

Psychopathy and Fear Enjoyment: The Role of Invincibility

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Abstract

Previous research has found a significant positive relationship between psychopathic traits and fear enjoyment (Book et al., 2020; Hosker-Field et al., 2016a). Because enjoyment of fear may be contingent on not feeling like one is actually in danger (Hitchcock, 1949), the current study investigated whether a sense of invincibility could explain the relationship between psychopathy and fear enjoyment. Participants included two online samples, one from two universities, and one from MTURK (*Total N* = 825). Participants viewed exciting and fear-inducing videos and completed affective appraisals for each video. As expected, psychopathic traits were associated with less negative and more positive responses to the fear-inducing video. Also as expected, invincibility partially explained the relationship between psychopathy and fear enjoyment. Mediation analyses confirmed a significant indirect effect for negative (but not positive) ratings of the fear-inducing video. The results of the current study supply further support for the Fear Enjoyment Hypothesis (Hosker-Field et al., 2016a) and support invincibility as one possible mechanism of the relationship between psychopathy and fear enjoyment.

Keywords: Psychopathy, Fear, Invincibility, Subjective Appraisal, Fear
Enjoyment

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Table of Contents

Abstract.....	ii
Acknowledgements.....	iii
Introduction.....	1
Psychopathy.....	1
Fear.....	3
Attentional and Motivational Theories.....	8
Fear Enjoyment.....	10
Invincibility.....	11
The Current Study.....	13
Methods.....	14
Participants.....	14
Measures.....	16
Procedure.....	19
Results.....	20
Combining the Two Samples.....	20
Statistical Analyses.....	27
Order Effects.....	28

Manipulation Check.....	29
Psychopathy and Fear Enjoyment.....	30
Video Game Genre Preferences.....	31
The Role of Invincibility.....	34
Discussion.....	35
Limitations and Future Directions.....	41
Conclusion.....	43
References.....	45
Brock University Ethics Approval Form.....	56
Lakehead University Ethics Approval Form.....	57
Appendix A. Demographics and Video Game Genres.....	58
Appendix B. Self-Report Psychopathy Checklist 4 th Edition.....	59
Appendix C. Invincibility Belief Index.....	64
Appendix D. Emotional Appraisal.....	67

List of Tables

Table 1. Demographics breakdown for university and MTURK samples.....	15
Table 2. Cronbach's α values for Emotional Appraisal measure and subscales.....	18
Table 3. Bivariate correlations of continuous study variables.....	21
Table 4a. Independent samples t-tests for group and study variables.....	22
Table 4b. Independent samples t-tests for gender and study variables.....	23
Table 5a. Interactions of moderated mediation model with gender and group as moderators.....	25
Table 5b. Interactions of moderated mediation model with age and gender as moderators.....	27
Table 6. Order effects in the indirect relationship between psychopathic traits and affective ratings of the exciting and fear inducing videos.....	29
Table 7. Simultaneous regression results for affective ratings and psychopathic traits for the exciting and fear-inducing videos.....	31
Table 8. Simultaneous regression results of video game genres predicting psychopathic traits.....	32
Table 9a. Simultaneous regression of video game genres and one affective rating predicting the other affective rating for the fear-inducing video.....	33
Table 9b. Simultaneous regression of video game genres and one affective rating predicting the other affective rating for the exciting video.....	34

Table 10. Mediation analysis results for effect of invincibility as a mediator.....35

List of Figures

Figure 1. Base conceptual mediation model.....	14
Figure 2a. Moderated mediation model with gender and group as moderators.....	24
Figure 2b. Moderated mediation model with age and gender as moderators.....	26
Figure 3. Conceptual model of moderated mediation model examining order effects.....	29

Psychopathy, Fear Enjoyment, and Invincibility

Until recently, it has been generally accepted that people with psychopathic traits have a fear deficit (Hare, 2003; Lykken, 1996; Viet et al., 2013), but recently, this view has been challenged by findings of a significant positive relationship between psychopathic traits and fear enjoyment (Book et al., 2020; Hosker-Field et al., 2016a; Thomson et al., 2018). While it appears that people with psychopathic traits interpret fear differently from others, the mechanism has not yet been established. Because enjoyment of fear may be contingent on not feeling like one is actually in danger (Hitchcock, 1949), one possible mechanism for this relationship is a sense of invincibility. The purpose of the present study was to examine whether invincibility is a plausible mechanism for the relationship between psychopathy and fear enjoyment.

Psychopathy

Psychopathy is defined as a set of personality facets that encompass affective, interpersonal, and lifestyle characteristics (Hare, 2003). There are several models of psychopathy, including two factor models of psychopathy (Fowles & Dindo, 2009; Hare, 2003), the Triarchic Model of Psychopathy (Patrick et al., 2009), and a four factor model (Vitacco et al., 2005). Hare's (2003) two factor model divides psychopathy into Factor 1, which consists of affective facets including a lack of empathy, fearlessness, and interpersonal manipulation, and Factor 2, which includes antisocial behaviour, parasitic lifestyle, and risk taking. Factor 1 is also sometimes referred to as primary psychopathy, and Factor 2 as secondary psychopathy, based on which factor is most prominent (Sethi et al., 2018; Shultz et al., 2016). Hare's (2003) two factor model is one of the most commonly used models of psychopathy and will be the focus of this thesis.

A significant societal concern when it comes to psychopathy lies mainly within those who commit crimes, especially violent crimes, and reoffend after they have served their sentence. Psychopathy is generally associated with higher rates of recidivism, with some estimates going as far as to relate psychopathy to a five times greater risk of recidivism compared to non-psychopathic offenders (Hemphill & Hare, 1998). Other estimates suggest psychopathic offenders commit up to 40% of violence-related crime (Groat & Shane, 2020). Additionally, higher levels of psychopathy are related to elevated aggression, with primary psychopathy predicting greater instrumental, or premeditated, aggression and secondary psychopathy predicting impulsive aggression (Korpel et al., 2019). Psychopathy has also been found to be related to lower Emotion Regulation, specifically affective traits such as callous aspects of Factor 1 (Garofalo et al., 2020). Lower Emotion Regulation has also been linked to aggression, which suggests that affective disturbances may play a part in the increased aggression seen in those high on psychopathy (Garofalo et al., 2020; Garofalo et al., 2018).

Recidivism is a particularly important topic regarding those high in psychopathy as despite many years of research and many different approaches taken, there are still few effective treatment options for reducing recidivism in psychopathic offenders, particularly those high on Factor 1 (Polascheck, 2011; Rasmus, 2019). One potential reason why psychopathic offenders engage in higher levels of risk-taking and antisocial behaviour, particularly recidivism (Hemphill & Hare, 1998), may lay in the fearlessness inherent in Factor 1 (Hare, 2003; Lykken, 1996).

Fear

Fear is defined as a response to a real threat in the environment that results in an acute, aversive state, while anxiety is more diffuse and long lasting, and can occur in the absence of a threat (Hoppenbrouwers et al., 2016a). A prominent theory on fear and psychopathy is the Fear Deficit Hypothesis which posits that those high in psychopathy have a lack of, or a reduced experience of, fear (Hoppenbrouwers et al., 2016a). A similar theory was also posed, known as the Low Fear Quotient Theory, which suggests that those high on psychopathy have a specific reduced experience of fear or anxiety while other emotional experiences remain intact (Lykken, 1996). This theory states that every individual has some fear quotient, or some level of innate fear, and that individuals with a low fear quotient are at risk of developing primary psychopathy. This may also mean that these individuals are less likely to fear punishment and thus be less likely to learn from punishment. As a result these individuals might be more likely to engage in, or be less averse to, engaging in anti-social behaviour (Lykken, 1996).

Some key support for the Fear Deficit Hypothesis comes from studies using physiological measures of fear, including heart rate (HR), skin conductance responses (SCR), and functional magnetic resonance imaging (fMRI) (Hoppenbrouwers et al., 2016a). The amygdala is also often studied as the 'fear centre' of the brain and is known to be involved in threat processing (Bertini et al., 2013). Abnormal activation of the amygdala is often observed in studies of psychopathy using these physiological measures, as well as lower arousal and lessened startle response (Birbaumer et al., 2005; Moul et al., 2012; Schultz et al., 2016; Veit et al., 2013). One study (Birbaumer et al., 2005) used a conditioning paradigm with neutral male faces as the conditioned stimulus (CS) and painful pressure as the aversive unconditioned stimulus (US) to examine fear

conditioning using fMRI and SCR. Differential amygdala activation was observed during the acquisition or learning phase between criminal psychopaths and age and education matched controls. Healthy controls showed sustained activation in the left amygdala and psychopaths showed only right amygdala activation, suggesting a lack of emotional processing of the conditioned stimulus (Birbaumer et al., 2005). Individuals in the psychopathy group also displayed differential activation in other brain areas during acquisition including the orbitofrontal cortex (OFC), the insula, and regions of the anterior cingulate cortex (ACC) (Birbaumer et al., 2005). The amygdala and OFC are involved in coding expected outcomes while learning as well as anticipation of rewards and punishment, while the insula is involved in emotional processing of anticipatory anxiety and anticipated pain, and the regions of the ACC with emotional stimulus content and expectancy (Birbaumer et al., 2005). This differential activation, and overall lower level of activation, supports the general finding that psychopathy is related to a lack of anticipatory anxiety and deficient fear learning. Studies have also found reduced connectivity between the amygdala and ventromedial pre-frontal cortex (vmPFC), which is involved in weighing the value of outcomes and options in decision making (Motzkin et al., 2011; Waller et al., 2019). This reduced connectivity has also been suggested as a common feature of psychopathy, and to be related to the deficient processing of fearful faces (Waller et al., 2019). One recent study using similar fear conditioning paradigms found compared to controls primary and secondary psychopaths showed differential activation in various structures related to fear conditioning (Schultz et al., 2016). These structures included the ACC, which is broadly involved in fear learning, expression, and inhibition, and the amygdala, with only secondary psychopaths showing activation in

areas of the ACC consistent with fear inhibition (Schultz et al., 2016). These findings collectively support a deficit in threat processing, but they do not necessarily equate to a fear deficit.

