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RESEARCH ARTICLE

The Impact of Emotive Music on Financial Decision-Making: An Analysis of Decision-Making in an Ultimatum Game Experiment

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This study explored the impact of emotive music on financial decision-making. Participants (N = 130) partook in an Ultimatum style game. The emotive condition was created through a music stimulus in the background of the game environment. The game consisted of 30 financial splits divided into three proposal types: unfavourable, fair, and favourable. Through conducting a three-way mixed ANOVA, this study found a significant interaction between emotive condition and increases in level of agreement, within unfavourable proposals. The study concluded that emotive music impacts financial decision-making. Following the interaction between emotive music and the level of increased agreement, a positive relationship is assumed. Future research should explore the influence of emotional-heightening situations, such as the recent pandemic, on financial decision-making.

Keywords: decision-making, emotional impact, behavioural economics, music

The topic of decision-making spans a range of multidisciplinary fields including philosophy, economy, neuroscience, and psychology. This field is concerned with the fundamental question of behavioural science: why people, when presented with the same options, make different choices (Hanbury & Wood, 2018). The present study extends this understanding by studying the impact of emotive music on decision-making, in a game setting.

Traditionally, decision-making theories have been concerned with the mathematising and simplification of behavioural choices. Over the last decade, a new field of behavioural economics has emerged which investigates the psychological motivations of an individual's financial decision-making (Shefrin, 2002). This new field of behavioural economics appeared following difficulties applying classical and naturalistic decision theory in a real-world setting. There has been growing interest in the role of specific emotions and their influence on the decision-making process (Summers & Duxbury, 2012). This study investigates the impact of emotively heightened environments, using emotive music, on financial decision-making.

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Classical Decision Theory (CDT): The Traditional View

According to the classical decision theory (CDT), the aim of decision-making is to maximise the gains and use this information to accomplish set goals. CDT assumes that individuals are consistently aggregating and rationalising information. It is expected that individuals present the capacity and ability to make rational and empirically correct judgements which are the core motivators for

decision-making. Further assumptions of the classical view are that consumers make decisions based on pure gain and profit with little to no regard for the influence of secondary factors (Sherman, Hunt, Nesiba & Ohara, 2008). The general assumption is that decisions are driven explicitly through the information available to individuals and are a result of a conscious deliberation (Falzer, 2004).

However, CDT is criticised for its limited application and descriptive power of reality. The essence of CDT assumes a linear module to decision-making and thus does not account for subjectivity and anomalous decisions. It is argued by Beach and Lipshitz (1993) that CDT presents a distorted and 'rose-tinted' description of reality. CDT is further criticised for its lack of emphasis on domain-specific knowledge and how this may impact an individual's decision (Sensat, 1997).

Naturalistic Decision-Making (NDM)

Naturalistic decision-making (NDM) emerged out of frustration with the efforts attempting to apply methods and findings from the classical decision research in complex and multifaceted settings. Patel, Kaufman and Arocha (2002) described NDM as an emerging paradigm which entwined traditional analytical methods with innovative methods designed to investigate cognition and behaviour in real world and practical settings. The NDM perspective highlights the importance of the descriptive adequacy of its models which is achieved through combining in-depth qualitative and quantitative approaches.

Unlike CDT, NDM describes the decision process from a problem-solving perspective and does not assume that all individuals have an expert understanding on the decisions they made. The application of the NDM model has had significant impact on cognitive science. The naturalistic approach recognises conceptual knowledge as a resource to aid decisions and misunderstandings which can lead to suboptimal decisions (Patel, Kaufman & Arocha, 1994).

Rise of Behavioural Economics

Behavioural economics is defined as a subdiscipline of economics which integrates psychology into its theoretical approach towards discussing judgements and decision-making (Peterson, 2009). By combining economics and psychology, the behavioural approach allows researchers to broaden the explanatory and predictive power of the classical economic theory. Kahneman (2003) states that although the incorporation of psychology within economic theories may be challenging, it is essential for the broadening of knowledge and research.

Current research in behavioural economics has established the significant impact of emotion on the process of decision-making (Schlösser, Dunning, & Fetchenhauer, 2013; Thaler, 2017). Researchers have identified the prevalence of impact bias, which is a term used to define the overestimation of the intensity and duration of negative emotional reactions to loss. Impact bias draws similarities between the way individuals make decisions in life events (e.g., ending a romantic relationship) and financial decisions, thus supporting the integration of subjective factors and financial decision-making in behavioural economics (Kermer, Driver-Linn, Wilson & Gilbert, 2006).

Further findings from the Giorgettea et al. (2013) gambling study found that individuals identify a reference point representing their current state, which is motivated by the outcome of previous decisions. Individuals were found to be more sensitive to potential losses than gains. Behavioural economics allows for the influence of subjectivity and emotion to be incorporated when understanding financial decision-making.

