Quantifying the if, the when, and the what of the Sublime:

A survey and latent class analysis of incidence, emotions, and distinct varieties of personal sublime experiences

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Abstract

Sublime encounters provide a compelling example of the peaks of our shared emotional and cognitive experiences. For centuries, these have been a target for philosophy and, more recently, for psychology, with its renewed focus on profound or aesthetic events. The sublime has been theoretically connected to multiple contexts, from interactions with overpowering nature, to beauty, music, even interpersonal engagements, and to multiple emotions—danger, awe, pleasure, fear—often with diametrically opposing arguments for what constitutes these events. However, despite this prolonged discussion, there is still a scarcity of actual systematic research. It is neither known if sublime encounters are actually common, nor how they are described by individuals, or if reports match theoretical arguments—are there one or more, or no, distinct sublime types? We address these questions by matching historical discussions to 402 participants' (Western adults') reports of whether they have ever experienced the sublime and, if so, how these are described in terms of cognitive/emotional and contextual factors. Roughly half reported having had at least one sublime experience, with accounts involving a range of contexts essentially covering the full spectrum of past theoretical arguments. At the same time, when we considered the cognitive/affective descriptions, using network science and latent class analysis of reported feelings, 90.8% fit one model, with involved communities (or interrelated clusters) of positive emotions, discrepancy, self-awareness, transformation/insight, and, notably, not including negative emotions/fear. We conclude with a discussion of how this might be used as a basis for considering sublime theory and shaping future research.

Keywords: sublime, emotion, latent class analysis, aesthetic emotions, profound experience; network model

"All available accounts of sublimity, duly unpacked, are indeed corrupted to the point that no coherent account is possible" – Aagaard-Mogensen (2018, p. vii)

The sublime has long been a core topic in aesthetics and discussions of profound human experience. Suggesting through its etymology the overcoming or transcending of typical human existence—'*sub'* + '*līmen,'* meaning "to come up from under the threshold" (Cohn & Miles, 1977)—it is often connected by writers, theorists, and in anecdotal accounts to powerful or overwhelming stimuli (e.g., standing before yawning canyons, rugged mountains, meetings with human frailty, the limits of human reason, music, art). With a rich history that spans from Roman rhetoric through the Renaissance to 18th century Romanticism and to postmodern metaphysics, the sublime is no doubt one of the most discussed concepts in Western aesthetic discourse (Doran, 2015; Morley, 2010). The sublime's descriptions span various cultures, from Southwestern Africa to East Asia (Shostak, 1983), and it has been a recent topic in empirical and theoretical psychology as part of a renewed focus on positive or aesthetic emotions and such complex peaks of human experience (e.g., Menninghaus et al., in press; Pelowski, Markey, Forster, Gerger, & Leder, 2017).

At the same time, this wealth of discourse is matched by a general lack of clarity and even disagreement regarding when and how the sublime might come about. A brief glance across arguments (e.g., see Doran, 2015 and below) suggests either the presence or absence of a range of emotions—terror, awe, harmony, tranquility, pain, pleasure—from multiple triggers—poems, music, mountains, delightful ugliness, gardens, persuasive speakers, even the analytical appreciation of math. Perhaps unsurprisingly, these conflicting descriptions have led to issues for research. As early as 1935, Samuel Monk noted that "no single definition of the term" would seem to serve for all writers. Similar arguments have been made in the present day, as in the heading quote of this paper, suggesting that due to the scope of accounts, and the plethora of

emotional, cognitive, or contextual aspects, there may not be any meaningful underlying thread for describing or identifying a distinct sublime experience (see also Forsey, 2007; Sircello, 1993). This issue has carried into empirical studies. In psychology, the sublime is often ill- or under-defined, and it is still common practice that researchers adopt their own eclectic versions in designing their studies, interpreting their data, or even when choosing suitable sublime-inducing stimuli (Hur & McManus, 2017). These issues run in parallel to related arguments that the sublime experience, although it *may* exist, is itself so ineffable to be beyond the ability for individuals to articulate at all (Aagaard-Mogensen, 2018; Pence, 2004) and, thus, perhaps beyond empirical study.

This leads to a number of basic questions important for advancing and grounding empirical and theoretical research: How do episodes of sublime happen in real life? What events trigger the sublime? What emotions might be used to describe experiences? Can sublime reports be meaningfully organized into one or more types that might serve as a basis to refine or even to reject and revise sublime theory? Do people even experience sublime occurrences?

The aim of this paper is to provide a new approach to the above questions. This is done by a systematic survey of a large number of individuals' reports to assess both *if* individuals have ever had an experience that roughly aligns with ideas of the sublime, and, if so, how these are described and what are the specific aspects of their personal experiences. To do this, we also build on past literature from both philosophy and psychology, which are briefly considered below, in order to provide a general idea of the breadth of sublime discussion and its major arguments—focusing primarily on settings/triggers and related emotions—that might be targeted in the survey. We then report the results in light of these theories in order to consider if our, admittedly Western, sample of participants do indeed provide descriptions that reveal notable patterns or align with certain theoretical discussions. We also go further to assess the emotional and cognitive factors with a new technique for network modeling and latent class analysis to identify with a data-driven method if there are indeed one or more sublime 'types'. This project

also follows in the footsteps of similar surveys on, for example, 'awe' (Allen, 2018; Yaden et al., 2019) or 'being moved' (Zickfeld et al., in press) and which considered primarily interpersonal differences in propensity to report these reactions or relation to social engagement. Here, especially with our pairing of results with advanced mathematical modeling, we hope to add an important new level of analysis and insight to varieties of profound experiences.

Review—Past Discussions of What, and When, Might be the Sublime?

First, as a basis for this study, it is useful to provide a general discussion of some of the major theories and writers who have tackled the sublime as a topic. It needs to be stressed from the beginning that this is not an exhaustive review nor meant to provide a theoretical 'answer' to what would be the sublime (for the interested reader, we refer to e.g., Doran, 2015; Morley, 2010). We also acknowledge that the following discussions occur in multiple languages, cultures, and theoretical backgrounds with important differences. Rather, the forthcoming collection is put together expressly to provide the reader with a general idea of the very breadth of discussions and, importantly, major disagreements, and to give a starting point for contextualizing our subsequent analysis. We will focus on two key aspects that inform our main research questions: (1) what triggers, settings, or other contextual factors bring about the sublime experience and (2) what emotions and subjective feelings are reported as key to a sublime event? We have condensed several major theories into Table 1.

<Table 1>

What Triggers or Context?

As can be seen immediately in Table 1, the sublime is very much denoted in its history by a wide-range of diverse arguments, as well as by a general lack of clarity and disagreement regarding what exactly was being described. First, there is the question of what objects or events could 'trigger' a sublime response. Probably the trigger that most often comes to mind for a contemporary reader, following the Romantic view (e.g., Burke, 1759/1958; and earlier Addison,

1773/1718; Cooper, 1709/2001; Dennis, 1693/1993), involves natural scenes or objects of overpowering scale—towering mountains, roaring rivers, expansive deserts or sunsets—giving a feeling of infinity, power, or lack of control (Ishizu & Zeki, 2014). Dennis (in Nicolson, 1973, p. 59), for example, after crossing the Alps, argued for an experience whereby his encounter was both a pleasure to the eye but "mingled with Horrours, and sometimes almost with despair." Cooper (1709/2001) suggested a sense of grandeur or astonishment at the infinity of spaces and of his smallness against the universe. And Burke (1759/1958), in what is still perhaps the best-known discussion, also suggested predominantly natural triggers that were in some way powerful, ruggedly beautiful, terror-inducing, and obscure.

However, there are a number of other suggestions. Perhaps the earliest discussion by the Roman philologist Longinus (Roberts, 1899; see also Havel, 2006; Leitch, 2001), in the 1st century AD, focused on rhetoric or language. Communication or communicators could be elevated "above the ordinary," becoming persuasive, overpowering the perceiver, evoking veneration, and thus a sense of sublime. Longinus also noted stimuli that might have a more conceptual bent—"strik[ing] vehemently upon the mind" (Richardson in Burke, 1759/1958, p. xlvii) and involving "the faculty of grasping great conceptions" (Boulton in Burke, p. l)—and even a "pathetic" variety (Des Pres, 1983), "vastly different from grandeur," involving lamentation, sorrow, and fear. Of course Burke (1759/1958) as well also noted the possibility of a range of stimuli, including fictional characters or literature.

Kant (1764/2011, 1790/1986) added further to the potential triggers. He suggested two main types: (1) a "dynamical sublime" related to perceptions of overwhelming nature and to a felt sense of the terrifying; and (2) a "mathematical" sublime, associated with the consideration of concepts expanding beyond human reason (e.g., infinity) and leading to a sense of the splendid or absolute greatness (1790/1986, § 27).[1] Self-reflection and reason also played an

[1] Note, some discussion (e.g., Clewis, 2009) also suggests a third, 'moral sublime,' tied again to the attempt of the rational mind or one's imagination to comprehend something so great so as to be inconceivable, and highlighting a sense of the noble.

important role. One's inability to grasp the magnitude of an event such as an earthquake demonstrated the inadequacy of one's imagination. At the same time, one's ability to identify, if only after the fact, such an event as special indicated the superiority of one's cognitive powers and a key basis of sublimity (see also Weiskel, 1976).

Hegel (1920; also Saxena, 1974), on the other hand, stressed that the sublime was a distinct stage in the refinement of symbolic art, whereby there was both an emphasis on conflict between significance and form, and even more, where this difference was not articulated via only emphasizing or enlarging proportions (such as might be found in monumental architecture or nature). Rather, sublime objects must express the infinite by representing the phenomenal as questionable (what he called a "negative aspect") and, practically, meant that this could not involve visual or natural objects. Instead, he argued for poetry (Psalms or even Persian works).

Schopenhauer (1819), another German Idealist, allowed visual aspects, and returned to an emphasis on overpowering or dangerous topics. He too gave a range of cases, from the weakest sublime (light reflected off stones; endless still desert) to turbulent nature, and suggested that the fullest feeling might come from facing the immensity of the universe, but which could also be evoked through music (symphonies and church mass) or even visual art.

Other pre-20th century writers include Georg Simmel (1958) who raised the sublime-evoking potential of ruins (see also Brown, 2012). John Baillie (1747/1967; see Ashfield & De Bolla, 1996) argued for a largely positive sublime, suggesting that this can be attached to anything that "extends" one's being, and connected this to a range of cases—art, nature, literature; even scientific discoveries. The Romantic era also tied sublime responses to gardening (e.g., Hirschfeld, 1779; Mortensen, 1998). In the mid to latter 20th century, theorists (Lyotard, 1994; Costa, 1990; Den Tandt, 1998) adapted the sublime to Modern or Post-Modern interpretations, focusing often on socio-political aspects and a sense of hopelessness or alienation felt in response to urban/industrial landscapes, cities, and skyscrapers, in addition to nature. Others have mentioned triggers such as loud sounds (thunder, cannons; Blair, 1783/1965),

spiritual encounters (Hegel, 1920; Perlovsky, 2012), and even to drug use (e.g., Drake, 2018). (See also Tsang, 1998 for a more cognitive/insight-related focus; Skorin-Kapov, 2016 or Freeman, 1995 for feminist interpretations; also Keltner & Haidt, 2003; Konečni, 2011; Kuiken & Miall, 2005; Shiota, Keltner, & Mossman, 2007).

The above range is also reflected in stimuli for empirical studies. Most common are again representations of nature, either via photographs (Gordon, Stellar, Anderson, McNeil, Loew, & Keltner, 2017; Hur, Gerger, Leder, & Mcmanus, 2018; Ishizu & Zeki, 2014) or short video clips (Piff, Dietze, Feinberg, Stancato, & Keltner, 2015). Visual artworks are also common—both abstract (Eskine, Kacinik, & Prinz, 2012; Seidel & Prinz, 2017) and figurative (Ortlieb, Fischer, & Carbon, 2016)—as well as sculpture (Era, Candidi, & Aglioti, 2015), architecture (Joye & Verpooten, 2013; Konečni, Wanic, & Brown, 2007), prose or poetry (Kuiken, Campbell, & Sopčák, 2012), and music (Konečni et al., 2007; Zentner, Grandjean, & Scherer, 2008).

This bounty of options obviously raises the questions of which of these are more or less present in contemporary examples? Are certain varieties more sublime-inducing, and how often they are suggested by a contemporary respondent. In addition, several sub-questions also arise from the dueling theories.

Perceptual versus conceptual.

One basic issue involves stimuli modality. The earliest arguments had focused more on verbal or written/spoken forms of discourse and the impact on the mind of the perceiver, whereas topics such as nature or architecture rely more on visual features. In fact, the 18th century writers marked a switch to a more sensory/visual focus (Ishizu & Zeki, 2014; Monk, 1935). Addison (1773/1718) argued for the need of a visual object, suggesting that the three pleasures of the imagination that he identified as key to sublime experience—greatness, uncommonness, and beauty—arise from visible objects rather than from rhetoric. On the other hand, others (e.g., Hegel 1920) again obviously suggested against visual aspects being important. Kant (1790/1986) also argued against outward (i.e., nature) objects, emphatically stating that sublimity "is not

contained in anything in nature [although it might be spurred by nature], but only in our mind" (§28, p. 264; see also Hipple, 1958). This raises the question of whether reports show either a visible/tangible or a mental aspect as dominant. It may also be that stimuli, regardless of type, must have certain qualities such as a sense of infinity or boundlessness (Burke, 1759/1958; also echoed by Romantic poets, see Mortensen, 1998). Questions have also been raised regarding other sense modalities. Baillie (1747/1967, p. 100), for example, suggested that "taste, smell, touch contain nothing that is exalted" and cannot lead to sublime experience (see also Ashfield & De Bolla, 1996).

