, SD = .80), $F(1, 23) = 7.00$, $p = .014$, partial $\eta^2 = .23$. The effect sizes indicated medium to large size effects. Figure 1 shows the average savouring and beauty ratings for both interruption conditions. The interaction between interruption and degree of beauty did not reach significance for either savouring, $F(1, 23) = .30$, $p = .589$, partial $\eta^2 = .01$, or beauty ratings, $F(1, 23) = .03$, $p = .871$, partial $\eta^2 = .00$.

[insert Figure 1.]

Mood Effects

Table 1 shows the means and standard deviations of the mood measurements before and after the experiment at T1 (i.e., interruption-no) and T2 (i.e., interruption-yes), respectively. We ran several paired-samples t-tests with a Bonferroni adjustment to compare the pre- and post-experimental mood measurements. For T1, we found a small decrease in NA between the pre-

experimental assessment (M = 1.33, SD = .32) and the post-experimental assessment (M = 1.20, SD = .63); $t(23) = 3.71$, $p = .005$, Cohen's $d = .18$. For T2, the results from pre-experimental PA (M = 3.26, SD = .63) and the post-experimental PA (M = 3.07, SD = .71) indicate that after the interruption, participants experienced a small decrease in PA, $t(23) = 3.00$, $p = .030$, $d = .31$."

Then, we explored the potential mediating role that mood changes might play in accounting for differences in beauty and savouring ratings between the two conditions. For this analysis, we used the MEMORE macro developed to assess statistical mediation in within-subjects designs (Montoya & Hayes, 2017). We conducted parallel mediation analyses with the differences between beauty (and savouring) ratings in the interruption-yes versus interruption-no conditions as the outcome, and condition differences between pre-post-difference scores for positive and negative affect, valence, arousal, and dominance as parallel mediators. We explored whether lower beauty or savouring ratings in the interruption-yes condition compared to the interruption-no condition were accounted for by condition differences in mood using a bootstrapping procedure with 5000 resamples together with heteroscedasticity-consistent standard errors (Davidson & MacKinnon, 1993). Effects were deemed significant when the confidence interval (CI) did not include zero. Bootstrapping analyses did not reveal a significant mediating effect of mood on the effect of interruption on savouring, IE = -.0153−.0967 and all 95% CIs included zero, or on beauty ratings, IE = -.1220−.1070 and all 95% CIs included zero, suggesting that any influence of interruption on beauty or savouring ratings was not mediated by mood.

We ran an additional sensitivity analysis based on 1000 Monte Carlo simulations using the R package SIMR (Green & MacLeod, 2016) in order to establish the minimal detectable effect size that yields a power of at least 80 %. SIMR allows to calculate power for generalized linear mixed models. Based on an investigation by Gabriel and coworkers (2011) who found correlations of r

= -.48 and r = .39 between task accomplishment satisfaction and negative and positive affect, it would be adequate to assume a medium to large effect size. According to Maxwell and coworkers (2018), interaction effects are often smaller in the real world, so a medium rather than a large effect size seemed a reasonable estimate. We found that with 80 % power we could have detected an interaction effect between mood and interruption as small as β_{stand} = 0.39 (corresponding to r = 0.44; Peterson & Brown, 2005). We acknowledge that we could have missed smaller interaction effects.

NFCC

To test whether a relationship between interruption and aesthetic judgment depended on NFCC, we conducted a moderation analysis using the MEMORE macro by Montoya (2019; Model 2), which provides path estimates for two-instance within-subject repeated measures at different levels of a moderator. Beauty and savouring scores (for beautiful and not-so-beautiful pictures) were included as dependent variables, and centered NFCC scores were entered as the moderator. We conducted tests of these four moderation hypotheses using Bonferroni-adjusted alpha levels of .0125 per test (.05/4). The overall model did not reach significance for any of the dependent variables (all ps > .044). Consequently, there was no evidence for a moderating effect of NFCC on the relationship between interruption and aesthetic judgment. However, again a sensitivity analysis using SIMR revealed the possibility of having missed small effects. The analysis showed that with our design and 80 % power, we could have detected an interaction effect between NFCC and interruption as small as β_{stand} = 0.28 (corresponding to r = 0.33).

Discussion

Study 1 provided evidence that an interruption impaired beauty and savouring ratings of art stimuli if participants possessed previous knowledge about the interrupted task and knew what

it would take to finish it. In order to complement our laboratory experiments with data that were even higher in ecological validity, we began a quasi-experiment in a photographic exhibition in the field—which, unfortunately, we had to cancel due to the coronavirus pandemic. However, the results of the field investigation partially support our hypothesis. A detailed description of this study can be found in the Supplementary Materials. Taken together, Study 1 supports our notion that an interrupted task hampers concentration in the aesthetic processing mode and thus negatively affects it.