Decision-Making under Risk, Uncertainty, and Ambiguity

Through the rise of behavioural economics, there has been a greater appreciation for the influence of situational elements on decision-making behaviours. The literature has established environments which present risk, uncertainty, and ambiguity which likely impact decision-making (Platt & Huettel, 2008). When evaluating courses of action, an individual's perception of risks is amplified through their emotional state and thus influences decisions (Feldman-Hall, Glimcher, Baker & Phelps, 2016).

Risk is identified as the perception of a loss or other negative outcomes which are associated with a decision. The severity of a 'risk' is extremely subjective, seeing as when assessed by different individuals, it is viewed in varying degrees (Wildavsky, 1986). In contrast, uncertainty refers to an individual's doubt in the making of the correct or most beneficial decision. The individual may have little to no knowledge regarding the possible outcomes of their actions, which in turn heightens an individual's current emotional state and the significance of other situational factors (Baratgin, Politzer, Over, & Takahashi, 2018).

Ambiguity occurs when all essential information is unavailable or partially missing. This prevents the

opportunity to make well-informed decisions and weigh in all possibilities in the risk and benefit analysis (Slaney & Racine, 2011). The Ellsberg paradox is a prominent example of decision-making under ambiguous situations; the paradox describes how individuals enter a state of ambiguity aversion under these circumstances. According to the paradox, an individual is more likely to choose suboptimal options with known probabilities in all scenarios, even if the unknown benefit probability is higher in an alternative decision (Ellsberg, 1961).

Ellsberg Paradox

The Ellsberg paradox is the broad assumption that real-world decisions violate the expectations of CDT. Classical theories assume decisions tend to follow the route with the highest probability of optimal and maximised reward outcomes (Sherman, Hunt, Nesiba & Ohara, 2008). Alternatively, the work of Ellsberg (1961), which popularised the paradox, found that decisions are not entirely driven by maximal profit outcome but can be altered through ambiguity and risk aversion.

Ellsberg (1961) conducted the urn experiment, in which individuals were presented with two urns containing 100 balls each. Urn 1 contained an even 50-50 split of black and red balls, and since there was an equal and known probability of the colour selection this was termed the 'risky' option. In contrast, Urn 2 contained between 0-100 red balls (the remainder were black) and represented the 'ambiguous' option. Participants were asked to choose an urn, and were informed of a monetary reward if a randomly selected ball from the urn was red. The findings indicated that a majority of participants selected Urn 1, the risk-aversion option. Ellsberg (1961) concluded that individuals tend to be more avoidant of ambiguous options than risky options.

However, Al-Najjar and Weinstein (2009) criticised the theory of ambiguity aversion by explaining the behaviour of participants as a misapplication of heuristics. It is suggested that behaviour and decision-making can be a result of external variables such as misunderstanding the task and modification of reward perception through fear of negative evaluation of others (Halevy & Feltkamp, 2005; Trautmann, Vieider & Wakker, 2008).

Nonetheless, recent work from Hayden, Heilbronner and Platt (2010) presents an argument supporting the Ellsberg paradox, by stating that similar behaviours are found in primates such as rhesus monkeys. The use of the Ellsberg paradox has been utilised in further game-theoretic scenarios such as the Prisoner Dilemma and the Ultimatum game (Ozdenoren & Peck, 2008; Rilling, Sanfey, Aronson, Nystrom & Cohen, 2004).

Decision-Making Ultimatum Game

The Ultimatum game is an economic game which assesses the process of decision-making under ambiguous circumstances (Thaler, 1988). The rules of the game are as follows: Two players are delegated the task of splitting a sum of money. The first player, the 'proposer', is responsible for making an offer of how the money should be split. The second player, the 'responder', is given the decision of either accepting or rejecting the offer. If the responder accepts the offer, the proposed transaction occurs. However, if the responder decides to reject the offer then neither player will win the game nor the money; and the monetary gain for both parties is eliminated. According to the traditional economic solution, any form of monetary gain is better than none therefore it predicts that 100% of responders will accept the proposer's transaction (Sherman, Hunt, Nesiba & Ohara, 2008).

However, through the application of the Ultimatum game in real world settings the traditional economic prediction is an inaccurate portrayal of decision-making. Studies conducted by Thaler (1988), found that in low offers where respondents were only offered 20% of the total sum, 50% of the players rejected the proposal. Following the game, participants were asked to complete reports, which suggested they rejected low offers due to negative emotions, such as anger, following the unfair nature of the offer. Participants explained that due to the unfair offer, they were motivated to punish their fellow participant which was achieved through removing any monetary gain. The unfair offers induced conflict between their cognitive motive to accept the offer and the emotional motive to reject the proposal.