Art or no-art; beauty or ugly?

A related question to that of concepts versus sensations involves art. Modern empirical studies on the sublime often use paintings or music, however Romantic writers often argued against art entirely. Addison (1773/1718) suggested that visual artworks, although able to evoke beauty, could not evoke greatness (as could nature), and thus could not be sublime. Burke (1759/1958, § IV) also suggested that he did not "know of any paintings, bad or good, that produce" strong passions. Kant (1790/1986; also Blair, 1783/1965), although leaving open the possibility for art to evoke the sublime, assumed nature to more predominant. On the other hand, Schiller (1801/1993) suggested that art is particularly suited, even more than nature, to creating sublime response. Other writers (see Hipple, 1957) proposed equality of both.

There is also the aspect of beauty. This is noted as a key element by some (Romantic writers with nature; later writers focusing on art), often as a necessary counterpoint to felt terror or loss of control—i.e., a mountain may be fear inducing, but somehow through its ruggedness, is beautiful and pleasing. Alternatively, beauty is argued to be in opposition to the sublime by Burke (1756/1958) and Kant (1764/2011; see also Dennis, 1693/1993; Cooper, 1709/2001; Lyotard, 1994; Schiller, 1801/1993). The claim of sublimity opposing beauty, however, is rarely supported in the psychological literature, which conceptually (e.g. Konečni, 2011) and empirically (Ishizu & Zeki, 2014; Hur et al., 2018) relates these.

Social situations; other people?

Questions have also been asked regarding whether the sublime can be evoked by social settings or by other people. Certainly, the early writing of Longinus (Roberts, 1899), which focused on often spoken rhetoric, would suggest another human correspondent. Modern writers such as Den Tandt (1998), focusing on man-made or urban triggers, also suggest that "the moment of sublime …is always to some extent a social construct." Keltner and Haidt (2003) suggested an increase in prosocial behavior following awe or sublime experiences. Menninghaus et al. (2015) argued that notable human events (death, marriage) were in fact probably more powerful, and potentially more sublime, than nature. On the other hand, authors such as Konečni (2011) argue against the notion that other people can evoke sublime experiences.

Other context-related questions might involve how long the actual experience takes, or whether it is indoors or out (e.g., Baillie, 1747/1967 who argued for the necessity of being outside).

What Emotions or Cognitive Processes Define the Sublime Experience?

A look across theories and descriptions also suggests that there is much variety in suggested emotions or other subjectively felt reactions or even cognitive processes. Although there appear to be commonalities in many descriptions—a sense of being overwhelmed, interacting with power, infinity, or greatness; having a largely arousing experience—as in Table 1, there are also a large number of suggested feelings, and in fact arguments for exact opposites (see also Keltner & Haidt, 2003; Morley, 2010), raising the question of which are actually noted by respondents.

Fear, terror, negative responses; or just positive?

Beyond a basic emotional pattern in the sublime, one point of contention involves the presence and role of negative emotions, notably fear, terror, or some sense of danger (see Hur, Gerger, Leder, & McManus, 2018; Ishizu & Zeki, 2014). These were specifically argued for by several authors (Addison, 1773/1718; Burke, 1759/1958; Schopenhaurer, 1819/1995) and were

either suggested as a primary response, present throughout an encounter and perhaps mixed with pleasure or some other cognitive/affective component, or as an initial response which is then overcome or replaced by pleasure/security (e.g., Dessoir, see Emery, 1973; Table 1). However, fear is downplayed by Kant (1790/1986), and authors such as Baillie (1747/1967) focus almost exclusively on positive emotion/ecstasy with little to no mention of negative feelings.

The idea that the sublime entails an experience of enthrallment/excitement without terror is echoed in subsequent observations in the empirical community. Eskine et al. (2012), who used fear-inducing movie clip primes before viewing paintings, suggested that fear rather than simple arousal increased subjective sublimity ratings. Gordon et al. (2016) argue that it is possible to evoke both fear-based and positivity-based types of sublimity. Hur et al. (2018), in a laboratory study using photographs of nature, suggested that even though participants report perception of fear in stimuli that they consider as sublime, there is no physiological evidence (from facial electromyography) for fear in these instances (see also Konečni, 2011; Ortlieb et al., 2016).

Existential safety?

Related is the importance of existential safety. Sublime triggers were often argued to require some degree of safety such as viewing from a safe distance, allowing us to enjoy an otherwise overwhelming or 'terror'-filled reaction (e.g., Kant, 1790/1986; Schiller, 1793/1993, and other Romantic writers, Table 1), and often overlapping with discussions of a detached or "aesthetic" mode to perceiving the environment. As noted by Kant (1790/1986) in sublime cases, danger or fear, although perhaps perceived, "has no dominion over us," and allows fearfulness "without [actually] being afraid" (§ 28; see also Konečni, 2011). On the other hand, Schopenhaurer (1819/1995), suggest that sublime is related to cases where stimuli and context have deep ties to the self and where danger is truly felt. Schiller (1801/1993) suggests both cases are possible with the sublime.

Cognitive aspects—novelty, insight, self-reflection, transformation?

Another issue involves the presence of more cognitive components. On the one hand, many discussions focus primarily on the affective experience at the expense of cogitation or understanding (Burke, 1759/1958). On the other hand, in the explanation of why or how sublime comes about, many authors do discuss cognitive components. Sublimity (e.g., for Longinus, Kant, 1790/1986, especially in mathematical cases, and in more contemporary discussions) is tied to situations that expand the mind or challenge concepts/schema. This is also often tied to the idea of learning, insight (Longinus), or novelty (Konečni, 2011). These terms also suggest a potential connection to cognitive processes of transformation. As suggested for aesthetic or everyday contexts (Pelowski & Akiba, 2011), these typically involve a process of matching schema to environment and finding the former somehow wanting, which in turn requires a revision or adjustment. This is mentioned, if only implicitly, by several authors (Dennis, 1693/1993; Kant, 1790/1986, Table 1), and explicitly by Keltner and Haidt (2003; see also Morley, 2010). Others mention aspects of cognitive difficulty, confusion, obscurity (Burke, 1759/1958), and schema change (Cooper, 1709/2001). Sircello (1993) in fact suggested a thread of "epistemological transcendence" running through sublime accounts, whereby experiences embody a cognitive failure, leading to reconsidering limitations (see also Pelowski et al., 2017).

Self-awareness/metacognition or loss of self?

Writers also question the role of self-awareness. On the one hand, several authors at least implicitly argue for the increase of self-awareness in moments of the sublime, often connected to insight, realization of limits, or changed conceptions (Cooper, 1709/2001; Kant, 1790/1986; Schopenhauer, 1819/1995; see also Tsang, 1998; Kuiken et al., 2012 for more contemporary arguments). Tsang (1998), similarly to Sircello (1993) above, also suggests that, while there may not be any common positively- or negatively-valenced set of emotions, all sublime cases contain a common trigger element involving the facing of life limits and thus a resulting realization and reflection on the self. Others argue for the opposite—tying the sublime to situations whereby one loses themselves so completely in an experience that they have no reflective awareness

(Brennan, 1987; Emery, 1973; Mortensen, 1998; Shiota et al., 2007)—aligning with a "flow"-like (e.g., Csikszentmihalyi, 1990) or harmonious/emotionally resonance (Pelowski et al., 2017) experience. Both or neither may relate to sublime reports.

Other affect-related questions might involve presence of sadness (noted by Schiller, 1801/1993), freedom, pride (Baillie, 1747/1967), or other responses such as awe (Allen, 2018; Keltner & Haidt, 2003) or being moved (Konečni, 2011; Zickfeld et al., in press), which are often mentioned either in conjunction with the sublime.

Are There Multiple—or Any—Sublime Types?

It is also quite possible that there are several distinct sublime types. This is again a common argument across the above review and may involve differing patterns of emotional experiences and triggers. Different patterns of emotion could also be tied to certain stimuli classes. In one of the only such empirical attempts to collect sublime reports in relation to both stimuli and emotion, Kuiken et al. (2012) suggested such evidence. Focusing primarily on literary works, they posited two varieties: (1) a "sublime disquietude," composed of a subjective feeling of "an inexpressible recognition/realization of no-longer-having" some desired thing, or (2) a "sublime enthrallment" identified by a felt desire ("not-yet-having"). After asking participants to read a series of literature passages, they reported these qualitatively different types—with the former denoted by a sense of loss, the latter evoking discord as a primary element, and both tied to specific literary works (Table 1).

Similarly, Gordon et al. (2016) considered individuals' ability to report a threat-based sublimity (e.g. storm, Second World War) and positive sublimity (Aurora Borealis, cloud formations, etc.). The researchers did suggest the possibility of evoking the two varieties, however with participants tending to better recall a positive variety. Such an emotion-based division of sublimity was also suggested by Hur et al. (2018), where stimuli of 'high-fear' and 'low-fear' sublimity were consistently reported in their rating data (see also Pelowski et al., 2017, who attempted to theoretically connect multiple emotional terms used in past studies to

their likely location within a processing model of aesthetic experience, and who suggested several potential locations for the sublime; Table 1).

On the other hand, there may not be any pattern to be found (Forsey, 2007; Sircello, 1993). When individuals are asked about sublime experiences, we may not find any distinct thread uniting and/or differentiating distinct sublime experience between individuals.

Present Study

By asking participants to recall a sublime encounter and using a mix of quantitative, scale-based measures and qualitative descriptions, we aimed to provide first systematic answers to the following questions: (1) Do individuals—'novice' participants without prior training in aesthetic philosophy or art—report having had a sublime encounter in their lifetimes? How often do they occur? (2) Of those who did report having experienced a sublime episode, we further asked them to recall one encounter which they considered the most profound and to report the triggering stimuli or contexts as well as key descriptive factors (including those aspects noted above and in Table 1). (3) We also asked participants to report their felt experiences using a list of terms tailored to include emotion or cognitive items noted in the above review of descriptions as well as terms noted in discussions of aesthetics and art (Pelowski et al., 2017).

To further assess especially the final research question, we then paired the emotion reports with recent tools for network modeling of correlations in answers. This approach offers many of the same data reduction abilities as that of factor or principle component analyses, however with important advantages. The network is item specific, assessing the correlations between items without an underlying assumption of higher-order factors. It further can allow for more information regarding the centrality, interconnection, and relative importance of items in connecting different aspects of reported experience and ultimately allowing the visualization of the entire network. A recent addition to this approach, a community detection algorithm (Pons & Latapy, 2006), allows for the identification of communities of terms (i.e., dimensions). Core items from these communities can then be used in a subsequent latent class analysis to provide a

data-driven method of identifying if there are one, multiple, or no consistent types of sublime experiences (e.g., see Pelowski et al., 2018 for use of network modeling with emotional reactions to art; Cotter, Silvia, & Fayn, 2018 for latent class identifications with reactions to music).

Method

Participants

The study had a sample of 402 participants (325 female, M_{age} = 21.6, *SD* = 5.9, 18 to 74 years), reduced from an initial set of 422 (20 participants were excluded based on not meeting minimum age requirements or other quality checks, see Results). Surveys were primarily distributed within the Faculty of Psychology, University College London, and at the Faculty of Psychology, University of Vienna, with most participants completing the survey for class credit. Surveys were also made available to respondents through colleagues of the authors at other universities in the US and Europe (See Table A1, Appendix, for a breakdown of nationalities and other population demographics). All participants provided informed consent. The study was approved by the ethics committee of the University College London. The sample size was based on a planned collection period of six months, with all individuals responding during that period included, and with the final sample judged to be large enough for our goals of reliably detecting incidence of sublime experience and the planned correlational and latent analyses (e.g., using procedures with small samples for the planned methods; Nylund, Asparouhov, & Muthén, 2007).

Procedure

The study was administered via the Qualtrics online survey platform (www.qualtrics.com). Participants were given a login address and password and asked to visit the survey site within a specified date range. Upon logging in, participants were presented with a set of instructions stating that we were interested in "investigating individual's sublime experiences." This was followed by a brief description of sublime, purporting to be from the

Oxford English Dictionary but fabricated by the authors (see footnote for full text).[2] This was written to provide participants with some general idea of sublime, due to the fact that we were first-and-foremost interested in ascertaining if individuals had had such experiences. At the same time, this was carefully constructed so as to be extremely broad and to minimize prompting towards any specific types of responses or underlying contexts, and in fact to leave open the possibility that individuals may have never had sublime encounters (both were confirmed in the results below). The ascription of the definition to the OED was also chosen in order to provide the perception of a sober and objective sourcing and, importantly, to avoid any direct connection to the research team (thus avoiding issues with social influence). Participants were further told that we were interested in both people who had experienced a sublime encounter as well as those who had not, and that the survey would be tailored to both groups with no time savings in either case. Finally, participants were informed that, if they had ever had a sublime experience, we were interested in the single most notable encounter in their lives and also not a combination or composite of different events. They were asked to complete the survey in one session (typically 30-45 minutes).

Materials: Survey Questions

Surveys were divided into multiple sub-sections, in the following order:

Sublime experience incidence and description.