Study 2

In Study 2, we tried to approach our research question differently. We investigated whether a state of rumination was associated with less savouring of aesthetic experiences. Ruminative processes are known to deplete working memory resources, making them less available for concurrent tasks (Curci et al., 2013). There is evidence that rumination significantly affects accuracy on the *N*-back task and the total number of items processed on the d2 test of attention (Desnoyers & Arpin-Cribbie, 2015).

By conducting a field study, we intended to maximise ecological validity. Also, we chose music and performing arts to ensure that we did not limit our findings to photographs and visual displays but rather allowed for a hint of generalization. Our third aim was to reach a larger, and more diverse sample. Therefore, we did not conduct an experiment, but tried to make our study as low-threshold, anonymous, and quick as possible. Accordingly, in Study 2 we examined whether opera, theater, and cabaret visitors savour these less if they are thinking about work. Work-related rumination, which is the process of thinking about work-related issues and events, can be a consequence of unfinished tasks (Masicampo & Baumeister, 2011). Since rumination demands working memory resources (Curci et al., 2013), concentration in the aesthetic mode should be

hampered. Therefore, we hypothesised that work-related rumination and aesthetic savouring would be inversely related.

Method

The sample for Study 2 consisted of 329 visitors to three houses of music and performing arts: an opera house (n = 104), a theater (n = 153), and a cabaret house (n = 72). A data collection overview can be found in the Supplementary Materials. *Savouring* was measured using the item "I savoured today's show," which was rated on a 7-point Likert scale ranging from 1 (*not at all*) to 7 (*very much*). This item was adopted from the German version of the savouring scale by Schall et al. (2017). We chose this item because it was the only item of the scale that included the term "savour" and therefore was considered to have the highest face validity. Also, the correlation between this item and the scale was high (between .68 and .88 in Studies 1a and 1b). *Rumination* was measured using the question "Did you think about work during today's show?," which was rated on a 7-point Likert scale ranging from 1 (*not at all*) to 7 (*all the time*). This item was used by Cropley and Millward Purvis (2003) to assess rumination.

An 850 mm × 2000 mm banner with the Helmut Schmidt University logo was used to attract visitors. After the show, visitors were asked to complete a paper-and-pencil questionnaire consisting of the two items. The item sequence and polarity of the rating scales were counterbalanced. Participants were either approached via a general introductory speech in front of a larger number of visitors, or—to avoid self-selection bias—were directly approached by a team consisting of two men and two women. Males and females as well as younger and older persons were alternately approached.

Results

Table 2 presents the study correlations. Rumination was significantly negatively

correlated with savouring (r = -.213, p < .001). No other correlations were significant. An examination of correlations revealed that no predictor variables were highly correlated. Therefore, we performed a hierarchical regression analysis on the data with savouring as the criterion. Two dummy variables (opera and theater) were computed to represent the categorical variable house (with cabaret being the reference category). In the first block of the regression model, all control variables were included. In the second block, rumination was added.

Table 3 presents the results of the hierarchical regression analysis. The analysis revealed that at stage one, the control variables opera, theater, polarity, and sequence contributed significantly to the regression model, accounting for 3.6% of the variation in savouring and leading to a significant change in R^2, $F(4, 324) = 3.07$, $p = .017$. Introducing rumination explained an additional 4% of the variation in savouring, and this change in R^2 was significant, $F(1, 323) = 14.02$, $p < .001$. Even though this was a small effect, our results indicate that individuals engaging in job-related rumination savoured less during the aesthetic experience (see Figure 2).

[insert Figure 2.]

Discussion

As hypothesised, Study 2 found a negative relationship between work-related rumination and savouring of aesthetic experiences. This study strengthens the notion that states and settings that interfere with working memory resources are associated with less savouring of aesthetic experiences and implies that these effects generalise to other aesthetic domains in a multimethod approach.

Study 3

The results thus far support our theoretical notion that any condition that reduces concentration in the aesthetic mode should interfere with aesthetic experience. Both operationalizations—actively reducing concentration via a secondary interrupted task and passively assessing a mental state that is associated with limited working memory resources—yielded results that are in line with our hypothesis. However, the observed effect in Study 2 was small. Therefore, we conceptually replicated Study 2. We employed the same methodology as in Study 2 with a slight change in the operationalization of the predictor variable: Instead of rumination, we investigated the relationship between stress and savouring. Stress has been defined as an imbalance between environmental demands and individual motives and abilities (Cox et al., 2000; French et al., 1974). On high-stress days, working memory performance appears to be impaired (Brose et al., 2012; Nguyen et al., 2012). Evidence suggests that the experience of stress competes for attentional resources, thereby impairing attention-dependent cognitive processing (Eysenck & Calvo, 1992; Kahneman, 1973; Klein & Boals, 2001a, 2001b). A number of studies (Baradell & Klein, 1993; Klein & Barnes, 1994; Klein & Boals, 2001a, 2001b; Yee et al., 1996) have shown that life stress negatively correlates with attention-demanding cognitive tasks. For example, Klein and Boals (2001a, 2001b) showed that college students who reported a lot of stressful events during the six months preceding cognitive testing performed worse on a working memory task than students who reported fewer stressors. In line with this, a controlled intervention study (Klein & Boals, 2001a) showed that a stress-management intervention significantly improved working-memory scores. Study 3 was designed to investigate the relationship between stress and the savouring of aesthetic experiences. We expected a negative relationship between the constructs under investigation. In contrast to Study 2, a validated single-item measure of the predictor variable was employed to improve data validity.