Oosterbeek, Sloof and Van de Kuilen (2004) conducted a meta-analysis of the Ultimatum game to assess the cultural variances in responder and proposer roles. The meta-analysis assessed 37 papers with 75 studies from experiments which had employed the Ultimatum game as an appropriate material to measure the influences on decision-making.

Emotions and Decision-Making

Emotion is defined as a complex mental state of feeling, which induces physical and psychological change that influence behaviour and thought processes (Zapf, 2002). Loewenstein (2000) argues that economists are mostly interested in emotions such as regret and disappointments, which occur due to the decision-making

process and these emotions are categorised as expected emotions. Through the progression of decision-making theories, psychologists have emphasised the importance of exploring the relationship between emotions and the decision-making process (Loewenstein, 2001).

According to Kahneman (2011), when an individual is involved with the decision-making process, their behaviour and choices are affected by their emotions as they consult their emotional state, which can also occur unconsciously. Zajonc (2000) further describes emotions as an independent, dominant, and primary influence of an individual's response to social situations. Therefore, emotions are proposed as the central motivator for decision-making behaviour. Furthermore, drawing upon Kahneman's (2011) notion of the unconscious influence of emotion, Schwarz and Skurnik (2003) concluded that emotions can have indirect effects on our behaviour through the implicit shaping of our judgement and attitudes. The importance of integrating emotions is vital to decision-making theories as the literature has drawn the consensus that emotions are primary motivators to understanding behaviour.

In traditional studies, emotions have been treated as irrelevant and basic functions when depicting decision-making. Livet (2010) disputed the traditional claim that emotions are pure and basic. He explains that emotions are not exclusively a state of mind but impacted by various extraneous variables, which can result in positive and negative effects. Although the application of psychological concepts such as emotions into economic theory might be challenging, the integrative nature of behavioural economics has proved to be advantageous and has led to a greater understanding of decision-making theories (Kahneman, 2003; Rabin, 1998).

The Influence of Music on Emotional States

Music has been shown to have a robust influence on emotional states (Harmon-Jones, Amodio & Zinner, 2007). It has been found to influence research settings without the conscious attention of participants to the stimulus, which in turn creates an ecologically valid environment (Halko, Mäkelä, Nummenmaa, Hlushchuk, & Schürmann, 2015). The influence of music on emotion is demonstrated through infancy, irrespective of musical background and cultural differences (Koelsch, 2011; Trehub, Becker & Morely, 2015).

Neuroimaging evidence has concluded that music activates a network compromising of the amygdala, hippocampus, hypothalamus, para-hippocampal gyrus, insula, cingulate cortex, orbitofrontal cortex and temporal lobes. These brain regions have all been found to also be involved in the modulation of emotions (Koelsch, 2009; 2014). Halko and Kaustia (2012) studied the influence of music and gambling behaviour. They concluded that music, in line with the participants musical preferences alleviated loss aversion; whilst alternative music exacerbated it. This suggests that different forms and genres of music elicit different emotional states and behavioural responses. Therefore, it can be concluded that music temporarily stimulates brain activity and results in changes of emotional state.

Mood Disorders and Decision-Making

Emotions are an integral part of an individuals' internal and behavioural state. Individuals suffering from anxiety and depression are often victim to altered belief systems which play an integral role in the conceptualisation of decision-making problems (Ellis, 1976; Paulus & Stein, 2010; Reiss, Peterson, Gursky & McNally, 1986). The relationship between altered belief systems and decision-making has been assessed through the multiple studies which utilise the Iowa Gambling Task (IGT), which was applied by Brevers, Bechara, Cleeremans and Noël (2013) to study gambling and risk-taking behaviour.

This task was a simple decision-making task which presented participants with high short-term gains with long term losses against options constructed of low short-term gains but higher long-term gains (Bechara, Damasio, Damasio & Anderson, 1994). Studies of individuals suffering from generalised anxiety disorder quickly learned to avoid decisions with high immediate gain but long-term loss (Mueller, Nguyen, Ray, & Borkovec, 2010). These findings showed that better performance in this task was representative of poorer ability to regulate emotions (Werner, Duschek, & Schandry, 2009). However, proceeding studies have found that when individuals suffered from high anxiety performance is impaired (De Visser et al., 2010; Miu, Heilman, & Houser, 2008). Sailer et al. (2008) argues that higher anxiety is a distractor from task relevant processing thus leading to interference in decision-making.

In comparison, alternative studies have discussed the influence of depression on decision-making. The study conducted by von Helversen, Wilke, Johnson, Schmid, and Klapp (2011) revealed that acutely depressed individuals make more efficient and rational choices than controls. These findings were consistent with previous work which suggested that depressive individuals learn to avoid risky decisions compared to control groups (Murphy et al., 2001; Smoski et al., 2008; Yechiam, Hayden, Bodkins,

O'Donnell, & Hetrick, 2008).