Unfortunately, a major gap in the literature exists concerning subjective experience of fear. Physiological measures only address the physiological response to threats, but few studies have used subjective measures of fear. Studies have found that individuals with cortical blindness still display threat responses without conscious experience of a threat (Bertini et al., 2013; Le Doux, 2014). One study (Bertini et al., 2013) recorded faster reaction times in participants with visual field defects when fearful faces were presented only in their blind field compared to when neutral or happy faces were presented in their blind field. The same participants scored at chance level accuracy when guessing the emotion of faces presented in their blind field, demonstrating that their decrease in reaction times appeared to be the result of unconscious processing (Bertini et al., 2013). This processing is likely through a subcortical visual pathway that includes the amygdala, which allows rapid threat processing even in the absence of conscious awareness (Bertini et al., 2013). Another study of patients with amygdala lesions found that CO₂ inhalation was able to induce a state of subjective fear in the absence of a threat, suggesting that amygdala activation may not be a correlate for the subjective experience of fear (Feinstein et al., 2013). These patients also did not display any physiological indicators of anticipation, including SCR increases, that were demonstrated in comparison participants without amygdala damage. These studies suggest that the emotional experience of fear does not necessarily equate to the physiological responses to threats that many studies have focused on. While both the subjective experience of fear

and physiological responses to threat may involve the same broad structures, the actual neural pathways appear to differ in terms of the specific nuclei involved (LeDoux, 2012). Additionally, subjective experience of emotion has been linked to activation specifically in the medial frontal cortex, in addition to other brain structures broadly associated with that emotion, such as the amygdala for fear (Saarimäki et al., 2016). This further suggests that activation in brain areas like the amygdala alone is not sufficient to represent subjective emotional experience, which includes cortical structures (Saarimäki et al., 2016). The systems often associated with a lack of fear are more indicative of automatic threat processing, and as such may be more indicative of abnormalities in threat processing, rather than evidence for a fear deficit (Hoppenbrouwers et al., 2016a). The study of subjective experience is necessary to study fear, rather than focusing only on physiological measures of threat processing.

Few studies have examined subjective emotional experience of fear in association with psychopathy, and those that have generally avoid actively inducing fear, instead using recall paradigms which rely on participants' memories of past events (Lamoureux, & Glenn, 2020; Marsh et al., 2011). One study that did examine subjective fear studied adolescent participants and asked them to describe a recent time when they could vividly recall experiencing one of five emotions including fear, and describe the circumstances and their feelings at the time (Marsh et al., 2011). Participants were also asked to recall physiological sensations and their behavioural responses at the time, along with how well they recall the event. Higher levels of psychopathic traits were associated with significantly less sympathetic activation (e.g. heart rate increase, sweating) during fear situations relative to healthy controls. Those high on psychopathic traits also reported

feeling less fear and feeling fear less intensely than healthy controls. This study however mainly focused on reported sympathetic and parasympathetic responses (e.g. upset stomach, lump in the throat) to recalled events, relying on accurate recall of the events themselves as well as the results of the event and the participants' internal state (Marsh et al., 2011). Measuring fear through recall of past events may not be adequately measuring fear, so much as participants' memory, and relies on the past experiences of participants rather than using one stimulus consistently across participants. A study examining the relationship between psychopathy and body sensations (e.g. heart racing, upset stomach) also found deficits in subjective experience of bodily sensations relative to measured SCR and HR (Gao et al., 2012). This study, however, used a social stressor task, writing and presenting a speech on the participants' own faults and failures, and not a fear-inducing stimulus. This further suggests that when examining fear in psychopaths, measuring subjective emotional experience is necessary. Physiological responses that are associated with fear in those lower on psychopathic traits do not necessarily match subjective experience in those higher on psychopathic traits. One study that examined both physiological measures, via SCR and HR, as well as subjective measures in a sample of jail inmates found no relationship between psychopathy and subjective reports of fear (Lamoureux, & Glenn, 2020). It is important to note that this study, like others previously discussed, used a recall paradigm to induce emotion, as well as still images of threats to the participants themselves and others (Lamoureux, & Glenn, 2020). These stimuli rely on participants' memory, and the ability of still images to induce fear through the display of a potential threat is likely limited. The lack of relationship between total psychopathy and HR or SCR found in this study runs contrary to previous fear deficit

literature, which has found a negative relationship between psychopathic traits and HR and SCR (Hoppenbrouwers et al., 2016a). The authors did find Factor 1 to be related to increases in SCR during threatening images to the self and others, as well as neutral images, which the authors suggest might show greater reactivity associated with affective traits (Lamoureux, & Glenn, 2020). The use of recall and still images to induce fear is not ideal, as recall relies on participant memory, and measuring fear without inducing fear is likely not particularly informative. The particular stimuli used in this study may have resulted in these contradicting findings.

There is also an increasing amount of research finding mixed results when trying to investigate the fear deficit. A meta-analysis on subjective experience in psychopaths found no evidence of a fear deficit, only differences in happiness and anger (Hoppenbrouwers et al., 2016a). Other theories pertaining to the observed differences in fear have suggested that rather than an emotional deficit, psychopaths have a deficit of attention which results in them ignoring stimuli that are not goal-relevant (Groat & Shane, 2020). As the literature becomes more mixed it is important to explore other possible explanations and mechanisms for the observed differences in psychopaths' experience of fear.

Attentional and Motivational Theories

In addition to the fear deficit hypothesis there are several other theories that suggest a similar deficit in fear and threat processing, but through motivation and attention. These theories focus on a cognitive deficit, rather than an affective deficit, as the basis for psychopathic characteristics (Groat & Shane, 2020). One such theory is the Response Modulation Hypothesis (Hoppenbrouwers et al., 2016b; Munneke et al., 2018)

which suggests that those high on psychopathy have difficulty processing information that is not task-relevant, even if it is important. This theory therefore posits that psychopaths have a situational deficit, where they only display a deficit in processing when the aversive stimuli is not goal relevant (Hoppenbrouwers et al., 2016b; Munneke et al., 2018). Additionally, the Response Modulation Hypothesis suggests that as a result of this deficit, bottom-up environmental information is ignored even if it is important, including potential threats (Hoppenbrouwers et al., 2016b). This can apply to fearful faces, which psychopaths have been shown to have impairments processing (Dargis et al., 2018; Deeley et al., 2006).

Another method used in some attentional studies is startle potentiation, in which a startle probe, such as a sudden noise, is played during a valenced (e.g. pleasant, neutral, and unpleasant images) stimulus and the resulting startle blink is measured via electromyogram (EMG) (Baskin-Sommers et al., 2013). One study examining emotion modulated startle found a deficit in psychopaths with novel stimuli, but not when the perceptual load was lessened by presenting familiar stimuli (Baskin-Sommers et al., 2013). Other studies have also found psychopathy to be related to reduced cortical activation in comparison to healthy controls when viewing fearful faces, but not happy or neutral faces (Deeley et al., 2006). A similar theory is the Integrated Emotions System Theory, which suggests that amygdala dysfunction results in an inability to process and direct attention to aversive emotional stimuli (Munneke et al., 2018). One study found support for rigid top down, or goal-directed, attention as psychopaths demonstrated an increase in reaction time in an attentional task when switching between tasks with a distraction and without a distraction (Hoppenbrouwers et al., 2016b). The same study

found no evidence for bottom-up, or environmentally driven, attentional deficit in a task that varied instructions versus no instructions. Those higher in psychopathic traits therefore only showed a deficit in using contextual cues (instructions versus no instructions) to facilitate a top-down attentional task. In addition to attentional and motivational theories on fear and psychopathy there are also alternative theories that focus on affective aspects of fear, rather than cognitive deficits or a lack of fear.

Fear Enjoyment

An alternative perspective to other theories on fearlessness that emphasize an emotional deficit is the idea that rather than lacking fear, those high in psychopathy have a differential experience of fear. The Fear Enjoyment Hypothesis was originally introduced by Hosker-Field, Gauthier, and Book (2016), and posits exactly as the name suggests, that those high on psychopathy enjoy the subjective experience of fear. Fear enjoyment necessarily comprises two aspects: 1) a lessened negative response to fear-inducing stimuli, and 2) a heightened positive response to the same stimuli. In this way, fear enjoyment suggests there must be a lack of avoidance of normally aversive, or scary, stimuli, as well as the presence of approach behaviour (Hosker-Field et al., 2016a). It is not simply enough to not avoid fear-inducing stimuli, psychopaths must also seek them out. Using videos of scary and exciting video games, one study (Hosker-Field et al., 2016a) found a positive relationship between positive affective ratings and psychopathy, and a negative relationship between negative affective ratings and psychopathy for the fear-inducing video. Those high in psychopathic traits rated the fear inducing video both less negatively, and more positively. They also found no relationship between affective ratings for the exciting video and psychopathy, suggesting the difference was only related

to fear-inducing stimuli. Another study using Virtual Reality (VR) stimuli found that those higher in psychopathy, specifically Factor 1, reported feeling happier in response to the fear-inducing stimulus (Thomson et al., 2018). A 2020 study by Book and colleagues replicated these results using video game stimuli, finding that participants higher in psychopathic traits rated the fear-inducing video more positively and less negatively. This study also used subjective emotional measures to assess positive and negative affect. There remains the question of what the mechanism may be that links psychopathy to fear enjoyment.

Invincibility

Humans are generally hard-wired to want to survive, but also have the conscious awareness of their inevitable death. Terror Management Theory suggests this motivates humans to avoid reminders that they are mortal and animal (Hirschberger et al., 2010; Lifshin et al., 2017). Reminders that they will die induce anxiety and potentially terror. One study found that death primes can modulate attention and the willingness to observe images of injury that can feed this fear (Hirschberger et al., 2010). Death primes have also been shown to increase support for killing animals, but not for killing humans, suggesting it may serve a terror management function of elevating and separating humans from animals (Lifshin et al., 2017). If humans fear reminders of their own death to such a degree, something that should prevent any enjoyment from threatening or fear-inducing situations and stimuli, then perhaps the key to fear enjoyment is the belief that you are essentially untouchable. Alfred Hitchcock (1949) outlined that the difference between fearing something, and enjoying the sensation of fear, is whether or not you will pay the price. This idea of enjoying fear when there will be no harm to you suggests that in the

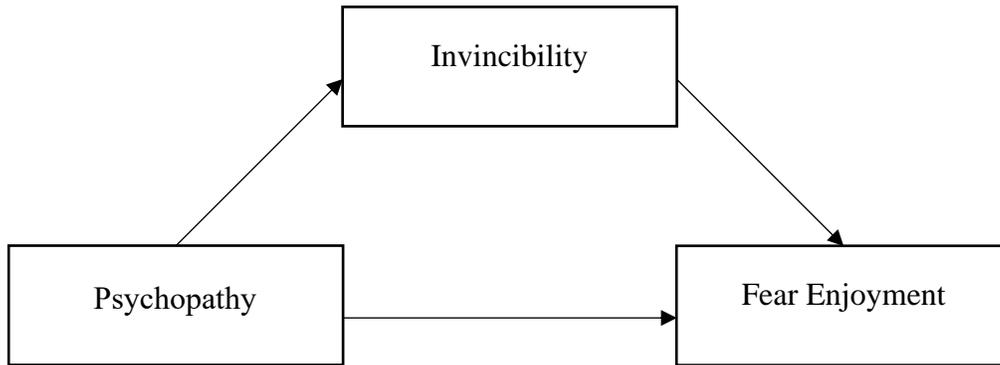
absence of a perception of threat or consequence, there can be enjoyment of things that would ordinarily be terrifying. For example, the experience of watching a horror movie about a serial killer, with no risk of becoming a victim yourself, is more enjoyable than being pursued by a serial killer yourself. This perception, invincibility, may hold the key to understanding the relationship between fear enjoyment and psychopathy.