First, participants were asked whether they had experienced a sublime feeling. Those

[2] The working definition that was given to participants was as follows: "The Oxford English Dictionary defines sublime experience as those encounters that 'produce an overwhelming sense of awe, vastness, grandeur, fear/terror, or other powerful emotion.' They are often reported in encounters with nature (imaging standing on a vista looking at the Grand Canyon), manmade wonders or scenery, works of art, or other objects/experiences that are felt to 'expand beyond us,' overwhelm, or be bigger than, more powerful than, or beyond the comprehension of, ourselves. On the other hand, sublime reactions might also involve quite intimate settings, small things, and personal objects that deliver a similar experience. The nature of the sublime, and the reason for this feeling, it seems, may depend greatly on the person having the experience. Thus, the reason for this survey!" Note again, *this is not actually the OED definition*. It was devised by the authors to provide a broad and general idea of typical concepts of the sublime without prompting participants necessarily toward any particular description.

answering ‘no’ were directed to the “General sublime understanding” subsection, whereas those answering ‘yes’ responded to a number of questions about their experience. These included: *(1) Free description*—First, participants were given the opportunity to describe their encounter in their own words. This was done to collect anecdotal responses without any priming from the following scale-based questions. *(2) Location, media, and age*—Participants then described where they had experienced the sublime (outdoors in nature, public space/city, etc.) and what type of stimulus (nature, art, music, etc.) using both provided lists and free answer. They were also asked at what age they had the experience and questions regarding any notable colors, smells, or sounds, whether they had experienced the stimulus before. *(3) Experience and time*—Participants also answered questions assessing factors related to time (e.g., length of the experience and the notable sublime portion; was the sublime experienced in one session or between repeat encounters; as well as how often they had similar reactions, whether they had ever made a special effort to try to revisit the stimulus, etc.). *(4) Stimulus meaning and evaluation*—We then asked participants to provide a short written answer to the question “What did the experience mean?” as a means of assessing their general understanding or contextualization of the event (see Pelowski, 2015). Participants also reported whether their reactions might have been intended and whether they thought that their own history, expectations, or mood might have been important.

(5) Felt emotion or other experiential factors—Participants then reported on their affective and cognitive experience using a list of 72 terms (see Table A2, Appendix, for full list). The collection of terms was again based on the literature review and previous theoretical models on profound/aesthetic experience (see Pelowski et al., 2017). The terms were accompanied by 9-point scales (“While I was having my experience, I felt [term]”; 0 = “not at all” to 8 = “extremely”), allowing the assessment of both binary yes (‘0’)/no (‘≥1’) answers and relative magnitude. This method has proven to be a useful way of differentiating major emotional factors in aesthetic or media experiences (Pelowski, 2015).

Background and personality.

Following the sublime encounter description, all participants (including those who had answered 'no' above) completed a set of standardized questions for background and other individual differences. This included questions assessing general education, previous training in aesthetics and the arts, current involvement in aesthetic-related occupations and general art or aesthetic interest and attitudes (following Pelowski et al., 2017; Leder, Gerger, Dressler, & Schabmann, 2012). In addition, we included a number of personality constructs. However, due to space considerations, this aspect of the study was deemed beyond the scope of the present paper. Order of sections was standardized for all participants; ordering of individual questions was randomized.

As a means of insuring attention given to answers, seven questions were repeated in different points of the survey (see below).

Results—How Do People Actually Describe the Sublime?

All data were analyzed for quality and test-retest reliability. Participants were removed who showed significant differences in the repeated set of seven manipulation check questions (paired *t*-test at $p < .05$). We also eliminated participants with monotonous answering patterns (i.e., entire sections with the same number on the scales), or those who did not complete all survey portions. This led to the removal of seven individuals. However, the manipulation check and a general analysis of the written answer portions suggested that the remainder of individuals had taken the survey quite seriously. Twelve individuals whose age was below 18 (age for consent) were also omitted.

The demographics of the participant population, including the entire sample and only those who did report sublime experience, are reported in Table A1. Overall, the participants were largely novices in regards to having studied or being professionals in art or art history ('No' = 86.6%), philosophy/aesthetics ('No' = 73.6%), or other courses that might give a background

knowledge of sublime. Among even those who did report sublime experiences, 89% suggested that they had never studied or were otherwise exposed to sublime theories. There were no significant differences in regards to the above factors and those who did or did not report feeling sublime.

Incidence: Have People Ever had Sublime Experiences; How Often?

Beginning with our first main research question, overall, 59.7% (n = 240) of participants reported having had at least one sublime experience, thus suggesting that such events are indeed at least relatively common among our group of participants. Among the individuals with sublime encounters, about one-third (32.5%) reported that their sublime feeling had only happened once in their lives. Whereas, 37.1% suggested that they had sublime experiences about once a year; 22.9% said once a month; only 5% said once a week and 2.5% reported experiences once a day.

Experience Descriptions—Triggers and Context

We then focused on those individuals who had answered 'yes' to having sublime experiences, walking through the various aspects and descriptions in order to address our subsequent research questions. This involves first the discussion of the more qualitative descriptions of the experiences and discussion of triggers. These are briefly discussed below with full break-down of answers provided in Tables 2-6. We also provide some examples of the participants' written answers to the various questions within the following discussion in order to flesh out the analysis. This is followed by the analysis of specific emotions and latent class identification of sublime types.

Duration, participant age, and general conditions.

The mean age of participants at the time of their experiences was 19.2 (*SD* = 5.8; Median/Mode = 18.5/18). However, we found a wide range (6 to 65 years). The mean number of years in the past when the experience occurred was 3.0 (*SD* = 4.5; Median/Mode = 1.5/1), again with a range of zero to 51 years. A significant positive correlation was found between participants' current age and the age at which they reported having the experience ($r = .74$, p

< .001, 95% CI = [.69 - .79]).

The total duration (Table 2) of the experiences, as perceived by the participants, showed a wide range—from a few seconds to multiple days. The mode and median were 30 and 25 minutes, respectively. The portion of the experience during which individuals had actually felt sublime, showed a mode and median of 10 minutes (generally, about 30-50% of the entire experience). About half (55.4%) of respondents suggested that they immediately had a sublime feeling upon encountering the stimulus; those who reported that the sublime feeling took some time to develop reported a mean time required of 28 minutes. The majority (66.4%) suggested that their experience arose from their first meeting with the stimulus.

<Table 2>

What Triggers evoked the sublime?

The specific triggers for the experiences are listed in Table 3. These are divided into main categories based on classifications from two independent raters. Looking to the table, it can immediately be seen that we do find a range of trigger types spanning most of the possibilities in the literature review.

The majority (50.8%) of cases involved nature, led by interactions with landscapes—such as viewing from the top of a mountain—which composed about 40% of this group. This was followed by seascapes and sky (e.g., cloud formations), and with a small number of individuals mentioning animals—herd of wild horses; swimming with a pod of orcas. The second most noted trigger type (14.6%) was experiences with other persons—both intense one-to-one conversations and being in a crowd, such as at a festival. This was followed by human-made environments (12.9%) such as cityscapes or involving individual buildings. On the other hand, art, design, or other visual media only represented 5.8% of cases. Lower incidence was also found for music (8.3%) and other media (theater, books, poetry). One person mentioned sports (scoring a goal), while several mentioned drug experiences. In keeping with the above connection to natural or landscape/cityscape stimuli, the majority (53.8%) noted that the

encounter occurred outdoors. Also of note, although most triggers, across the types, tended to match conceptions of powerful or overwhelming encounters—rushing water, great views, speakers, losing oneself in a crowd—there were also multiple examples suggesting infinity—fireflies in the forest; contemplating the stars/universe—and triggers suggesting very intimate aspects—tiny shrimp swimming in a pool; a quiet dinner for two; walking in the rain and watching the lamplight reflected off the cobblestones of Paris.

<Table 3>

Notable aspects of triggers, experience meaning.

Answers to supporting questions about the triggers and the experience are reported in Table 4. When asked whether there were any aspects of the trigger that participants were particularly drawn to, 55.0% answered 'yes'. However, there did not appear to be a general pattern or division to responses. Rather, people tended to either reiterate the elements mentioned in the trigger type—"*the distant end of the fjord*"—or to specify details— "*brushstrokes; detail of the artists hand*"; "*All the city lights*." On the other hand, when asked if anything about the setting played an important role, 65.0% said 'yes'. The subsequent explanations (broken down into main categories in Table 4) once again tended to provide a range of responses hitting many of the arguments in the literature review, albeit with no clear consensus.

The most common answer (29.5%) highlighted the unique or (positively-valenced) amazing nature of the settings—*"a desert-an unusual setting"; "I suppose standing at the top of the first castle I have ever been in added to the feel".* Several (7.1%) also mentioned a generally positive feeling towards the setting—*"it was a beautiful country and very emotional"; "The whole room had an unbelievable good mood."* Several reports (7.1%) also addressed the aspect of existential safety or being in controlled or safe environments—*"Classroom meant a fairly controlled setting"; "I felt comfortable to give in to my emotions."* At the same time, several others (5.8%) mentioned the importance of being in unfamiliar or unsafe surroundings—"*A city I didn't know too well - the feeling of being somewhere unknown"; "Nowhere near anything that*

felt safe." Similarly, we found a lack of agreement regarding involvement of social aspects or other people: 14.1% suggested the importance of being alone or in very intimate settings— *"In the middle of desert without any other human except our group of people"; "The fact that it was underwater and I was unable to exchange my awe or wonder with anyone else"*; 3.8% also mentioned silence. Whereas, 9.6% noted the importance of being in a social situation.

To consider whether there might be an underlying pattern relating the setting categories and the trigger classes, a Chi-square comparison was conducted. This did show significance ($X2$ (55, N = 152) = 89.93, p = .002; 'other' trigger category and 'no notable aspect' answers omitted). However, this generally suggested that nature-related triggers tended to lead to higher rates of noting the uniqueness or amazingness of the setting and of being alone. Aspects such as being safe and/or threatened or with/without people showed no differences in their distribution; all aspect categories also emerged in at least some cases for each type of trigger.

<Table 4>

This generally wide-range of triggering characteristics, and thus lack of one specific sublime-inducing pattern, could also be found in the explanation of the meaning or significance of the experiences (Table 4). Meaning types (again coded by two independent scorers) tended to involve either answers focusing on cognitive explanations, often involving insight, learning, or change in conceptions (42.5%), or involving a general appreciation of the emotions or feelings engendered (35.0%). About twenty percent of people also explicitly stated that the experience had no meaning or that they could not understand its significance; a small but notable 2.9% explicitly mentioned a spiritual or religious significance. A Chi-square comparison of *Meaning* x *Trigger Classes* was not significant (X^2 (10, N = 228) = 14.84, p = .138, 'other' trigger category answers omitted). When participants were asked if the experience was largely harmonious and notable for a feeling of ease or largely dissonant and difficult, they predominantly chose the former (84.2%).

Other sense modalities.

Although almost all descriptions noted a primary visual component (excluding those mentioning music), when asked about other sense modalities (Table 5), most participants (53.6%) did suggest that sound played a role. Among these individuals, the most often noted sounds were from nature (45.4%)—rushing water, wind; a few mentions of animals. This was followed by background music (25.5%), voices or people talking (14.5%), and then a few mentions of traffic or even one's own pulse or breathing. One constant appeared to be a rather backgrounded and monotonous quality to the sounds—hums, psithurism, choirs. Interestingly, although participants were asked specifically about sounds, 12.7% specifically noted silence or the overwhelming absence of sound.

Only 24.8% of individuals noted a smell as an important aspect. The majority of answers (71.7%) again involved nature—fresh air, water, dirt, plants. Among non-nature smells, participants mentioned aspects of rooms, cleaning products; incense or burning candles (see also Table 5 for notable colors and relative darkness/brightness, again with general lack of any consensus in results).

<Table 5>

Importance of prior thoughts, feelings, tie to self.

Finally, in describing whether the participants thought anything about their own background or personality played a role in the creating the experience (Table 6), we again found a range of answers. The majority (57.9%) did agree. However, most mentioned basic aspects of their own proximity to the triggers—"*growing up on the beach*"; "*Buddhist upbringing*"—or general personality aspects— "*easily excited*"; "*very emotional person.*" Few (less than 10% of those reporting 'yes' answers above) mentioned a specific relationship with, interest in, or attitude about the triggers that would suggest a stronger tie to the self—e.g., "*desire to prove my worth (on the hike).*" Once again, nearly two-thirds of participants stated that the experience was itself *not* unique to them and probably commonly had by others. Over half (59.6%) of the participants also noted that they had not previously been doing or thinking anything particularly

important that might have led to the experience. Among those who did answer 'yes,' most again suggested only actions related to the activity—such as hiking or being on vacation (thus, these were not quantified further).

Participants were also split between those who had been feeling specific moods or emotions before their encounter that they thought contributed to the sublime experience (49.6%) and those who had not (50.4%). Among those who answered 'yes' to notable prior moods/emotions, once again, we found a rather even spread among generally positive (28.3%: happy, joy, free, comfort/safety, love/affection, etc.) and negative emotions (37.2%: anxiety, fear, lonely, sad), or, for the remainder, between emotions suggesting generally high (15%: attention, excitement, anticipation) or low arousal (16.8%: physical exhaustion, calm).

<Table 6>

Reported Emotions

We then turned to the list of emotions and the question of the subjective feeling or notable affective/cognitive aspects of the experiences. Descriptive statistics for all emotion scales are provided in Table A3 of the Appendix. The 30 highest scoring emotions, with means and boxplots, as well as other notable emotion terms, based on the literature review, are shown in Figure 1.

Following the above qualitative findings, the highest scoring emotions, after a "sense of the sublime" itself, were again a collection of largely positive responses—a sense of beauty, absorption or fascination, happiness, joy, tranquility, catharsis, contentment, etc. These were accompanied by terms dealing with a sense of power and grandeur—awe, overwhelmed, being moved, sense of powerful force, amazement/wonder—as well as more cognitive terms such as insight, novelty, enlightenment, and mindfulness—and also by self-awareness. On the other hand, generally negative terms (e.g., anger, shame, offended, disgust) tended to have the lowest magnitudes across most participants. Notably, this was also true for fear, anxiety, stress, and confusion. Over half of participants claimed that they did not feel fear at all. Whereas, over 90%

mentioned awe, being moved, amazement, thrills; and 83-85% of all respondents mentioned some novelty, insight, or transformation.