In sum, the research discussed has found strong evidence that anxiety and depression exert a complex relationship with decision-making. The core differences found within this population were an increased sensitivity to loss and an attenuated processing of the meaning of rewards (Chase et al., 2010; Harlé, Allen, & Sanfey, 2010; Murphy et al., 2001; van Randenborgh, de Jong-Meyer & Hüffmeier, 2010; Yechiam, Hayden, Bodkins, O'Donnell & Hetrick, 2008). Although there is a wide discussion on the impact of heightened emotional states on decision-making, there is a lack of literature exploring specific emotions and decision-making**.**

Heightened Emotion and Decision-Making

Negative emotional states have been described as one of the most persuasive emotions (LeDoux, 2012). The impact of fear and anxiety have been described as playing a crucial role in determining economic consumption behaviour (Gambetta & Giusberti, 2014).

Becker and Rubinstein (2011) argue that heightened emotions generate a distortive effect on the decision-making process. In risky situations, individuals tend to possess an understanding of the possible results of their decisions and thus feel threatened if there is certainty of a negative outcome. These circumstances still allow individuals to make 'rational' choices. In contrast, uncertainty of both negative or positive outcomes induces fear and hence deprives individuals from making an optimal choice based on reliable information, as there is therefore an imperfect representation of necessary information.

Johnson and Tversky (1983) stated that negative emotions are extremely influential to risk perception. During their seminal work, they found that through reading newspaper articles on human-related traumatic events, participants gave an amplified estimation of the likelihood of various negative events, irrespective of the similarities or differences to the article they had previously read. They concluded that the negative emotional reaction to reading the newspaper article influenced their perception of risk. Through the application of this framework, subsequent research has concluded that people experience fear when they face uncertain outcomes. As a result, individuals engage in cognitive and behavioural actions to minimise uncertainty and reduce negative emotional states (Lazarus & Folkman, 1984; Smith & Ellsworth, 1985).

Raghunathan and Pham (1999) applied a similar framework to dissect betting behaviour. Their work has been applied to understand investment and selling behaviour. Individuals reported a willingness to place safer bets in order to reduce uncertainty and anxiety resulting from a situation. Emotional states lead individuals to approach certain environments and avoid uncertain environments. Therefore, negative emotional states can be advocated as a predictor of selling behaviours. Despite the negative influence and biases created by negative emotive states, recent research has noted that they may play a positive role as a useful heuristic (Cedrini & Novarese, 2015; Simon, 1983).

Throughout the literature there has been a clear concern regarding the impact of emotive stimuli in economics (e.g., Most, Sorber, & Cunningham, 2007). However, Nelson (2015) criticises the research conclusions for undervaluing the effect of fear-heightening environments. Due to low ecological validity, research has failed to reach a consensus regarding the nature of the impact of emotive stimuli on financial decision-making.

This study explores the impact of emotive music on financial decision-making. Empirical studies into emotional variable and decision-making are limited, and have been heavily criticised for lacking ecological validity. Despite recent studies which have provided an understanding of the influence of emotions in decision-making, researchers have failed to study the immediate impact of emotions which are present during the decisions. Research has tended to focus on the emotions which arise following the decision.

This study adopts Thaler's (1988) Ultimatum game and consists of two conditions: 1) control setting, and 2) emotive, which included emotive music. The Ultimatum game has successfully been employed in previous research to assess the influence of a specific variable on financial decision-making, thus has been deemed as an appropriate material to test the hypothesis (Hoffman, McCabe & Smith, 1996., 1996; Cameron, 1999; Roth, Prasnikar, Okuno-Fujiwara & Zamir, 1991; Henrich et al., 2001). Following previous research, the hypothesis was that emotive music would influence how individuals make their financial decisions.

Methods

Participants

The study consisted of 130 undergraduate and postgraduate participants (M_{age}: 20 years; *SD*: 1.43; Male: 76%). Participants were recruited through opportunity sampling as they responded to advertisements of the

study on social media platforms (i.e., Facebook, Instagram). The advert stated that the study was concerned with the study of 'Emotion and Financial Decision-making' and included involvement in a short game. The inclusion criteria required all participants to be over 18. Participants who responded to the advertisement were provided with an information sheet and informed that participation in the study was on a voluntary basis. The study ran from November 2019 to January 2020 on the campus of Royal Holloway, University of London.