Method

The sample consisted of 368 visitors to an opera house. Data were collected after five different operas. A data collection overview can be found in the Supplementary Materials. Savouring was measured using the same item as in Study 2. Stress was measured using a validated single-item measure of stress symptoms (Elo et al., 2003) referring to present stress experiences. The item was: "Stress means a situation in which a person feels tense, restless, nervous, or anxious or is unable to sleep at night because his/her mind is troubled all the time. Do you feel this kind of stress these days?" The response format was a 5-point Likert scale ranging from 1 (*not at* all) to 5 (*very much*). The procedure was identical to the procedure for Study 2.

Results

Table 4 presents the study correlations. Spearman's rank correlation coefficient revealed a significant negative correlation between stress and savouring ($r = -.182$, $p < .001$). There was also a significant correlation between the specific show and savouring (contingency coefficient $C = .369$).

Since no predictor variables were highly correlated, we performed a hierarchical regression analysis with savouring as the criterion. To include the specific shows, four dummy-coded variables were computed. All control variables were included in the first block of the regression model. Stress was added in the second block. Table 5 presents the results of the hierarchical regression analysis. At stage one, the control variables contributed significantly to the regression model, accounting for 6% of the variation in savouring and leading to a significant change in R^2, $F(6, 361) = 4.93$, $p < .001$. Introducing stress explained an additional 5.5% of the variation in savouring, and this change in R^2 was significant, $F(1, 360) = 22.63$, $p < .001$. Again, this was a small effect. However, our results do indicate that stress and savouring of aesthetic

experience are negatively related (see Figure 3).

[insert Figure 3.]

Discussion

Consistent with the notion of competing working memory resources in both aesthetic savouring and the experience of stress, participants savoured less during an evening at the opera if they felt stressed. Taken together, Studies 2 and 3 suggest that stress and rumination negatively relate to aesthetic savouring. Accordingly, it appears that not only an active task interruption, but also working-memory-depleting mental states, are associated with reduced aesthetic savouring. This supports our theoretical notion that any condition that reduces concentration in the aesthetic mode should interfere with aesthetic experience.

General Discussion

One experiment and two field studies yielded substantial support for the key prediction that conditions that have the potential to reduce concentration in the aesthetic mode impair the savouring of aesthetic experiences. By reporting a controlled laboratory experiment together with two cross-sectional anonymous field studies, we hope that we have mitigated the conflict between the degree of experimental control and the range of generalizability of the findings.

Study 1 provided evidence that, in a laboratory context, art stimuli are savoured less and rated less beautiful after an interruption during an unrelated writing task. Importantly, this effect emerged despite the samples' relatively low interest in and knowledge of art. We can conclude that distraction via an unfinished task seems to impair the savouring of aesthetic experience. Studies 2 and 3 assessed the relationship between mental states that are associated with limited working resources and aesthetic savouring (e.g., Brose et al., 2012; Curci et al., 2013;

Kahneman, 1973). Study 2 provided evidence that work-related rumination is inversely related to aesthetic savouring. Study 3 further suggested that the general experience of stress is negatively related to aesthetic savouring. Together, these investigations imply that concentration on the aesthetic mode may be crucial for maximizing the intensity of the experience.

This research contributes to a better understanding of cognitive processing during aesthetic experiences by building on influential theories of working memory and long-term memory and investigating the phenomenon in question with a multimethod approach. Prior work has identified processing mechanisms in the aesthetic mode (Menninghaus et al., 2017), stressed the importance of schematic knowledge in art perception (e.g., Wagner et al., 2016; Wagner et al., 2014), and discussed the use of high-capacity-demanding processes in art appreciation (Mullennix et al., 2018). Several influential information-processing models of aesthetic experience also highlight the roles of perceptual processing and attentional mechanisms in the generation of the aesthetic response (Chatterjee, 2011; Leder et al., 2004; Marković, 2012).