<Figure 1>

Network Analysis of Emotion and Varieties of Sublime Experience

In order to reduce the number of emotion terms and, more importantly, to assess their underlying relationships and whether or not we could detect one or more varieties of experience, we then conducted a network model followed by latent class analysis.

Network construction.

We used the *Triangulated Maximally Filtered Graph* (TMFG; see Massara, Di Matteo, & Aste, 2016) to construct the networks. The TMFG algorithm begins by connecting the four terms that have the highest sum of zero-order correlations with all other terms. Then, the algorithm connects the next term with the largest sum of zero-order correlations to three nodes already included in the network. The algorithm continues adding new terms until all terms have been added to the network. Thus, the TMFG builds the network so that "like" terms are constantly being connected to one another. The TMFG has been an effective method for producing stable network measures (Christensen, Kenett, Aste, Silvia, & Kwapil, 2018) and for identifying the dimensional structure of constructs (Christensen, Cotter, & Silvia, 2018). The TMFG method was applied via the *NetworkToolbox* package (Christensen, 2018) in *R* (R Core Team, 2018).

Community identification (Bootstrap Exploratory Graph Analysis) and Core items.

To evaluate the dimensions of the emotion terms, we applied the *Bootstrap Exploratory Graph Analysis* (bootEGA; Christensen & Golino, 2019) using the *EGAnet* package (Golino & Christensen, 2019) in R. This method builds on a recently developed network dimension reduction approach called *Exploratory Graph Analysis* (EGA; Golino & Demetriou, 2017; Golino & Epskamp, 2017). EGA first uses a network construction method (e.g., TMFG) to create a network model. Then, a community detection algorithm is applied, which identifies the "communities" or dimensions in the network (Golino & Epskamp, 2017). In EGA, the walktrap

community detection algorithm (Pons & Latapy, 2006) is applied via the *igraph* package (Csardi & Nepusz, 2006) in R. The walktrap algorithm uses "random walks" or a certain number of random "steps" from one node to another node. Through these steps, community boundaries are formed. The item content and number of communities are deterministic without any direction or specification from the researcher. In addition, a series of simulation studies has demonstrated that EGA is as accurate or more accurate than more traditional methods of dimension reduction (Golino & Demetriou, 2017; Golino & Epskamp, 2017; Golino et al., 2018).

bootEGA further applies bootstrap with replacement (Efron, 1979), conducting EGA on each bootstrapped sample. The bootstrap EGA networks form a sampling distribution of networks, which allows the researcher to examine the stability of their network's dimensions but also provides a median (i.e., the median value of each correlation between the terms in the network) network structure, which offers a more generalizable final network structure (see Christensen & Golino, 2019). Notably, EGA and bootEGA are exploratory; however, confirmatory techniques can be applied to estimate how well the data fits this structure (e.g., Kan, van der Maas, & Levine, 2019).

To identify core emotion items representing each community, we then applied the hybrid centrality measure (Pozzi, Di Matteo, & Aste, 2013), which quantifies the overall "centralness" of each terms in the network based on their connections and relative location to other terms. Thus, terms that tend to have many connections within their own community but also between communities or are most central in the network can be interpreted as representing the terms that best reflect each latent dimension and the overall network. The top 20% of hybrid centrality values in each community were designated as core terms (Christensen, Kenett, et al., 2018). These then can be used in the following class analysis to assess how individual participants tend to show patterns of answers across the core terms and thus their represented emotion communities.

Results—Network model and Communities.

The final network is shown in Figure 2. The connections between terms (red or green lines) indicate a zero-order correlation surviving the TMFG algorithm. Red lines indicate negative relations, and green lines indicate positive. Thickness of lines indicates the strength of correlations. Relative distance between items also suggests the strength of their connection as a function of the entire network (i.e., items far apart would have a low correlation). The relative closeness of one term to all other terms thus also signifies its relative predictive power in positing specific answers to the other emotions within the network.

The network identified six emotion communities and 13 core items (see Appendix Table A2 for full list). These included: (1) a community of 28 items that represented generally positive emotions and appraisals with five core items including "a sense of beauty," "sensuality," "amusement," "mindfulness," as well as "sublime". This community also included other (non-core) items such as awe, wonder, and tranquility; (2) 14 items that represented insight or transformative terms—enlightenment, transformation, epiphany, etc.—with the core items of "profundity" and "a sense of realization"; (3) 12 items that described a sense of discrepancy or tension—confusion, tension, stress, shock, anxiety—with core items of "surprise" and "powerful force". This community also included the (non-core) term fear, however with this term having the lowest hybrid centrality score suggesting a low connectivity to this or to any other community (see Table A2); (4) 12 items represented more classically negative emotions—guilt, disgust, sadness, etc.—with core items of "anger" and "offended"; (5) three items denoted by the core item of "self-awareness" as well as awareness of one's body; and finally (6) two items which described general felt arousal, with a core item of "feeling like laughing," accompanied by the non-core term needing to clap or yell. This class might also be related to the unique feeling of needing to respond bodily to an overwhelming stimulus while also feeling a need to remain reserved or to control one's reactions (e.g., see Goffman, 1974 for a discussion in social situations; see also Pelowski & Akiba, 2011).

<Figure 2>

Varieties of Sublime Experience?—Latent Class Estimation

The 13 core emotion items were then tested in one-, two-, three-, and four-class solutions (see Swanson, Lindenberg, Bauer, & Crosby, 2012; Silvia, Kaufman, & Pretz, 2009). To compare results, we emphasize specific fit indices (i.e., the Akaike's information criterion, AIC, and the adjusted Bayesian information criterion, BIC; following Swanson, Lindenberg, Bauer, & Crosby, 2012) as well as inferential tests more robust in smaller samples (bootstrapped likelihood ratio test; Nylund, Asparouhov, & Muthén, 2007). We also considered entropy, an index of classification quality. Fit indices for models can be found in Appendix Table A3. Two-, three-, and four-class solutions were all found to be better than a single class. The initial use of fit indices favored the four-class solution. However, further investigation revealed this solution contained two sets of parallel profiles (relative patterns of responses) at relatively lower and higher intensity levels. Thus, this was discarded (following Silvia, Kaufman, & Pretz, 2009) in favor of two classes. A likelihood ratio test also suggested that the two-class solution was a better fit than the three-class, $p = .17$.

Interpretation and Comparison of Sublime Classes

To further consider these classes, individuals were assigned to each of the two sublime classes (based on probability of most likely class, average probability across participants = 1.0, no marginal cases encountered). Figure 3 shows the profiles as mean emotion ratings of the core items across all assigned participants. The most notable immediate finding is that Class 1 represented the vast majority (90.8%) of all sublime reports. This class showed generally high responses regarding the pleasure/beauty, transformative/insight, discrepant/tension, self-awareness, and arousal items, and again showed very low negative emotions. On the other hand, Class 2 (9.2%) had a much smaller number of individuals and showed relatively lower (albeit still around the midpoint of the scales) positive emotions, including felt sublimity. This class also had relatively similar levels of transformative/insight, discrepancy/tension, self-awareness, and arousal items to that of Class 1. However, it had higher negative emotions.

<Figure 3>

The general consistency of the emotional sublime reports regarding felt experience, and the difference between classes, could further be seen in the comparison across trigger types. This is shown in Figure 4 and suggested a very consistent pattern for Class 1 across all emotion communities regardless of the type of the actual trigger engendering the experience. Due to the much smaller samples, sublime Class 2 showed more variance between trigger types. However, the most notable difference again appeared to involve the relative magnitude of negative emotions (especially higher for cities buildings). The other emotion community scores tended to show similar patterns across all triggers, again with a generally lower reported level of Pleasure/beauty terms and all other community terms around the midpoint of the scales.

<Figure 4>

Finally, we briefly considered what else might have led individuals in Class 2 to report higher negative and less positive emotions. This was done by assessing a number of qualitative factors discussed above. We also looked at the written descriptions of the Class 2 sublime accounts. Both are provided for the interested reader in Supplementary Materials, Tables S1 and S2 (note, due to the small number of Class 2 individuals the following comparison was only descriptive and did not make use of inferential statistics).

Overall, we found very few obvious distinctions between the classes in terms of trigger-related aspects. Participants in both classes suggested their experiences occurred a similar number of years ago, lasted a similar duration, showed an equal ratio of first-time meetings with the stimuli; they also showed no clear differences in regard to whether or not participants were thinking or feeling anything before the encounter or had some other personality or background aspect that they thought might play a role. Participants also showed no obvious differences in the ratios of notable aspects driving their experiences.

The only notable differences involved, first, the general distribution of trigger types. Class 1, again, matched the general stimuli distribution discussed above, with nature the most

prominent, followed by cities/architecture, people, and then a handful of reports on art or other media. In Class 2, the majority (54.55% versus 10.6% of Class 1) reported sublime experiences with people. The written descriptions of Class 2 also suggested a potential difference, whereby the reports tended to recall rather violent or terrifying encounters. This was especially true of the cases involving people (e.g., a violent attack by one's mother, a fight in school; the near death of a loved one). In the cases of nature as well, several participants mentioned terrifying situations such as meetings with spiders, while one individual mentioned losing hope in humanity from a book. Several also specifically mentioned fear or terror. (Comparison of the reported fear did also show this to be generally higher in Class 2, $M = 6.23$, $SD = 2.73$, versus Class 1, $M = 2.28$, $SD = 2.18$).

At the same time, it is important to note that the above distinctions were not consistent across all reported cases. Half of Class 2 cases were again not attached to people but to other trigger types. In the written descriptions, although many did recall threat, many also mentioned more 'classic' sublime situations such as viewing mountains or listening to music, but for whom, and for whatever reason, this also involved stronger felt terror or negative responses. Class 1 also contained a substantial number of 'people' cases. Due to the small sample, this remains a question for future research. (Note, due to the fact that individuals were asked to report only one, albeit their most profound, experience, but could potentially have had others from both Class 1 and 2, we did not consider personality aspects).

Discussion and Conclusion

This study sought to provide new insight into when and how sublime experiences occur and what are the cognitive-emotional components. This was addressed by collecting data from self-reports, by novice participants with little specific training in areas related to sublime. Our results, in turn, do paint an intriguing, and surprisingly, both a broad yet, in some ways, very consistent pattern of experiences.

Incidence and Commonality of Sublime Experience

First, in regards to the initial research question of whether individuals would be able to recall and report on a distinct moment in their lives when they had felt the sublime, just under two-thirds (59.7%; 240 individuals) answered 'yes'. Among these, two-thirds again suggested that sublime experiences had happened, for them, more than once, with most suggesting sublime encounters one to several times a year. This result itself provides important evidence that the sublime as an experience seems to be a rather common, shared experience (e.g., supporting such theoretical arguments by Burke, 1759/1958; Konečni, 2011), and also calls into question recent arguments that the sublime might be so ineffable or non-existent so as to defy reporting (Aagaard-Mogensen, 2018; Pence, 2004). At the same time, this evidence does also leave open the possibility that the sublime is not *universal,* and raises questions regarding assumptions made from surveys of, for example, aesthetic experiences that these happen to everyone (e.g. Gordon et al., 2016; Menninghaus et al., 2015; Shiota, Keltner, & Mossman, 2007). Importantly, this study was, to our knowledge, the first time this question had been raised for the sublime using a more or less systematic method. This of course also raises the question regarding what might be the key differences—personality, simple access or experience chances—that may lead to sublime incidence, and thus many targets for future research.

When and with What was the Sublime?—A Wide Range of Trigger Types

When we looked to the explanations for the conditions and stimuli or triggers that had brought the experiences about, we find a very broad spectrum of qualitative answers. Although about half of participants noted natural phenomena—ranging from 'classic' sublime tropes of mountains, volcanoes, seascapes, clouds, sunsets, and deserts—we also find a range of other answers. Participants noted flowers, tiny animals, cityscapes, towering buildings, music, poetry; visual art. They also suggested cases of powerful interactions with crowds, intimate conversations with other people. We also find evidence for some of the more obscure sublime

arguments such as spiritual contexts (e.g., Hegel, 1920; Perlovsky, 2012), occurring in about 3% of our cases, or even drug usage.

This range of reports again is in itself quite interesting. Participants, with little prompting regarding what they should report as sublime, tended to hit almost all of the possible sublime arguments from the literature review (as also reviewed in Table 1). This would in turn tend to suggest against any particular 'proper' trigger for sublime experiences. Thus, previous arguments that the sublime 'must' or cannot involve certain elements—e.g., art, people, visual elements—do not find support. Similar arguments can also be made for supporting elements, which also tended to cover a spectrum of answers. Many explanations did suggest powerful, overwhelming stimuli and even a sense of the infinite; however, others touched aspects involving intimate spaces. Some stressed the importance of being alone; others highlighted being with others. Some stressed losing control or encountering the dangerous and unfamiliar; others stressed safe, controlled environments. Experiences also ranged from seconds to several hours; came suddenly or after some time. In general, we also found that participants often suggested that the actual sublime experience, again regardless of trigger, tended to not have much to do with the prior feelings or thoughts of the participants. In fact, most suggested that the experiences they were having were expected to be similarly possible for other individuals—and perhaps speaking again to the universality of the experience.

Beyond the basic finding for a wide scope in triggering varieties, the evidence does also, at the same time, suggest some other intriguing patterns. First, despite the potential for a wide range of triggers, we do find evidence for at least an emphasis on nature (50.3% of cases), with around 90% of these descriptions involving landscape, sea/water, and the sky. This of course matches a good deal of the 'classic' sublime discourse (e.g., Burke, 1759/1958; Addison, 1773/1718; Kant, 1790/1986), that, while sometimes leaving open other possibilities does single out such stimuli. The current work is also in line with the work by Shiota and colleagues (2007),

where nature was the most commonly evoked source of awe, in front of the likes of social interaction, art, music, and personal accomplishment.