Materials

The experimental study used a self-created Ultimatum game questionnaire, inspired by Thaler's (1988) Ultimatum game. The game sheets consisted of 30 theoretical financial proposals (10 unfavourable, 10 fair, 10 favourable) where participants were asked to either accept or decline the proposal. Proposals were split 50-50 in fair proposals, whilst remaining proposals were split 80-20 being either favourable or unfavourable to participants. These set splits of the money sums reduced extraneous variables which may arise through inconsistent splits of the proposal and was done to maximise the reliability of the results. The split of financial proposals reflected the original work of Thaler (1988) and Game theory, which has been rigorously explored and applied in previous studies (Hoffman, McCabe & Smith, 1996, 1996; Cameron, 1999; Roth, Prasnikar, Okuno-Fujiwara & Zamir, 1991; Henrich et al., 2001).

To stimulate the emotive condition, the study played an mp3 download of Camille Saint-Saëns - Danse Macabre. Fleming (2014) describes the piece as inducing terror and horror. It was played only in the emotive condition, on standard computer speakers at a medium volume (volume: 50), whilst it was absent in the control condition.

The dependent variable was the frequency of accepted and declined offers across conditions which was further divided into unfavourable, fair, and favourable proposals. Unfavourable was defined as when participants received less than their partner; favourable referred to proposals where participants received more than their partner whilst fair was an even split between both parties.

Procedure

This study consisted of an Ultimatum game style questionnaire which was assigned to participants under either a control or emotive stimulated condition. The independent variable explored was the emotions of the participants; the participants were exposed to a cued heightened emotional state. The experiment consisted of two conditions: individuals in the control condition completed the game in a natural setting, whereas individuals in the experimental setting played whilst listening to Camille Saint-Saëns - Danse Macabre. The study utilised a between-groups design, where each participant was assigned to a single condition.

To assess the influence and effect of the musical stimuli, a manipulation check was carried out at Royal Holloway, University of London. A small pilot group of participants (N = 7) were played the audio file which would be played in the main study (Camille Saint-Saëns - Danse Macabre). Participants were asked to write any words or feelings which came to mind whilst listening to the soundtrack. They were also asked to note down at what times during the track they felt this emotion or association. Words or phrases with the most occurrences were: 'suspense', 'horror', 'thriller', 'chase', 'fast-paced', 'mysterious' (n = 7, 6, 6, 4, 3, 3 respectively). It was concluded that the musical stimuli created a negative emotive setting.

The study was conducted in a booked study room at Royal Holloway, University of London. Upon arrival, participants were provided with an information sheet which they had previously been emailed. Each participant was randomly allocated to either the emotive or control condition (46%, 54% respectively). The study ran participants in groups ranging from 3-10 participants per session. The auditory stimulus was played on a continuous loop in the experimental condition. Participants in the control condition completed the game questionnaire in a silent room which allowed for any natural sounds. Once assigned a condition, participants were given the opportunity to ask any questions and requested to sign a consent form.

Participants listened to a standardised set of instructions and the 'rules' of the game which were recited by the researcher. Participants were informed that they would be exposed to 30 theoretical financial proposals and were tasked with either accepting or declining the proposal, by ticking yes or no on their game-sheet. They were instructed that if the proposal were accepted, both parties theoretically would receive the proposed offer, and if rejected, neither party would receive anything. Participants were given no time restrictions to complete the game questionnaire, which took between 5 and 10 minutes. Once all participants completed their questionnaires, scores and raw results

were collated for further analysis.

This study was screened and approved by the Royal Holloway, University of London. Ethics Committee before the research was undertaken. It was ensured that participants received all the information regarding the study prior to being selected to participate and before the game sheet was completed. Participants were reminded of their right to withdraw from the entire study at any point with no reason or to refuse to answer any proposals in the questionnaire.

Analysis

Following the collation of raw data, information was inputted into SPSS Version 21 for further analysis. A three-way mixed ANOVA was conducted to study the interaction between proposal type (Unfavourable; Fair; Favourable), condition (Control; Emotive), and gender (Male; Female).

Results

Descriptive statistics for agreement levels (outcome variable) across control and emotive groups and proposal types were calculated (see Table 1).

Table 1. Descriptive statistics of the percentage of agreed proposals across conditions.

	Descriptive Statistics					
	Unfavourable		Fair		Favourable	
% of Agreed Proposals	*M*	*SD*	*M*	*SD*	*M*	*SD*
Control	42.57	26.52	94.42	17.99	79.71	22.46
Emotive	53.67	22.32	98.00	5.46	84.00	19.50
Total	47.69	25.20	96.07	13.78	81.69	21.17

Note: *M* = Mean. *SD* = Standard Deviation

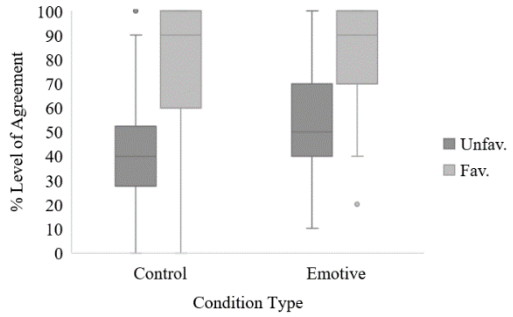
The assumptions of ANOVA were analysed and evaluated. Data was analysed using a mixed-design ANOVA including within-subjects variables (proposal types) and between-subjects variables (condition and gender). Mauchly's test indicated that the assumption of sphericity had not been violated (p = .083).

