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Biochemical responses to horror, or, ‘why do we like this stuff?’

ABSTRACT

‘Biochemical responses to horror, or, “Why do we like this stuff?”’ analyses human’s enigmatic interest in horror narrative. Analyses to date have been oversimplified, and overlook essential conditions and responses that take place during the consumption of horror narrative. A key misunderstanding is that the central question of the interest in horror is understood to be ‘Why do we find gratification in what by nature is so disturbing and disagreeable?’ This approach overweighs the enjoyment that horror consumers feel, and ignores the fear response. The fear response is the starting point of any analysis of human interest in horror. This key emotional reaction is tightly linked to goal-directed, advanced cognition in humans, with these conditions functioning in feedback looping mechanisms in human psychology and physiology. This interplay is further conditioned within a framework of socio-biological conditions and adaptive pressures. The socio-biological framework and adaptive pressures yield other effects in human personality and society that also condition and add elements to the human interest in horror narrative. I argue that the most precise and comprehensive explanation of human interest in horror narrative is a sundry synthesis of scientific and sociological fundamentals.

KEYWORDS

horror cinema
horror fiction
film studies
emotion
fear
evolution
culture

1. That is, in response to *frightening* horror narrative, for many intended horror narratives have failed to scare anyone at all. Of course this point is wide open to interpretation and matters of taste, which will not be taken up in this article. I will not, in a word, attempt to explain or defend what is or should be *really scary*. The above-mentioned films and authors have frightened me, but some people might laugh at loud at them. In 'The definition of horror?' below I will provide a brief definition that I hope is as transparent and broadly applicable as possible, with limited room for value judgements of what is 'good', 'better' or 'best' (let alone 'bad') in horror narrative.

INTRODUCTION

During the many years I have absorbed the terrifying isolation, ruthless attacks, shocking violence, 'interstitial' monstrosities (Carroll 1990: 185), and eerie supernatural themes in horror literature and films, I have always had a lurking recognition that horror is a peculiar genre that engenders puzzling, seemingly contradictory, emotional and cognitive responses. The dark pleasures of authors including Edgar Allan Poe, William Fryer Harvey, Ray Bradbury, Stephen King, Peter Straub, Anne Rice, Dean Koontz and others have struck fear in me, while horrifying film narratives like *Night of the Hunter* (Laughton, 1955), *Hush... Hush, Sweet Charlotte* (Aldrich, 1964), *Night of the Living Dead* (Romero, 1968), *Damien: The Omen II* (Taylor and Hodges, 1978), *Halloween* (Carpenter, 1978), *The Shining* (Kubrick, 1980) and *The Blair Witch Project* (Myrick and Sánchez, 1999) have done the same (made even worse by way of the unique visual film element, which brings narrative to life in such striking ways). During all of this, I have asked myself a question that has perplexed those interested in horror and the tragic since Aristotle. Simply put, 'Why do I like this stuff?' A more complete version of this question typically reads, 'Why do I find pleasure in what by nature is so distressful and unpleasant?' (based on Carroll [1990: 159]; Carroll also stated straightforwardly 'In the ordinary course of affairs, people shun what disgusts them' [1990: 158]). Answers to these questions have ranged from the psychoanalytic to the mythological/archetypal, from the aesthetic to the cognitive/evaluative, from the cathartic to the gender-based. Sometimes these theories yielded hints at the answer, but none reached the emotional and cognitive roots of the phenomenon.

I believe that the opacity surrounding this topic stems from errors and misunderstandings germane to the interpretation of 'the question' itself. On its face, 'Why do I find pleasure in what by nature is so distressful and unpleasant?' (to say nothing of that which disgusts) over-weighs the *pleasure* (or *reward*) that horror consumers feel, and all but ignores the fundamental *fear* experienced. This flawed disposition can be made clearer by slightly altering the question to read 'Why am I *not afraid* of what by nature is so distressful and unpleasant?' But the fact is that horror buffs *are afraid* during the consumption of horror. The omission of fear in studies of horror is odd, given research I think few would disagree with that shows that fear is the central emotion in response to horror (see e.g. Zuckerman 1996), to say nothing of the familiar shrieks, gasps, anxious clutches and shivers that almost everyone has either experienced or observed during horror films.¹ Ignoring the fear response or over-emphasizing the enjoyment of horror can lead to conclusions such as that the central reward that horror consumers crave is a 'good story well told' (see the final chapter of Carroll [1990] for this idea), or that horror consumers are essentially wicked personalities who celebrate seeing helpless victims destroyed by monsters, human or otherwise (this might in turn be understood as a sort of inspired awe in witnessing horror, and H. P. Lovecraft wrote of 'a profound sense of dread, and of contact with unknown spheres and powers' and 'the scratching of outside shapes on the known universe's utmost rim' [1973]), or that horror tales represent allegories that illuminate cruel, perverse corners of human psychology and society (see again Carroll [1990] for examination here, and Wheatley [2009]). Answers like these – focusing on genre considerations, unsupported conjecture about human psychology, or politically motivated attacks on various ideologies or

groups of people – almost wholly overlook the human fear response to horror narrative. When analyses like these refer to the dark side of horror, it is rarely to the fearful feelings proper that horror readers and watchers experience, but various repellent features of the genre itself. Some analyses do examine something like *discomfort* that horror consumers feel, but at heart they miss the fear response, and ultimately sidestep the question that I think is most salient to our topic: What are the roots of human interest in horror?

