

Spotlight

The Paradox of Pleasurable Fear

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Why do some people enjoy being afraid? A recent study by Andersen *et al.* found an inverted U-shaped relationship between fear and enjoyment, consistent with the theory that the pursuit of pleasurable fear is a form of play.

Psychologists often expose experimental participants to muted versions of the real-world phenomena that they are really interested in. They study retaliation against wrong-doers by asking subjects to deprive strangers of pennies in online economic games; they study how people react to being tickled by having a rod gently touch the palms of their hands. There are clear ethical and practical reasons for this genteel approach, but it limits what such studies can tell us. It is refreshing, then, to read a paper about how people respond to being afraid and see one of the conditions described as: ‘a large man with a bloody butcher’s apron and a pig mask emerg[ing] from hiding to chase participants with a roaring chainsaw’ [1].

This experiment, by Andersen and colleagues [1], was done to explore the paradox of pleasurable fear. Fear is a response to threatening situations and is typically aversive, which suggests that we should avoid fear, just as we avoid guilt, embarrassment, and grief. Yet, many people often seek out frightening experiences and take pleasure in them, as when participating in certain extreme sports, watching horror movies, and going to haunted houses [2,3].

Fear appears to be a central part of the appeal of these experiences, not an unavoidable by-product of some other positive feature. In one set of studies [4],

horror movie fans were shown frightening clips (including the classic scene from *The Exorcist* in which a possessed 12-year-old spews green vomit, shouts obscenities, and swivels her head like a dreidel). Unlike another group, who disliked horror movies, the fear and happiness of the horror movie fans was correlated: the scarier the movie, the more they enjoyed it.

Andersen *et al.*’s study involved 110 subjects, aged 12 to 57, who chose to visit the Dystopia Haunted House in Vejle, Denmark. Subjects were equipped with heart rate monitors; they were video recorded at three scare points (including the aggressive pig man scenario described earlier); and were asked to complete a questionnaire at the end of their trip through the house about their overall experience and about their experience at these specific scare points. The questionnaires asked about fear and enjoyment, as in ‘How scared were you when the zombie jumped out from inside the table?’ (10-point Likert scale; 0 = not at all scared, 9 = more scared than ever) and ‘Did you enjoy it when the zombie jumped out from inside the table?’ (10-point Likert scale; 0 = not at all!, 9 = very much!).

Consistent with previous findings, self-reported fear was positively associated with both a higher average heart rate and greater large-scale heart-rate fluctuations. Fear makes the heart pound. (See [Box 1](#) for a discussion of individual differences in fear.) By contrast, self-reported pleasure had an inverted-U-shaped relationship to small-scale heart rate fluctuations. Most notably, there was an inverted u-shaped relationship between self-reported enjoyment and fear for the three scare points. That is, for these points, subjects reported the most pleasure when their fear was in an intermediate state.

The authors see these findings as suggesting that we enjoy fear only when the arousal dynamics are ‘just right’: enough

arousal to be engaging, not so much to be chaotic or overwhelming. They noted that previous research looking at play involved ‘situations that have a just-right amount of uncertainty and surprise’ and tentatively concluded that what they described as recreational horror is a form of play.

This is an interesting proposal and is consistent with their findings. However, one concern is that just about all positive experiences involve an inverted-U shaped relationship between intensity of the experience and how much we like it. It is not just play that has a sweet spot. A good cup of coffee should be neither lukewarm nor scalding hot; a nice hug falls somewhere between listless and bone-crushing. Now, not all pleasurable experiences involve a balance of ‘uncertainty and surprise’; perhaps this is special to play, but uncertainty and surprise were not what the researchers measured; they looked at the intensity of fear and pleasure.

Also, while the right sort of arousal might be a necessary condition for pleasure, it is not sufficient. After all, you can get to any level of bodily arousal you wish in the privacy of your living room, by doing jumping jacks and push-ups, but it is not a whole lot of fun. Similarly, the right balance of uncertainty and surprise can arise from a crossword puzzle or good novel; such pursuits give us pleasure, but they do not scratch the same itch as going to a haunted house. As the researchers were well aware, people do not go to the haunted house to get their hearts pumping in the right rhythm, neither are they there for the sweet spot of uncertainty; they go to feel afraid.