A mixed-design ANOVA with proposal type (unfavourable, fair, favourable) as a within-subjects factor and condition (control, emotive) and gender (male, female) as a between-subjects factors was conducted. This yielded non-significant main effects of proposal type, condition, and gender on agreement levels (F(2,252) = 0.19, p = .825). There was a non-significant three-way interaction, thus the hypothesis was not supported. Following this, all variables were examined for effects on agreement levels.

Gender

Gender (male, female) was assessed for between-subject effects by means of a one-way ANOVA, which revealed a non-significant relationship with agreement levels (F (1,126) = 0.24, p = .624). This relationship was assessed for interaction effects with proposal types and condition for which both yielded insignificant relationships (p = .958; p = .876).

Figure 1. Box Plot of Interaction between Proposal Type and Condition



Note: Circles represent outliers

Proposal Types

Proposal types (unfavourable, fair, favourable) were analysed for within-subjects' effects through applying a repeated-measures ANOVA and tested for violations of the assumption of variances. Levene's test for Equality of Error Variances revealed insignificant values for unfavourable and favourable proposals (F(3,126) = 0.68, p = .566; F(3,126) = 1.39, p = .249, respectively), however a significant value for fair proposals was found (F(3,126) = 4.59, p = .004). Fair proposals violated the variances assumption and was thus not included in further analysis.

Analysis between proposal types and agreement level

Table 2. Pairwise comparison for control and emotive conditions.

(1, Control; 2, Emotive)	(1, Control; 2, Emotive)	Mean Difference	Std. Error	Sig.	95% Confidence Interval for Difference	
					Lower Bound	Upper Bound
Emotive	Control	6.70	2.57	.01	1.62	11.79

Note: Std. Error = Standard Error. Sig.= Significance.

displayed a strong relationship between variables ($F(2,252) = 163.17$, $p < .001$). However, proposal type interactions with other variables displayed insignificant relationships, which concluded an independent relationship with agreement levels. Further, post-hoc pairwise comparisons found a significant difference, where agreement levels increased during favourable proposals ($t(126) = -11.59$, $p < .001$).

Condition

Condition (control, emotive) was evaluated for a between-subjects effect using a one-way ANOVA, and this yielded an overall significant influence between condition on agreement levels ($F(1,126) = 6.81$, $p = .010$). Post-hoc pairwise comparisons identified the direction of this relationship, where emotive condition increased levels of agreement compared to the control condition ($t(126) = -2.61$, $p = .010$).

The effect of condition was further analysed on an interactional basis with propositional types. The overall relationship between both variables generated an insignificant relationship ($F(2,252) = 1.26$, $p = .286$). Pairwise comparisons revealed that unfavourable propositions shared significant interactions with conditions (control, emotive) ($t(126) = -.2.37$, $p = .019$). However, favourable propositions did not share a significant relationship with the conditional variable ($t(126) = -1.11$, $p = .268$).

Overall Significant Findings

Significant patterns and interaction patterns emerged. Firstly, it was found that proposal types and agreement levels share a significant relationship. Secondly, further analysis displayed that the emotive condition, yielded a significant relationship with agreement levels. Finally, unfavourable propositions shared a significant relationship with the condition variable and this relationship was exclusive to unfavourable propositions.

Discussion

Overall Findings

This study investigated the impact of emotive music on financial decision-making. The first significant finding of this study was that proposal type significantly influenced

Table 3. Pairwise comparison for proposal types (unfavourable; favourable) against conditions (control; emotive).

Proposal Types	(1, Control; 2, Emotive)	(1, Control; 2, Emotive)	Mean Difference	Std. Error	Sig.	95% Confidence Interval for Difference	
						Lower Bound	Upper Bound
Unfavourable	Emotive	Control	11.66	4.92	.019	1.92	21.41
Favourable	Emotive	Control	4.70	4.22	.27	-3.66	13.05

Note: Std. Error = Standard Error. Sig.= Significance.

agreement level. Proposal types were split between unfavourable, fair, and favourable. The findings of this study focused primarily on the comparison between unfavourable and favourable proposals as fair proposals violated the assumption of equality of variances. Descriptive statistics (Table 1) revealed that an approximate of 48% of participants agreed to unfavourable proposals across both control and emotive conditions, whilst 82% agreed to favourable proposals. Further analysis found that proposals significantly interacted with agreement level ($p < .001$). Financial decision-making was influenced by the nature of proposal types; this finding provides a foundation for greater analysis.

