In the Mood for Doing Good: The influence of positive and negative emotions in game narratives on prosocial tendencies

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Abstract

The interactive nature of video games provides a plethora of emotional experiences to its players through their in-game narratives and mechanics. However, very few studies have investigated the effect of emotional valence in gaming experiences on motivating prosocial tendencies. This study examined the effects of a collaborative prosocial game as well as the influences of positive and negative emotional mode in game on individuals' attitudes, empathic concern and prosocial intentions. Results showed that all participants who played the game had improved attitudes and empathic concern. Participants in the positive emotional tone condition showed improved attitude and empathic concern change, while those in negative emotional tone condition showed only improved attitude towards racial and ethnically different others. Additionally, there were also differences in players' attitude and empathic concern based on exposure to negative and positive emotional tones in the game.

Keywords: emotions, narrative, video games, attitudes, prosocial intentions

1. Introduction

Video games allow players to experience a wide spectrum of emotions, that range from the positive, such as happiness and excitement, to the negative, such as fear and sadness [1]. Current literature exploring emotion as a narrative device in video games has looked at the influence of components of a gaming experience on emotions, and how video games can be used to regulate emotional states. Existing studies have demonstrated the capacity for video games to elicit instantaneous emotional responses as a result of in-game events [2][3]. Moreover, emotions are said to be motivators of behaviours [4]. Inducing emotional responses to persuasive messages has been proven to be effective in influencing people's attitudes, intentions, and behaviours [5], and past studies have shown that educational entertainment video games can influence players' attitudes [6][7].

However, emotions do not influence human behaviors and tendencies in a homogenous manner. As suggested by functional emotion theories [8], different emotions motivate human behaviours situationally to protect human survival and well-being [9]. This means that each emotion, whether positive or negative, distinctively motivates different cognitive or physical activity [10], depending on the nature of the emotion and one's subjective appraisal of that emotion. More concretely, an event perceived by an individual may trigger a set of subjective emotional responses, which then often prompts adaptive behaviour or a particular state of action-readiness that will help to cope with that specific emotion [11].

Positive emotions, such as hedonic joy, positively influences interpersonal interaction and mutual understanding, as well as facilitates bond-building [12]. On the other hand, negative moods signal a problematic situation to an individual that may also help to improve behaviour. The affect-as-information theory [13] posits that individuals who experience a negative affective state may use this feeling as "information" that guides future behaviour. For instance, initially uncooperative individuals that experience the discomfort of guilt and the resultant reduced joint benefit may be motivated to subsequently pursue a more cooperative strategy [14]. This is substantiated by the Negative State Relief Model [15], which argues that individuals may attempt to relieve themselves of the discomfort and distress from not helping by engaging in helping behaviour thereafter. Negative emotions have been empirically proven to promote fairness and less selfishness in interpersonal situations [16] and have also been theorised to be motivated to process information more systematically according to the heuristic-systematic model of persuasion (HSM) [17].

Current gaming literature has mostly focused on the general content of video games narratives, and how gaming components like immersion, identification and presence in video games affect emotional responses of players [18]. While some research has shed light on the potential of positive emotions such as hedonic joy and elevation [19] in video games to promote

prosocial tendencies, the impact of negative moods on prosocial tendencies has not been fully explored in video game literature despite its potential to influence prosocial tendencies. Additionally, there is a dearth of studies that examine the impact of positive or negative emotional tone of game narratives on prosocial attitudes and behaviour. This study focuses on how emotion valence in video game environment influences attitude and prosocial intentions towards racially and ethnically different groups.

2. Literature Review

2.1. Emotion Valence and Prosocial Tendencies

Cognitive appraisal [4] and functional emotion theories posit that each emotion distinctly directs specific action tendencies. These specific action tendencies have different impacts on one's cognitions and behaviours, which can influence persuasive outcomes [20][21]. Several past studies have proven that emotional states, such as gratitude, awe, and sadness, promote prosocial behaviour, via videos [19][22], and natural environment [23].