Why fear? Theories of the appeal of play often see its evolved function as derived from the benefits of practice. We are motivated to experience, in a safe context, situations that we might have to deal with in the future. Certain forms of play are, as the authors nicely put it, ‘threat simulation’ (see also [2,3,5]). From this perspective,

Box 1. Who Is Afraid of Haunted Houses?

Everyone interested in individual differences should have a haunted house close by. Andersen *et al.* [1] found that women report more fear and less enjoyment compared with men. Perhaps these two findings are connected; maybe women's increased fear takes them out of the pleasurable sweet spot. This suggests that, if the level of fear is appropriately titrated, men and women might enjoy horror to the same extent. A survey of the experience of horror media of >1000 participants [7] found that, while, again, women reported being more scared by horror media than were men, the actual sex difference in enjoyment of horror, although in the expected direction, was surprisingly small: -0.3 on a five-point scale.

Another study, done in Markoff's Haunted Forest (replete with zombies, clowns, and chainsaw-wielding murderers), in Dickerson, MD, USA, looked at individual differences in fear [8]. The researchers found that, for those participants who showed a relatively low level of fear, there was an inverse correlation between how afraid they said that they were and the extent of their serious lifetime antisocial behaviors. This supports the theory that there is a relationship between fearlessness and psychopathy [9].

we seek out fear because being afraid is a good indication that one is simulating the right sorts of threat.

However, pleasurable fear is not the only form of aversive play, and not everyone enjoys being afraid. Hundreds of years before philosophers and psychologists started to engage with 'the paradox of horror', David Hume described a different sort of pleasurable suffering. He wrote about the 'unaccountable pleasure' of a well-written tragedy [6] and observed that the more spectators feel passions 'that are in themselves disagreeable and uneasy ... the more they are delighted with the spectacle'. It is an open question why people are drawn to sadness, while others are drawn to fear, why some prefer to weep, and others like to scream. What brought those 110 participants to the Dystopia Haunted House in the first place?

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Spotlight

Similarity as a Window on the Dimensions of Object Representation

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Hebart *et al.* recently analysed 1.5 million human similarity judgments and found that natural objects are described by a small set of interpretable dimensions. Such large-scale analyses offer new opportunities to characterise how people represent their knowledge, but also challenges, including scaling to even larger data sets and integrating accounts of semantic representation.

Judging the similarity of two objects is relatively effortless to the point of appearing trivial. However, similarity judgments can reveal a great deal about how people represent and compare objects [1]. Although similarity has been studied for decades, only recently have cognitive scientists considered this question at scale, analysing millions of ratings [1]. In some ways, this approach parallels work in machine learning, where large data sets are used to develop and evaluate models. The ImageNet object recognition database, which consists of a large number of images with corresponding human judgments, is one such example [2].

The similarity at scale approach to elucidating how people represent and compare objects differs from prior approaches, in which one group of people list features for objects and another group rate the features. These semantic norms can comprise thousands of features [3], which successfully capture human performance in several tasks, such as semantic priming. However, one potential criticism of this earlier approach is that feature listings rely on self-report, which may bias toward features that are easier to verbalise.

One alternative to explicitly listing features is to infer representations in a more holistic and indirect manner, such as through similarity judgments. Multidimensional scaling (MDS) [4] was a precursor to the large-scale similarity approach for inferring representation. MDS relies on people's similarity ratings but on a smaller scale. Here, quantity has a quality all its own. The dimensions one extracts from MDS or any other approach to finding low-dimensional representations are determined, in part, by the stimuli considered. For example, if nothing edible is included in the stimulus sets, then no dimensions related to flavour will be extracted because such dimensions would not explain significant variance in the similarity ratings.

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