Encounters with nature have been previously shown to evoke profound emotions (Joye & Bolderdijk, 2015; Silvia, Fayn, Nusbaum, & Beaty, 2015; Shiota, Keltner, & Mossman, 2007), which might be closely associated with sublimity. This may tie to an argued for sense of power and the infinite, to cases of feeling small and humble (Joye & Bolderdijk, 2015; Piff et al., 2015), or to meetings with actually physically large objects. For example, Keltner and Haidt's (2003) two central pillars of sublime/awe reactions were also a sense of *vastness* and *accommodation.* It is also often the case that examples of large physical objects are used as objects that evoke the sublime (e.g. Keltner & Haidt, 2003; Konečni et al., 2007; Konečni, 2011). It is then not surprising that when some participants mentioned the Human-made environment (12.9%), the third highest trigger type following nature (50.8%) and people (14.6%), the most mentioned triggers were of vast physical size, amounting to more than 60% of all participants.

On the other hand, the great majority of encounters were outside, which does give support to such arguments as that by Baillie (1747/1967; see Ashfield & De Bolla, 1996) that this would be an important factor. Most accounts, even including visual art, also involved the physical immediacy of the participant and stimulus, with only one or two cases of music being watched on TV. This supports the idea that sublime encounters may often require the presence of an individual's body, in order to either evoke a sense of real presence or perhaps because of the importance of proprioceptive or other sense experiences (see e.g., Schiller, 1793/1993). This would, of course raise important questions for laboratory study.

That people-related events were the second most common sublime category also can be connected to previous research. Gordon et al. (2016) have noted the ability of social interactions to lead to awe, and Menninghaus et al. (2015) have connected this to moving experiences (note, however, that these works found a higher incidence with people than with nature). However,

again, it is notable that this category had such a high incidence in our results, and certainly contradicts theorists who argue against people as a seed for sublime occurrence.

It is also of note that in our study, as well as in other surveys of aesthetic experiences (e.g. Menninghaus et al., 2015), music and art were rarely seen as elicitors of the sublime. In our data, art and music combined accounted for under 15% of reported encounters. It may be that these triggers do not possess the aspects—size, being outside, evoking overwhelming reactions—that can be more easily triggered via nature etc. At the same time, once again it should be stated that, again contrary to certain theorists (Addison, 1773/1718; perhaps Burke, 1759/1958), art can be connected to sublime experience, even if not as often. It is also important to note here and in the above discussions, that participants were asked to report one (their most profound) experience. They may very well have had others covering a range of trigger classes.

Finally, although the sublime accounts were largely based on visual features, with the exception of music (8.3% of cases), they did often contain other sense modalities. About half of participants explicitly noted sounds (highlighting a droning quality, or even total silence). This itself raises an interesting question regarding the role of such a context in relating to the sublime experience. A quarter also mentioned specific smells. Interestingly, this thus calls into question the argument that other modalities such as touch, smell, or taste could not bring sublime about (Baillie, 1747/1967; see Ashfield & De Bolla, 1996).

Different Triggers but a Consistent Pattern of Felt Emotional/Cognitive Experience

At the same time, despite the breadth of answers to what evoked the sublime, when we look to the reported emotional or cognitive experience, there was high consistency and suggested one major sublime type. A network model of correlations between reported emotions and subsequent reduction to six dimensions/13 core items via Exploratory Graph Analysis (EGA), showed that 90% of participants could be fit into one shared pattern. This involved a largely positive experience with high reported pleasure (i.e. feeling of amusement, sensuality, mindfulness, sublime, and sense of beauty), tension (surprise and powerful force), bodily

arousal, and self-awareness as well as transformation or insight (i.e. denoted by feeling of profundity and realization). This was in tandem with low reported negative emotions, and was consistent across all trigger types.

This finding, too, suggests important evidence in regard to previous sublime arguments. First, it suggests that there is indeed a consistent thread to the sublime, which both runs across a wide swath of accounts, and is consistently reported by individuals when recalling the experience. This itself perhaps lends credence to the idea of the sublime itself, with evidence suggesting a quite commonly felt experience. The six emotion communities and core items also tell much about sublimity's emotional components in relation to past theories.

A general sense of pleasure and positive aesthetic experiences form an integral part of the first community. Here, the sublime appears to be associated with other notable aesthetic experiences, including wonder (Fingerhut & Prinz, 2018), awe (Keltner & Haidt, 2003), thrill (Konečni, 2011), and being moved (Menninghaus et al., 2015). All of these emotions have also been mentioned as components of, for example, Konečni's (2011) "aesthetic trinity" theory, and do all coincide in the same community in our data. Notable also is the senses of beauty, which in fact showed some of the highest magnitudes, again across all trigger types. This finding tends to go against various 18th century thinkers (Burke, 1759/1958; Kant, 1790/1986; see also Lyotard, 1994). However, the positive association between sublimity and beauty replicates recent empirical works (Ishizu & Zeki, 2014; Hur et al., 2018), as well as psychological theories that view sublimity ultimately as a kind of beauty (e.g. Konečni, 2011). Against' Kant's view that sensual pleasures cannot be beautiful, a feeling of sensuality was also associated with this community. This finding also finds support in recent study (e.g., Brielmann & Pelli, 2017).

Sublime responses were also accompanied by emotions that relate to surprise and a powerful force. This community, which includes experiences of tension, confusion, anxiety, shock, etc., fits into what one may call a 'Burkean sublime'. For Burke (1759/1958), the sublime represented an experience riddled with tension or fear, yet of a kind that attracted people's

attention, and through the human imagination, were suggested to be a form of delight and in fact one of "the most powerful of all passions." (Part I. Section VI). At the same time, our findings also suggest the presence of cognitive aspects connected to tension resolution, or even learning, insight, and transformation. This had been argued for by several authors (e.g., Ashley-Cooper, 1709/2001; Kant, 1790/1986; Schopenhauer, 1819/1995; Kuiken, Campbell, & Sopčák, 2012; Longinus, Keltner & Haidt, 2003; Konečni, 2011; Schiller, 1793/1993), but often as only one sublime variety—for example connected to interpersonal or conceptual, mathematical triggers. However, here we find that the insightful aspect tends to play a role across all accounts. A parallel might be found for this in the suggestions (e.g., Pelowski et al., 2017) that transformation and insight is a key component of many moving and powerful aesthetic encounters.

Hand-in-hand with transformation/insight was self-awareness. This too had been a point of contention, with some suggestions that sublime might be related more to a selfless loss of surroundings or "flow"-type experience (Emery, 1973; Brennan, 1987; Mortensen, 1998). Transversely, self-awareness is often argued to be a key step towards transformation (Pelowski et al., 2017), opening the door to reflection and cognitive reorganization. That the element of tension exists as a separate dimension to that of pleasure and self-awareness/transformation also may imply an important dual-process that, for example, Kant (1764/2011) observed in sublime episodes. In explaining his dynamically sublime, Kant argued that the mind, first baffled by the enormity of a sublime conception, is transformed, before it is delighted by its own recognition of invincibility. The process of tension transforming into pleasure also appears in Burke (1759/1958), when he claims that the very nature of sublimity's delight springs from reliefs from anxiety. In our study, the three components necessary in such dual process—a pre-transformation state of unease, transformation, and a post-transformation state of pleasure—emerged as distinct dimensions of the sublime. This finding supports, for example, Sircello's (1993) suggested "epistemological transcendence" in sublime accounts (also Pelowski et al., 2017).

It is also perhaps not surprising to find the general absence of negative emotions. These items, which includes anger, being offended, guilt, grief, disgust, and emptiness, for example, are rarely associated with aesthetic experiences, and it is hardly surprising that most individuals report low in these emotions within this cluster when rating their sublime encounter. It is notable, however, that the results also suggest against fear or terror (included in the tension emotion community but showing a very low incidence across all reports). These were again often mentioned as a necessary aspect of the sublime, often in their mixture with awe, pleasure or beauty. However, in our reports, fear was very rarely mentioned—both with or without notice of existential safety or control, suggesting support for more positive sublime arguments such as by Kant (1790/1986) or Baillie (1747/1967). The idea that the sublime entails an experience of enthrallment and excitement without terror or danger is echoed in observations in the empirical community (Eskine, Kacinik, & Prinz, 2012; Konečni, 2011; Ortlieb, Fischer, & Carbon, 2016). This study marks the first time that *all* of these elements have been connected.

A Second Sublime Class—Why Did Some Report a More Visceral/Fearful Experience?

Finally, it must be noted that despite the main findings above, fear did appear to play at least some role in defining a second, albeit statistically robust, sublime class. Occurring in only 9% of cases, this was notable for much higher negative and relatively lower positive emotions. A check of the written reports also suggested that this occurred in rare cases where individuals did actually come up against some danger or often violence—discussions of abuse, fights, war, dangerous animals. Interestingly, this class also appeared to occur more with people. However, it also did involve more classic sublime triggers, whereas the main sublime type also again involved interactions with others. Equally important, beyond negative emotions, this class showed the same patterns of other key emotional and especially cognitive aspects—transformation, discrepancy, self-awareness, arousal—as above. It also had relatively lower magnitude of reported sublime itself.

The finding of two distinct sublime classes in itself supports previous empirical studies (e.g., Gordon et al., 2016; Hur et al., 2018) showing the possibility to evoke both a threat/fear-based and positivity-based sublimity. This raises the question of how these might qualitatively differ in other aspects as well as what kinds of interactions were being had by past writers to push fear and negative emotions to the forefront, and why this was not often reported by our participants. One interpretation could be that the Class 2 should be treated as noise, with a small subset of participants (only 22) reporting something other than a 'sublime' account. It may also be that the nature of a self-report method—asking participants to recall an event perhaps several years after the fact—could lead to especially negative emotions being obscured. For example, Gordon et al. (2016) suggested that participants better recalled positive sublime cases versus those containing threat. It is also possible that the sublime accounts involved a sequential process, as might be suggested from the *discrepancy, self-awareness, insight, positive emotion* factors. Once an interaction itself was resolved, one might be less likely to note negative emotions, even though they were felt in reports. This second case, in tandem with the main finding, raises a fascinating avenue for future research.

Caveats, Limitations, Questions for Future Research

This study also of course comes with other caveats. We assessed a sample of mostly young students. It would be interesting to try this with an even larger range, or in different cultures and languages. The self-report method, although providing a powerful qualitative and quantitative view, can also obscure or foreground certain factors and should certainly be followed up in other domains. Limiting evaluations of the sublime to those who have previously felt sublimity may also introduce its own bias. This may, on the other hand, also allow us a more accurate picture of actual intensely felt sublime experiences. As noted above, the task of asking individuals to recall an event from the past and to make a detailed report of the experience also itself raises issues. That said, the evidence does support the arguments that: (1) even novice participants can often recount sublime occurrences; (2) these can involve a large number of

triggers; and (3) in almost all cases and regardless of the underlying stimulus, these involve responses that (at least 90% of the time) describe a consistent cognitive and affective pattern which may provide an important new window into our shared peak human experiences.

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Footnotes

[1] Note, some discussion (e.g., Clewis, 2009) also suggests a third, moral sublime, tied again to the attempt of the rational mind or one's imagination to comprehend something so great so as to be inconceivable, and highlighting a sense of the noble.

[2] Note that they tend to conflate sublime with "awe" experiences, which they use interchangeably. However, they also take their point of departure from Burke's theory of the sublime.

[3] The working definition that was given to participants was as follows: "The Oxford English Dictionary defines sublime experience as those encounters that 'produce an overwhelming sense of awe, vastness, grandeur, fear/terror, or other powerful emotion.' They are often reported in encounters with nature (imaging standing on a vista looking at the Grand Canyon), manmade wonders or scenery, works of art, or other objects/experiences that are felt to 'expand beyond us,' overwhelm, or be bigger than, more powerful than, or beyond the comprehension of, ourselves. On the other hand, sublime reactions might also involve quite intimate settings, small things, and personal objects that deliver a similar experience. The nature of the sublime, and the reason for this feeling, it seems, may depend greatly on the person having the experience. Thus, the reason for this survey!"

Note, this is not actually the OED definition. It was devised by the authors to provide a broad and general idea of typical concepts of the sublime without prompting participants necessarily toward any particular description.

Tables

Table 1
A Wealth of Explanations, but Little Consensus—Overview of Some Key Theories Regarding Factors in Sublime Experience

author (period)	noted stimuli/aspects	noted emotions	cognitive/insight component?
Longinus (1st century AD; Roberts, 1899)	• elevated or lofty rhetoric, language (communication/ communicator is elevated "above the ordinary" and becomes persuasive). • five sublime-evoking features: "great thoughts, strong emotions, certain figures of thought and speech, noble diction, and dignified word arrangement" • also topics of death, blood, rage, natural disasters	• veneration, marvelous, surprise, passion, ecstasy, joy, exultation. • BUT ALSO dismay, fear ("pathetic"/"inferior" type)	• "great thoughts" (included with five key features). Must strike vehemently upon the mind." Includes "the faculty of grasping great conceptions" • emphasis on transcendence of reality through heroic communicator
Romanticism			
Dennis, John (1693/1939) Addison, Joseph (1773/1718) Cooper, Anthony Ashley (1709/2001)	• Nature/natural forces: mountains (Alps), rivers, volcanoes. Vast, rugged, or great phenomena, uncommonness, beauty. • sense of infinity: objects "unbounded," "unlimited," "spacious". • wasted areas or ruins (Cooper, Part III, Sec. 1, 390–91) • (Addison) especially visual stimuli: evoke greatness, uncommonness, and beauty. NOT from rhetoric. However NOT visual art.	• pleasure, harmony, appreciation, grandeur, awe, astonishment • BUT ALSO sense of overwhelming power, fear, terror, horror, despair, repulsion, smallness. • freedom	• suggested mismatch of schema: "horrours inconsistent with reason" (Dennis) • metacognitive reflection, transformation or schema change (Cooper).
Baillie, John (1747/1967)	• anything that "raises the mind to fits of greatness, "extends" one's being, and "expands it to a kind of immensity". • art, nature, literature, music (music of 'grave' sounds with long notes), science, BUT NOT involving smell, taste, touch ("contain nothing that is exhaulted"). • involves vastness, uniformity, unfamiliarity • particularly outdoors/open spaces.	• exultation, pride, freedom, resonance (mind consumed by one uniform sensation)	• disposes mind to enlargement of itself and gives conception of mind's own powers.
Burke, Edmund (1759/1958)	• range of stimuli: literature, art, nature, literary characters (Death and Satan in Milton's Paradise Lost) with dark, uncertain, and confused quality and with "some sort of approach toward infinity" (p. IV). • terror-inducing stimuli (but fictitious). • either intense light or darkness--can obliterate the sight of an object • NOT beautiful	• awe, pleasure • BUT ALSO horror, terror, negative pain, tightness • existential safety	• NO: Burke (p. 58), "the mind is so entirely filled with its object, that it cannot entertain any other."