However, studies that investigate the relationship between emotional state during game play and their impact on players' prosocial tendencies are scant. Most existing studies are based on social-cognitive learning theories, such as the General Learning Model, which posit that external stimuli like video games prime knowledge structures associated with prosocial actions through their narrative content, which guides one's behaviour in the intended direction [24][25]. As such, these studies make use of existing prosocial video games that contain narratives that are generally prosocial in *content*. This means that these prosocial video games are typically characterised by having players participate in helping, sharing and cooperating behaviours, but there is little emphasis on the emotional impact of gaming on players' prosocial tendencies.

In a study conducted by Liu (2015) to assess the short-term effects of prosocial video games on aggression, a prosocial video game *Rescue Team 2* was used. *Rescue Team 2* is set in islands that have been damaged by a hurricane. Players had to engage in prosocial tasks such as rescuing trapped civilians, repairing infrastructure and putting out fires. Results showed that playing prosocial video games temporarily inhibited aggressive behaviours and increases prosocial thought [24]. Similarly, in a study conducted by Saleem, Anderson and Gentile (2012), results showed that children displayed increased helpful and reduced hurtful behaviours after playing a

prosocial video game (*Chibi Robo*) [25]. Based on this literature, we designed a prosocial collaborative game to test its effectiveness in enhancing positive attitude and prosocial intentions towards racially and ethnically different outgroups.

H1: Players' empathy (H1a), prosocial intentions (H1b) and attitude (H1c) towards racial outgroup members will improve after playing a collaborative prosocial game.

While the impact of the content of narratives in video games have been widely studied, how the emotional tone of the game influences prosocial tendencies remains underexplored. Additionally, past studies tend to examine the effects of positive or negative affect on prosocial behaviour separately, but not simultaneously. As positive and negative emotional experiences stimulate prosocial tendencies or attitude change through different ways and under different contexts, we aim to test the effectiveness of positive and negative valence in inducing prosocial intentions and perceptions through video game environment, which is a medium rarely explored in past literature. Also, the effect of positive versus negative valence of video game environment and experience on prosocial tendencies and attitudes towards outgroup members remains largely unknown. We will therefore propose hypotheses and research question based on related literature on emotional valence of prosocial tendencies and attitude change.

2.1.1. Positive Valence and Prosocial Behaviour.

According to the Broaden-and-Build Theory of Positive Emotions [26], positive emotions enlarge an individual's momentary thought-action repositories, which then construct resources that facilitate bond-building. This theory explains the associations between positive emotions and prosocial behaviour. Some examples of positive emotions include hedonic joy, pleasure and awe. Positive affect has been proven to have major positive influences on helping as well as interpersonal interaction and understanding [12]. A study conducted by Zhao (2018) on positive emotions and prosociality reported that hedonic joy significantly predicted the likelihood of participants engaging in future helping behaviour [19]. Similarly, Carnevale and Isen's (2001) study which examined the relationship between positive affect and interpersonal interaction in the context of a negotiation has proven that positive emotions are linked to reduced use of contentious tactics and are more able to reconcile divergent views [12]. Based on this literature, we propose

H2: Positive emotional tone of gaming experience will increase empathy (H2a), prosocial intentions (H2b) and positive attitudes (H2c) towards racial outgroup members.

2.1.2. Negative Valence and Prosocial Behaviour.

Studies suggest that negative emotions like anger, fear and sadness influence prosocial outcomes. Forgas (2011) tested affective influences on reliance stereotypes, participants were instructed to do complete a shooter's task in which they had to 'shoot' at targets appearing on a computer screen who were carrying guns. Some targets were wearing a turban, which tested participants' bias towards Muslims. Results showed that participants who were in negative moods (i.e. sadness, anger) were less likely to selectively shoot at Muslim targets, demonstrating that negative moods reduced stereotyped-based aggression to Muslims [16]. In a study conducted by Askevis-Leherpeux, Schiaratura and Douilliez (2012) to examine the effect of mood on the expression of stereotypes of outgroup members, it has been proven that in comparison to positive emotions, negative emotions may reduce the negativity of stereotypic thoughts [27].