2. And again, recall the variety of horror narrative, good and bad, I have referred to.

The human fear response is complex enough to analyse in relation to horror, and yet there is quite a bit more data and interpretation that must be incorporated into a complete analysis of this topic. For as noted, there is pleasure (reward is the more accurate term) that horror buffs feel, intimately linked to the fear response. Additionally, the mostly autonomic fear responses referred to thus far function within various independent, cognitive, adaptive, and socio-biological inputs. I will examine these further in the following.

In this article I rely heavily on the work of Marvin Zuckerman, whose theory of sensation seeking has for years held the door open to answer ‘the question’ at hand. To be sure, Zuckerman’s ideas (which have been extensively supported by other researchers and analysts) are well known and influential, and Zuckerman has himself applied his concepts to the study of the human response to horror cinema. Strangely, however, aside from a handful of instances, Zuckerman’s theory and research have not been applied often enough or comprehensively enough to studies of the human interest in horror. In this article I will try to rectify this omission by linking Zuckerman’s ideas to other data, expanding them where I can, in order to make a contribution to the solutions we seek.

THE DEFINITION OF HORROR?

What is horror? This is a very slippery topic, and previous analyses have offered up a variety of definitions, which, unfortunately, have mostly added to the confusion surrounding this subject. It is not necessary or helpful to define horror, beyond a straightforward dictionary definition such as ‘painful and intense fear, dread, or dismay; intense aversion or repugnance’ (*Merriam-Webster’s Collegiate Dictionary* 1998). The borders of horror are extremely porous, and to attempt to anchor a specific definition beyond the basics can be limiting, and probably at best only partially accurate.² In the varieties of horror narrative, we regularly find that one person’s ‘horror’ is another’s ‘thriller’ is another’s ‘drama’ is another’s ‘science fiction’ is another’s ‘fantasy’ is another’s ‘fairy tale’ (‘most fairy tales...may be considered bona fide horror stories’ write Zillmann and Gibson [1996: 16]). This is no doubt because what is frightening to people differs widely, with some people requiring buckets of blood for a narrative to count as horror, while for others the image of a shawl thrown over the back of a chair in a dim room is enough to terrify (I borrow this image from Anne Rice’s *Interview with the Vampire*, 1976). Rather than a re-conceptualized definition of horror in this article I will depend on a general (common sense and admittedly broad, as I have stated) set of ‘family resemblances’ in the horror genre. I ask for the reader’s latitude, and will endeavour not to muddy the waters as I try to employ a simple definition of horror, allowing for a modicum of interpretive flexibility. This analysis can be applied to the entire range of horror narrative, most importantly to horror fiction. Although in this article I will generally focus on horror film, horror fiction will at times be referred to. Both forms, in a word, are narratives that can be analysed similarly.

THE HUMAN INTEREST IN HORROR CINEMA: PSYCHOLOGY, EMOTION, COGNITION

Extensive research over the course of many years has explained the foundations and varied manifestations of the human fear response nearly all the way down. This response stems from a single bodily network: the subcortical limbic system of the brain (the emotion and memory centre that includes the amygdala, hippocampus, thalamus, catecholamine systems that control the release of essential hormones and neurotransmitters, and other structures that are foundational to emotional experience). That horror consumers are experiencing fearful emotions has been directly observed by Zuckerman through skin conductance testing during viewing of horror films and in post-film analysis of audience reaction. An analysis of subcortical limbic system rewards is based on Zuckerman's research into sensation-seeking traits, but has not been directly tested on horror consumers. We can thus see that the fear experienced can be scientifically measured, as examined here, and that horror consumers exhibit sensation-seeking traits with concomitant brain activity. I will continue to examine these points.

In addition to controlling emotions and memory, these brain systems and the following three chemicals control reward functions and responses during novel and threatening situations:

1. Monoamine oxidase (MAO) is an enzyme involved in the control of neurotransmitters such as dopamine, serotonin and norepinephrine. The levels of MAO have been found to be lower in the brains of sensation seekers. Low MAO levels can make sensation seekers more impulsive and less inhibited, and can yield the increased levels of dopamine and decreased levels of serotonin and norepinephrine noted in point 2.
2. Neurotransmitters controlled by catecholamine systems (which function in the arousal and reward systems of the central nervous system) include dopamine (involved in motivated activity directed at rewards such as food and sex, as well as aggression and the Orientation Reflex (OR) when evaluating threat and new stimuli; levels are potentially higher in sensation seekers), serotonin (which interacts with dopamine, and is involved in inhibition during threats; levels are potentially lower in sensation seekers, yielding more active or aggressive behaviour), and norepinephrine (generally involved in arousal, possibly including anxiety, fear response, and threat preparedness; levels are potentially lower in sensation seekers).
3. Hormones that originate in or interact with the limbic system and have significant affects on psychology and behaviour, such as cortisol (stress responsive), thyroid hormones (related to anxiety and depression) and sexual hormones (which influence behaviours including aggression and passivity).

That these elements of the brain and human biology are highly heritable characteristics that by definition have evolved in response to adaptive pressures during human evolution is most important to keep in mind, and will be explored in more detail in this article.