Essentially invincibility is the belief of invulnerability, that there will not be adverse consequences (Wickman et al., 2010). There is a significant amount of research in invincibility among veterans, and studies have found a relationship between the amount of combat experience and self-reported invincibility (Killgore et al., 2010). It is suggested that exposure to trauma through intense, life-threatening combat situations resulted in changes in the threat-assessment systems in these veterans (Killgore et al., 2010). One study specifically found a relationship between having taken the life of an enemy or friendly individual and both increased risk taking and self-reported feelings of invincibility (Killgore et al., 2008). The same study also found a relationship between self-reported aggression and these same combat experiences. A similar study of adolescent children of military service members also found a relationship between invincibility and aggression as well as delinquency (Wickman et al., 2010). Based on these studies there appears to be a link between invincibility and both risk taking and aggression, both of which are also associated with psychopathy (Hare, 2003; Hemphill & Hare, 1998; Korpel et al., 2019). This provides a potential conceptual bridge to psychopathy and fearlessness, as psychopaths have been shown in many studies to have deficiencies in the systems involved in threat detection and processing (e.g. Birbaumer et al., 2005; Moul et al., 2012; Schultz et al., 2016; Veit et al., 2013). Invincibility related to

differential threat processing may provide this sense of a lack of threat or consequence in those high on psychopathy.

The Current Study

The Fear Enjoyment Hypothesis suggests that rather than not experiencing fear, those high on psychopathy might enjoy the experience of it (Hosker-Field., 2016a; Book et al., 2020). This will manifest as a lack of avoidance of, and approach towards, aversive stimuli. In the current study, I expected to replicate the observed relationship between psychopathic traits and fear enjoyment by examining affective responses to fear-inducing and exciting stimuli. As the Fear Enjoyment Hypothesis (Hosker-Field et al., 2016) specifically includes both an increased approach towards and lessened avoidance of aversive stimuli, fear enjoyment will be measured including both positive and negative affective appraisal. Given this study used video game stimuli I also wanted to examine participants' enjoyment of various game genres to see if enjoyment of any specific video game genre was related to psychopathy. As this analysis was exploratory, I made no predictions about which video game genres would be related to psychopathy. Finally, I predicted that the relationship between psychopathic traits and fear enjoyment would be indirect through invincibility (see Figure 1 for conceptual model). That is, a sense of invincibility may be one potential mechanism for this relationship.

Figure 1. *Base conceptual mediation model*

Note. Fear enjoyment is replaced by individual affective appraisal variables (positive or negative) for individual mediation analyses. For each video the affective rating not included as outcome was included as a covariate because fear enjoyment requires consideration of lessened negative response and heightened positive response.

Methods

Participants

Two samples of participants were recruited for the present study; 1) a sample of undergraduate students from two Canadian universities, and 2) a sample from Amazon Mechanical TURK (MTURK). The demographics of each sample are discussed below (see Table 1).

Table 1. *Demographics breakdown for university and MTURK samples*

Characteristic	Student		MTURK	
	n	%	N	%
Gender				
Female	319	85.5	161	40.3
Male	50	13.4	234	58.5
Non-Binary	2	.5	2	.5
Genderfluid	1	.3	0	0
Prefer not to say	1	.3	3	.8
Ethnicity				
Caucasian	268	71.8	290	72.5
African American	9	2.4	45	11.3
Asian	42	11.3	26	6.5
Indigenous	6	1.6	0	0
Latinx	10	2.4	14	3.5
Middle Eastern	4	1.1	0	0
Multi-racial	13	3.5	12	3.0
Prefer not to say	11	2.9	7	1.8
Did not specify	10	2.7	6	1.5

Note. Student sample $N = 373$, MTURK sample $N = 400$. The category 'Did not specify' refers to participants that either marked themselves as something other than an ethnicity in the ethnicity category, including their species, or their country of residence that does not denote a specific race, such as 'Canadian'. As there was missing data for the student sample the valid percent was reported.

The University Sample

The university sample included a total of 425 individuals, of which some did not supply demographic information for ethnicity or gender (*Missing* $n = 52$), for a total of 373 in Table 1. Participants from both universities primarily consisted of undergraduate psychology students and were initially recruited online through each institution's online recruitment tools. A course credit was supplied as compensation for participation. The student sample was majority female (85.5%; *Male* = 13.4%) and majority Caucasian (71.8%; *Asian* = 11.3%, *Multi-racial* = 3.1%, *Latinx* = 2.7%, *African American* = 2.4%), with a mean age of 20.75 years ($SD = 5.44$).

The MTURK Sample

The online MTURK sample consisted of 400 total individuals. Participants were recruited through Amazon Mechanical Turk and compensated with five US dollars for their participation, as per typical MTURK payment values. The MTURK sample was majority male (58.5%; *Female* = 40.3%) and Caucasian (72.5%; *African American* = 11.3%, *Asian* = 6.5%, *Latinx* = 3.5%, *Multi-racial* = 3.0%), with a mean age of 37.86 (*SD* = 11.42).

Measures

Psychopathy

To measure psychopathy the Self-Report Psychopathy Checklist 4th edition (SRP-4) (Paulhus et al., 2016) was used. This measure was developed based on non-clinical samples and is appropriate for measuring psychopathy in the general population. This measure is based on the two-factor model of psychopathy, with Factor 1 being associated with manipulation and callous unemotional traits and Factor 2 associated with anti-social behaviour and parasitic lifestyle. Participants rated their agreement with items on a five-point likert scale from 1(*disagree strongly*) to 5(*agree strongly*). Items included “I purposely flatter people to get them on my side” and “I am an impulsive person”. This measure has shown high reliability across student samples in previous studies (Book et al., 2020), and in this sample Cronbach’s *α*s of .92, .89, and .88 were observed for SRP total, Factor 1, and Factor 2, respectively.

Invincibility

Invincibility was measured using the Invincibility Belief Index (IBI) (Killgore, Kelley, & Balkin, 2010), a 20-item measure evaluating vulnerability-invincibility. The measure includes 20 vignettes and participants were asked to rate the probability of the given outcome on an 11-point scale from 0% likely to 100% likely. Items included scenarios such as “If you were to find yourself confronted by a vicious angry dog, what is the probability that YOU could get away unharmed?” and “While on vacation in the woods, you decide to go hiking in an unfamiliar and thickly wooded area without a map or guide. What is the likelihood that YOU will get lost?”. The measure has demonstrated good reliability and validity in previous studies (Killgore et al., 2010). In the current study a Cronbach’s α of .76 for the measure was obtained, demonstrating good reliability.

Emotional Appraisal

Given that this study built off previous work on fear enjoyment the same measure developed for and used in previous studies (Hosker-Field et al, 2016a; Book et al., 2020) was utilized to measure the participant’s emotional experience of each video. We used negatively valenced adjectives to measure negative responses to the stimuli and positively valenced adjectives to measure positive responses to represent the two parts of fear enjoyment, namely the lessened negative response and the heightened positive response. The measure consisted of synonyms for fear and excitement taken from the Merriam-Webster Dictionary (2014). Participants rated how strongly they felt each emotional word on a five-point likert scale from 1 (*not at all*) to 5(*very much*). Fear words included “alarmed”, “panicked”, and “scared”, while exciting words included “exhilarated”, “charged”, and “delighted”. Two scores were calculated to reflect positive and negative affective ratings, with positive ratings based on exciting synonyms and negative ratings

based on fear synonyms from the affective appraisal measure. The overall measure displayed good reliability for both the exciting video (*Cronbach's* $\alpha = .90$) and the fear-inducing video (*Cronbach's* $\alpha = .91$). Both the positive and negative subscales also showed good reliability (see Table 2). The appraisal was filled out separately for each video.

Table 2. *Cronbach's* α values for Emotional Appraisal measure and subscales

	Total	Positive Ratings	Negative Ratings
Exciting Video	.90	.93	.94
Fear-Inducing Video	.91	.92	.94

Note. Positive Ratings = excitement synonyms, Negative Ratings = fear synonyms.

Exciting Video. To induce excitement a first-person perspective video of a roller coaster ride was used. A first-person video was chosen to make the videos as immersive, and emotionally evocative, as possible while participants were viewing them on a screen. The video was obtained from the video sharing platform YouTube and the video was taken on the Kraken rollercoaster at SeaWorld (TemporaryTourist, 2016 June 12). As the introduction in the video leading up to the ride was not necessary for the purposes of the study the video began at the 2:42 time mark (<https://www.youtube.com/watch?v=N1-9oVd6DdY>).

Fear-Inducing Video. To induce fear a first-person clip from the horror video game *Outlast* was used (Petty, 2013). The video included suspenseful scenes and jump scares intended to scare, rather than just startle, the participants. An older video game was chosen in an effort to avoid any familiarity effects from participants possibly having recently played the video game, or having the events of the game fresh in their minds. The video (GameSpot Trailers, 2013, March 12) was originally published on the video

sharing platform YouTube. As the beginning introduction of the video was not necessary for the purposes of this study the video began at the 0:41 time mark

(<https://www.youtube.com/watch?v=uKA-IA4locM>).

Video Game Genre Preferences

To examine video game genre preferences a simple measure including ten video game genres was used. Enjoyment of each genre was rated on a five-point likert scale from 1(*extremely unenjoyable*) to 5(*extremely enjoyable*). Genres included action, adventure, puzzle, simulation, strategy, sports, horror, action/adventure, racing, and role-playing games (RPG). The original ten genres were then compiled into four genres to eliminate any redundancy, as some of the genres were similar. The four final categories/genres were horror, action (action, action/adventure, racing, and sports), puzzle (puzzle and strategy), and fantasy adventure (RPG, simulation, adventure).

Procedure

The study was conducted online using Qualtrics to host the questionnaires. Participants were instructed to fill out the survey on a computer, rather than a mobile device in order to have a full screen for the video viewing. The study began with the consent form followed by the psychopathy measure, the Self-Report Psychopathy Checklist 4th edition (SRP-4) (Paulhaus, Neumann, & Hare, 2016). The invincibility measure, the Invincibility Belief Index (IBI) (Killgore, Kelley, & Balkin, 2010) followed, after which the participants would watch each of the videos, the order of which was randomized, and rate them in terms of emotional appraisal. Participants were also asked

about their liking of certain video game genres and their enjoyment of each video overall. The study concluded with a debriefing form.

Results

Combining the Two Samples

In order to decide whether to use the combined sample rather than splitting by group (MTURK/student) or gender, I examined whether group, age, and gender were significant moderators in the mediation model. Bivariate correlations of continuous study variables (shown in Table 3) showed small significant relationships between age, psychopathic traits, and invincibility. Age also produced weak correlations with negative affective ratings for the fear-inducing video.

