Emotion
2012, Vol. 12, No. 5, 1071–1074

1528-3542/12/$12.00 DOI: 10.1037/a0027200

Stirring Images: Fear, Not Happiness or Arousal, Makes Art More Sublime

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Which emotions underlie our positive experiences of art? Although recent evidence from neuroscience suggests that emotions play a critical role in art perception, no research to date has explored the extent to which specific emotional states affect aesthetic experiences or whether general physiological arousal is sufficient. Participants were assigned to one of five conditions—sitting normally, engaging in 15 or 30 jumping jacks, or viewing a happy or scary video—prior to rating abstract works of art. Only the fear condition resulted in significantly more positive judgments about the art. These striking findings provide the first evidence that fear uniquely inspires positively valenced aesthetic judgments. The results are discussed in the context of embodied cognition.

Keywords: aesthetics, embodied cognition, emotion, abstract art, fear

> Indeed terror is in all cases whatsoever, either more openly or latently, the ruling principle of the sublime. (Burke, 1757/2008, p. 54)

Consumers spend billions of dollars on the arts every year, and aesthetic decisions pervade human life. Introspectively, emotions seem to be an essential part of aesthetic experiences, and neuroscience research has shown that emotions play an important role in making aesthetic judgments (Chatterjee, 2011; Cinzia & Vittorio, 2009; Kuchinke, Trapp, Jacobs, & Leder, 2009). However, relatively little is known about which specific emotions arise when we view art, and whether emotions contribute to our positive aesthetic judgments or simply follow from them. Although a range of emotions, including pride, disgust, and confusion, have recently been discussed in relation to aesthetics (Silvia, 2009), no research to date has directly investigated their effects. Furthermore, because emotions are typically accompanied by increased states of physiological arousal, it is unclear whether simply feeling physiologically excited is sufficient for a positive aesthetic experience or whether a corresponding emotional state is necessary. In this study, we investigated the emotional basis of sublime experiences (i.e., the experience of perceiving something that evokes feelings of astonishment and amazement) in an effort to determine which emotions underlie awe-inspiring experiences when viewing works of art.

Neuroimaging research has revealed that aesthetic judgments are accompanied by significant activity in orbitofrontal cortex and the anterior cingulate gyrus (Kawabata & Zeki, 2004); the left cingulate sulcus, bilateral occipital gyri, bilateral fusiform gyri, and right caudate nucleus (Vartanian & Goel, 2004); as well as the posterior cingulate, frontomedian cortex, and the temporoparietal junction (Jacobsen, Schubotz, Höfel, & Cramon, 2006). Because these regions have been implicated in emotion processing, they support the proposition that emotions are important to aesthetic judgments (Freedberg & Gallese, 2007). Yet these findings do not indicate whether emotional states are fundamental to making aesthetic judgments or simply the consequence of those judgments.

One possibility is that artwork is viewed as sublime when it causes general physiological arousal. However, Edmund Burke (1757/2008) advanced the fascinating alternative that our sense of the sublime depends on the specific emotion of fear. According to Burke, this conventionally negative emotion paradoxically underwrites our positive appraisals of art. This claim appears to have never been tested.

At first glance, positively valenced emotions like happiness might seem like better candidates. Therefore, the present study tested the effects of fear, happiness, and general physiological arousal on participants' sublime feelings as they rated abstract art. The primary goal was to determine whether aesthetic judgments are informed by a specific emotion or by general physiological arousal. The larger objective, however, was to shed light on the power of visual art and the underpinnings of aesthetic experiences. Art is central to human life, and it is a mystery why something that does not seem essential for survival would capture our interest so intensely and become so ubiquitous in culture. The link between a

This article was published Online First February 6, 2012.

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We thank Thomas McAusland and Igor Beytelman for their help with data collection. We also thank Aaron Kozbelt, Margaret-Ellen Pipe, Glen Hass, and Tony Ro and his lab for their helpful suggestions.

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specific emotional state like fear and sublime experiences may point toward an answer.

Method

Eighty-five undergraduate students (47 women, 37 men) from Brooklyn College participated in this study for course credit; they were randomly assigned to one of five conditions (fear, happiness, high physiological arousal, low physiological arousal, or control) in a between-subjects design ($n = 17$ per condition). Fear[1] and happiness[2] were induced using a brief video depicting a scary or happy event, respectively. Although these videos have not been validated or used in previous research, they were chosen from YouTube on the basis of their similar duration (14 s after some editing), climatic emotive moment, which occurred in the last 3 s of each clip, and apparent ability to induce the desired emotions. This was confirmed after the critical part of the experiment by asking participants to rate the extent to which they perceived their video to be scary or happy.