Note, however, that the emotions, and associated rewards and punishments we are examining, do not stem *entirely* from the autonomic (and, we may add, instinctual) reactions described above. Additionally, high-level cognitive activity – evaluation, orientation, classification, ratiocination,

imagination, planning, memory, learnt behaviour, etc. – significantly interacts with the subcortical limbic system during fear responses, augmenting and influencing emotions and experiences. Konner describes in much technical detail the complexity and interaction of higher-level cognition and autonomic brain activity during fear response in humans, which we shall see unfold in various ways in relation to the human interest in horror:

The hypothalamus and midbrain generate flight or freezing along with sympathetic nervous system arousal. The amygdala mediates learned cues, and the hippocampus provides context. Neurochemical interventions that calm fear include drugs that bind with opiate receptors and those that potentiate serotonin or GABA [gamma-aminobutyric acid, an inhibitory neurotransmitter], so all three systems are probably involved in generating fear itself. Mobilizing cortisol may be an ancillary stress response, but cortisol's ultimate controller in the hypothalamus, CRH [corticotripin releasing hormone, which stimulates the stress hormones], may be more intrinsic to the emotion. Finally in monkeys and humans, the frontal lobes [which in addition to other functions control high cognition] play an important role in emotion, and an excess of right frontal activity is associated with greater fear.

(2003: 231–32)

The above indicates that fear in humans is truly intricate, comprising a complex of responses, both autonomic and cognitive. We find that some of these responses may even seem to be contradictory – and this is essential to understanding the emotional foundations of the human response to horror. Research on fear in humans has often outlined a reciprocal relationship of fear and other emotions and feelings. LeDoux notes how fear is directly linked to courage, moral feelings, and notions of peace and order in society (1998: 130). Robert Plutchik's 'wheel' of eight basic emotions posits combinations of emotions that result in yet new emotions. Seen this way, it is not uncommon to find fear occurring simultaneously with joy, surprise, disgust, anticipation, anger, etc. (from LeDoux 1998: 114). In part based on these conceptions, this article will examine human fear – the emotion at the core of the response to horror narrative – as a combination of pain (fear) and pleasure (reward) that horror consumers routinely feel.

MARVIN ZUCKERMAN AND SENSATION SEEKING

Marvin Zuckerman's research incorporates the interrelated elements of human fear, and describes how they are manifested in sensation seeking, a battery of human traits that are 'central to a basic dimension of personality', and which we will see are broadly applicable to the study of the human interest in horror (1994: 373). Sensation seeking is defined by Zuckerman as 'the *seeking* of varied, novel, complex and *intense* sensations and experiences, and the willingness to take physical, social, *legal*, and *financial* risks for the sake of such experience' (1994: 27, original emphasis).³ In the remainder of this article, I will treat horror consumers as sensation seekers, as Zuckerman and others have done.

Sensation-seeking behaviour is measured along the Sensation Seeking Scale (SSS), which includes four subscales: *thrill and adventure seeking* (interest in physical risk taking and risky sports), *experience seeking* (wider disposition to

3. Zuckerman italicizes the words in this definition to show changes to his original 1979 definition of Sensation Seeking.

try new things in art, music, travel, friendship or drugs), *disinhibition* (hedonistic pursuit of pleasure) and *boredom susceptibility* (aversion to routine and boredom) (from Konner 1990: 132; and Zuckerman 1994). In his studies on horror films, Zuckerman has found that male and female horror fans scored high on the total sensation-seeking measure, with the highest correlation along the *disinhibition* subscale and significant correlation along the *thrill and adventure seeking* subscale. I shall evaluate the meaning of these data in regard to horror cinema consumers.

The most important finding in Zuckerman's work in relation to horror consumers and fear identifies what is happening in their brains and emotions. Zuckerman has found that high sensation seekers (horror consumers) are highly sensitized to internal body sensation, including fear emotions that stem from autonomic/cognitive interaction during apprehensive or fear-inducing experiences. This group of people 'is sensitive to... internal sensations and chooses external stimuli [in our discussion, horror narratives] that maximize them' (Zuckerman 1979: 10). Simply put, the fear and feelings of threat or disgust, which are felt during the consumption of horror, are interpreted by horror consumers as increased stimulus, which to them (for the most part) is pleasurable. This point is explained by Zuckerman's Optimal Level of Arousal (OLA) theory, related to sensation seeking. OLA theory posits that subjects seek their own best or most comfortable level of arousal, stimulus or sensation, based on psychological and physiological drives. Zuckerman and others have found that most subjects (and certainly sensation seekers) often go beyond their OLA – which often includes stimuli that non-sensation seekers and others would consider uncomfortable. In this respect horror buffs are able to 'tolerate a wider range of discomfort produced by painful stimuli' (1979: 249), and they interpret the ostensibly difficult feelings felt during consumption of horror as comfortable or enjoyable. Sensation seekers (horror consumers) are attuned to the fact that 'arousal of negative emotions can be positively reinforcing because it takes [them] to a level of arousal that is optimal or just a little beyond that level' (1994: 199). Simply put, 'sensation seekers' activities and preferences are based on their desire to increase arousal, even if negative feelings like fear or disgust are components of that arousal' (1996: 151). We see here how *negative* emotions (fear, disgust, repulsion) are interpreted as *positively reinforcing* rewards in sensation-seeking personalities. Strange indeed, on the surface, but the psycho-biological explanations of these experiences are solidly founded, and largely explain 'the paradox of horror' (to borrow Noel Carroll's memorable phrase). In respect to the paradox of horror and conscious reactions to horror, recall Zuckerman's disinhibition subscale of the SSS, which horror buffs score most highly on. Disinhibition has various attributes, but in one key way it is a neurological disinhibition of the response in the brain that naturally protects against overstimulation from intense stimuli. In other words, the brains of horror consumers are disinhibiting their natural inhibition, and thereby increasing their OLA.