Table 3. *Bivariate correlations of continuous study variables*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1.Age	---												
2.F1	-.18***	---											
3.F2	-.12**	.72***	---										
4.SRP	-.16**	.93***	.93***	---									
5.IBI	.18***	.17***	.14***	.17***	---								
6.ExcP	-.06	.05	.10**	.08*	-.02	---							
7.ExcN	-.07	-.03	-.02	-.03	-.22***	.10**	---						
8.FearP	-.01	.26***	.28***	.29***	.05	.32***	.11**	---					
9.FearN	-.12**	-.10**	-.05	-.08*	-.23***	.27***	.36***	.20***	---				
10.Horror	-.05	.26***	.24***	.27***	.07*	.13***	-.01	.42***	-.16***	---			
11.Action	-.05	.21***	.13***	.18***	.15***	.23***	-.06	.28***	.00	.37***	---		
12.Puzzle	.07	-.08*	-.10**	-.10**	.05	.12**	.02	.01	.07	-.00	.08*	---	
13.Fantasy	-.09*	-.02	-.05	-.04	.01	.10**	.01	.11**	.03	.17***	.27***	.37***	---
M	30.00	73.23	64.58	137.81	5.89	29.30	20.27	25.35	30.20	2.85	3.37	3.86	3.89
SD	12.05	17.09	17.02	31.65	1.00	9.75	8.58	9.61	10.30	1.42	.87	.95	.88

Note. F1 = Factor 1 scores, F2 = Factor 2 scores, SRP = total psychopathy scores, IBI = invincibility scores, Exc = exciting video, Fear = fear-inducing video, P = positive affective ratings, N = negative affective ratings, Fantasy = fantasy adventure, * = <.05, ** = <.01, *** = <.001.

As gender and group categories were assigned arbitrary values, both variables were examined in relation to other study variables using independent samples t-tests. Group was significantly related to age, such that the MTURK sample was significantly older than the student sample, and scored significantly higher on invincibility. The MTURK sample also rated the exciting video significantly less negative, and rated the fear-inducing video significantly more positively and less negatively (see Table 4a).

Table 4a. *Independent samples t-tests for group and study variables*

Variable	Student		MTURK		<i>T</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Age	21.04	4.91	38.35	10.66	-29.14	<.001	2.09
F1	73.88	15.06	72.62	18.78	1.04	.301	.07
F2	64.75	13.71	64.42	19.63	.272	.786	.02
SRP	138.64	25.88	137.04	36.22	.711	.477	.05
IBI	5.68	.92	6.08	1.04	-5.62	<.001	.41
ExcP	29.64	9.28	28.98	10.18	.94	.348	.07
ExcN	21.29	8.19	19.32	8.83	3.19	.001	.23
FearP	24.36	8.61	26.30	10.39	-2.81	.005	.20
FearN	31.49	9.61	28.99	10.78	3.38	.001	.24
Horror	2.75	1.40	2.95	1.43	-1.95	.051	.14
Action	3.32	.87	3.41	.87	-1.47	.143	.10
Puzzle	3.90	1.00	3.82	.90	1.18	.241	.08
Fantasy/Adv	3.91	.91	3.88	.86	.46	.648	.03

Note. F1 = Factor 1 scores, F2 = Factor 2 scores, SRP = total psychopathic trait scores, IBI = Invincibility scores, Exc = Exciting video, Fear = Fear-inducing video, P = Positive affective ratings, N = Negative affective ratings, Fantasy/Adv = Fantasy/Adventure games.

For gender, given there were few participants who identified their gender as non-binary ($N = 4$), genderfluid ($N = 1$), or prefer not to say ($N = 4$) (see Table 1), I only used the male and female categories for the independent t-test with study variables. Gender was significantly related to age, such that male participants were significantly older. Male participants also scored significantly higher on Factor 1, Factor 2, and total psychopathy compared to female participants (see Table 4b). Gender was also significantly related to

invincibility with males scoring significantly higher. Male participants also rated the exciting video significantly less negative, and rated the fear-inducing video significantly more positive and less negative than female participants. Horror and action games were also rated as more enjoyable by male participants, and puzzle games were rated significantly less enjoyable by male participants compared to female participants.

Table 4b. *Independent samples t-tests for gender and study variables*

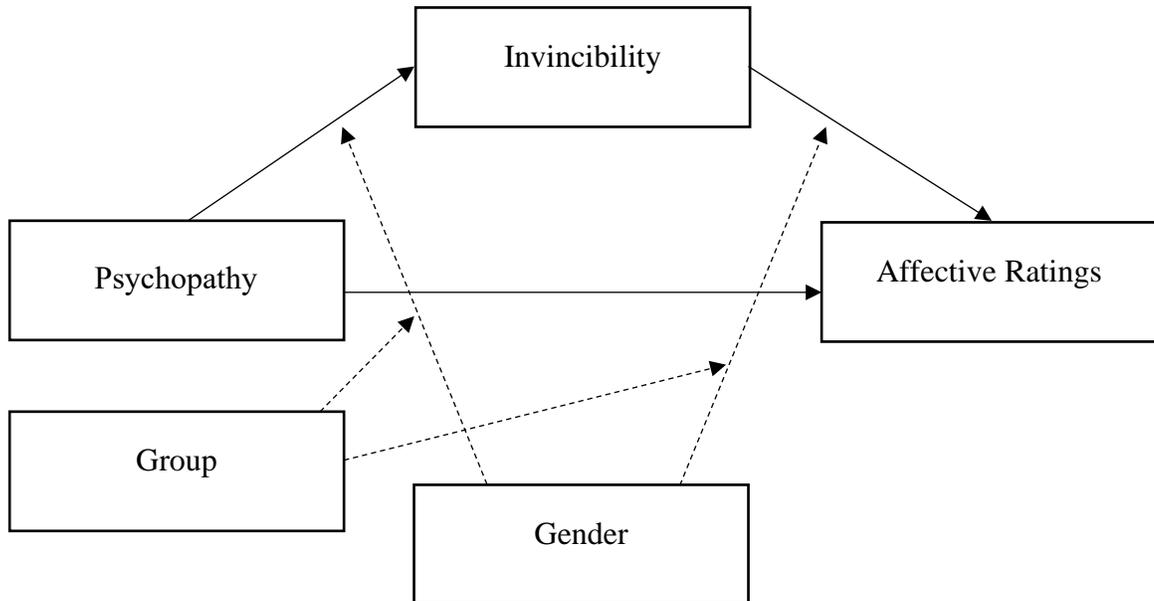
Variable	Male		Female		<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	M	SD	M	SD			
Age	33.99	10.53	27.65	12.31	7.52	<.001	.55
F1	79.56	17.61	69.28	15.62	8.12	<.001	.62
F2	68.76	19.82	61.00	14.61	4.99	<.001	.45
SRP	148.35	35.01	131.28	27.70	7.01	<.001	.54
IBI	6.26	1.05	5.68	.91	7.77	<.001	.59
ExcP	29.31	10.18	29.20	9.49	.15	.880	.01
ExcN	18.40	7.89	21.30	8.80	-4.68	<.001	.35
FearP	27.84	9.76	23.73	9.17	5.80	<.001	.43
FearN	27.58	10.14	31.74	10.15	-5.44	<.001	.41
Horror	3.14	1.34	2.67	1.44	4.49	<.001	.34
Action	3.71	.71	3.18	.90	9.01	<.001	.65
Puzzle	3.71	.91	3.96	.96	-3.46	.001	.27
Fantasy/Adv	3.91	.76	3.88	.95	.56	.575	.03

Note. F1 = Factor 1 scores, F2 = Factor 2 scores, SRP = total psychopathic trait scores, IBI = Invincibility scores, Exc = Exciting video, Fear = Fear-inducing video, P = Positive affective ratings, N = Negative affective ratings, Fantasy/Adv = Fantasy/Adventure games.

To examine these variables as potential moderators I ran two separate groups of analyses as PROCESS (Hayes, 2012) version 3.5 for SPSS (Statistical Package for Social Sciences) software only allows two moderators at once. Both groups of analyses were run using model 72 of PROCESS (Hayes, 2012), based on the assumption that the moderators would be acting on the indirect effect of the base mediation model (see Figure 1) with 95% bootstrapping set to 5000 samples. Moderation analyses were only run for the fear-inducing video given that this is the variable of interest. The first group of

analyses included gender and group as moderators for video and each affective outcome, positive or negative, with the opposing affective outcome included as a covariate (see Figure 2a).

Figure 2a. *Moderated mediation model with gender and group as moderators*



Note. Two separate analyses of each model were run for each video, with the affective rating (positive or negative) not included as the outcome was included as a covariate.

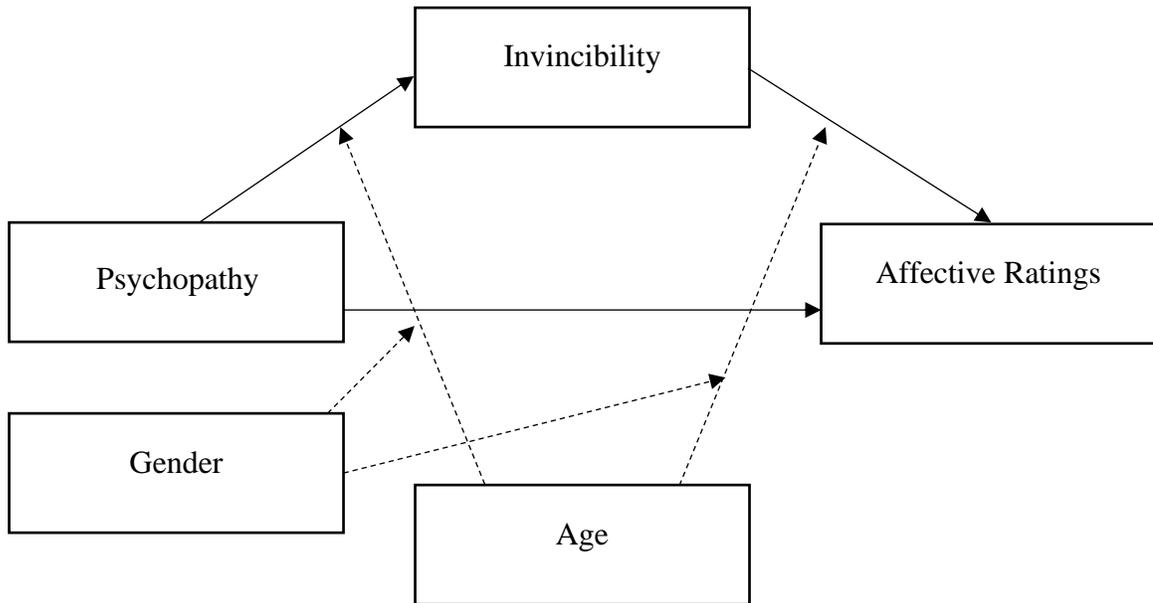
There were no significant interactions, indicating a lack of moderation (see Table 5a).