Kant, Immanuel (1764/2011, 1790/1986)	• "not contained in anything in nature" [although spurred by nature], only in "mind" • 3 types (two main) • (1) mathematical: considerations of infinity/ concepts expanding beyond scope of reason. • (2) dynamical sublime: overwhelming nature, which one is unable to grasp the magnitude of. • (3) moral sublime, tied to attempt of rational mind/imagination to comprehend greatness, highlighting "noble" • not beauty: connected to form of object having "boundaries," and "is what pleases in the mere judgment. The sublime "is to be found in a formless object" and is what pleases immediately through its opposition to the interest of sense" (§ 23).	• splendor, greatness (mathematical) • overwhelmed, terror (dynamical). BUT ALSO detachment, perceived existential safety, fear without being afraid	• tied to human "reason," or "presentation of an indeterminate concept" and "shows a faculty of the mind surpassing every standard of Sense," but also able to appreciate importance ("one's ability to subsequently identify such an event as singular and whole").
Wordsworth, William (1770 - 1850)	• cases where mind attempts to "grasp at something towards which it can make approaches but which it is incapable of attaining," leading mind to lose consciousness (self-awareness?), and yet allowing the spirit to grasp the sublime, if fleetingly.	• awe, • BUT ALSO fear/terror, relief/catharsis, potential enlightenment	• enlightenment
Coleridge, Samuel Taylor (1772 - 1834)	• sublime not contained in stimulus, but attributed to stimulus following induced contemplation of eternity.	• infinity • NOT terror/awe	
German Idealism			
Hegel, Georg Wilhelm Friedrich (1770 - 1831)	• true sublime only with poetry (e.g., Old Testament Psalms). NOT visual scenes/art • stage in symbolic expression, significance and form disconnected, but not through mere fantastic enlargement. • stimuli which bring about recognition of the one absolute substance of god, through recognition of the nullity of objective fact, leading to a spiritual exultation. • NOT beauty	• exultation, wonder, serenity • EITHER positive/negative (grief or happiness) • NO confusion • self-awareness or reflection (like confession), self-respect.	• recognition of the one absolute substance of god through recognition of the nullity of objective fact. • self-awareness or reflection, new self respect
Schiller, Friedrich (1793/1993, 1801/1993)	• 2 main types: • (1) practical sublime: overcome bodily reaction to natural conditions/desires for self-preservation through will. • (2) theoretical sublime: maintain through Reason an independence from Nature, dealing with infinity or boundlessness, allowing transcendence and conceiving of more than perceived. • mechanism involving cases where an impulse to maintain circumstances/"self-preservation drive" comes up against its limits (through danger, loss of control), yet "cognition" drive to mark or change our circumstances allows us to maintain control, and our rational nature to "experience its freedom from limits" allowing "inner perceptions of existence • nature and art (greater) • potentially requires presence of one's body.	• joyfulness • BUT ALSO woefulness, shock, enrapture • practical sublime: pain (reminding of danger), desire to escape/resist, fear (if danger un-resistible). • theoretical sublime: impotence, powerlessness, aversion, melancholy, BUT NO fear/pain	• first drive is an impulse to mark or change circumstances, thereby "give expression to our existence," which always amounts to "gaining conceptions"

Schopenhauer, Arthur (1819/1995)	• range of stimuli from weakest (Light reflected off stones; endless still desert, no immediate threat but cannot support life) to turbulent nature, to fullest feeling from facing Immensity of Universe. • stimuli does not invite contemplation/observation, but overpowering or dangerous, could destroy observer. • also noted artistic contemplation, especially music (e.g., symphonies; mass) a means, albeit temporary, to escape the confines of one's will	• pleasure • BUT ALSO threat, danger • NO existential safety	• No. Does not invite contemplation
Neo-Kantian			
Simmel, Georg (1958)	• alternative to Romantic sublime involving contemplation or immediate experience of the physical existence of objects themselves, bypassing reason, especially in mountains and ruins.	• contemplation	• bypassing reason, but involving contemplation of experience
Dessoir, Max (Emery, 1973)	• objects exhibiting superior might, thus prompting "tragic" realization of life's unrealizable oppositions," such as fate.	• self-forgetfulness, personal fear replaced by well-being, security	
Modern/Post Modern			
Lyotard, Jean-François (1994)	• urban landscape, skyscrapers, large cities, in addition to natural scenes	• socio-political sense of hopelessness, lack of control, alienation, "aporia" (impassable doubt)	
Contemporary cognitive/psychological focus			
Tsang (1998)	• no one common property of sublime objects. • involve limit situations, whereby one comes up against previously assumed thresholds in contemplation of natural order, self-preservation, capacity.	• NO DEFINING EMOTIONS	• encountering limits (schema/conceptions), leads to self-realization of the limit of our existence.
Kelter & Haidt (2003)	• Cases combining (1) perception of vastness, great physical size, but also any stimuli that challenge one's accustomed frame/schema of reference in many domains including "physical space, time, number, complexity of detail, ability, even volume of human experience," and (2) need for accommodation • also from prominent (i.e., political) personalities	• awe (used interchangeably) • stimulus-focus/self-diminishment • rooted from social dominance in interpersonal relations • sense of belonging to larger groups, prosocial behavior	• challenge to conceptions, which leads to expansion and update of perceiver's frame/schema.
Konečni (2011)	powerful experience triggering stimuli ("sublime stimulus-in-context"), with the guarantee of "existential safety"	• thrills/chills, being moved, overwhelmed, "wow effect" (mixture of fear and joy) • BUT ALSO existential safety	
Kuiken, Campbell, & Sopčák (2012)	• literary works (empirical study) • 2 types: • (1)sublime Disquietude: subjective feeling "inexpressible recognition/realization of no-longer-having" what one once almost had, and Inexpressible Realization (Celan's Death Fugue, Owen's Exposure, etc.) • (2) sublime Enthrallment: "not-yet-having" what one might yet have (Shelley's Mont Blanc, Coleridge's Frost at Midnight, etc)	• unpleasure, absence, "inexpressible" recognition/realization, BUT ALSO pleasure, "felt shift" toward self-perceptual depth, poignancy • sublime Disquietude: loss, discord, • sublime Enthrallment: discord, unattainability, Inexpressible Realization, Self-perceptual Depth, wonder/reverence	

Skorin-Kapov (2016)	• no one common property of sublime objects. • cases of break between expectations/sensibility and one's powers of representation.	• surprise, recuperation, admiration, responsibility, awe, BUT ALSO apprehension	
Pelowski et al. (2017a, 2017b)	• Any stimulus, but three potential times when sublime feelings might be reported: • (1) interaction with a stimulus that is cognitively discrepant (in violation of expectations/schema), mixed with general lack of personal involvement or existential safety, allowing enjoyment, and aligning with literature tied to stimuli that evoke beauty, rarity, or physical grandeur but which expand past capacity for one to process or control the experience, • (2) circumstances have strong tie to self, but initially a stimulus and/or emotion matches schema to a degree that one experience harmony or resonance, yet so far as to overpower or overwhelm, leading to felt threat or loss of control. • (3) transformative outcome, whereby some cognitive or affective content is at first troubling and discrepant, but perhaps with a stronger tie to the self, forcing both discomfort and the individual to change their expectations or schema as in case one.	• type 1: pleasure, awe, cognitive reflection, changing one's mind, insight, novelty, BUT NO discomfort, fear. • type 2: harmony, resonance, overpowering, threat, loss of control • type 3: pleasure, awe, cognitive reflection, changing one's mind, insight, novelty, BUT ALSO discomfort, anger, catharsis, transformation.	• type 1 and 2

Table 2
Sublime experience and time duration

How long did the Sublime portion of your experience last? (minutes)[a]	
Mean (SD)	109.2 (631.0)
Median/Mode	10/10
Min-Max	.01 - 7200
How long did the entire experience last? (minutes)[a]	
Mean (SD)	240.4 (1542.0)
Median/Mode	25/30
Min - Max	.08 - 20160
Did you immediately have a sublime feeling after encountering the object/stimulus?	
I immediately felt sublime	55.4% (n = 124)
It took some time to develop	33% (74)
I don't know	11.6% (26)
If it took time, how long did the Sublime feeling take to develop? (minutes)[a]	
Mean (SD)	28.0 (43.7)
Median/Mode	10/5
Min - Max	.5 - 200
Did your experience involve only one encounter, or did you leave and come back?	
It ended as a single encounter	62.1% (149)
I left and came back at least once within that day/session	8.8% (21)
I became fascinated with the object/setting for an extended period longer than one session	29.2% (70)
Have you ever made a special trip or gone out of your way to revisit the stimulus?	
No	67.5% (162)
Yes	32.5% (78)

Note. [a] If respondent provided time range, the midpoint was used in scoring. "A couple" coded as '2' minutes; "a few" coded as '3' minutes.

Table 3
Sublime experience specific triggering objects/events

Nature (50.8%)	• **landscape (42.5%):** mountains as landscape (9); Fjords (5); view from mountain peak (4); volcano (3); gorge/canyon (3); desert (2); Kings-Canyon Australia; camping trip; Ayers rock; high view of rocks and woods; paragliding-lifting from ground; high Alpine road; View of hills of Tuscany, Italy; driving through Aceh, Indonesia; watching earthquake and landslide (Langtang, Nepal); plain of stones and barbed wire; Grand canyon; mountains with red/gold trees-Kyoto, Japan; Forrest, Hawaii; Horton Plains Natural Park; Sun reflected on glaciers; Horseshoe bend, Arizona; Nant Ffrancon Valley, Wales; leaves falling from trees; river-mountain-pink cloud-cottages (Rheine, Germany); trees-Hyde Park; Scottish Highlands; vast Danube landscape • **sea/water (25%):** waterfall (3); sea and cliffs (3); river (2); mountain lake (Traunsee); Loch Ness; Staffelsee at sunrise; hundreds of islands in sea-Halong Bay, Vietnam; Norwegian cruise; breathing salt air; sea and 100 orcas (Kaikoura, New Zealand); expanse of sea when driving (Koh Chang, Thailand); Malta coast, sudden feeling of universe; sea kayaking; diving with coral (Red Sea, Jordan); on Catamaran in Atlantic (Newfoundland); Black Sea (Batumi, Georgia); Azenhas Do Mar (Sintra, Portugal); Philippines sea; Seven Sisters Cliff (Sussex); swimming close to shark; sunset in complete silence on boat; waves • **sky (22.5%):** sunset (4); sunrise (4); clear starry sky (3); skydiving (2); laying in Navajo desert watching night sky; watching sky from train; rays of light through dense clouds; Falling snow in Alps; lightning strike; starry sky (with marijuana); Mountains and sky melting into one; Northern lights; talking philosophy and looking at sky on mushrooms; Sitting on bench looking at trees and sky; sky from mountain; flying • **other (10%):** herd of wild horses (Montana); Wisteria; memories from childhood, forest in autumn; Fireflies in woods; insects in mountains; Insects and spiders; orcas; deer in forest; monotony while hiking in barren environment at end of stay abroad; turtle and night sky (Pacuare, Costa Rica); tiny shrimp swimming around hand in rock pool; thinking of universe
Person (14.6%)	conversation (3); talking to mother (3); being in crowd (2); with partner in home (2); watching fight (2); talking to mentor; grandfather at cemetery; niece crawling; looking in mirror with partner; watching sons; niece surgery; passionate embrace; people praying around me; sad phone call; performing play; listening to poem, singer (2), university lecture; sex; Love; ballroom; Leeds festival; woman saving an elderly woman's self-respect
Human-made environment (12.9%)	New York (3); Empire state building (2); London skyline (2); city buildings (2); church (2); Buddhist temple (2); Taj Mahal; St Paul's Cathedral; Parliament of Vienna from tram; Edinburgh castle; Forbidden City, China; Paris lamplight and rain glistening off pavement; buildings from bus; park and huge castle; Chongqin, Hongyadong; pagodas (Bagan, Myanmar); Vienna Hofburg castle; Machu Pichu ruins; Chichen Itza (Mexico); top of St. Stephen's cathedral; La Sagrada Familia; view of civilization from plane; small closed radio studio; door
Visual art (5.8%)	• **painting, drawing (78.6%):** painting in museum (3); Jesus drawing in museum; art object in Japan; Summertime 1948 by Jackson Pollock; paintings by Van Gogh; painting by Dali in Spain; Un Mundo by Angeles Santos; making paintings in bedroom; artworks in church with candles • **sculpture, installation (21.4%):** David by Michelangelo; installation by Pierre Hyghe at Documenta 13; Terracotta soldiers
Music (8.3%)	
	• **personal listening (60%):** listening to music in bedroom (4); Cantonese pop song by An Yong; listening to song while walking on empty street; Song reminding of childhood/fairytales; Driving while listening to Panama's Always; Music on TV; listening to music sitting under tree in park; This will destroy you- the Mighty Rio Grande • **public listening (40%):** church choir (3); outdoor concert (2); Outdoor music festival-Burning Spear (Reggae) and LSD; Maestranza Theatre, Seville-Daniel Barenboim concert; Palace of Auburn Hills-Demi Lovato; dancing in gym; concert hall
Other media (5.4%)	Poem (2); Poem-The waste land, t.s. Elliot; Book-elegance of the hedgehog; Book-Under the volcano, Malcolm Lowry; Book-No trifling with Love by Alfred de Musset; Movie-Dracula, thinking of person crawling on wall; Youtube video; ballet at amphitheater-Plovdiv, Bulgaria; Play at London theater-the Tempest, Shakespeare; play-dark setting; Play (reading)-Ionesco's Exit the King
Other (2.1%)	Drug experience (2)—on LSA; alcohol and marijuana; Performing own music; Scoring a goal in a tournament; bloody sheets being washed and the bloody water gushing from everywhere in a warzone.