Joseph LeDoux's analysis of the human fear response introduces another important cognitive element into this discussion. LeDoux writes that 'feelings of fear are a by-product of the evolution of two neural systems: one that mediates defensive behavior and one that creates consciousness' (1998: 128). For LeDoux, memory is the central constituent of consciousness. He writes, 'you *can't* have a conscious emotional feeling [in our purview, fear during the consumption of horror narrative] without aspects of the emotional experience being represented in working memory. Working memory is the

gateway to subjective experience' (1998: 296, original emphasis). He continues, 'you *can't* have a sustained emotional experience without... long term memories that allow the creation of 'as-if' feedback' (1998: 298, original emphasis). Although some may differ with LeDoux's conception of the foundations of conscious experience, he makes a point about the links between emotion (fear) and cognition (evaluative 'as-if' feedback, memory) that can be valuable in understanding the human response to horror. Many different analysts have endorsed a view that human interest in horror is rooted in aesthetics, the 'good story well told' approach, and that ultimately 'the pleasure derived from the horror fiction and the source of our interest in it resides, first and foremost, in the processes of discovery, proof and confirmation that horror fictions often employ' (Carroll 1990: 184). I agree that Carroll has identified an important element of the human interest in horror, but I think that the actual impact 'of discovery, proof and confirmation' is relatively minor in regard to the question at hand, and I will interpret how narrative in human life conditions the human interest in horror in ways different from Carroll's. For the time being, in relation to LeDoux's points, recall that the subcortical limbic system is not only the *emotion centre* of the brain – which as we have seen plays a central role in the horror experience – but also the *memory centre* of the brain. Recall also that the autonomic emotional responses are tightly interrelated with higher-level cognition in humans. If we focus horror narrative through LeDoux's lens, we can see a new aspect of this interrelatedness, in how memory – a high-level cognitive activity that humans use to manage, interpret and respond to narrative – is linked to the 'emotional experience' evoked by horror.

To return to an earlier point, it was shown that sensation seekers (horror consumers) scored highest on the *disinhibition* subscale of Zuckerman's SSS, and that disinhibition was marked by 'the hedonistic pursuit of pleasure'. I have noted that sensation-seeking horror consumers can tolerate and actually welcome higher levels of distress (a sort of disinhibition), and it is also known that horror consumers are getting a 'rush' from the horror experience both at the 'primitive' autonomic level (by way of the release of neurotransmitters and hormones) and at the 'higher' cognitive level (in that they are experiencing the natural input of cognitive responses during fear emotions, and also by way of their pleasurable involvement in narrative, as per Carroll) (preceding based on Bailey cited in Zuckerman 1994: 67). Viewed this way, the hedonism that horror consumers experience can be seen as a sort of indulgence in the 'pure pleasure' of the experience (in spite of, as noted, the inherent displeasure of fear emotions). As Zuckerman puts it, 'an intrinsic pleasure from sensations and activities seems to motivate sensation seeking' (1994: 66). Note that Zuckerman posits other facets of disinhibition and hedonism, including 'sensation seeking through social activities like parties, social drinking, and sex', and an interest in frightening, unconventional, illegal, unsafe or rebellious activities (1994: 32, 389–93). My focus in my examination of hedonism and horror narrative in this article does not take in such a range of possible factors – although 'frightening' and 'unconventional' certainly fall within my purview. Below I will examine certain 'social activities' in relation to the human interest in horror, although not through a lens of disinhibition.

The essential elements of human interest in horror narrative are the autonomic human fear response, in combination with a network of higher-level cognition, conditioned by key aspects of the psychological profiles of sensation seekers (horror consumers). These neural and physiological systems

are the building blocks ‘that mediate behavioral interactions with the environment, particularly behaviors that take care of fundamental problems of *survival*’ (LeDoux 1998: 125, emphasis added). I italicize the word *survival* to highlight points to be taken up in the following section, in which I shall show how the emotional and cognitive responses described so far, as evinced and developed in response to horror narrative, have played central roles in humanity’s ‘behavioural interactions with the environment’. These interactions include not only various secure, unproblematic scenarios but also threatening environments that require the keenest attention and most skilful responses on the ultimate stage of human survival: the theatre of evolution and natural selection.

THE HUMAN INTEREST IN HORROR CINEMA: EVOLUTIONARY CONTOURS AND EXPLANATIONS

Explanations that point towards evolutionary pressures and adaptation over the course of millennia as the sources of human interest in horror narrative can be compelling at both popular and scientific levels. At a gut level many of us feel that

it all began thousands of years ago in some dark and smoky cave with a tale-teller chanting to his awe-struck tribe huddled around a sputtering fire. He told of strange beasts, angry gods, and dark magic afoot in a dangerous world.