Table 5a. *Interactions of moderated mediation model with gender and group as moderators*

Interaction Term	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI	
					LL	UL
Fear Video: Positive Ratings						
a path (SRP x Gender)	-.01	.01	-.74	.461	-.031	.014
a path (SRP x Group)	-.02	.01	-1.61	.108	-.040	.004
a path (Gender x Group)	-1.11	.93	-1.20	.232	-2.942	.714
a path (SRP x Gender x Group)	.01	.01	1.05	.296	-.006	.019
b path (IBI x Gender)	-4.23	2.76	-1.53	.127	-9.652	1.198
b path (IBI x Group)	-4.16	2.76	-1.51	.132	-9.587	1.257
b path (Gender x Group)	-11.12	9.71	-1.15	.252	-30.174	7.934
b path (IBI x Gender x Group)	1.64	1.60	1.02	.306	-1.506	4.788
Fear Video: Negative Ratings						
a path (SRP x Gender)	-.01	.01	-.60	.550	-.029	.016
a path (SRP x Group)	-.02	.01	-1.55	.123	-.040	.005
a path (Gender x Group)	-1.09	.95	-1.15	.249	-2.947	.767
a path (SRP x Gender x Group)	.01	.01	1.00	.317	-.006	.019
b path (IBI x Gender)	2.54	3.03	.84	.403	-3.414	8.492
b path (IBI x Group)	3.22	3.03	1.06	.289	-2.732	9.163
b path (Gender x Group)	14.52	10.63	1.37	.172	-6.353	35.401
b path (IBI x Gender x Group)	-2.27	1.76	-1.29	.197	-5.717	1.179

Note. SRP = total psychopathy, IBI = invincibility.

The second group of analyses included age and gender as moderators (see Figure 2b). Age could not be included in analyses with group as the age and group variables were confounded with one another, given the MTURK group was significantly older than the student group.

Figure 2b. *Moderated mediation model with age and gender as moderators*

Note. Two separate analyses of each model were run for each video, with the affective rating (positive or negative) not included as the outcome was included as a covariate.

As can be seen with Table 5b, there were no significant interactions in this group of analyses. Because there was not any evidence of significant moderation by group, age, or gender, I decided to combine the MTURK and student samples for all remaining analyses.

Table 5b. *Interactions of moderated mediation model with age and gender as moderators*

Interaction Term	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI	
					LL	UL
Fear Video: Positive Ratings						
a path (SRP x Age)	.00	.00	.56	.576	-.001	.001
a path (SRP x Gender)	.01	.01	1.03	.303	-.007	.023
a path (Age x Gender)	.01	.03	.22	.827	-.055	.069
a path (SRP x Age x Gender)	.00	.00	.00	1.000	.000	.000
b path (IBI x Age)	-.09	.10	-.91	.361	-.296	.108
b path (IBI x Gender)	-2.23	2.07	-1.08	.281	-6.299	1.831
b path (Age x Gender)	-.30	.36	-.82	.414	-1.010	.416
b path (IBI x Age x Gender)	.04	.06	.72	.475	-.074	.158
Fear Video: Negative Ratings						
a path (SRP x Age)	.00	.00	.56	.579	-.001	.001
a path (SRP x Gender)	.01	.01	1.13	.258	-.006	.024
a path (Age x Gender)	.01	.03	.19	.847	-.057	.069
a path (SRP x Age x Gender)	.00	.00	.03	.978	.000	.000
b path (IBI x Age)	.15	.11	1.31	.191	-.074	.368
b path (IBI x Gender)	2.04	2.26	.90	.367	-2.401	6.486
b path (Age x Gender)	.61	.40	1.54	.124	-.167	1.390
b path (IBI x Age x Gender)	-.09	.06	-1.44	.152	-.219	.034

Note. SRP = total psychopathy, IBI = invincibility.

Statistical Analyses

As a note, missing data on questionnaires was pro-rated provided the participant answered 70% of the items for a particular scale score. All study variables were normally distributed with skewness and kurtosis values within the normal range of expected values of $-/+2.00$. This was confirmed by normal probability plots. Multivariate assumptions were assessed by conducting a multiple regression with the variables of interest; SRP total scores predicted from positive and negative ratings of the video of interest, with invincibility included in the model. These regressions were conducted for the exciting and fear-inducing videos separately. Cook's distances were all near zero indicating there were no cases exerting undue influence on the results. Q-Q plots and P-P plots indicated

the assumption of multivariate normality was met and standardized residual by standardized predicted values plots indicated homoscedasticity, normality, and linearity. The Durbin-Watson test was conducted to check for independent errors and the assumption was met. The Levene's test for homogeneity of variance was violated, however the samples were similar in size (*MTURK* $N = 400$, *Student* $N = 425$) and the moderated mediation analyses discussed above did not find group, age, or gender differences. Thus, the samples were combined for a total of 825 participants.

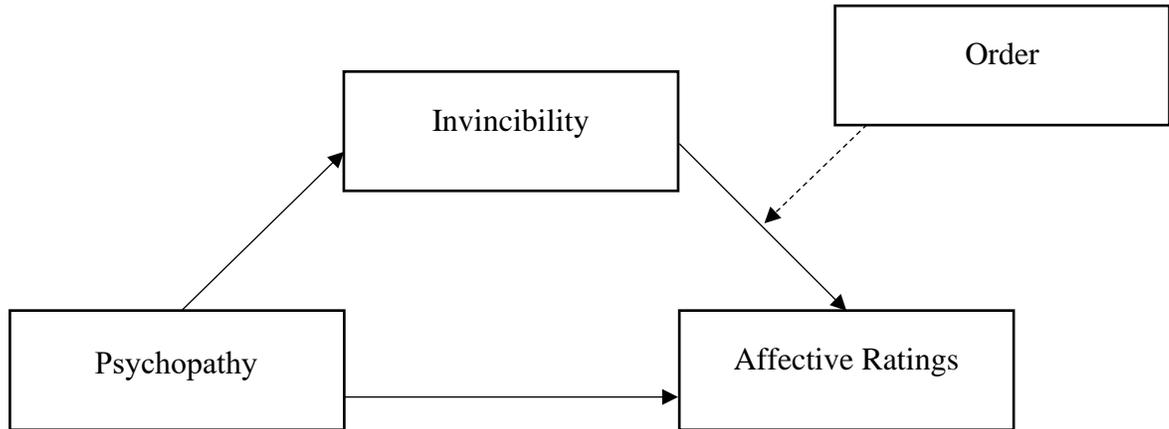
Order Effects

PROCESS version 3.5 software (Hayes, 2012) was used to examine the effect of order of video presentation (see Figure 3). Order effects were examined using model 14, as they were hypothesized to exert effect on the relationship between invincibility and affective ratings, given psychopathy and invincibility were both measured prior to the participants viewing any videos.

To check for order effects on the exciting and fear-inducing videos a series of moderated mediation analyses were performed with order as a moderator, total psychopathy as the predictor, invincibility as the mediator, and affective ratings as the outcome variable. A separate analysis was performed for each video and each rating, positive and negative, with one rating as the outcome and the other included as a covariate. It was important to include both positive and negative ratings in the model as both are integral to the concept of fear enjoyment, representing the approach and lack of avoidance of aversive stimuli. Bootstrapping was set to 95% and 5000 samples. All affective outcomes, positive and negative for both videos were assessed separately (see

Figure 1 for base mediation model). There were no significant effects of order in any of the moderated mediation analyses (see Table 6).

Figure 3. *Conceptual model of moderated mediation model examining order effects*



Note. Dashed line indicates hypothesized moderation relationship, affective rating not included as outcome was included as a covariate for each video.

Table 6. *Order effects in the indirect relationship between psychopathic traits and affective ratings of the exciting and fear inducing videos*

Outcome	B	SE	t	p	95% CI	
					LL	UL
Fear Video:						
Positive Ratings	-.93	.65	-1.42	.157	-2.212	.358
Negative Ratings	-.22	.71	-.30	.763	-1.616	1.185
Exciting Video:						
Positive Ratings	-.06	.71	-.09	.928	-1.453	1.325
Negative Ratings	.34	.61	.56	.578	-.860	1.541

Note. All interactions are invincibility x order.

Manipulation Check

As a manipulation check that the exciting video was rated more positively, and less negatively, than the fear-inducing video a group of paired-samples t-tests were conducted. I hypothesized that if the video stimuli we used did induce excitement and fear then these tests should be significant. The exciting video was expected to be rated

more positively and the fear-inducing video more negatively. As expected, the exciting video was rated more enjoyable than the fear-inducing video ($t(769) = 11.21, p < .001, d = .40$), and was rated more positively ($t(741) = 9.47, p < .001, d = .35$), and less negatively ($t(752) = -25.06, p < .001, d = -.91$) than the fear-inducing video. All effect sizes were medium to large.

Psychopathy and Fear Enjoyment

The first objective of the present study was to replicate the relationship between psychopathic traits and fear enjoyment. Two simultaneous regressions, one for the fear-inducing video and one for the exciting video, were conducted to determine whether positive and negative ratings of the videos were related to psychopathic traits. The overall model for the fear-inducing video was significant, indicating affective ratings of that video were related to psychopathic traits ($R^2 = .10, F(2,745) = 42.04, p < .001$). Specifically, people with greater psychopathic traits tended to rate the fear-inducing video more positively and less negatively (see Table 7). Another simultaneous regression was run to examine the relationship between psychopathy and affective ratings for the self for the exciting video and the overall model was nonsignificant ($R^2 = .01, F(2,745) = 2.59, p = .075$).

Table 7. Simultaneous regression results for affective ratings and psychopathic traits for the exciting and fear-inducing videos

	<i>b</i>	<i>SE</i>	<i>B</i>	<i>t</i>	<i>p</i>	95% CI		<i>sr</i> ²
						LL	UL	
Fear-Inducing Video								
Positive Ratings	.32	.12	1.04	8.92	<.001	.808	1.264	.10
Negative Ratings	-.14	.11	-.42	-3.85	<.001	-.632	-.205	.02
Exciting Video								
Positive Ratings	.08	.12	.26	2.19	.029	.027	.496	.01
Negative Ratings	-.03	.14	-.12	-.86	.393	-.381	.150	.00

Note. SE = Standard error for the unstandardized coefficient, sr^2 = squared semi-partial correlation.

Video Game Genre Preferences

A simultaneous regression was used to examine the relationships between total psychopathy scores and the four final video game genres. Genres included horror, action, puzzle, and fantasy/adventure. The overall model was significant ($F(4,764) = 20.69$, $p < .001$, $R^2 = .10$), and all four genres were significantly related to psychopathic traits. Enjoyment of horror and action games were both significantly positively related to psychopathic traits while puzzle and fantasy adventure genres were negatively associated with psychopathic traits (see Table 8). The relationship between horror and psychopathic traits yielded the greatest effect size ($sr^2 = .05$), accounting for more than four times the variance in psychopathic traits of action games ($sr^2 = .01$).

Table 8. *Simultaneous regression results of video game genres predicting psychopathic traits*

Predictor	<i>B</i>	SE	<i>T</i>	<i>p</i>	95% CI		<i>sr</i> ²
					LL	UL	
Horror	5.26	.83	6.35	<.001	3.630	6.881	.05
Action	4.49	1.37	3.27	.001	1.789	7.181	.01
Puzzle	-2.66	1.23	-2.16	.031	-5.086	-.241	.00
Fantasy Adventure	-3.12	1.37	-2.27	.023	-5.821	-.427	.01

Note. SE = Standardized error for the unstandardized coefficient, *sr*² = squared semi-partial correlation.