In another study conducted by Forgas (2011) to test affective influences on behaviours using an allocation task, participants in negative moods were less selfish and less likely to keep resources to themselves [16], demonstrating the potential of negative emotions to influence prosocial behaviour.

A study conducted by Yoo (2001) which explored the effect of discrete negative emotions in personal stories found that sadness [28] enhanced the persuasive process the most, more so than fear and anger. As such, negative emotions such as sadness may make the persuasiveness of a message more effective [23].

H3: Negative emotional tone of gaming experiences will increase empathy (H3a), prosocial intentions (H3b) and positive attitudes (H3c) towards racial outgroup members.

However, it is unclear whether positive and emotional tones exhibited through the gaming experience induce prosocial tendencies in the same way. Therefore, we propose the following research question.

RQ1: Is there a difference in inducing positive attitude, empathy and prosocial intentions towards racial outgroup members between the positive and negative emotional tone of gaming experiences?

2.2. Constructing Valence

2.2.1. Music. One critical role of sound and music in video games is to amplify mood and emotional impact [29]. Even when the processing of sounds may be unconscious, sounds still influences emotional judgments. More specifically, the mode (major or minor key) of music has a significant impact on an individual's mood [30]. While major triads and scales

contain pitches that sound higher, minor keys contain pitches that sound lower, similar to that of a sad speech [30]. Music has been proven to be powerful in affecting mood. The results of a study conducted to test the effects of music on mood showed that mood changes according to the music's direction, be it positive or negative [31]. Most notably, the type of music played for its participants appears to be able to predict an individual's preposition towards a different other. In a study conducted by May and Hamilton (1980), participants who listened to music they enjoyed thought more favourably of a stranger whose picture they examined, whereas participants who listened to unpleasant music thought less favourably of the same stranger [32]. With the ability of music to evoke emotional responses offers a glimpse of the potential of using music as a simple manipulation for regulating individuals' emotions, in which emotions have been proven to promote helping behavior. As such, music is a crucial component for conceptualising valence and will be used in our experiment.

2.2.2. Narrative priming. Priming is the use of a stimuli to predict subsequent behaviour. A common theory that explains the effectiveness of priming is based on the notion that activating a node in an individual's associative network temporarily makes that same node easier to be activated again [33]. Hence, priming allows a concept in question to be subsequently more accessible [34]. In the context of this experiment, narrative priming will be used to activate a certain perception.

4. Methodology

4.1. Participants

Sixty-eight participants (38 females and 30 males) between the ages of 21 and 61 were recruited via email for the experiment through convenience snowball sampling. Following random assignment through Qualtrics, 33 completed responses (17 females and 16 males) were obtained in the positive valence condition, and 35 completed responses (21 females and 14 males) were obtained in the negative valence condition. The sample size was guided by a recommendation of at least 30 based on the central limit theorem [35] Each participant received a \$10 Singapore dollar voucher as an incentive.

4.2. Materials

Participants accessed the online questionnaire and played the video game using their own computers or laptops. A game was specifically developed for this

experiment using Unity and was inserted into the online questionnaire. Participants were to play as the protagonist in this video game. As the protagonist, they were required to collaborate with an NPC who was visually different from him and belonged to an enemy tribe in order to overcome multiple quests together in the game. Participants took approximately 15 to 20 minutes to complete the video game. After playing the video game, they completed the post-test. The whole procedure took approximately less than an hour.

4.3. Experiment

4.3.1. Procedure. An email was sent to all participants which contained instructions and an online questionnaire link. At the start of the questionnaire, participants were asked to complete a pre-test survey on their existing attitudes and tendencies towards different others. Participants were then randomly assigned to one of two conditions or versions of the video game after completing the pre-test: one containing positive valence narrative and music, and the other containing negative valence narrative and music.

For the narrative prime, depending on their randomly assigned condition, players read either positive or negative narrative primes before beginning the video game. Players in the positive valence condition were presented with a narrative prime framed in terms of a positive scenario of success, activating the concept of victory in participants often associated with a positive emotional experience:

*"You will be playing as the heir of the Ice Gatekeeper clan. Once you **succeed** in protecting the townspeople, you will be **gifted** a magical creature of your choice for your **victory**."*

This positive narrative prime (i.e. being gifted a magical creature upon victory) was also repeated in the gaming dialogue.