(Taylor 2003)

In addition to this popular notion, there is substantial evidence showing that fear responses and other neurological activity activated during the consumption of horror stem from heritable sources that have evolved in humans. With these factors in mind, I will present evidence for my position that, during the course of human evolution, protection from horrifying, uncertain and dangerous threats in life became an ingrained attribute of human biology, psychology, consciousness and behaviour, which gave rise to the necessity of forming representations – narratives, as it were – about these threats and dangers. Consumers of these narratives focused on ‘rethinking with and through... the evasive manoeuvres of those who survived and the errors of those who did not’ (Konner 2003: 234). This explanation could conceivably be viewed as a sort of effort to ‘master’ emotions and threatening situations, a common psychoanalytic approach to horror analysis. However, psychoanalytic analyses tend to conjecture mistaken motivations for this search for ‘mastery’, such as repressed childhood antagonisms, a Nietzschean ‘will to power’, imagined mastery over ‘the monster inside’ the human psyche, etc.

Such usage of horrifying narratives continues in modified forms, not least in the form of cinematic narrative, to this day. Note that humans have employed representations of horrifying events and characters for various reasons, and not solely to prepare for danger as posited here. Other uses of horrifying imagery have been to memorialize terrible events, to reflect perceived threats and social trends (such as the appearance of space aliens, often hostile, in narrative with the continuing development of space science from the late nineteenth century; or the inclusion of feminist or gay themes in more recent horror narratives), to evoke moral or social reflection and possibly reduce the potential that given horrible events (such as pogroms) happen

again, or to exert power and control behaviour, such as to teach children of dangers in life, to enforce dogma in religions and spiritual groups, or to reinforce gender distinctions and other roles. While these approaches may yield fruitful analysis, they tend to describe social factors or genre developments that have influenced the ways horror is represented, and do not penetrate to the evolutionary roots of the human interest in horror.

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Before I look at some possible evolutionary roots of human interest in horror as a manifestation of the sensation-seeking trait, however, a caveat is required. Note that even with genetic evidence (which we have in the area of sensation-seeking behaviour), explanations of evolution and adaptation such as the following are often conjectural, for it is extremely difficult to reconstruct conditions that exerted adaptive pressures on humans in millennia past, and from there to concretely link these evolutionary roots to modern behaviour. To further complicate the matter, manifold cultural changes and modern influences have blurred the 'primitive' roots of horror I will examine. As Zuckerman asks, 'Are trips to the supermarket "foraging" and is vacation travel "exploration"?' (1994: 286). The same type of question could be asked about the human interest in horror narrative. The answers to these questions vary, and though substantive conclusions can be reached, 'best guesses' based on available evidence are often part of the explanations.

Having said that, we know that the biological attributes linked to sensation seeking examined in the previous section are highly heritable, indicating a role in evolution (see Zuckerman 1994: 285–95). Additional evidence (particularly across species, for sensation seeking is found in animals, and thus cross-species studies are possible) will ultimately be required for substantiation, but the door to evolutionary explanations for the human interest in horror narratives is ajar. Zuckerman writes that 'there is a strong possibility that the

fundamental trait of sensation seeking has not changed since the Pleistocene period when it may have had adaptive value at moderate levels' (1994: 289). One central element of human existence in pre-history and well into modern eras – an element of life that was both in response to dangerous conditions and itself created dangerous conditions – was humans' roles as both hunters and hunted creatures. In the following passage Zuckerman notes how this core experience probably engendered sensation-seeking propensities – which in turn had additional survival advantages:

A successful hunter must take some risks and even enjoy predation. Because of the risks, a moderate but not too high level of [sensation seeking] was probably optimal for survival, reproduction, and insuring the survival of one's offspring.

(1994: 287)

The first appearances of the horrible and the horrifying in human representation were probably that of cave paintings that represented dangers and death that were a part of everyday life long ago – particularly, as noted, during the hunt. Such cave paintings have been found worldwide, in Europe, Asia, Australia and in the United States; some are prehistoric, others more recent, completed after the beginning of the common era and up to last several hundreds of years. These depictions of the horrifying spread into many other areas of human representation: 'from simple representations of early cave drawings to graphic depictions of 18th-century intaglio engravings, symbolic representations have allowed us to face our fears in rituals that help us to cope with different threats' (Tamborini and Weaver 1996: 5). Clearly, evaluation of the roots of horrifying narrative can extend into pre-history, and thus can further be linked to evolutionary and adaptive pressures. Another such area in which humans have portrayed a plethora of enemies and terrifying happenings is in religious and other supernatural imagery. A terrifying array of devils, demons, witches, monsters and otherworldly forces have been used to explain human life in religious narrative. Also keep in mind that these threats have not always been so improbable as they might seem today. The threat of attack from these dangers was for eons taken very seriously (and in some cases still is), and humans have gone to elaborate lengths to protect themselves. To what extent horrifying religious imagery and narrative has played a role in human evolution is open to debate, although my own view would be to place this particular activity within an understanding of the social parameters of horror consumption (which are very important in terms of a socio-biological explanation such as this one), and less so the evolutionary contours.