Further results of this study observed that the overall agreement level of all proposal types was significantly increased between control and emotive conditions (p = .010). Participants agreed to more proposals within the emotive condition, regardless of proposal type. Pairwise comparison of agreement level between control and emotive conditions found a mean difference of -6.70 (p = .010), thus concluding that the average agreement level significantly increases when participants were in the emotive condition (Table 2). The discussed findings identify the significant impact of an emotive stimulus (music) on overall agreement levels of all proposals.

Through additional pairwise comparisons, a comprehensive analysis found that the impact of the emotive condition was only significantly influential on unfavourable proposals. Unfavourable proposals generated a significantly negative mean difference of -11.66 (p = .019) suggesting agreement levels significantly increase in unfavourable proposals, between both conditions (Table 3). This relationship is insignificant amongst favourable and thus exhibits an exclusive interaction.

To conclude, the emotive condition significantly influenced the total overall agreement levels. It is key to note, upon deeper analysis of proposal types that this interaction was exclusively significant at one level - unfavourable proposals. These unfavourable proposals were characterised by little financial gain and unfair advantage for the unknown partner in the game. The results and findings provide empirical support for the alternative hypothesis which hypothesized that 'emotive music impacts financial decision-making.

Current Implications

Within the original Ultimatum game, Thaler (1988) concluded 50% of participants agreed to unfavourable proposals which contradicted traditional economics. Traditional economics hypothesized when engaging in financial decision-making, individuals will prioritise any form of financial gain even in circumstances where benefits may be small and unfair (Falzer, 2004; Hastie & Dawes, 2001). This study replicated similar agreement levels to Thaler (1988), through the unfavourable propositions across both the control and emotive condition (43%; 54% respectively).

The finding of this study further supports the arguments posited by behavioural economics. The main assumption of this approach is that decision-making behaviour does not follow the linear patterns of reward and costs analysis. Similar to the original work of Thaler (1988), this study found that individuals often fail to follow the precincts set by traditional economics and make decisions based on emotional and internal states.

Additionally, this study found that emotive music can influence decision-making behaviour, trends which have been previously discussed by Raghunathan and Pham (1999). Participants within the emotive condition were found to more likely to agree to any form of financial proposal. Individuals in this condition were more focused on reward acquisition and averting the risk, which is associated with money loss if they disagree. This is further exemplified in the significant difference found within the unfavourable proposals; although individuals made a loss in comparison to their 'partner', they are more likely to desire financial rewards even if relatively small.

Based on the findings of this study, there are similarities with the recent literature by Becker and Rubinstein (2011). They theorised that heightened emotive states generate a distorted effect of decision-making. Their findings explored this impact in a more general sense and failed to explore the impact of emotions exclusively on financial decision-making. The conclusions drawn within this study extend and support the findings of previous work through incorporating these ideas to a financial decision-making setting.

According to traditional economic theories, rational financial decision-making leads to an individual agreeing to any monetary rewards, even if extraneous factors (i.e., the unfair split) make the agreement unfavourable. The findings of this study showed that individuals in the emotive condition were more likely to agree to all proposals thus maximising monetary gain which is defined as 'rational decision-making', in accordance with classical economic theory. The central finding of this study was that emotive music leads to individuals making stronger rational financial decisions, as defined by

traditional theories. This has been echoed through previous literature, such as Simon (1983), who applied these concepts in earlier work which concerned decision-making in different forms.

In contrast, through the lens of the Ellsberg paradox, decision-making is manifested by individual and extraneous factors which lead to a redundancy of the traditional cost-benefit theories (Ellsberg, 1961). In the control condition, participants violated the assumption of traditional economics and made irrational decisions as they declined several proposals, despite monetary loss. In contrast, participants in the emotive condition displayed an adherence to traditional theories, as they agreed to an increased number of proposals.

This study found that negative emotional states, created by emotive music, lead to movement towards traditional theories: individuals maximise profit even in unfavourable circumstances. This pattern has been replicated in alternative negative states such as risky and ambiguous situations, thus suggesting a pattern in the impact of negative emotional states on financial decision-making (Becker & Rubenstein, 2011; Ellsberg, 1961; Raghunathan & Pham, 1999; Simon, 1983).

Real World Implications and Future Directions

The findings of this study have allowed for a wider understanding of financial decision-making. A main conclusion drawn from the results of this study describes that negative emotional states, created by emotive music cause an increase in agreement levels. These findings can be applied to a series of real-world situations to gain a better understanding of human behaviour.