Players in the negative valence condition were presented with a narrative prime framed in terms of a negative scenario of failure, activating the concept and fear of punishment in participants which is often associated with a negative emotional experience:

*"You will be playing as the heir of the Ice Gatekeeper clan. If you **fail** to protect the townspeople, you will **face punishment** from your clan."*

This negative narrative prime (i.e. the fear of facing punishment) was also repeated in the gaming dialogue.

As for music, in the positive valence version, a royalty-free music track was played on loop throughout the video game that was mostly in major key and was predominantly relaxing and unaggressive.

On the other hand, for the negative valence version, royalty-free music tracks in minor key and consisting of ambient sounds were played on loop throughout the video game, which was ominous and unsettling.

Upon completion of the game, participants were asked to complete a post-test survey on their attitudes and tendencies after playing the game.

4.4. Dependent Measures

Two-time measurements were taken: (1) a pre-test self-report questionnaire to assess participants' existing attitude, emotional state, empathy levels and prosocial intentions towards racial and ethnically different others, and (2) an identical post-test self-report questionnaire after gameplay.

4.4.1. Attitude. Using a 3-item Feeling Thermometer Scale [36] participants' attitude towards a different other was reported using a feeling thermometer scale (0-100) that measured warmth (*Very Cold – Very Warm*), favourability (*Favourable – Unfavourable*) and overall attitude (*Positive – Negative*) in pre- and post-tests. Participants had to rate between 0 and 100, which represents negative to positive feelings respectively. This scale has been extensively used for and has been widely validated in measuring attitudes [37]. Cronbach's α for the pre-test and post-test scales were .941 and .923 respectively.

4.4.2. Empathic Concern. Using a 7-point Likert scale, participants' existing level of empathy towards a different other was reported with an adapted 4-item (*Warm, Soft-hearted, Compassionate, Moved*) from the Emotional Response Questionnaire [38] in both pre- and post-tests. These four adjectives are typically associated with empathy. Participants were required to reflect on their experiences with different others. Empathy scores were calculated based on averages. Cronbach's α for the pre-test and post-test scales were .899 and .936 respectively.

4.4.3. Prosocial Intention. Using a 7-point Likert scale, participants' intention to exhibit future prosocial behaviour was reported using an adapted 4-item Prosocial Intentions scale [39] Participants were asked to indicate their likelihood of exhibiting four different prosocial behaviours, such as donating goods to a charity of a different other community or going out of their way to help a different other in need. For each participant, their pre- and post-test scores were averaged to derive the prosocial intention scores.

Cronbach's α for the pre-test and post-tests scales were .798 and .918 respectively.

4.4.4. Emotional State. Adjectives from an adapted version of the Positive and Negative Affect Scale (PANAS) [40] were used. Participants were presented with ten adjectives intended to measure positive and negative emotions. Five of these terms describe positive emotional states (*Determined, Inspired, Alert, Enthusiastic, Excited*) while the other five describe negative emotional states (*Afraid, Scared, Upset, Distressed, Nervous*). For each emotion, participants described the strength of their emotional reactions on a 5-point Likert scale (1 = Very slightly or not at all, 5 = Extremely). Cronbach's α was .837 for the pre-test and .823 for the post-test scale.

4.5. Data Analysis

Outlier and normality tests were run to check assumptions for parametric tests prior to statistical testing. For variables that did not have a normal distribution, non-parametric tests were used. To investigate changes in attitude from pre-test to post-test and how this differed by condition, a mixed factorial analysis of variance (ANOVA) with time (pre-test vs. post-test) as a within-subject factor and condition (positive vs. negative) as a between-subject factor was conducted. Follow-up paired t-tests were

also run to determine the simple effects of time. For (1) empathy and (2) prosocial intentions, sign tests were run to determine the effects of time (pre-test and post-test) on score changes for each condition. These were followed up by Mann-Whitney U tests to determine if there were differences in these changes between the two conditions.