And yet humans have long faced much more danger in life than just hunting: devastation wrought by war; plagues, starvation and epidemics; wild animal and insect attacks; vicious crime in the home, on the street or when travelling or in isolated areas; torture and persecution at the hands of enemies ranging from the roughly sane to the psychotic; and a range of accidents and natural disasters, many that have wiped out hundreds of thousands of people in a fell swoop. If we travel back in time, life was without question seriously dangerous and threatening. Life expectancy estimates vary, but in ancient times it may have been approximately 25–28; by the Middle Ages in England, it may have been about 36; about 47 in early twentieth-century United States; and approximately 77 in early twenty-first-century United States. (Figures from Sellers [2005] and the United States Centre for Disease Control [2004].) Note

that higher infant mortality rates are the principal reason for low lifespans in earlier periods of human history, but the lifespan of the average adult in ages past was nevertheless much lower than what it is today, and subject to a variety of serious threats. While it is true that life has in many ways become safer – with advances in science, nutrition, medicine, law, ethics, law enforcement, public policy, etc. – death rates are still appreciable (mortality rates rose in some developed countries as recently as the 1990s), and life expectancy is as low as the mid-30s in some countries (from the World Health Organization [2005]).

Indeed, the dangers listed above still exist in various guises and severity, and to make matters worse, modern life has introduced a variety of new threats. In short, ‘in the dead of night or in plain day our modern experience of fear is far less explicable and palpable, but it is not less immediate’ than in ages past (Konner 2003: 235). Ultimately, fear is ‘pervasive’ (LeDoux 1998: 129); the human brain has ‘been programmed by evolution to deal with danger in routine ways’ (LeDoux 1998: 130), and ‘natural selection has poised us on a knife-edge of uncertainty’ (Konner 2003: 235). Humans have not sat by passively in the face of these dangers, and protection of self, home, community and nation has always been a full-time job. Thus, a very likely reason for representations of the horrible and horrifying – from cave paintings to present-day horror narrative – is as a tool used by humans to explain and prepare for danger. As LeDoux notes,

no matter how useful automatic reactions are, they are only a quick fix, especially in humans. Eventually you take control. You make a plan and carry it out. This requires that your cognitive resources be directed to the emotional problem.

(1998: 176)

Horror narrative may indeed be such a tool to ‘make a plan’ for dangerous situations, and as Konner notes, elements of such present-day representations of horror may be ‘held over from a time when they were more adaptive’ (2003: 226).

Such preparation can be seen in another respect as a way to *habituate to danger* (humans in this way transfer the uncomfortable feelings of fear or threat in horror narrative into positive learning feedback), a response that Zuckerman has found is particularly pronounced in sensation-seeking men and women (1994: 212). (All people who view or read uncomfortable imagery habituate after a time, but Zuckerman’s research has found that high sensation seekers habituate more rapidly than others.) Note that this fact may be a primary reason that horror narrative has continually become more violent, particularly over the course of the twentieth century. Almost needless to say, the creators of horror narratives have recognized this ‘thirst’ for ever more explicit violence in audiences (sensation seekers) who by definition habituate more rapidly to uncomfortable experience.

Another view in terms of preparation for danger is that early human societies would have profitably encouraged courageous guardians in societies, those who could ‘by their show of fearlessness... [project] superior ability to cope with fear-inducing conditions’ (Zillmann and Gibson 1996: 17). This view is also prominent in the sensation-seeking thesis, and

during our own evolution small, kin-based groups might have gained much from having a minority of reckless sensation seekers in the

ranks – people who wouldn't hesitate to snatch a child from a pack of wild dogs or to fight an approaching grass fire with a counterfire.

(Konner 2003: 137)

To these guardians (usually dominant males), horrifying 'tales of exaggerated dangers, of threatening bigger-than-reality conditions and supernatural forces, proved useful' to establish leadership and exert control over groups (Zillmann and Gibson 1996: 16).

One important theory about preparedness for danger is the OR in humans and animals. The OR is the propensity to approach a new danger to the extent possible, in order to evaluate and respond (whether fight or flight), and to learn about and facilitate memory of the situation. Zuckerman has determined that sensation seekers exhibit 'a greater disposition to approach novel and intense stimuli' (1994: 287), and the desire for an 'active, complex, novelty-seeking approach in their processing of information' (1979: 250). Further, Zuckerman has asked, 'could such a propensity have some relationship to [the] liking for horror movies?' (1996: 156). If we view horror filmgoers' responses as a type of OR – horror consumers do exhibit the typical autonomic changes in skin conductance when engaging in horror, and so the belief is that they are indeed enacting the OR – then we can extrapolate that these consumers are seeking information about the threatening situations portrayed in the genre, in order to orient themselves and prepare for given dangers.