High and low physiological arousal were induced through 30 or 15 jumping jacks, respectively, whereas control participants were not assigned to any video or activity prior to rating the art. They were told that the study was testing how people perceive art under various distractions. Participants were then instructed according to their assigned condition (e.g., video clip, jumping jacks, or sitting normally), and immediately shown the same four paintings (in counterbalanced order). As an initial attempt to investigate Burke's hypothesis, we chose simple geometric abstract pieces from the artist El Lissitsky to avoid variability in conceptual and emotional content from different artists and genres.

Each painting was presented for approximately 30 s on a computer screen as participants rated it on 10 items assessing how "inspiring," "stimulating," "dull," "exciting," "moving," "boring," "uninteresting," "rousing/stirring," " imposing," and "forgetful" it was on a 5-point scale from 1 (*completely disagree*) to 5 (*completely agree*). These dimensions were chosen because they convey components of sublime experiences, as conceptualized by Burke. Participants then filled out some manipulation checks using 5-point scales to confirm their subjectively felt physiological arousal from 1 (*much less physiologically excited than normal*) to 5 (*much more physiologically excited than normal*) and rated how scared or happy they felt after the corresponding video from 1 (*not at all scared/happy*) to 5 (*very scared/happy*). Finally, participants answered some demographic questions before they were debriefed.

Results

Participants' ratings of their emotions confirmed that they were actually scared ($M = 4.53$, $SD = 0.63$) or happy ($M = 4.24$, $SD = 0.75$) after those videos, respectively, indicating that the videos were successful at inducing the desired emotion. It is also important to note that the emotional strength between the groups did not differ, $t(32) = 1.166$, $p = .252$, indicating that both emotions were induced to the same degree. With respect to their physiological arousal, a one-way analysis of variance (ANOVA) revealed a significant effect in arousal ratings depending on condition, $F(4, 80) = 12.821$, $p < .001$. A follow-up Tukey's honestly significant difference (HSD) test showed that the control condition ($M = 2.29$, $SD = 0.92$) significantly differed from the high physiological arousal condition ($M = 3.71$, $SD = 0.78$), fear condition ($M = 3.76$, $SD = 0.90$), and the happiness condition ($M = 3.71$, $SD = 0.92$), but not from the low physiological arousal condition ($M = 2.47$, $SD = 0.72$). The low and high physiological arousal conditions differed significantly, confirming that the arousal manipulation worked. Of note, the high physiological arousal, fear, and happiness conditions did not differ significantly, indicating that any differences in sublime feelings between those three conditions cannot be explained by variations in physiological arousal.

Due to the similarity of the artwork, each participant's ratings for all four paintings were averaged into a single "sublime score." Items like "boring" and "uninteresting" were reversed scored so that all reflected positively valenced judgments. A principal components factor analysis with no rotations was conducted to determine whether the 10 dimensions measured the same "sublime" construct. Nine of the 10 items loaded onto one factor, whereas "imposing" loaded onto its own separate factor, and "imposing" scores were therefore removed from subsequent analyses (see Table 1). The remaining nine items were analyzed for reliability, resulting in a high Cronbach's alpha coefficient of .956. The one-way ANOVA of these sublime scores was significant, $F(4, 80) = 5.075$, $p = .001$. A follow-up Tukey's HSD test indicated that the fear condition ($M = 3.74$, $SD = 0.96$) resulted in significantly higher sublime scores than all other conditions, which did not differ significantly from each other (see Table 2).

Together, these results suggest that fear might play a special role in the sublime experience. However, physiological arousal was also found to generally correlate with sublime scores ($r = .322$, $p < .01$), suggesting that arousal is still involved in this process. When participants' physiological arousal and fear ratings were treated as predictors of sublime ratings, a multiple regression revealed a marginally significant effect of physiological arousal consistent with the above finding, $t(14) = 1.807$, $p = .092$, $\beta = .432$. However, fear was not found to significantly predict sublime ratings, $t < 1$. We believe that this finding is due to the similarity of the ratings given by participants in the fear condition, thereby limiting the variance available for a regression model.

Discussion

The present experiment was designed to disentangle the effects of emotion and physiological arousal in order to determine their role in aesthetic experiences. Fear was the only factor found to significantly increase sublime feelings. Because higher sublime scores were also significantly associated with greater physiological arousal, arousal does generally contribute to aesthetic experiences. Overall, however, Burke's original hypothesis was supported.

But why fear? One potential explanation for the apparently unique role of fear is that it motivates organisms in an evolutionarily significant way. At its core, fear is an emotional mechanism

[1] The fear video showed a car traveling along a scenic route until the climatic emotive moment when a zombie-like face appears abruptly on screen and screams (the raw, unedited video can be found at http://www.youtube.com/watch?v=tHEwaHNnw0w).

[2] The happy video showed an infant crawling toward a dog until the climatic emotive moment when the dog begins licking the infant's face and she begins laughing and cooing (the raw, unedited video can be found at http://www.youtube.com/watch?v=41BvNhzl83Y).