In the present research, we tried to integrate these findings, developing reasoning that builds on the concept of concentration in the aesthetic processing mode, which—we assume—can account for most variation in aesthetic savouring. Based on previous literature (Cupchik et al., 2009; Menninghaus et al., 2017; Sundararajan, 2015), we suggested that interruption, rumination, and stress impair aesthetic savouring because those states reduce concentration in the aesthetic processing mode. The present findings reinforce this claim. Our results are in line with the theoretical accounts of Cupchik and Winston (1996), who specified the importance of top-down control for (re)directing attention towards the properties of an artwork and stressed the importance of stepping out of a pragmatic, goal-oriented state of mind in order to deeply engage with an artwork. Anicha et al. (2012) reported a better capacity to respond deeply to an artwork when attention is focused on present-moment experiences. This “better capacity to respond

deeply" is reflected by our criterion variable, aesthetic savouring. Our results are also in line with two studies investigating the relationship between mindfulness and aesthetic responses. Diaz (2013) investigated the effect of inducing body-scan mindfulness on aesthetic responses to music compared to a control group's responses. Based on participants' verbal accounts after the experiment, Diaz argued that the mindfulness may have improved attentional focus, decreased distraction, and improved awareness of the music's quality. Harrison and Clark (2016) reported a positive correlation in a cross-sectional online study between the observing facet of mindfulness and the frequency of aesthetic experiences. Since mindfulness refers to a nonstriving, present-moment-oriented attitude towards experience (Kabat-Zinn, 1994) and one of the goals of mindfulness meditation is the anchoring of attention to a particular entity, an association between mindfulness and aesthetic experience underpins our theoretical reasoning.

Findings may suggest that working memory resources play an important role in accounting for differences in aesthetic savouring. We have argued that limited working memory resources make it more difficult to concentrate in the aesthetic mode, which comprises not only a conscious evaluation of the aesthetic stimulus, but also involves attending to elements from long-term memory that are activated, consciously or unconsciously, upon encountering the aesthetic stimulus. If working memory resources are limited by thoughts about a personally important, but unfinished task, or intrusive thoughts about work or other stressors, concentration in the aesthetic mode should be more difficult. Our results suggest that the aesthetic experience felt from encounters with visual art, performing art, and photography (for the latter, see the Supplementary Materials) seems to be affected by conditions that undermine concentration in the aesthetic mode.

In order to gain a domain-general view, further studies should investigate the influence of states and settings that impair working memory resources for other domains of aesthetic appreciation, such as architecture, music, poetry, or human beings. As a first step in this

direction, evidence from a recent experience-sampling investigation suggests that other goal-oriented behavior that requires working memory resources conflicts with aesthetic experience in everyday life across a wide range of possible aesthetic domains (e.g., nature, human beings; Weigand & Jacobsen, 2021). However, the results from Study 0 suggested that the effect might not hold for landscape stimuli. Possibly, in our sample, this could be explained by effects of familiarity and episodic memory: Some participants reported having been reminded of their military basic training and/or a previous vacation when viewing pictures of woods and trees. Retrieval of personal and social attitudes or associations can interfere with aesthetic experience (e.g., Jacobsen & Höfel, 2003; North & Hargreaves, 2007). Therefore, judgments may have been full-blown memory-based rather than aesthetic (e.g., Jacobsen, 2010b). Since this sample perceived landscape pictures as more beautiful than art pictures, it is also possible that the high aesthetic appeal made concentration on the stimulus easier and participants less susceptible to distraction. An informative research track in this context might also lie in identifying the particular circumstances under which limited working memory resources might *not* impair aesthetic experiences. Speculatively, aesthetic experiences involving fluent processing (Reber et al., 2004) or stimuli with extremely high aesthetic appeal (though this is not an objective quantity) may not be influenced by limited working memory resources. Although we have taken a general approach here, in future work it might be interesting to disentangle how interindividual differences might interact with the effects found here. For example, would knowledge about or interest in a certain domain influence an individual's proneness to cognitive interference? Also, would concentration in the aesthetic mode be more crucial for individuals with lower individual working-memory capacity in order to benefit from aesthetic experiences? Related to this, it appears that art appreciation is increased when the level of visual complexity in an artwork matches the individual's visual working memory capacity (Sherman et al., 2015).

Our results are also interesting in light of the theoretical divide concerning the nature of working memory. While multiple-resource models assume that task performance depends on a number of subsystems dedicated to specific processes or domains (Baddeley, 1986; Shah & Miyake, 1996), resource-sharing models assume that storage and processing compete for general working memory resources (Daneman & Carpenter, 1980; Just & Carpenter, 1992). In support of the domain-specific view, Daneman and Tardif (1987) argued that performance on a task is directly related to the overlap of processing requirements with those of a second task, and Shah and Miyake (1996) found that the concurrent processing demands of a task interfered with the maintenance of same-modality information (spatial vs. verbal) more than different-modality information. In contrast to both multiple-resource and resource-sharing models, the multiple-component model of Baddeley and Logie (1999) assumes domain-specific storage and domain-general processing. Rhodes et al. (2019) emphasised the theoretical stalemate on the issue of storage and processing in the working memory literature due to contradictory accounts and advocated for integrating the theories by pointing out and comparing the explanatory power of the two accounts with regard to specific results. Following this recommendation, if we assume a multiple-resource model, then, in Study 1 and in the quasi-experiment discussed in the Supplementary Materials, storage of verbal material (writing task) and processing of visual material (aesthetic stimuli) should not interfere so much. Therefore, our findings can only be interpreted in terms of resource-sharing models or the multiple-component model.