I should here address one possible paradox about this explanation (indeed, this topic seems to have more than its share of paradoxes). This is that, although modern life has its dangers, there is a general perception that life, at least in the West, is much safer now than it had been hundreds and thousands of years ago. That life expectancy is far longer now than in years past, and that medical technology has had amazing breakthroughs, are key elements of this. We may in fact reflect on an ennui that people have commented about in modern life – that is, the ostensible absence of felt danger and excitement, in comparison to life in ages past, when danger and challenge were literally daily occurrences. Any 'danger' that consumers of horror narrative feel in ordinary life today, or the discomfort they feel during horror consumption, seem like fairly mild varieties. 'It's only a movie', as they say, and some might say that this diminishes any interpretation of horror narrative as a tool to prepare for threat and danger. In spite of what I say here, however, some would argue that life is in fact quite dangerous now. As a reader of this article noted, 'For a culture raised in the threat of nuclear warfare, terrorism (biochemical and otherwise), environmental catastrophe, racial and sexual violence, there is no "general perception" that ours is a "safe" society'. In a word, people who live in Syria in 2016 do not feel very safe at all, and thus there is a measure of truth in this. But it does not alter the thrust of my argument: life was a whole lot tougher and more challenging, and yes, dangerous, many years ago, and advances in life expectancy and medical technology have made life, in general, a lot safer and less threatening nowadays.

There is a measure of truth in this claim, and adaptive benefits that may have once accrued from preparation for life-threatening situations by way of horrific representation in these ways are probably less salient than they once were for humans – although this is arguable, if one accepts my proposition of the 'permanent danger' in life. Shall we suppose that prehistoric and more recent humans observing depictions of dangerous conditions and threatening animals said something like 'It's only a cave painting'? In any case, this does

not discount possible evolutionary origins of the human interest in horror. Modern-day preparation for danger such as that evinced in horror films might be milder than many another such preparation ritual (both in the past, and in some places in the present day), but it has its role, and as already noted there is a good chance that this method is exactly in keeping with horrifying representations of ages past. As noted, research shows that the autonomic responses and behavioural analysis of horror consumers show *normal functioning* in terms of preparation for danger (that is, horror consumers are indeed frightened, exhibit orienting behaviour, habituate to the fear, re-represent it at times of their choice, etc.). In short, although the evolutionary manifestations of humanity's long association with (dependence on?) horror narrative have become 'softened' by changing cultural conditions and practices, the original heritable neurobiological traits are still perfectly in evidence and continue to have important (and predictable) influences on psychology and behaviour. One such influence can be seen in the popularity of horror narrative (probably far more popular than it ever had been in ages past, when it had a more immediate application in everyday life), a point that applies to our look at modern-day ennui. In this respect, horror is a source of relief from this ennui, raising the horror consumer's OLA to a more comfortable level. Recall also that sensation seekers potentially have in their brains a lower level of norepinephrine, which may result in a generalized depressed state of arousal, which they try to relieve through their sensation-seeking activities (which stimulate the release of norepinephrine and other stimulating neurotransmitters). Horror consumers may thus be engaging in their interest in horror burdened by two sources of *boredom* (one of the four subscales of the SSS), which they try to relieve through pursuit of the *internal* rewards of increased neurochemical activity in the reward systems of their brains, and the *external* rewards of the stimuli proper (this 'double pleasure' may very possibly be interpreted in terms of the hedonism indulged in by horror consumers). Simply put, Zuckerman writes that 'in periods of safety and security, persons with high sensation-seeking needs may voluntarily engage in moderately risky activities to relieve the boredom of everyday life' (1994: 288–89).

To extend the examination of this apparent paradox and why it does not discount the evolutionary explanation of human interest in horror film and fiction, recall that amplification of danger portrayed in fantastic tales of horror has always been the norm for the medium (noted above in Zillmann and Gibson 1996: 16). This ingrained attribute continues to play out in current horror films. It seems that in terms of horror films in the modern day (many of which are shockingly violent and graphic), 'we have more fears than we need', and 'our utterly efficient fear conditioning system, combined with an extremely powerful ability to think about our fears [that is, to create narratives about them] and an inability to control them [because of their autonomic bases], is probably at fault' (LeDoux 1998: 266).

Finally, this apparent paradox is further not borne out in terms of evolution and adaptation, where safe, 'once-removed' approaches to storytelling have been normal within human preparation strategies for danger. To take a risk that invariably kills you is a bad decision, one not often taken by even the most sensation-seeking ancestors of today's horror narrative fans, and after all, horror consumers know that the terrors they imbibe in 'aren't going to jump out of the screen and get them' (Zuckerman, 'Desperately', taken from Patoine 2009). These forebears, who were in their own ways testing their responses in dangerous situations, would have 'taken their risks

selectively' and 'may have found it advantageous to take risks with the seemingly controllable and familiar' (Konner 1990: 137). Zuckerman specifically states that 'when [sensation seekers] do take [actual physical and social risks] it is generally not the point of the activity and they seek to minimize risk' (1994: 373). We see this conception evinced in the modern human interest in horror. Note that in Zuckerman's SSS, horror consumers measured higher on the thrill and adventure seeking subscale, which by definition is an 'interest in physical risk taking and risky sports'. A second SSS subscale is experience seeking, which is a 'wider disposition to try new things in art, music, travel, friendship or drugs'. At first glance, we might think that horror consumers should score higher on the second subscale, for they are after all indulging in narrative art. However, the horror consumer's interest can be understood in this light when we realize that in their preparation for dangerous conditions, their principal aim is to engage in 'physical risk taking' – even once-removed – and their aim to seek a 'wider disposition to new things in art' is a secondary (though important) consideration (quotes from Konner 1990: 132).