Table 4
More about triggers: Sublime experience notable aspects, progression, and meaning

Were there any aspect of the stimulus that you were particularly drawn to?	
No	45% (108)
Yes (note, generally reiterated trigger details)	55% (132)
Did anything about your setting play an important role?	
No	35% (84)
Yes	65% (156)
• **unique/amazing place (29.5%, n = 46)** • **alone/intimate (14.1%, 22)** • **social (9.6%, 15)** • **positive prior rating or feeling of setting (7.1%, 11)** • **controlled/safe environment (7.1%, 11)** • **unfamiliar surroundings (5.8%, 9)** • **silence (3.8%, 6)** • **freedom (2.6%, 4)** • **juxtaposition of elements (3.2%, 5)** • **basic description of trigger (10.9%, 17)** • **other**: music (3); heat/brightness (3); drugs (1); incense (1)	
Would you describe your experience as largely harmonious and/or notable for a feeling of ease, or as largely dissonant/difficult?	
harmonious/feeling of ease	84.2% (202)
dissonant/difficult	15.8% (38)
What do you think the experience meant?	
cognitive explanation, insight, personal growth/change	42.5%
appreciation of feeling/experience	35.0%
don't know/no meaning	19.6%
spiritual, religious	2.9%

Note. All percentages rounded up to nearest tenth.

Table 5
Sublime experience notable smells, sounds, colors

Notable sound?	
No	46.4% (111)
Yes	53.6% (128)
• **Nature (45.5%, n = 50):** water (25); wind (16); animals (8); thunder (1)	
• **music (25.5%, 28)**	
• **people/voices (14.5%, 16)**	
• **silence (12.7%, 14)**	
• **other:** traffic (4); self (4); other (10)	
Notable smell?	
No	75.4% (181)
Yes	24.6% (59)
• **Nature (71.7%, 43):** fresh air (20); water/sea (13); dirt (5); forest/plants (5)	
• **candles/incense (8.3%, 5)**	
• **other:** person (2), paint, cleaning products, book, carpet, medicine, perfume, stale, musk, airplane, sweetness.	
What notable color did the object/setting have?	
• **cool (30.8%):** green (20); blue (34); purple (2); blue-green (18)	
• **warm (16.3%):** red (7); orange (4); yellow/gold (17); red-yellow-orange (11)	
• **white (10.4%)** (25)	
• **black (5.8%)** (14)	
• **grey/silver (4.6%)** (11)	
• **brown (1.7%)** (4)	
• **multiple (30.4%)** (warm+cool): 73	
Was the experience dark or bright?	
Very dark (0-3)	17.5% (42)
Mid (4-6)	31.3% (75)
Very bright (7-10)	51.3% (123)

Note. All percentages rounded up to nearest tenth.

Table 6
Sublime experience and importance of personal background, expectations, prior thoughts and feelings

Did anything about your own history or personality have something to do with your reaction?	
No	42.1% (101)
Yes	57.9% (139)
Had you been THINKING or DOING anything before your encounter that you think played a role in your sublime experience?	
No	59.6% (143)
Yes (typically acts related to setting)	40.4% (97)
Had you been FEELING anything (such as a particular emotion) before your encounter that you think played a role in your sublime experience?	
No	50.4% (121)
Yes	49.6% (119)
• **Positive (28.3%):** happy/joy (7); free (5); curiosity (4); comfort/safety (3); luck (3); love/affection (3); sympathy; lust; open; relief; reverent; strong; proud; satisfaction; gratitude; confident. • **Negative (37.2%):** anxiety/nervous (11); fear (7); loneliness (6); sad (5); Depressed (2); stressed (2); emptiness; social discomfort; bored; disappointed; melancholy; grief; turmoil; lost; confusion. • **High arousal (15.0%):** attention/excitement/anticipation (17). • **Low arousal (16.8%):** physical exertion/exhaustion (7); calm/relaxed (8); self reflection/rumination (4).	
Was your experience with that object/setting unique or commonly had by others?	
It was personally unique	37.1% (89)
It is a common reaction	62.9% (151)
If the object/setting was human made, do you think it was intended to create such a response?	
No, response was not intended	22.9% (55)
Yes, my response was intended by the designer	22.1% (53)
Experience not based on man-made objects/settings	55% (132)

Figures

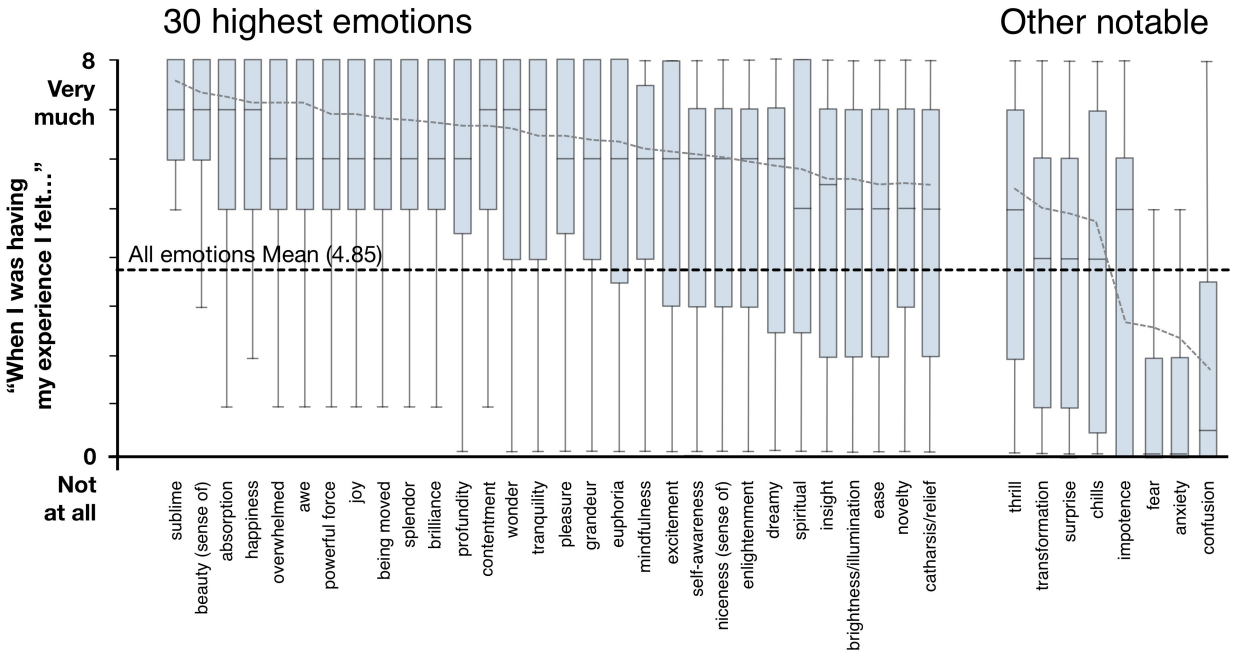

Figure 1. Boxplots of Most Noted Emotions in Reports of Sublime Experiences, as well as Other Theoretically Key Terms

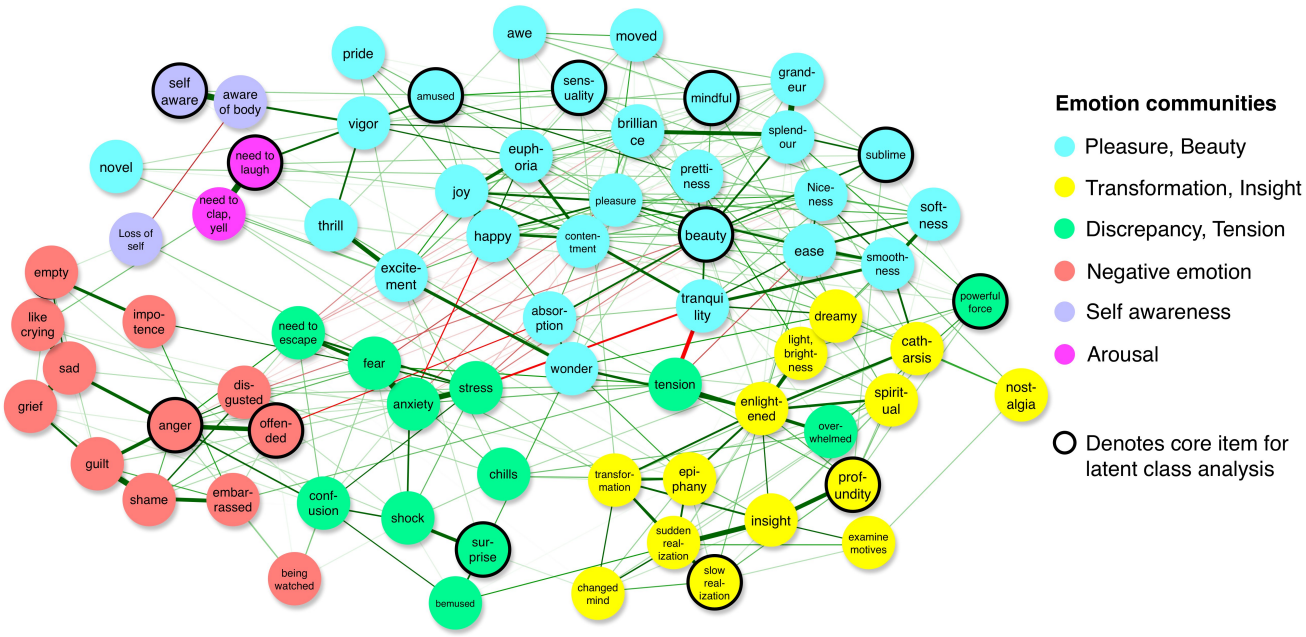

Figure 2. Network Model of partial correlations between emotions in reports of sublime experiences as well as main emotion communities and core items for latent class analysis of Sublime types. (Note. red or green lines indicate a partial correlation surviving the regularization procedure. Red lines indicate negative relations; green lines indicate positive relation. Line thickness indicates strength of correlations. Emotion communities and core items based on *Bootstrap Exploratory Graph Analysis* (bootEGA) with hybrid centrality measures. Top 20% of nodes in each community designated as core items).

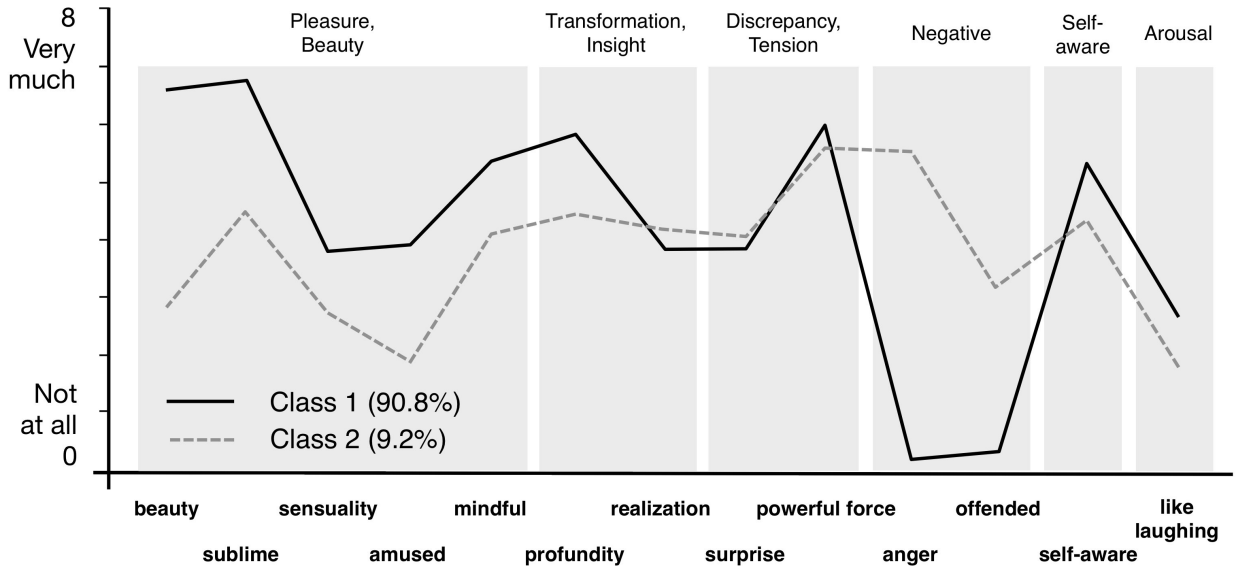

Figure 3. Profiles of two classes of Sublime, based on mean scores of core emotion items and latent class analysis. (Researcher-derived labels for 6 emotion communities shown at top of graph, core representative items shown at bottom).