5. Results

5.1. Descriptive Statistics

Descriptive statistics were computed for participant demographics as well as the reported pre-test and post-test attitudes, empathy, and prosocial intentions between the positive and negative valence conditions (see Table 1). In both the positive and negative valence conditions, an increase in mean reported attitude between the pre-test and post-test scores was observed. Mean empathic concern scores from the pre-test and post-test in the positive valence condition showed an improvement after participants played the game, however, this was not observed in the reported scores from participants in the negative condition. There were also no clear observed differences in the mean pre-test and post-test reported scores for prosocial intentions in either the positive or negative valence conditions.

Table 1. Descriptive statistics for positive and negative valence conditions

	Positive valence condition				Negative valence condition			
	Pretest		Posttest		Pretest		Posttest	
	M	SD	M	SD	M	SD	M	SD
Attitude	41.67	20.46	61.05	20.28	55.92	19.48	65.23	17.35
Empathic Concern	4.37	1.15	4.9	1.07	4.67	0.94	4.63	1.27
Prosocial Intention	5.39	1.04	5.37	1.3	5.36	1.02	5.41	1.3

5.2. Emotional State

As the data for negative affect scores in the negative valence condition was not normally distributed, the non-parametric Mann-Whitney U test was run to determine if there were differences in players' post-game emotional state between the two conditions after playing the game. There were no significant differences in post-game emotion between the positive valence (positive emotion, $Mdn = 13.00$; negative emotion, $Mdn = 7.00$) and negative valence conditions (positive emotion, $Mdn = 13.00$; negative emotion, $Mdn = 7.00$) of the game, $U = 693.50$, $z = 1.48$, $p = .14$.

5.3. Attitude towards outgroup members

The attitude score distribution among all players was not normally distributed based on Shapiro-Wilk's test ($p < .05$). A Wilcoxon signed-rank test was run to determine if there was a significant improvement in attitude scores before participants played the game ($Mdn = 49.50$) compared to after they played the game ($Mdn = 67.17$), the change in scores was statistically significant, $z = 4.54$, $p < .001$. H1c is supported.

Looking at the attitude scores between conditions, a two-way mixed ANOVA was conducted to understand the interaction effects between the two

conditions and time on attitude change. No outliers were detected based on an examination of studentized residuals for values greater than ± 3 . The data was also normally distributed as assessed by a normal Q-Q plot. There was homogeneity of variances ($p > .05$) and covariances ($p > .001$) as assessed respectively by Levene's test of homogeneity of variances and Box's M test. There was no statistically significant interaction between the game conditions and time on attitude, $F(1, 66) = 3.69, p = .06$, partial $\eta^2 = .05$. The main effect of time showed a statistically significant difference in mean attitude score at the different time points, $F(1, 66) = 29.86, p < .001$, partial $\eta^2 = .311$. The main effect of game conditions showed that there was a statistically significant difference in mean attitude score between groups in different game conditions, $F(1, 66) = 5.56, p = .021$, partial $\eta^2 = .078$. RQ1 is partially answered.

This was followed up with paired sample t-tests to determine if there was a statistically significant mean difference between the pre- and post-test reported Feeling Thermometer score (attitude) for participants in both the positive and negative valence conditions respectively. Based on visual analysis of a boxplot, there were no outliers for the data in the positive valence condition and two outliers for the data in the negative valence condition which were removed for analysis. The assumption of normality was not violated as assessed by Shapiro-Wilk's test in both the positive valence ($p = .17$) and negative valence ($p = .40$) conditions. In the positive valence condition, there was a significant increase between pretest ($M = 41.67, SD = 20.46$) and posttest ($M = 61.05, SD = 20.28$) reported attitudes, $M = 19.383$, 95% CI [9.97, 28.80], $t(32) = 4.195, p < .001, d = 0.73$. H2c is supported. In the negative valence condition, there was also a significant increase between pretest ($M = 57.26, SD = 18.83$) and posttest ($M = 63.97, SD = 16.70$) reported attitudes, $M = 6.707$, 95% CI [2.53, 10.89], $t(32) = 3.27, p = .003, d = 0.57$. H3c is supported.