In addition to developing a better theoretical understanding of the cognitive mechanisms involved in aesthetic experiences, our results also have practical implications. Since temporary experiences of positive emotions are known to promote a variety of durable personal resources, such as resilience (Fredrickson, 2013), and savouring in particular has been shown to contribute to well-being and life satisfaction, as well as less negative affect and depression (e.g., Bryant,

2003; Feldman et al., 2008; Jose et al., 2012; Weytens et al., 2014), it may be of particular relevance if stressed or ruminating people are not able to benefit from these. If so, it would be wise for artists, organizers, and recipients of art to try to implement interventions for maximizing the "output" for the recipient in situations of art reception. Interestingly, it appears that in artistic practice, the notion that distraction, work rumination, and stress might impair aesthetic experiences is somehow already common sense. Marina Abramović, one of the world's most well-known and influential artists (Phelan, 2004), has developed her own method for encountering music through a communal sense of mindfulness in order to make the experience authentic, moving, profound, and transcendental. Prior to the actual concert, she makes the audience count grains of rice, look into someone's eyes for an extended period, walk in slow motion, or experience their surroundings blindfolded. This method was based on Abramović's artistic conception and experience. For Abramović, the biggest obstacle in art encounters lies in overcoming the feeling that there could be much better, more urgent things to do (McDonald, 2015). Our findings provide a scientific underpinning for this intuitive approach of the experienced artist. Therefore, in order to further improve the beneficial effects of art therapy (Daykin et al., 2008; Thomson et al., 2018; Todd et al., 2017), mindfulness interventions could be implemented to help patients leave daily concerns behind, concentrate on the aesthetic experience, and benefit from the enhanced savouring experience.

Finally, it is important to acknowledge the scope of these investigations. Relating working memory resources to aesthetic experience is a challenging endeavor. Working memory is a theoretical concept that is approached differently depending on the underlying theory (e.g., multiple-resource models vs. resource-sharing models). Therefore, measuring working memory resources might also depend on the underlying theory, but – traditionally – is measured or manipulated by asking individuals to remember and recall a list of items. We approached the

subject by choosing three settings that are known to interfere with working memory resources and are high in personal relevance and ecological validity. Other, more conventional operationalizations are possible – even necessary in order to be able to make more precise claims about how working memory resources were exactly affected. For example, Mullennix et al. (2018) employed the well-established *N*-back task (Kirchner, 1958) and found that the understanding of visual artworks was impaired by working memory load. Since the *N*-back task allows for systematic variation of the working memory load, further studies could investigate the specific effects on aesthetic savouring. A general challenge in research on aesthetic experiences – maybe more than in other areas of psychological research – is finding the right balance between capturing the phenomenon comprehensively while keeping the tasks or settings as unintrusive as possible (Jacobsen, 2019) in order for the individual to process stimuli in the aesthetic mode. Another limitation concerns the correlational nature of our data in Studies 2 and 3: We did not manipulate our predictor variables rumination and stress and did not control for extraneous variables. Therefore, we cannot infer causality from these findings. It could be that the experience of a great performance led participants to report less rumination or stress in retrospect. In further studies, it would be of interest to assess stress and rumination prior to the aesthetic experience in order to rule out other possible explanations. Even though this would result in a much higher threshold for participation, a smaller sample, and expectancy effects regarding the hypothesis, such studies could complement our results. It is also important to note that in all three investigations, data were collected through a self-report questionnaire. In future work, it may be pertinent to include other more objective forms of data collection (e.g., behavioral observation and physiological monitoring) in order to triangulate the psychological information that is collected. The need to relate our approach to the human brain architecture is also highlighted by the claim (Jacobsen, 2010a) that any attempt to understand the cognitive processes underlying the

complex phenomenon of aesthetic experience is best approached from a number of different vantage points at different levels of analysis.

In conclusion, the present report combines laboratory with field work, contrasts good experimental control with maximally noisy measurement conditions, and constitutes direct as well as conceptual replications. In doing so, it offers evidence that interruption, work rumination, and stress interfere with savouring of aesthetic experiences.