Additionally, to examine how enjoyment of game genres was associated with affective ratings of the fear-inducing and exciting stimuli an additional set of four simultaneous regressions were run, two for each video. Video game genres were entered as predictors predicting one affective outcome, and the other affective outcome was entered as a covariate. For the fear-inducing video with positive ratings as the outcome the overall model was significant ($F(5,741) = 54.01, p < .001, R^2 = .27$). Of the video game genres only horror and action games were significant, with negative ratings. For the second simultaneous regression with negative ratings as the outcome the overall model was again significant ($F(5,741) = 19.77, p < .001, R^2 = .12$). Only horror games and positive ratings were significant predictors (see Table 9a).

Table 9a. Simultaneous regression of video game genres and one affective rating predicting the other affective rating for the fear-inducing video

Dependent		95% CI							
Variable	Predictor	<i>b</i>	SE	<i>B</i>	<i>t</i>	<i>p</i>	LL	UL	<i>sr</i> ²
Positive	Horror	.42	.24	2.87	12.19	<.001	2.408	3.332	.14
	Action	.12	.38	1.37	3.57	<.001	.617	2.120	.01
	Puzzle	-.02	.34	-.15	-.43	.669	-.823	.528	.00
	Fantasy/Adv	-.00	.38	-.03	-.08	.939	-.780	.721	.00
	Negative	.27	.03	.25	8.33	<.001	.191	.309	.07
Negative	Horror	-.31	.29	-2.23	-7.67	<.001	-2.805	-1.662	.07
	Action	.02	.45	.23	.50	.618	-.663	1.114	.00
	Puzzle	.05	.40	.59	1.45	.147	-.205	1.376	.00
	Fantasy/Adv	.03	.45	.33	.73	.467	-.554	1.206	.00
	Positive	.32	.04	.34	8.33	<.001	.262	.424	.08

Note. The affective rating not included as the dependent variable was included as predictor, Positive = Positive affective ratings, Negative = Negative affective ratings, SE = Standardized error for the unstandardized coefficient, Fantasy/Adv = Fantasy/adventure genre games, *sr*² = squared semi-partial correlations.

For the exciting video, two simultaneous regressions were again run, with one affective rating as the outcome and the other included as a covariate. With positive ratings as the outcome, the overall model was significant ($F(5,743) = 12.41, p < .001, R^2 = .08$). Puzzle and action games were both significant predictors along with negative ratings (see Table 9b). With negative ratings as the outcome the overall model was significant ($F(5,743) = 2.86, p = .015, R^2 = .02$) and only action games and positive ratings were significant predictors (see Table 9b).

Table 9b. *Simultaneous regression of video game genres and one affective rating predicting the other affective rating for the exciting video*

Dependent		95% CI							
Variable	Predictor	<i>b</i>	SE	<i>B</i>	<i>t</i>	<i>p</i>	LL	UL	<i>sr</i> ²
Positive	Horror	.05	.26	.35	1.34	.181	-.164	.863	.00
	Action	.21	.44	2.31	5.31	<.001	1.457	3.170	.04
	Puzzle	.10	.39	.98	2.53	.012	.221	1.746	.01
	Fantasy/Adv	.01	.43	.08	.19	.849	-.769	.933	.00
	Negative	.11	.04	.13	3.18	.002	.049	.206	.01
Negative	Horror	.01	.24	.08	.32	.750	-.391	.542	.00
	Action	-.10	.40	-.99	-2.45	.014	-1.774	-.197	.01
	Puzzle	.01	.35	.11	.32	.751	-.583	.807	.00
	Fantasy/Adv	.02	.39	.18	.45	.653	-.596	.950	.00
	Positive	.12	.03	.11	3.18	.002	.040	.170	.01

Note. The affective rating not included as the dependent variable was included as a predictor, Positive = Positive affective ratings, Negative = Negative affective ratings, SE = Standardized error for the unstandardized coefficient, Fantasy/Adv = Fantasy/Adventure genre, *sr*² = squared semi-partial correlation.

The Role of Invincibility

The second objective in the present study was to examine whether the relationship between psychopathic traits and fear-enjoyment is indirect through invincibility, particularly for the reduced negative ratings for the fear-inducing video. To examine this, two mediation analyses were conducted using PROCESS (Hayes, 2012) software (Model 4). Total psychopathy was entered as predictor, invincibility as mediator, one of the affective variables as the outcome, and the opposing affective variable as a covariate (see Table 10). Only affective ratings for the fear-inducing video were examined for two reasons. First, invincibility was posited as a potential mechanism in the relationship between psychopathic traits and fear enjoyment, and no prediction was made for excitement. Additionally, the simultaneous regression did not find a relationship between

psychopathic traits and affective ratings for the exciting video. In the model predicting negative ratings of the fear-inducing video psychopathic traits were significantly related to both invincibility and negative affective ratings. Further, there was a significant indirect effect such that it was partly indirect through invincibility, as psychopathic traits were also still significantly related to negative ratings even after controlling for invincibility. In the second analysis, while psychopathic traits were significantly related to positive ratings of the fear-inducing video, there was no significant indirect effect of invincibility. Psychopathic traits remained significantly related to positive ratings even after controlling for invincibility. Full results of both mediation analyses are presented in Table 10.

Table 10. *Mediation analysis results for effect of invincibility as a mediator*

Regression Path	Positive Ratings			Negative Ratings		
	<i>b</i>	95% CI		<i>b</i>	95% CI	
		LL	UL		LL	UL
Mediation path <i>a</i> (SRP on IBI)	.15*	.080	.219	.17*	.093	.241
Mediation path <i>b</i> (IBI on PR or NR)	.05	-.025	.115	-.22*	-.286	-.149
Total Effect <i>c</i> (SRP on PR or NR)	.31*	.239	.374	-.14*	-.216	-.070
Direct Effect <i>c'</i>	.30*	.232	.368	-.11*	-.179	-.035
Indirect Effect <i>ab</i>	.01	-.004	.020	-.04*	-.059	-.017

Note. SRP = Total psychopathy score, IBI = Invincibility, PR = Positive ratings, NR = Negative ratings, *b* = standardized coefficient, affective ratings not included as outcome was included as a covariate for each video. * = $p < .05$ where confidence intervals did not include zero.

Discussion

This study had two main objectives; 1) to confirm a link between psychopathic traits and fear enjoyment, and 2) to determine whether invincibility could explain the relationship between psychopathy and fear enjoyment. Concerning the first objective, the

relationship between psychopathic traits and fear enjoyment was replicated. As expected, psychopathic traits were related to heightened positive and lessened negative ratings for the fear-inducing video. This replicates findings from previous fear enjoyment studies (Book et al., 2020; Hosker-Field et al., 2016) that found heightened positive and lessened negative responses to fear-inducing stimuli associated with greater psychopathic traits. The findings for video game genre preferences also added support for the idea of fear enjoyment with the relationship between psychopathic traits and horror games. Total psychopathy was significantly positively related to enjoyment of horror and action video games, with the effect size for the relationship between psychopathic traits and horror games being the largest, accounting for more than four times the variance in psychopathic traits compared to action games. The significant relationship between enjoyment of horror games and psychopathic traits is in line with the Fear Enjoyment Hypothesis (Hosker-Field et al., 2016a). Enjoyment of puzzle and fantasy adventure games was significantly negatively related to psychopathic traits. Additionally, for the fear-inducing video enjoyment of horror video games was significantly positively related to positive affective ratings and negatively related to negative affective ratings, when controlling for the opposing affective variable. This again supports the heightened positive and lessened negative responses to normally fear-inducing stimuli outlined by the Fear Enjoyment Hypothesis (Hosker-Field et al., 2016) and lends further support to the theory. Enjoyment of action games was only associated with positive affective ratings for the fear-inducing video, when controlling for negative affective ratings. Given that enjoyment of action games was also significantly related to psychopathic traits this is also in line with the increased sensation seeking observed in relation to psychopathy (Kavish et al., 2017).

Neither puzzle games nor fantasy/adventure games were significantly related to affective ratings for the fear-inducing video. Given both of these game genres have little to do with horror or fear, and would involve less intense arousal relative to horror or action genres it makes sense that neither of these genres would be related to fear enjoyment or affective ratings for fear-inducing stimuli. These results further support the Fear Enjoyment Hypothesis (Hosker-Field et al., 2016). For the exciting video only action and puzzle games were significantly related to affective ratings. The lack of relationship between positive ratings for the exciting video and enjoyment of horror games also adds to previous findings in this study on the lack of relationship between fear enjoyment and affective appraisal of the exciting video.

The results regarding the first objective provide further support for the Fear Enjoyment Hypothesis, mirroring findings from previous research on fear enjoyment and psychopathy (Book et al., 2020; Hosker-Field et al., 2016a). The lessened negative ratings for the fear-inducing video also mirror findings from previous research supporting the fear deficit model (Hoppenbrouwers et al., 2016a), however the relationship between psychopathy and fear appears to be more complicated than can be explained with a deficit. While the fear deficit model aligns with a lessened negative response to a fear-inducing stimulus, it does not explain the heightened positive response observed in this study. This is where the Fear Enjoyment Hypothesis (Hosker-Field et al., 2016a) fits into the picture. A heightened positive response suggests a different interpretation of fear which may account for the tendency for those high in psychopathic traits to engage in risk taking behaviour (Hosker-Field et al., 2016b). This presents one possible avenue for future research into the relationship between psychopathic traits and positive affective

ratings for fear-inducing stimuli. Another potential explanation for the heightened positive response may rest in the attentional and motivational theories on fear and psychopathy. The Response Modulation Hypothesis states that bottom-up, important information like threats can be ignored by those higher in psychopathic traits when it is not goal-relevant (Hoppenbrouwers et al., 2016b). Additionally, other studies have suggested that those higher in psychopathic traits show the fear deficit with novel stimuli when the perceptual load is higher and there is more novel information to process (Baskin-Sommers et al., 2013). As a result, watching a novel fear-inducing video may have made the threatening nature of the video less salient, and therefore the stimulus less aversive. Similarly, Integrated Emotion Systems Theory (Munneke et al., 2018) suggests that amygdala deficits in psychopaths inhibits their ability to divert attention to aversive stimuli, which may make the subjective experience of these stimuli more pleasant. Being unable to attend to the aspects of the fear-inducing stimuli that normally induce fear may make the experience more exciting rather than scary. Attentional and motivational models of psychopathy as a result may fit the results of the current study better as opposed to fear deficit models. Another potential explanation resides with arousal theory, which postulates that individuals with lower resting arousal seek out stimuli to raise their arousal to preferred levels (Ellis, 1987; Kavish et al., 2017). Scary videos, like the fear-inducing video in the present study, may provide an avenue for increasing arousal in this manner, and as a result these individuals would perceive this video more positively, or more exciting rather than scary. This may also explain the relationship found in this study between psychopathic traits and enjoyment of action games.