The first application of studies regarding the impact of emotions on financial decision-making is to assess the decisions made in times of financial crisis. When a country is faced with recession, the spending habits of the government are adjusted to fit the volatile state of the economy. Through the rise of uncertainty and risk, it is often seen that during times of financial crises, negative emotions peak at both a state and individual level (Lovelock, 1997). Further research regarding the role of emotions on financial decision-making can aid the understanding of individual and state behaviours.

Following the recent confirmation of Brexit and the increased state of fear proceeding the COVID-19 virus; this study provides current and relevant views to explaining behaviours. Abnormalities in financial decision-making and spending behaviours are exhibited in the behaviours of consumers following the COVID-19 pandemic. The newly heightened levels of emotions simultaneously followed stark increase of sales of goods, thus resonating with the findings of this study. However, it is key to note that requires further investigation. The circumstances at hand have led to an increased state of uncertainty and fluctuation in the economic standing at a national and global scale. The need for an understanding of the impact of fear and anxiety on financial decision-making is at a high. The findings of this paper broadly suggest that heightened emotions will impact financial decisions-making; however, this requires further research to be applied to current circumstances.

The real-world applications of these findings can open doors for further exploration into spending habits and how heightened emotions may influence an individual's ability to make rational financial decisions. Through the foundations of this study and additional research into this field can further build an understanding into consumer behaviour, especially given the recent pandemic.

Strengths and Shortcomings

These results build upon previous research. This suggests that the work conducted in this study has been able to provide a more rigid and solid foundation for behavioural research to build upon. Through using a standardised method of the Ultimatum game, the influence of confounding variables was limited. Furthermore, a strength of this study is that it has filled a previous gap in the research which has not considered the impact of direct emotional states, created by emotive music, whilst simultaneously assessing financial decision-making behaviours.

Although the findings of this study have added to the previous body of work (Becker & Rubenstein, 2011; Raghunathan & Pham, 1999; Thaler, 1988) there are limitations which may restrict the application of these findings. The following section will explore methodological limitations presented within this study and highlight how these can be addressed in future studies.

The procedure and design of this study have been founded on previously acclaimed game theory designs (Thaler, 1988) to maximise reliability of the measures and outcome. Nonetheless, the reliability of this study can be assessed through conducting test-retests to examine the conclusions and findings discussed in this study. The analysis of multiple studies can be assessed through meta-analysis, to improve reliability and draw stronger conclusions.

The study fails to represent the wider population and produce generalisable results due to the participant

demographic. It is possible that the results discussed in the present study is a representation of the impact of emotive music in this discrete group as opposed to the wider population. Future adaptations of this study should involve and place importance on the integration of a wider participant demographic which covers a greater age bracket and is representative of a larger scale population.

The nature of this study is heavily set in a laboratory setting and lacks ecological validity. Participants in the study were fully informed of the outcomes of their financial choices and were presented with a perfect representation of information. Participants were not exposed to the uncertainty and asymmetrical nature of financial choices which is often manifested in real-world decision-making. To address this limitation, alternate studies could study the impact of fear on financial decision-making in a real-world setting.

Further limitations arise through the possibility that the stimulus, which was intended to evoke a change in emotional state, did not successfully achieve this. Although, there was a manipulation check to minimise this impact, it is possible that the music stimulus did not achieve a changed state in all participants. The manipulation check found association words which had strong relation with negative emotional concepts, however this does not necessitate that the stimulus created a heightened emotional state equally in all participants.

It is likely that due to individual differences, each participant felt different levels of emotional changes in the emotive condition. Through the absence of a specific measurement of the impact of the emotive music, the study can only assume the manipulation was effective for all participants subject in the manipulated environment. This may have amplified or abated the differences of agreement level between the control and emotive conditions. Future studies will benefit from direct and specific measurements of change in participants. This could be achieved through the implementation of functional magnetic resonance imaging (fMRI). The involvement of fMRI could be used to measure the emotional state in all individuals through completing the game. This would allow researchers to view the emotional state of participants through the neuronal variations in their brain activity and allow strong confirmation of the changed state being achieved, hence solidifying the findings of the study.

Conclusion

Based on the findings generated by this study, it is concluded that emotive music significantly influences financial decision-making. The data and results of this study illustrate a significant increase in agreement levels in both control and emotive conditions. The increase across control and emotive was significant only in unfavourable proposal types. Thus, it was concluded that the emotive condition leads individuals to making decisions which reflects traditional economic theory.

Through this research it has been demonstrated that emotive music has an impact on financial decision-making. Nevertheless, the methodological limitations of this study restrict the application and generalisability to the wider population. To conclude, this paper has opened discussions to studying the impact of heightened negative emotional states in times of financial crisis and volatility. Further research could explore the influence of various emotional states on financial decision-making leading to a greater understanding of spending behaviours.

Conflicts of Interest

The author has no conflicts of interest to declare.

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