Acknowledgments

We wish to thank Dr. Andreas Löw for his assistance with programming. Also, we thank Annika Moosmayer, Ramon Andres, René Neumann, Thomas Abben, and Okko Ites for assistance with data collection, and the teams at Staatsoper Hamburg, Thalia Theater, and Alma Hoppes Lustspielhaus for providing the opportunity to conduct Studies 2 and 3. Furthermore, we wish to thank the team behind the photographic exhibition "100 years in 100 pictures" for providing the opportunity for data collection during the exhibition. We are also grateful to Merrie Bergmann for copy editing the original draft, and to three anonymous reviewers for helpful comments on the article.

Funding

The authors received no financial support for the research, authorship, and publication of this article.

Declaration of Conflicting Interests

The authors declare that there is no conflict of interest.

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T**able 1**

Study 1: Pre- and Postexperimental Means and Standard Deviations of Mood Measurements

T1: No Interruption	pre	post
PA	3.20 (.64)	3.30 (.63)
NA	**1.33 (.32)**	**1.20 (.21)**
Valence	3.04 (1.63)	2.75 (1.36)
Arousal	6.96 (1.97)	6.96 (2.31)
Dominance	7.25 (1.45)	7.63 (1.55)
T2: Interruption	pre	post
PA	**3.26 (.63)**	**3.07 (.71)**
NA	1.30 (.39)	1.32 (.45)
Valence	2.96 (1.83)	3.46 (1.79)
Arousal	6.58 (2.30)	6.42 (2.19)
Dominance	7.54 (1.74)	7.29 (1.83)

Note. $N = 24$.

T**able 2**

Study 2: Means, Standard Deviations, and Correlations

Variable	*M*	*SD*	1	2	3	4
1 Savouring	5.86	1.32				
2 Rumination	1.85	1.44	-.213**			
3 House[a]	1.90	0.73	.122	.085		
4 Polarity[b]	0.52	0.50	-.016	-.079	.014	
5 Sequence[c]	0.50	0.50	.068	-.056	.069	-.052

Note. $N = 329$.

[a] 1 = opera, 2 = theater, 3 = cabaret. [b] 0 = starting with largest value, 1 = starting with smallest value.

[c] 0 = starting with rumination, 1 = ending with rumination.

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

Table 3

Study 2: Results of Hierarchical Regression Analysis Using Savouring as the Criterion

Variable	Step 1 (control variables)			Step 2		
	B	*SEB*	β	*B*	*SEB*	β
Sequence[a]	.188	.144	.071	.173	.141	.066
Polarity[b]	-.082	.144	-.031	-.117	.141	-.045
Opera[c]	.364	.200	.129	.341	.196	.121
Theater[d]	-.176	.186	-.067	-.160	.182	-.061
Rumination	-	-	-	-.184	.049	-.201
r^2	-	.036	-	-	.077	-
F for change in r^2	-	3.07*	-	-	14.02**	-

Note. $N = 329$. *B* = unstandardised beta; *SEB* = standard error for the unstandardised beta.

[a] 0 = starting with rumination, 1 = ending with rumination. [b] 0 = starting with largest value, 1 = starting with smallest value. [c] 0 = other, 1 = opera. [d] 0 = other, 1 = theater.

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

Table 4

Study 3: Means, Standard Deviations, and Correlations

Variable	*M*	*SD*	1	2	3	4
1 Savouring	5.37	1.76				
2 Stress	2.74	1.17	-.182**			
3 Opera[a]	3.07	1.42	.369**	.237		
4 Polarity[b]	0.49	0.50	.076	.128	.017	
5 Sequence[c]	0.51	0.50	.099	.122	.056	.016

Note. $N = 368$.

[a] 1 = Falstaff, 2 = Lulu, 3 = La Traviata, 4 = The Flying Dutchman, 5 = Madame Butterfly. [b] 0 = starting with smallest value, 1 = starting with largest value. [c] 0 = starting with stress item, 1 = ending with stress item.

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

Table 5

Study 3: Results of Hierarchical Regression Analysis Using Savouring as the Criterion

Variable	Step 1 (control variables)			Step 2		
	B	*SEB*	β	*B*	*SEB*	β
Sequence[a]	.121	.178	.034	.038	.174	.011
Polarity[b]	.080	.178	.023	.083	.173	.024
Falstaff[c]	-.270	.283	-.064	-.351	.275	-.083
Lulu[d]	-.573	.322	-.111	-.580	.312	-.112
La Traviata[e]	.355	.296	.078	.229	.289	.050
The Flying Dutchman[f]	-.967	.268	-.248	-.963	.261	-.247
Stress	-	-	-	-.355	.075	-.237
r^2	-	.060	-	-	.113	-
F for change in r^2	-	4.93**	-	-	22.63**	-