The second objective of the current study was to examine whether a sense of invincibility could help explain the relationship between psychopathy and fear enjoyment. The significant results of the mediation analysis add to previous studies examining participant's subjective experience of fear and the Fear Enjoyment Hypothesis (Book et al., 2020; Hosker-Field et al., 2016a). In addition to finding a significant relationship between psychopathy and fear enjoyment represented by affective ratings of the fear-inducing video, this study provided a potential mechanism for this relationship. The fact that there was only a significant indirect effect for negative affective ratings of the fear video, and not for positive affective ratings, explains the relationship between psychopathy, invincibility, and the lack of avoidance proposed in the Fear Enjoyment Hypothesis (Hosker-Field et al., 2016a). Given that invincibility is associated with feelings of invulnerability (Killgore et al., 2010), it makes theoretical sense that it would mediate negative emotional appraisal of the fear-inducing video. A sense of invincibility may reduce avoidance behaviour of aversive stimuli through the feeling of invulnerability. The non-significant positive affective ratings may suggest there is another factor mediating the relationship between psychopathy and affective appraisal that was not measured in this study, such as boredom proneness (Buckholtz et al., 2020; Jonason & Jackson 2016) or under-arousal (Kavish et al., 2017), both of which are related to psychopathic traits. Additionally, it is important to note that psychopathy was not related to any ratings of the exciting video, suggesting that the effect is restricted to fear and not related to excitement. Future research should attempt to manipulate participant's sense of invincibility to determine whether this would impact the relationship. Additionally, future studies should include a measure of arousal, such as HR or SCR, to examine whether

each video actually increases the participants' arousal and examine potential relationships with psychopathic traits. This is particularly important because very few studies have examined both subjective experience and physiological arousal within the same study (Lamoureux, & Glenn, 2020; Thomson et al., 2017).

Invincibility did not help to explain the relationship between psychopathic traits and positive ratings of the fear-inducing video suggesting that it is not a potential mechanism in that relationship. As mentioned above, we expected invincibility to be important in the relationship between psychopathic traits and the lessened negative response to fear-inducing stimuli and not necessarily important in how psychopathy relates to the heightened positive response. As the lessened negative response has been theoretically linked to lack of avoidance, it makes sense that a sense of invulnerability to danger would be important. This would not likely impact the approach response that the positive response would entail. One potential variable that may impact the positive affective ratings, or both affective ratings, may be related to arousal levels and boredom proneness, which has been shown to relate to sensation seeking (Kavish et al., 2017). Boredom proneness is included as a trait of psychopathy in the Psychopathy Checklist Revised (PCL-R) (Hare et al., 2012) and is often associated with Factor 2 and total psychopathy scores (Berninger, 2017). A normally aversive fear-inducing stimulus, in individuals who are prone to boredom, may present as less aversive (and even exciting) if it is viewed through the lens of trying to alleviate a state of boredom. This proneness to boredom and drive to alleviate said boredom may be linked to the reward sensitivity often observed in those higher on psychopathy (Buckholtz et al., 2020; Jonason & Jackson 2016). One study found hyperactivity in reward systems of psychopathic participants and

linked the hyperactivity with aggressive and antisocial behaviours (Buckholtz et al., 2010). This increased sensitivity to reward may explain the increased boredom proneness and approach behaviours towards normally aversive stimuli. Reward sensitivity has also been linked to arousal, and specifically sub-optimal levels of arousal that result in sensation seeking and risk taking behaviours in order to achieve optimal arousal levels (Ellis, 1987). Arousal theory suggests that for those whose normal resting state is lower in arousal, they will seek out stimuli to raise their arousal to a more preferred level, and are reinforced by doing so (Ellis, 1987). It has also been linked to some affective and interpersonal aspects of psychopathy, as well as general criminality (Ellis, 1987; Kavish et al., 2017). Given the theoretical links that exist between boredom proneness, sensation seeking, and psychopathic traits, future research should examine whether boredom proneness is important in the relationship between psychopathy and fear enjoyment. It will also be important to include measures of physiological arousal, such as HR and SCR.

Limitations & Future Directions

One limitation that may have affected the data and the outcomes is the global Coronavirus disease 2019 (COVID19) pandemic that was ongoing throughout data collection for this study. The influence this may have exerted is currently unknown, and as a result a future replication would be ideal. Recent studies examining some of the initial effects of the global pandemic on populations have focused on emotion regulation as a factor of interest. One study from Pakistan conducted on a convenience sample found a significant relationship between cognitive emotion regulation and depression, anxiety, and stress prevalence and severity (Riaz et al., 2021). A systematic review of psychological outcomes of the pandemic in multiple countries including China, Italy,

Turkey, the United States, and Denmark similarly found high rates of stress, anxiety, depression, distress, and Post-Traumatic Stress Disorder (PTSD) in the general population (Xiong et al., 2020). This increased prevalence of mental illness and distress may have impacted the results, especially considering I was specifically measuring subjective emotional experience. As one author notes, we are not in this together (Krupka, 2021), the experience of each individual participant may vary widely during the pandemic, one person could be doing well and another could be a front line health worker overrun with COVID19 patients. This variation could have impacted the results, and hence a replication after the pandemic would help identify whether the pandemic impacted the results of this study.

Due to the pandemic and need for social distancing this study was entirely online, and while participants were instructed to complete the study on a computer rather than a mobile device we cannot know whether participants actually followed this direction. The availability of a computer versus a mobile device may also be a factor, as participants may not have had access to a computer during the pandemic. This may affect how immersive the video stimuli were and to what extent they were successful in evoking fear and excitement, and this may have also introduced additional variance not accounted for by study variables. While the manipulation check was significant and participants did rate the exciting video as more positive (exciting) and the fear-inducing video as more negative (scarier), the effect may be stronger if the environment in which participants viewed the videos was more controlled.

Additionally, the original plans for this study included both a subjective measure of fear, the affective appraisal survey, as well as a physiological measure, such as HR or

SCR. While I was unable to include any physiological measures due to social distancing rules, future studies should use both to examine what degree of agreement there is between the two types of measures. One recent study included measures of autonomic nervous system activation (via SCR and respiration) as well as measures of subjective fear and found lower physiological activation, as well as greater reported happiness in response to the fear-inducing condition in those higher in psychopathic traits (Thomson et al., 2018). These results add support to both the fear deficit and fear enjoyment literature, and demonstrate the need for more research examining both physiological and subjective experiences of fear. Future studies should also explore using community samples as opposed to exclusively online samples. This will also address the uncertainty of the conditions in which participants were viewing the video stimuli and control any unknown effects that may have resulted. Finally, as positive affective ratings for the fear video were not significant in the mediation analysis, future studies should examine potential other factors that may explain this portion of the relationship between psychopathy and fear enjoyment. Boredom, as previously mentioned, could present a good avenue for examination, and may also provide a mechanism for the approach behaviour outlined in the Fear Enjoyment Hypothesis (Hosker-Field et al., 2016a).

Conclusion

The findings of this study contribute to the growing body of research supporting the Fear Enjoyment Hypothesis, which predicts that those with greater psychopathic traits will have lessened negative and heightened positive responses to fear-inducing stimuli (Book et al., 2020; Hosker-Field et al., 2016a). Further, this study investigated a possible mechanism for this relationship through invincibility. The relationship between

psychopathic traits and fear enjoyment appeared to be indirect through a sense of invincibility, particularly with regard to the lessened negative appraisal of fear-inducing stimuli. Future research should explore other avenues, such as boredom proneness to explain positive emotional ratings.

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Brock University
Office of Research Ethics
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Social Science Research Ethics Board

Certificate of Ethics Clearance for Human Participant Research

DATE: 8/21/2020
PRINCIPAL INVESTIGATOR: BOOK, Angela - Psychology
FILE: 20-030 - BOOK
TYPE: Faculty Research STUDENT: Tori Wattam
SUPERVISOR: Angela Book
TITLE: Videogames and Personality 3

ETHICS CLEARANCE GRANTED

Type of Clearance: NEW

Expiry Date: 8/1/2021

The Brock University Social Science Research Ethics Board has reviewed the above named research proposal and considers the procedures, as described by the applicant, to conform to the University's ethical standards and the Tri-Council Policy Statement. Clearance granted from 8/21/2020 to 8/1/2021.

The Tri-Council Policy Statement requires that ongoing research be monitored by, at a minimum, an annual report. Should your project extend beyond the expiry date, you are required to submit a Renewal form before 8/1/2021. Continued clearance is contingent on timely submission of reports.

To comply with the Tri-Council Policy Statement, you must also submit a final report upon completion of your project. All report forms can be found on the Office of Research Ethics web page at <http://www.brocku.ca/research/policies-and-forms/research-forms>.

In addition, throughout your research, you must report promptly to the REB:

- a) Changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
- b) All adverse and/or unanticipated experiences or events that may have real or potential unfavourable implications for participants;
- c) New information that may adversely affect the safety of the participants or the conduct of the study;
- d) Any changes in your source of funding or new funding to a previously unfunded project.

We wish you success with your research.

Approved:

Lynn Dempsey, Chair
Social Science Research Ethics Board

Robert Steinbauer, Chair
Social Science Research Ethics Board

Note: Brock University is accountable for the research carried out in its own jurisdiction or under its auspices and may refuse certain research even though the REB has found it ethically acceptable.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and clearance of those facilities or institutions are obtained and filed with the REB prior to the initiation of research at that site.



Research Ethics Board
t: (807) 343-8283
research@lakeheadu.ca

October 4, 2020

Principal Investigator: Dr. Beth Visser
Co-Investigator: Angela Book
Student Investigator: Tori Wattam
Interdisciplinary Studies
Lakehead University – Orillia Campus

Dear Drs. Visser and Book and Tori:

Re: Romeo File No: 1468253
Granting Agency: N/A
Agency Reference #: N/A

On behalf of the Research Ethics Board, I am pleased to grant ethical approval to your research project titled, "Videogames and Personality 3".

Ethics approval is valid until October 1, 2021. Please submit a Request for Renewal to the Office of Research Services via the Romeo Research Portal by September 1, 2021 if your research involving human participants will continue for longer than one year. A Final Report must be submitted promptly upon completion of the project. Access the Romeo Research Portal by logging into myInfo at:

<https://erpwp.lakeheadu.ca/>

During the course of the study, any modifications to the protocol or forms must not be initiated without prior written approval from the REB. You must promptly notify the REB of any adverse events that may occur.

Best wishes for a successful research project.

Sincerely,

A handwritten signature in black ink, appearing to read "Kristin Burnett".

Dr. Kristin Burnett
Chair, Research Ethics Board

/sw

Appendix A**Demographics**

Age: _____

Gender: _____ (open-ended)

Ethnicity: _____ (open-ended)

Frequency of Video Game Play (for each of the genres or altogether?)

1 = never

2 = rarely

3 = sometimes

4 = often

5 = very often

Enjoyment of Video Game Genres

(scale from 1 to 5, 1 = extremely unenjoyable, 2 = somewhat unenjoyable, 3 = neutral, 4 = somewhat enjoyable, 5 = extremely enjoyable)

Horror _____

Action (combat-based) _____

Action/Adventure _____

Racing

Sports

Puzzle

Role Playing

Problem Solving

Simulation

Appendix B**Self-Report Psychopathy Checklist 4th Edition**

Please rate the degree to which you agree with the following statements about you. You can be honest because your name will be detached from the answers as soon as they are submitted.