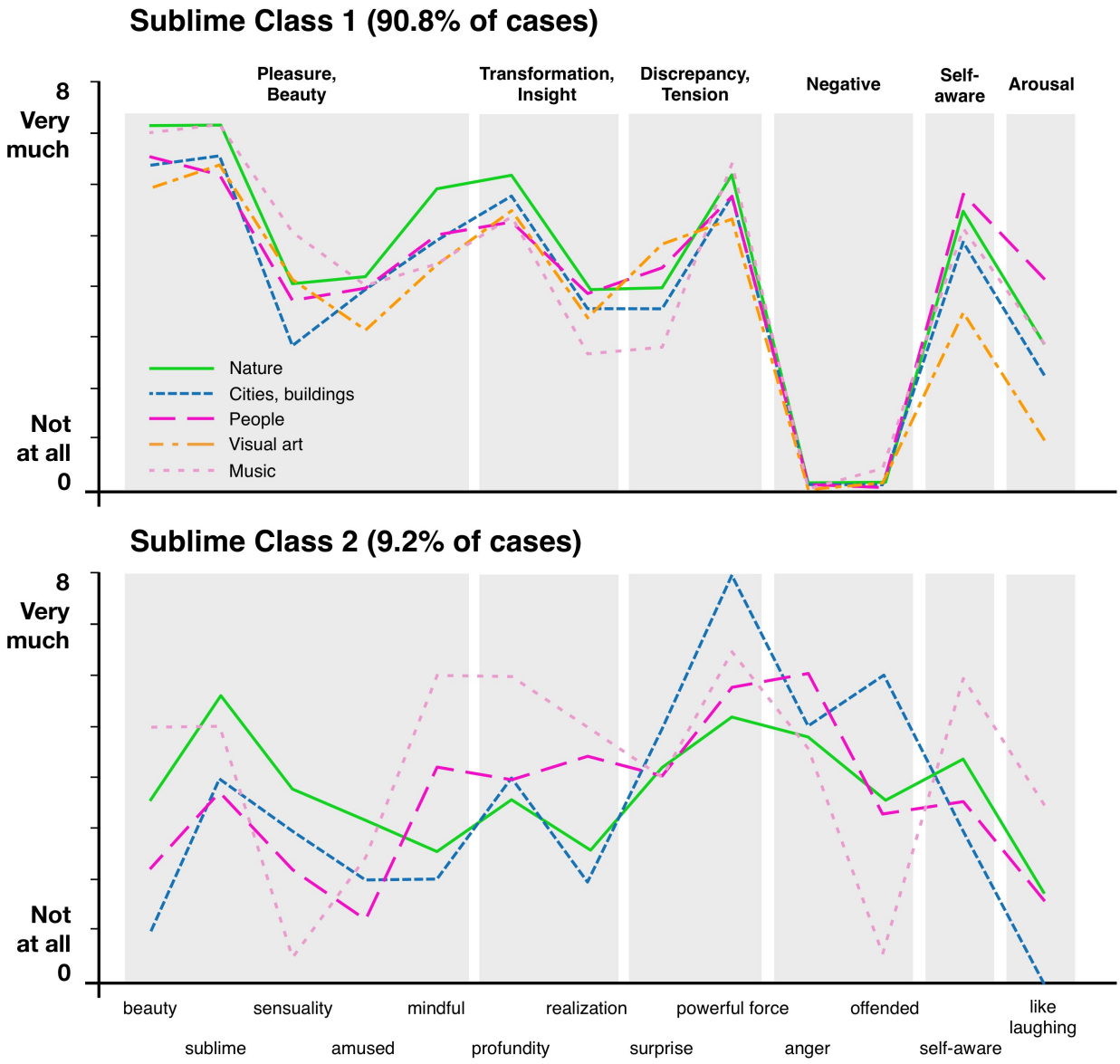

Figure 4. A consistent felt sublime across a wide range of trigger types?—Emotion patterns across core emotions and trigger types, compared between two Classes of sublime. (Researcher-derived labels for 6 emotion communities shown at top of graph, core representative items shown at bottom. Visual art trigger type not shown for Class 2 due to only 1 respondent in this category).

Appendix

Table A1
Demographic and background information of study participants

factor	all participants (N = 402)	"Yes Sublime" (n = 240)
sex	Female = 324 (80.6%)	Female = 192 (80.0%)
Age	21.6 (SD = 5.9)	22.2 (SD = 6.6)
Nationality		
Austria	19.70%	20.00%
UK	19.40%	20.80%
Germany	17.40%	16.30%
China	10.90%	8.30%
USA	3.70%	5.80%
Singapore	3.50%	2.90%
Romania, Malaysia, India, Spain, France, Italy, Korea	3-1%	---
highest level education		
High school degree or lower	41.80%	35.40%
undergraduate degree	52.00%	56.30%
postgraduate	6.20%	8.30%
studied art/art history	No = 86.6%	No = 84.6%
studied aesthetics/philosophy	No = 73.6%	No = 70%
familiar with/studied theories of sublime	---	No = 89%

Table A2
Emotion items with centrality metrics (w/ factor structure)

Item	Mean (SD)	Community	Hybrid Centrality
Sense of Beauty	**7.36 (2.45)**	**1**	**.94**
Sense of the Sublime	**7.58 (1.89)**	**1**	**.89**
Feeling of Sensuality	**4.75 (2.89)**	**1**	**.87**
Amusement	**4.79 (2.76)**	**1**	**.87**
Feeling of Mindfulness	**6.22 (2.62)**	**1**	**.83**
Sense of Prettiness	5.41 (2.91)	1	.77
Grandeur	6.45 (2.67)	1	.77
Joy	6.93 (2.54)	1	.74
Sense of Niceness	6.09 (2.62)	1	.74
Happiness	7.18 (2.47)	1	.68
At Ease	5.65 (2.75)	1	.62
Amazement/Wonder	6.63 (2.65)	1	.60
Vigor	5.41 (2.71)	1	.58
Splendor	6.83 (2.55)	1	.56
Awe	7.15 (2.59)	1	.54
Intense Absorption/Fascination	7.35 (2.26)	1	.54
Pride	4.58 (2.88)	1	.48
Softness	4.92 (2.78)	1	.46
Novelty	5.62 (2.65)	1	.45
Tranquility	6.52 (2.73)	1	.44
Excitement	6.20 (2.64)	1	.43
Contentment	6.73 (2.58)	1	.43
Smoothness	5.42 (2.74)	1	.27
Brilliance	6.80 (2.53)	1	.25
Pleasure	6.51 (2.54)	1	.23
Feeling of Thrill	5.45 (2.89)	1	.21
Feeling of Being Moved	6.85 (2.45)	1	.19
Euphoria	6.42 (2.74)	1	.06
Feeling of Profundity	**6.75 (2.45)**	**2**	**.91**
Slow Dawning of Realization	**4.87 (2.90)**	**2**	**.90**
Sudden Insight/Like Turning on a Light	5.26 (2.87)	2	.90
Enlightenment	6.00 (2.82)	2	.77
Sense of Catharsis/Relief	5.58 (2.88)	2	.58
Feeling of Transformation	5.04 (2.74)	2	.51
Epiphany	4.79 (2.82)	2	.48
Spiritual	5.81 (2.88)	2	.33
Need to Examine My Motives	3.57 (2.67)	2	.31
Insight	5.81 (2.79)	2	.25
Feeling of Changing My Mind	4.22 (2.78)	2	.19
Nostalgia	4.09 (2.93)	2	.16
Dreamy	5.89 (2.88)	2	.13
Sense of Light, Brightness, or Illumination	5.67 (2.90)	2	.11
Surprise	**4.94 (2.71)**	**3**	**.83**
Powerful Force	**6.97 (2.36)**	**3**	**.65**
Bemused	2.89 (2.32)	3	.61
Tension	4.15 (2.89)	3	.58
Confusion	2.75 (2.37)	3	.49
Need to Leave/Escape	2.35 (2.48)	3	.43
Overwhelmed	7.15 (2.25)	3	.39
Stress	2.26 (2.18)	3	.32
Shock	3.27 (2.70)	3	.28
Anxiety	2.55 (2.40)	3	.14
Chills	4.76 (3.00)	3	.11
Fear	2.65 (2.50)	3	.06

Anger	**1.63 (1.67)**	**4**	**.86**
Offended	**1.45 (1.41)**	**4**	**.85**
Guilt	1.58 (1.33)	4	.67
Grief	2.12 (2.05)	4	.64
Disgust	1.44 (1.51)	4	.53
Like Crying	4.54 (3.08)	4	.52
Emptiness	2.87 (2.46)	4	.49
Sadness	2.80 (2.56)	4	.34
Personal Impotence	3.66 (2.78)	4	.33
Sense of Being Watched	2.35 (2.28)	4	.31
Shame	1.54 (1.51)	4	.21
Embarrassment	1.79 (1.48)	4	.10
Self-Awareness	**6.13 (2.46)**	**5**	**.96**
Loss of Awareness of my surroundings	4.35 (2.92)	5	.73[a]
Awareness of My Body/Actions	5.39 (2.72)	5	.27
Like Laughing	**3.68 (2.72)**	**6**	**.78**
Needing to Clap or Yell	3.48 (2.88)	6	.71

Note. Bold items designate core items for use in latent class analysis. Centrality scores are absolute values; they do not imply directionality of correlation. [a] Negative partial correlation to other items in the community.

Table A3
Statistical Fit Indices for Two-, Three-, and Four-Class Solutions.

Fit Index	Class Solution		
	Two-Class Solution	Three-Class Solution	Four-Class Solution
AIC	8,392.03	8,191.04	8,018.33
BIC	8,531.26	8,379.00	8,255.02
Adjusted BIC	8,404.47	8,207.83	8,039.47
Entropy	1.00	.97	.97

Note. Lower AIC, BIC, and adjusted BIC values indicate better fit, as do entropy values above .90.

Supplementary Materials

Table S1
Comparison of quantitative aspects of two Sublime Latent Classes

	Class 1 (n = 218)	Class 2 (n = 22)
Years ago experience had	2.85 (3.36)	4.45 (10.74)
First time to encounter stimuli		
No	67.0%	63.6%
Yes	33.0%	36.4%
Duration (minutes) of experience	238.24 (1588.4)	262.8 (957.7)
Trigger type		
Nature	53.67%	22.73%
City/Buildings	13.76%	4.55%
People	10.55%	54.55%
Visual Art	5.96%	4.55%
Music	8.26%	9.09%
Other Media	7.80%	4.55%
Important aspects of Setting		
No important aspect	35.1%	57.1%
Unique/amazing place	20.4%	14.3%
Positive prior feeling toward trigger	5.3%	0%
Alone/intimate/silence	12.1%	14.3%
Social	6.8%	4.8%
Controlled/safe environment	4.4%	4.8%
Uncontrolled/unfamiliar/free	5.8%	0%
Juxtaposition	1.9%	4.8%
Basic trigger description	8.3%	0%
Meaning		
Cognitive/Insight/Change	42.66%	40.91%
Experience/Emotion	36.24%	22.73%
Spiritual/Religious	3.21%	0.00%
No meaning/Don't Know	17.89%	36.36%
Doing or thinking anything before		
No	58.3%	72.7%
Yes	41.7%	27.3%
Feeling emotion before		
No	50.0%	54.5%
Yes	50.0%	45.5%
Own history/personality important		
No	42.7%	36.4%
Yes	57.3%	63.6%

Table S2
Self reports for individuals in Sublime Class 2

Trigger type	Specific trigger description?	Where did you have the experience?	What did the experience mean?	Why do you think you reacted that way?
nature	Sea	Xiamen	inspiration	unconsciously
nature	Insects and spiders	where I lived	It doesn't mean anything	Because I was terrified
nature	Mountains and sky melting into one	mountains	introspection	I had never seen nature in such a capacity
nature	insect	mountain	fear	scared
nature	sky	near a lake when sun was setting	not sure	it was a calm thing to look at
city/buildings	door	in the room	no idea	safety reaction
people	phone call	In my room	-	Because its natural for people to react badly when something bad happens to them
people	My niece almost died in my arms. The doctors said they needed to get the resuscitation equipment and I was the only one who heard it in my family. I cried loudly as I held her and the ambulance came.	India, in a hospital	It meant that there are flaws in the world that need to be fixed	because the situation I was in was emotionally impactful
people	Violent assault. I was attacked by my mother when I was a teenager. I only ever recalled the incident in fragments and I can only ever see most of it as a third person looking on. I feel shaky writing about it even now over 50 years later.	At my childhood home both indoors and outside	It meant I could not trust anyone	I was in danger
people	A fight between two students	Classroom	Brought me into the real world of teaching	Because I gave myself time to think
people	graduation	university	special	The feeling
people	A mentor	Maze of city streets	Unsure	Personality
people	Knowledge about a person. I heard from a friend that my crush has gone off and slept with someone for the first time.	Some street around Camden	The end of feelings	Surprise and misunderstanding of the person involved
people	grandfather	cemetery	to value reading	I was overwhelmed by feelings
people	Niece	GP surgery	Opened up my eyes about the experience of life	I was scared

people	poetry	in an office	no clue	no clue
people	mum	home	life changing	automatically
people	sex	Out in the woods	not sure	enjoyed it
music	piece of music	sitting under a tree in a park	Didn't mean anything, but to inspire my emotions	Don't know
music	One song	Bedroom	Not much of a meaning, more emotional.	It was constructed beautifully.
visual art/design	A drawing of Jesus	Museum	That something has change inside of me	Because of the realization
Other media	Book (Under The Volcano). I felt I gained an insight into the nature of what may be called the soul	balcony of apartment	We are a creature without hope	My mindset and outlook on life