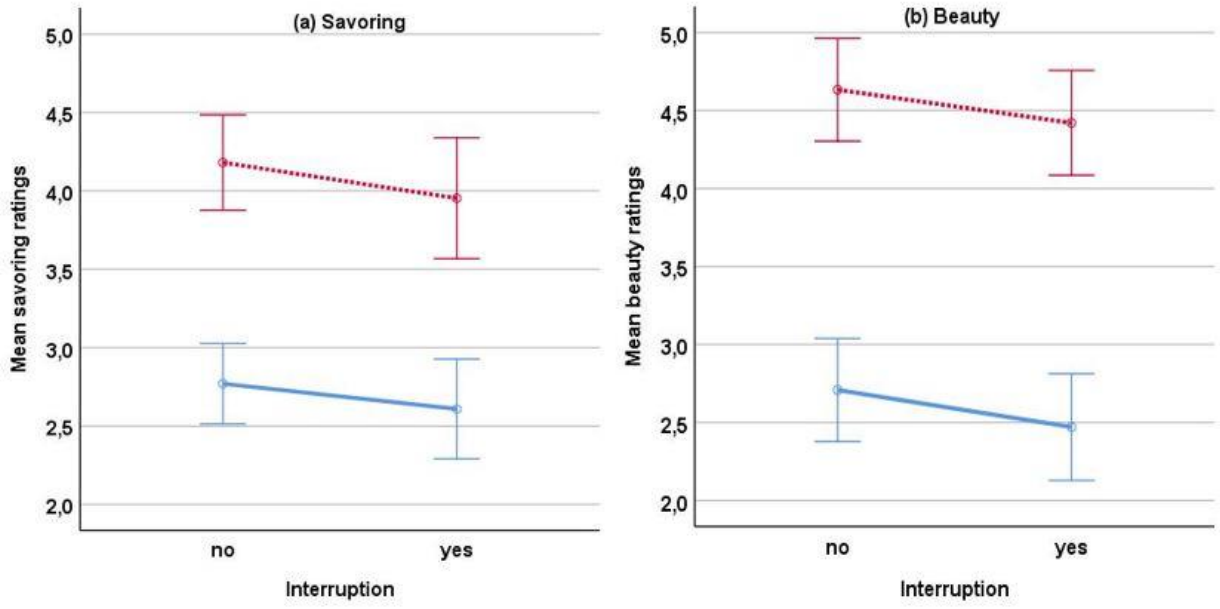
Note. $N = 368$. *B* = unstandardised beta.; *SEB* = standard error for the unstandardised beta.

[a] 0 = starting with stress item, 1 = ending with stress item. [b] 0 = starting with smallest value, 1 = starting with largest value. [c] 0 = other, 1 = Falstaff. [d] 0 = other, 1 = Lulu. [e] 0 = other, 1 = La Traviata. [f] 0 = other, 1 = The Flying Dutchman.

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

Figure 1

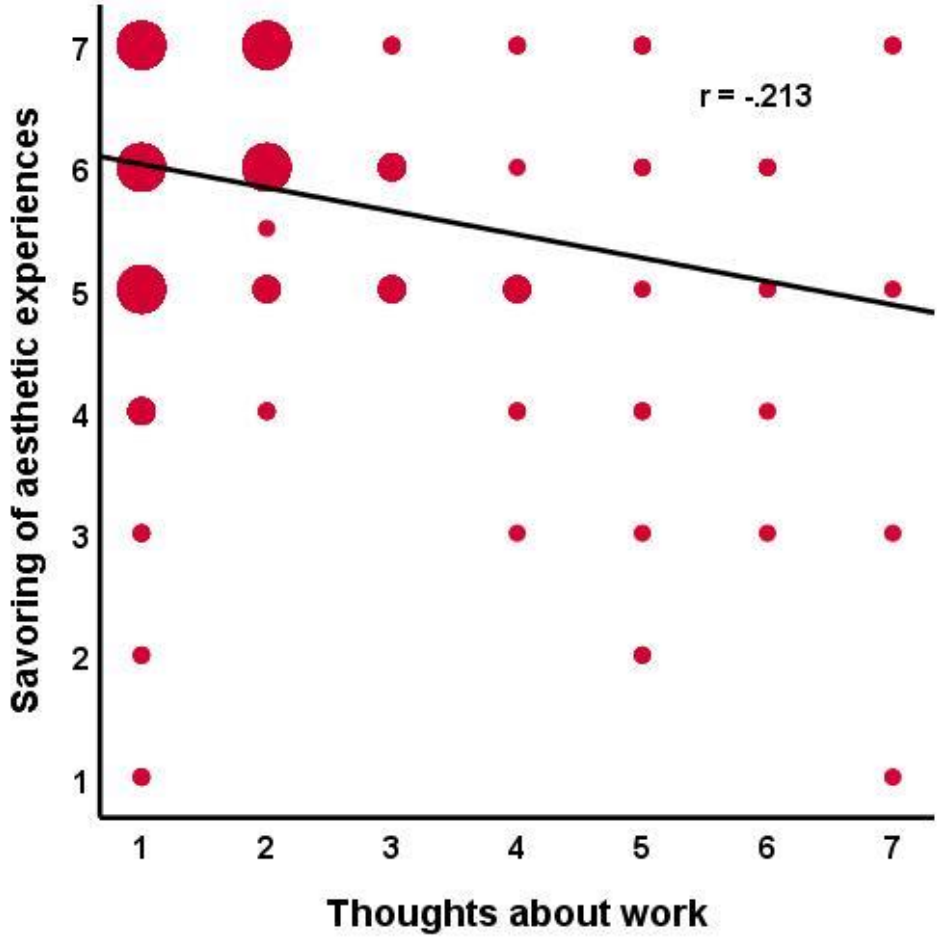
Average (a) savouring and (b) beauty ratings for not-so-beautiful (solid line) and beautiful (dashed line) pictures for interruption-yes and interruption-no conditions.