	Disagree Strongly	Disagree	Neutral	Agree	Agree Strongly
1. I'm a rebellious person.	1	2	3	4	5
2. I'm more tough-minded than other people.	1	2	3	4	5
3. I think I could "beat" a lie detector.	1	2	3	4	5
4. I have taken illegal drugs (e.g., ecstasy).	1	2	3	4	5
5. I have never been involved in delinquent gang activity.	1	2	3	4	5
6. I have never stolen a truck, car or motorcycle.	1	2	3	4	5
7. Most people are wimps.	1	2	3	4	5
8. I purposely flatter people to get them on my side.	1	2	3	4	5
9. I've often done something dangerous just for the thrill of it.	1	2	3	4	5
10. I have tricked someone into giving me money.	1	2	3	4	5
11. It tortures me to see an injured animal.	1	2	3	4	5
	Disagree Strongly	Disagree	Neutral	Agree	Agree Strongly

	Disagree Strongly	Disagree	Neutral	Agree	Agree Strongly
12. I have assaulted a law enforcement official or social worker.	1	2	3	4	5
13. I have pretended to be someone else in order to get something.	1	2	3	4	5
14. I always plan out my weekly activities.	1	2	3	4	5
15. I like to see fist-fights.	1	2	3	4	5
16. I'm not tricky or sly.	1	2	3	4	5
17. I'd be good at a dangerous job because I make fast decisions.	1	2	3	4	5
18. I have never tried to force someone to have sex.	1	2	3	4	5
19. My friends would say that I am a warm person.	1	2	3	4	5
20. I would get a kick out of 'scamming' someone.	1	2	3	4	5
21. I have never attacked someone with the idea of injuring them.	1	2	3	4	5
22. I never miss appointments.	1	2	3	4	5
23. I avoid horror movies.	1	2	3	4	5
24. I trust other people to be honest.	1	2	3	4	5
25. I hate high speed driving.	1	2	3	4	5
26. I feel so sorry when I see a homeless person.	1	2	3	4	5
	Disagree Strongly	Disagree	Neutral	Agree	Agree Strongly

	Disagree Strongly	Disagree	Neutral	Agree	Agree Strongly
27. It's fun to see how far you can push people before they get upset.	1	2	3	4	5
28. I enjoy doing wild things.	1	2	3	4	5
29. I have broken into a building or vehicle in order to steal something or vandalize.	1	2	3	4	5
30. I don't bother to keep in touch with my family any more.	1	2	3	4	5
31. I find it difficult to manipulate people.	1	2	3	4	5
32. I rarely follow the rules.	1	2	3	4	5
33. I never cry at movies.	1	2	3	4	5
34. I have never been arrested.	1	2	3	4	5
35. You should take advantage of other people before they do it to you.	1	2	3	4	5
36. I don't enjoy gambling for real money.	1	2	3	4	5
37. People sometimes say that I'm cold-hearted.	1	2	3	4	5
38. People can usually tell if I am lying.	1	2	3	4	5
39. I like to have sex with people I barely know.	1	2	3	4	5
40. I love violent sports and movies.	1	2	3	4	5
	Disagree Strongly	Disagree	Neutral	Agree	Agree Strongly

	Disagree Strongly	Disagree	Neutral	Agree	Agree Strongly
41. Sometimes you have to pretend you like people to get something out of them.	1	2	3	4	5
42. I am an impulsive person.	1	2	3	4	5
43. I have taken hard drugs (e.g., heroin, cocaine).	1	2	3	4	5
44. I'm a soft-hearted person.	1	2	3	4	5
45. I can talk people into anything.	1	2	3	4	5
46. I never shoplifted from a store.	1	2	3	4	5
47. I don't enjoy taking risks.	1	2	3	4	5
48. People are too sensitive when I tell them the truth about themselves.	1	2	3	4	5
49. I was convicted of a serious crime.	1	2	3	4	5
50. Most people tell lies everyday.	1	2	3	4	5
51. I keep getting in trouble for the same things over and over.	1	2	3	4	5
52. Every now and then I carry a weapon (knife or gun) for protection.	1	2	3	4	5
53. People cry way too much at funerals.	1	2	3	4	5
54. You can get what you want by telling people what they want to hear.	1	2	3	4	5
	Disagree Strongly	Disagree	Neutral	Agree	Agree Strongly

	Disagree Strongly	Disagree	Neutral	Agree	Agree Strongly
55. I easily get bored.	1	2	3	4	5
56. I never feel guilty over hurting others.	1	2	3	4	5
57. I have threatened people into giving me money, clothes, or makeup.	1	2	3	4	5
58. A lot of people are “suckers” and can easily be fooled.	1	2	3	4	5
59. I admit that I often “mouth off” without thinking.	1	2	3	4	5
60. I sometimes dump friends that I don’t need any more.	1	2	3	4	5
61. I would never step on others to get what I want.	1	2	3	4	5
62. I have close friends who served time in prison.	1	2	3	4	5
63. I purposely tried to hit someone with the vehicle I was driving.	1	2	3	4	5
64. I have violated my probation from prison.	1	2	3	4	5
	Disagree Strongly	Disagree	Neutral	Agree	Agree Strongly

Appendix C

Invincibility Belief Index

Read the following scenarios. Each scenario presents a situation and asks a question about the chance or likelihood that you would experience a particular outcome. For each one, think about how likely that outcome would be for YOU in that situation. Do NOT worry about how most people would do in a particular situation—just think about the chance that a particular outcome would happen to YOU in that situation. Circle the percent chance that best represents the probability that the outcome would happen to YOU.

1. You arrive 25 minutes late for a big job interview. What is the probability that YOU will get the job?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

2. If you were to find yourself confronted by a vicious angry dog, what is the probability that YOU could get away unharmed?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

3. Regardless of your moral convictions, if you were to shoplift a pair of \$50 sunglasses from a chain drug store, what is the probability that YOU could get away with it without being caught?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

4. While leaving a popular night club, you are attacked by a drunk man in his early 20s wielding a 10-inch knife. During the scuffle, your friend is stabbed, but not fatally. What is the chance that YOU will be killed during the attack?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

5. While on vacation, you meet up with a stranger asking for help. Although the story the stranger tells you is heart wrenching and he seems very sincere, you are aware that he may just be a con-artist trying to scam you. If the stranger truly is a con-artist, what is the probability YOU will end up being scammed out of some of your money?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

6. You awaken one morning realizing that you engaged in unprotected sex with someone you just met. Now that the alcohol has worn off, your partner remorsefully tells you that he/she has suffered for a long time with a very serious sexually transmitted disease. What is the chance that YOU will contract the sexually transmitted disease yourself after this contact?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

7. While on vacation in a far away country, your 3 traveling companions have all contracted a bad case of diarrhea after drinking the water. You realize that you just drank

some of the same water about an hour ago. What is the likelihood that YOU will come down with diarrhea too?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

8. While on vacation in the woods, you decide to go hiking in an unfamiliar and thickly wooded area without a map or guide. What is the likelihood that YOU will get lost?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

9. You have been at a nightclub for 4 hours. During that time you have had 7 alcoholic beverages. You are feeling a little “buzzed” but you decide to drive yourself home anyway because it is only about 5 miles away. What is the probability that YOU will make it home without any negative incident?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

10. While playing golf one afternoon a thunderstorm comes up quickly. There is much wind and occasional lightning is hitting nearby. Because you are winning the game and only have two more holes to play, you decide to continue to the end. What is the likelihood that YOU will be struck by lightning before finishing the game?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

11. While at your job you discover that one of your superiors has been embezzling large amounts of money from your organization. You decide to inform higher management of his illegal behavior. What is the chance that YOUR future career at the company will be harmed by reporting him?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

12. Your company has a strict policy forbidding the removal of computer equipment from the work premises. However, you have a big project due that can only be completed if you “borrow” a company laptop computer over the weekend. What is the probability that YOU could secretly remove the computer for the weekend and return it to work on Monday without ever being caught?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

13. You are a foreigner living in a war-torn country that is filled with violence and frequent sniper attacks. Although it is dark outside and there are many hostile insurgents in the area, you decide to drive alone and unarmed down a 10 mile stretch of empty highway to spend the weekend in the next town. What is the probability that YOU will be killed while making the trip?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

14. While staying at a high-rise hotel a bad fire breaks out several floors below yours. After hearing the fire alarm and smelling smoke, you quickly devise a plan of escape. What is the likelihood that YOU would be unable to figure out a way to escape and would die in the fire?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

15. A severe natural disaster has devastated your town, resulting in widespread panic, looting, and deadly violence. The escape routes leading from the town are blocked with gridlock traffic and street gangs are killing at random and using violent means to steal limited necessities and survive. What is the chance that YOU will be able to outmaneuver the looters and escape the town unharmed?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

16. You enter a competition in an arena in which you are particularly talented. What is the chance that YOU will ultimately win the competition?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

17. You are sightseeing off a tall bridge where many individuals have tried to commit suicide by jumping to their deaths in the water below. Approximately half of all jumpers have not survived the long drop into the bay. Unfortunately, you stumble and are accidentally knocked off of the bridge. What is the likelihood that YOU would die in the fall?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

18. Your biggest rival has challenged you in some way. What is the likelihood that YOU will ultimately defeat your rival at whatever he/she has challenged you with?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

19. A bad automobile accident has just occurred in front of you. In one of the cars, the driver is unconscious and bleeding. You smell gas and notice that smoke is starting to billow out from the car. Afraid that the car may explode at any moment, you work to pull the unconscious driver from the car. What is the chance that YOU will die in the process of saving the driver?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

20. While on vacation on a tropical island you decided to rent a small motorboat to do some sightseeing and fishing out along the island coast. After stopping the boat some distance from the shore you lay down to take a brief nap. Upon awakening you realize that you can no longer see the shore and notice that there is a fierce storm coming. What is the likelihood that YOU will die at sea?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Appendix D**Emotional Appraisal**

To what extent did the video you watched make you feel . . .

	Not at All	Not Much	Neutral	Somewhat	Very Much
Alarmed	1	2	3	4	5
Dread	1	2	3	4	5
Buzzed	1	2	3	4	5
Thrilled	1	2	3	4	5
Apprehensive	1	2	3	4	5
Excited	1	2	3	4	5
Exhilarated	1	2	3	4	5
Enthusiastic	1	2	3	4	5
Afraid	1	2	3	4	5
Anxious	1	2	3	4	5
“a rush”	1	2	3	4	5
horror	1	2	3	4	5
Stimulated	1	2	3	4	5
Delighted	1	2	3	4	5
Panicked	1	2	3	4	5
Scared	1	2	3	4	5
Worried	1	2	3	4	5
Charged	1	2	3	4	5
	Not at All	Not Much	Neutral	Somewhat	Very Much