5.4. Empathic Concern

Among all players, empathic concern scores were not normally distributed and a Wilcoxon signed-rank test was run to determine if there was a significant improvement in empathic concern scores before participants played the game ($Mdn = 4.50$) compared to after they played the game ($Mdn = 4.75$). The change in scores was statistically significant, $z = 2.01, p = .04$. H1a is supported,

As the data for empathic concern scores in each condition was also not normally distributed and the presence of outliers was observed through visual inspection of a boxplot, a non-parametric method was also used to investigate differences between the pre-

and post-test scores for both conditions. An exact sign test was used as the distribution of scores was not symmetrical as required for the Wilcoxon signed-rank test. In the positive condition, there was a statistically significant median increase in empathic concern ($Mdn = 0.5$) between the pre-test ($Mdn = 4.5$) and posttest ($Mdn = 4.75$) scores, $p = .015$. H2a is supported. However, in the negative condition, there was no statistically significant median change in empathic concern ($Mdn = 0$) between the pre-test ($Mdn = 4.75$) and post-test ($Mdn = 4.75$) scores, $p = .678$. H3a is rejected.

This was followed up by running a Mann-Whitney U test to determine if there were differences in empathic concern change between the two conditions after playing the game. Distributions of empathic concern changes for both groups were similar. Median empathic concern change was statistically significantly higher in the positive valence ($Mdn = 0.50$) than the negative valence ($Mdn = 0.00$) condition, $U = 411.5, z = -2.068, p = .04$. RQ1 is partially answered.

5.5. Prosocial Intention

Prosocial intention scores among all players were also not normally distributed. A Wilcoxon signed-rank test was run to determine if there was a significant improvement in prosocial intention scores before participants played the game ($Mdn = 5.63$) compared to after they played the game ($Mdn = 5.75$). There was no statistically significant change in scores, $z = 1.45, p = .15$. H1b is rejected.

Similarly, the data for prosocial intention scores violated assumptions for the paired sample t-test and Wilcoxon signed-rank test and thus an exact sign test was also used to investigate differences between the pre- and post-test scores for prosocial intention in both conditions. In the positive condition, there was no statistically significant median change in prosocial intention ($Mdn = 0.25$) between the pre-test ($Mdn = 5.75$) and post-test ($Mdn = 5.75$) scores, $p = .078$. H2b is rejected. There was also no statistically significant median change in prosocial intention for the negative condition ($Mdn = 0$) between the pre-test ($Mdn = 5.5$) and post-test ($Mdn = 6.0$) scores, $p = .404$. H3b is rejected.

This was followed up by running a Mann-Whitney U test to determine if there were differences in prosocial intention change between the two conditions after playing the game. Distributions of prosocial intention changes for both groups were similar. Median prosocial intention change was not statistically significantly different between the positive valence ($Mdn = 0.25$) and negative valence

($Mdn = 0.00$) condition, $U = 531.5$, $z = -0.57$, $p = .57$. RQ1 is partially answered.

6. Discussion

This study utilized a custom developed prosocial collaborative game to provide empirical evidence in investigating how differences in emotional valence experienced in a video game can impact prosocial tendencies such as attitude, empathic concern and prosocial intention towards racially and ethnically different others. All 68 participants were able to complete the game successfully.

6.1. Effects of playing a collaborative prosocial game

The results were supportive of H1a and H1c. Overall, participants showed a significant improvement in attitudes and empathic change after playing the video game. As the game was designed to be a collaborative prosocial game, these results provide support for existing theories positing that exposure to prosocial video games increased levels of empathy [35] and reducing stereotypes towards different others [41]. However, the results did not provide support for H1b in relation to prosocial intentions. There is a lack of support for effects on prosocial intentions in both the positive and negative emotional tone conditions too. One possible explanation is the concept of moral licence. Ellithorpe, et al (2015) discussed that participants who have engaged in the moral behavior in the game may “licence” less moral behaviors later on because they felt that they had the moral high ground and behaved morally [42]. It is possible that participants in this study were forced to collaborate with the hostile NPC in the game and felt that they had moral high ground. They therefore did not feel more compelled to help others after game play.