Note. N = 24. Bars represent 95% confidence intervals.

Figure 2

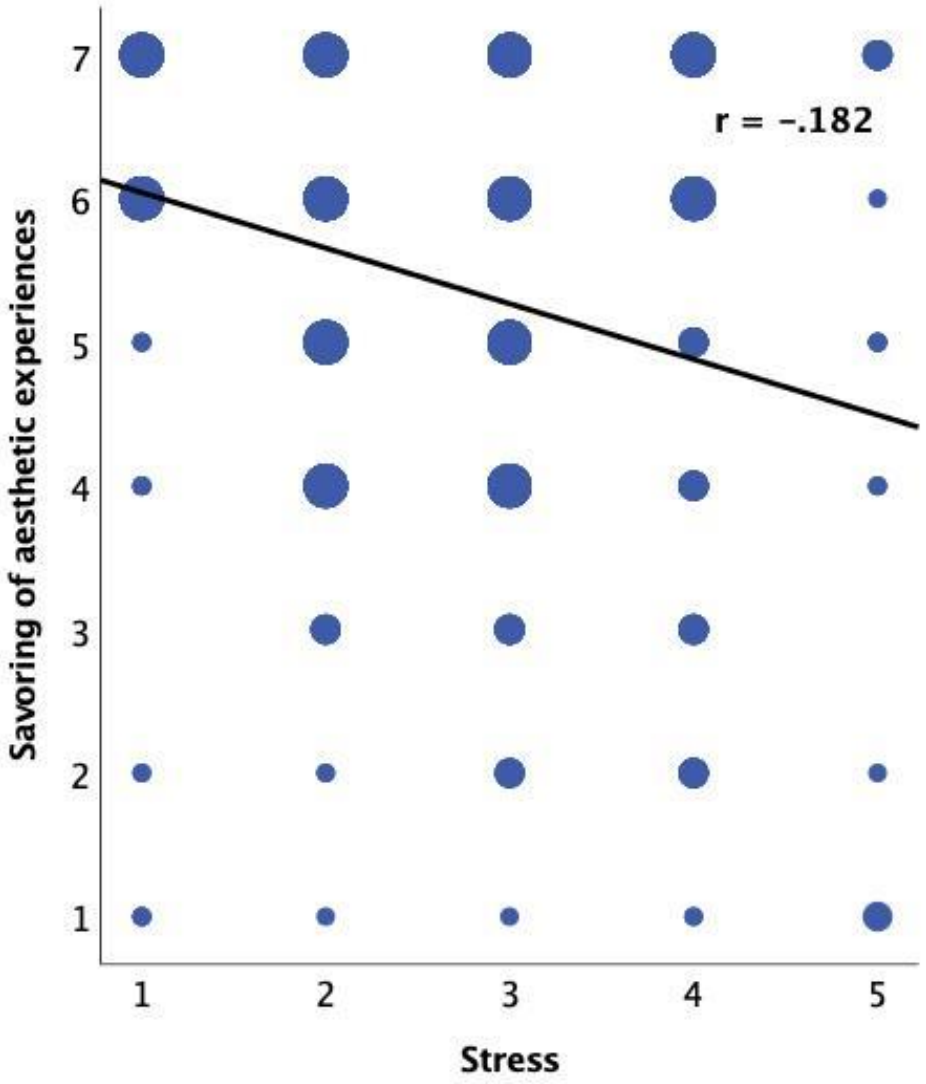
Savouring ratings associated with thoughts about work.



Note. $N = 329$. Dot sizes indicate subsample sizes: 1–5 participants (small dots), 6–15 participants (medium dots), > 15 participants (large dots).

Figure 3

Savouring ratings associated with stress.



Note. $N = 368$. Dot sizes indicate subsample sizes with 1–5 participants (small dots), 6–15 participants (medium dots), > 15 participants (large dots).