Table 1
Factor Loadings Based on a Principle Components Analysis for the 10 Sublime Scale Items

Dimensions	Component 1	Component 2
Inspiring	.815	.145
Stimulating	.783	−.091
Dull	.717	−.215
Exciting	.822	.136
Moving	.716	.279
Boring	.868	−.300
Uninteresting	.868	−.300
Rousing	.807	.243
Imposing*	.446	.767
Forgetful	.701	−.316

Note. The dull, boring, uninteresting, and forgetful dimensions were reversed scored so that all items indicate positively valenced judgments.
* The imposing dimension was the only rating item not highly loaded on Component 1.

that increases survival chances by motivating fight, flight, or freezing responses to threatening situations (Panksepp, 1998). Fear seizes one's attention, halts current plans, and increases vigilance in a threatening situation. Indeed, Burke described the sublime experience as "that state of the soul in which all its motions are suspended . . . so entirely filled with its object (1757/2008, p. 52)." The capacity for a work of art to grab our interest and attention, to remove us from daily life, may stem from its ability to trigger our evolved mechanisms for coping with danger. Art is not typically described as scary, but it can be surprising, elicit goose bumps, and inspire awe. Like discovering a grand vista in nature, artwork presents new horizons that pose challenges as well as opportunities.

Recent evidence from neuroscience supports this view (Brown, Geo, Tisdelle, Eichhoff, & Lotti, 2011). A meta-analysis of 93 neuroimaging studies across four sensory modalities (visual, auditory, gustatory, and olfactory) investigating participants' positively valenced aesthetic judgments found that the right anterior insula showed the greatest activity during these appraisals. This was surprising because that region is typically discussed in terms of its processing of negative-valenced emotions like disgust. The insula has also been directly implicated in fear (Schienle et al., 2002). Activity in the left anterior cingulate and left dorsolateral prefrontal cortex also appears to be correlated with *both* aesthetic preference and the processing of fear (Pissiota et al., 2003; Phillips et al., 1998). The present study confirms and extends these correlational findings by providing the first experimental evidence that inducing different emotional states, and dissociating them from general physiological arousal, differentially affects one's perception of art. This experiment provides evidence that emotions can impact aesthetic judgments, but provides no indication about the extent to which emotions also accompany (or follow from) aesthetic judgments. Future research will be necessary to determine the precise nature of this complex relationship, by examining whether similar results are obtained when inducing fear by other means and with other types of art.

Pending the outcome of those investigations, the present finding of a link between fear and the sublime may lead to insights into why people like art. Some authors have argued that the aesthetic sense is an adaptation associated with sexual selection (Dutton, 2009), but if so, we would expect pleasure to guide preference. Our data suggest that art's allure may instead be a byproduct of one's tendency to be alarmed by such environmental features as novelty, ambiguity, and the fantastic. Artists may be tapping into this natural sense when their work takes people's breath away. Other emotions (like confusion or contempt) may also contribute to sublime experiences. Future research should explore the effects of different emotions in greater depth, and assess emotional reactions with physiological measures.

The connection between embodied responses to fear and sublime experiences provides evidence that emotional states might influence the perception of art even more fundamentally than previously thought (Gombrich, 1960). Some theorists, like E. H. Gombrich, have argued that art is perceived in a top-down manner, specifically that appreciating art is a higher-order cognition that draws from one's beliefs, concepts, and experiences; on this approach, emotional and other embodied states play little role in art perception. On the other hand, there is a growing body of evidence that embodied emotions are critical for grounding cognition (Barsalou, 2008; Damasio, 1994; Haidt, 2001; Schwarz & Clore, 1998). Indeed, recent research indicates that aesthetic experiences result from the complex interaction between *both* top-down emotional orientations and bottom-up perceptual processes, like feature detection (Cupchik, Vartanian, Crawley, & Mikulis, 2009). It is particularly worth noting that the anterior insula was again found to be correlated with aesthetic judgments.

Although the exact nature of the top-down−bottom-up interaction will have to be specified by future research, the present findings help confirm the importance of studying specific emotions with respect to how feelings influence various judgments. They also point to a surprising explanation of why art can be so captivating. Recently, considerable effort has been devoted to studying morality with the tools of science (Chapman, Kim, Susskind, & Anderson, 2009; Eskine, Kacinik, & Prinz, 2011; Haidt, 2007; Inbar, Pizarro, & Bloom, 2009; Schnall, Haidt, Clore, & Jordan, 2008). Art plays a comparably central role in human life,

Table 2
Participants' Mean Ratings of Art in Each Condition

	Condition				
	Control	Low physiological arousal	High physiological arousal	Happiness	Fear
Rating	2.71 (0.55)	2.92 (0.70)	2.88 (0.76)	2.87 (0.69)	3.74 (0.96)

Note. Higher values indicate more positive impressions and stronger interest in the art. Standard deviations are in parentheses.

and it can be argued that aesthetic values deserve similar scientific scrutiny.

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Received November 17, 2011
Revision received January 5, 2012
Accepted January 6, 2012 ■