6.2. Positive and negative emotional valence

Participants in the positive valence version of the game showed a significant improvement in attitudes and empathic concern after playing the game, providing support for H2a and H2c. However, like the results for overall participants, there was no support for H2b, with no significant change in prosocial intention.

In the negative valence version of the game, participants showed a significant improvement in attitudes after playing the game, supporting H3c, however, there was no significant change in both

empathic concern and prosocial intention. Hence, H3a and H3b cannot be supported by the results.

Between conditions, attitudes and empathic concern were significantly different between the positive and negative valence versions of the game. However, it should also be highlighted that pre-test sensitization effects such as halo effects may have played a role in affecting the post-test scores [43]. As there is a lack of consensus on a recommended procedure for evaluating pre-test effects in post experiment analysis, these evaluations were not included in our analysis [44]. However, for future iterations of similar experiments a recommendation for tackling pre-test effects would be the implementation of the Solomon four-group design [44].

The game was designed similarly in both versions to be a collaborative prosocial game, requiring players to work together with a stigmatized outgroup member to achieve objectives in the game. Positive and negative emotions were induced via differences in music and the narrative prime. While the results for participants in the positive condition were similar to those for all participants, there was a slight difference in the results for participants in the negative condition in terms of empathic concern. This could be due to the method used in manipulating the emotional differences. Past literature has proven that apart from modes of music, other elements of music such as tempo and rhythm also affect an individual’s mood [30][45], which might not have been fully explored in this study as there was only a single piece of music used for each condition. Additionally, listener variables, such as a listener’s previous experience with said music, should also be considered since music may be subjected to independent projection [46]. However, we were unable to take this into account in this study.

While mood modification through music has been identified as an essential factor in effecting behavioral change [47], the music that had been used may also not have consistently moved participants’ mood in the desired affective domain, that is, towards a positive or negative mood in each respective condition. This might have confounded our findings of this study. As such, future research could consider other ways of manipulating affect more effectively.

6.3. Implications and limitations

The study has showcased the promising potential of harnessing emotional experiences in video game narratives to at least incite attitudinal changes. The results of the study also add to the literature that positive emotions are associated with prosocial behaviour [48]. Additionally, it suggests that while inducing positive emotions may help to promote a

higher level of attitude change, the use of negative emotions can also promote attitude improvements. As this study focused on eliciting emotion through aesthetical components such as music and narrative priming, future studies could potentially also investigate the effects of affective manipulation through game narrative and gameplay.

While the prosocial video game has demonstrated a significant first step in improving attitudes and increasing empathy towards different others or outgroup members, it did not ultimately result in a significant impact on participants' future prosocial intentions. One consideration may be the inherent limitations found in the prosocial game narrative that was written specifically for this study and was not further tested. Therefore, it is difficult to fully understand and determine the impact the narrative itself had on the participants. Crucial elements of a story narrative such as the language used, the plot structure and the specific characteristics given to the gameplay avatars may have influenced the experience in ways that were not captured in this study.

Additionally, there is a possibility that narrative priming and music as means to construct valence in the video game may have influenced each other. The effect of narrative priming in shifting a subject to a desired affective domain may also have been overestimated. Future studies could investigate more effective uses of narrative priming and to facilitate the shifting of one's affective domain in a desired direction for the purpose of inspiring prosocial behaviour. Future follow-up studies can further clarify the way in which narrative and emotions interact in the specific highly interactive medium of video games and the causal relations are between these elements.

7. Conclusion

This study found effects of playing a collaborative game and the positive emotional tone in video game experiences on improved attitudes, and increased empathy, but not prosocial intentions towards racially and ethnically different others of society. People who played the game with a negative emotional tone have shown improved attitudes towards others, but not in empathy and prosocial intentions. There is a difference in players' attitude and empathic concern between negative and positive emotional tones of gaming experiences.

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