I will now examine a few other directions in which consumption of horror narrative has developed in its 'softened' modern sense – that is, how its evolutionary roots have been modified by social factors. If the original motivations for the representation of horrifying events have changed – and of course in many ways they have – we can see how the flexible human animal has taken ingrained attributes and behaviours and applied them in new ways. Some of these developments apply specifically to horror, and they largely revolve around group and individual dynamics, particularly in respect to sexual interests and gender roles.

One area that has been studied is that of initiation rites for boys, to which horror films have been strongly correlated. It is well known that the largest segment of horror cinema audiences has long been and continues to be adolescent males: the genre 'is designed to allow adolescent males to demonstrate to their peers that they can stand up to the frights and shocks...and offer comfort and protection to their girlfriends...' (Cherry 2009: 38; and see Carroll 1990: 193). It is believed that the principal motivation of these adolescents is that they are seeking outlets for aggressive tendencies and opportunities to prove themselves. Of course, boys and young men undergoing initiation rites today in most western or modern cultures are rarely given socially sanctioned opportunities to engage in genuinely aggressive or dangerous behaviour, and any attempts to 'prove' themselves occur in much milder forums than in years past. Activities like sports, while semi-dangerous at times and aggressive in their way, hardly compare to what was seen in the past – travel to unknown places and hunting rituals, trials of deprivation, fights to the death, Aztec forehead flattening. One writer notes in contrast that 'passage experiences for males are hard to come by today' (Earl Hipp quoted in Vanderosen 2016). For these reasons, some researchers believe the (admittedly once-removed) danger and violence encountered in horror films '... may be viewed as... a last vestige of ancient rites of passage' (Zillmann and Gibson 1996: 25). The female reverse of this phenomenon is how horror narratives are used by some girls and women to engage in passive roles for boys and men who are showing off their machismo (the widely held 'snuggle theory' of horror – those male consumers of horror narrative have been noted above, and the females 'can demonstrate their sensitivity and need for protection' [Cherry 2009: 38]). Such traditional gender development and roles may seem vaguely out of step in modern times, but they were once essential for group survival and is

deeply insinuated in human social development (even today, many believe that 'the vast majority of young men and women continue... to be socialized along "traditional" gender roles' [Zillmann and Gibson 1996: 24]). In this way horror narrative is simply playing a similar role in the human drama that it has always played. Related, and further underscoring this evolutionary thesis, is the fact that research on mate preferences in both genders in 37 societies determined that the three most favoured attributes included tenderness and kindness, intelligence, and an exciting personality (cited in 1994: 288). Zuckerman writes that *exciting personality* 'sounds like extraversion and sensation seeking' (1994: 288), providing another probable link of sensation seeking and horror narrative as they are evinced on the human evolutionary path.

CONCLUSION

In this article I have argued that the central elements of the roots of human interest in horror narratives comprise a complex synthesis of psychological, biological and social factors. These views are based on human emotional response and personality theory, which develop and unfold within human evolutionary development and socio-biological adaptation. Human behaviour, emotion and personality traits stemming from these sources are rooted in autonomic responses in the brain and body that are heavily conditioned by higher-level cognition. From this point, a range of environmental and social factors, along with higher-level cognition (including, most importantly, the impact and uses of language), enter into the picture, and ultimately a panorama of horrific representation emerges into the human drama, spurring yet more change and development. In the deep recesses of the past, humans lived in vastly different environments and social conditions than they do today, giving rise to psychological and behavioural development that enabled them, in some respects, to prepare for a variety of dangerous situations at a high pitch. The success of the human animal shows that its strategies for survival were better than average, and we see some of these strategies played out in modified form in modern horror films and narrative. The questions in this study are prickly, at times puzzling. The nature of horror has no simple answers, and to be sure we continue to wonder...Why do we like this stuff? Well, like it we do – I suppose 'We all go little mad sometimes' (Anthony Perkins as Norman Bates in *Psycho* [Hitchcock, 1960]), and I hope that the work and ideas examined in this article point towards solutions to our little madness, and understanding, explanations and descriptions of the fascinating, complex sources of human interest in horrifying narratives.

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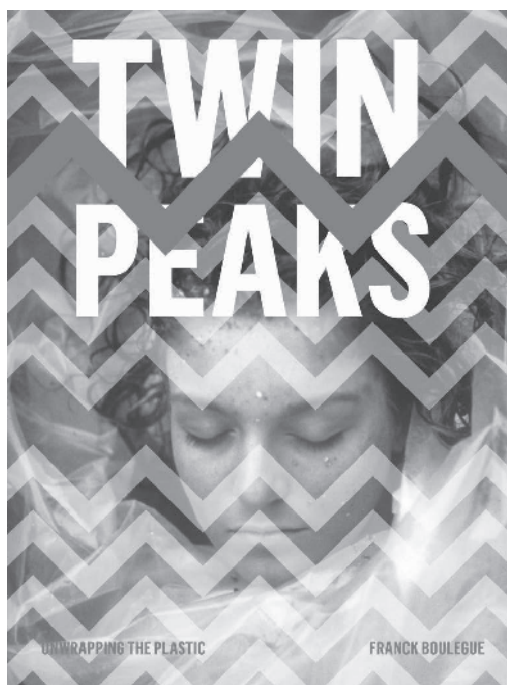
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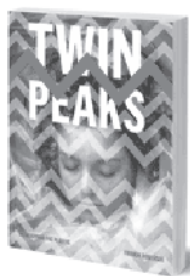
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