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Conveying Emotion Through Gameplay Mechanics

by

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Abstract

This project evaluates how effective game mechanics can be at eliciting emotion in their players without additional stimuli. Due to an increase in prevalence in recent years, anxiety was the main studied emotion, with an additional emphasis placed on stress. To achieve this, a playable 3D prototype was designed, developed and distributed amongst 30 participants with experience in playing video games. The prototype was followed by a 15-question survey employing quantitative and qualitative data to address the aim of the project. Through analysis of the results it was found that whilst mechanics can successfully elicit an emotional response and cause an increase in stress levels, a full game with audio, visual and narrative elements would be more successful in achieving this effect.

Keywords: *anxiety, game mechanics, mechanics as metaphor, emotion in games*

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1.0 Introduction and Rationale

1.1 Introduction

Anxiety is described by the NHS (National Health Service) as "a feeling of unease, such as worry or fear, that can be mild or severe" (NHS, 2018). Although it is natural for everybody to experience anxiety at some point in their life, it can also turn into a vicious mental disorder commonly referred to as GAD (Generalized Anxiety Disorder). When referencing "Anxiety" throughout this dissertation, it is this disorder rather than the general feeling, which is being discussed.

According to a 2011 report, 38.2% of the entire EU population (~164.7 million) suffers from one of 27 mental disorders. Of these 27 disorders, the most prevalent disorder was shown to be anxiety with ~69.1 million people affected (Wittchen et al., 2011). Though the report states that this is a best estimate based around limitations, it is well supported by a variety of other sources. A similar 12-month long report from the United States conducted in 2012, found that 21% of adults are affected by anxiety each year (Kessler et al., 2012). Lastly, another 2012 report consolidating 87 studies from 44 countries found that the global prevalence rate of anxiety is 1 in 13 people. Though this results in a smaller percentage of 7% of the global population, the report goes to discuss the differences in research, prevalence, and diagnosis between cultures, which leads to a smaller number (Baxter et al., 2012).

Regardless of this difference in prevalence rate across studies, it is unanimously-agreed upon that mental disorders have a large impact on modern society. Personal wellbeing aside, a 2017 report showed that mental health problems in the United Kingdom cost the country's employers roughly £35billion - a 35% increase from the same report performed in 2006 (Parsonage and Saini, 2017).

With this large impact, it is becoming increasingly important to decrease stigma against mental disorders and increase empathy and understanding to foster support. A 2008 study by Alonso et al. surveyed 80,737 participants across 16 countries comparing perceived stigmas - defined as health-related embarrassment and discrimination - against people suffering from mental disorders and chronic physical conditions. The study found that 21.9% of people suffering from mental health received negative stigma, compared to 15.5% for those suffering from chronic physical conditions (Alonso et al., 2008). Additionally, the study found that the combination of anxiety disorders matched with another disorder

(physical or mental) led to an increase in stigma in comparison to people without anxiety disorders.

Humans have always expressed themselves through various media. Ranging as far back as cave paintings, our culture has historically used art for the dual purpose of expression and entertainment (Hurlburt and Voas, 2011). In modern day society, a relatively new form of expressing oneself is through the interactive form of video games. Expressing oneself and portraying ideas through gaming is a particularly attractive prospect to creators due to the interactive nature of the medium. If a designer can guide a player to partake in a pre-planned experience, they achieve the goal of communicating their message alongside having a larger impact on the consumer due to their involvement with the content. As Calleja stated in his 2011 book "In-Game" which studied the various forms of immersion in games; "Games reflect aspects of the society and culture that made them while contributing to that society in the process." (Calleja, 2011). In the past few years there has been a steady increase of self-expressive video games dealing with the portrayal of their creators' lives, or aspects of the society/culture they find themselves in.

"By the nature of what constitutes a game, one cannot dissociate games from emotions." (Yannakakis et al. 2011) This point portrayed by Yannakakis in their 2011 paper bases this proposition upon multiple other researcher's findings. Within their work, Yannakakis draws upon studies by Deci and Ryan to state that play is one of the main motivators for learning, developing and evolution (2000). However, they also draws upon points raised by Salen and Zimmerman, where a player will willingly engage in an experience likely to have negative emotion including frustration or fear (2011).

1.2 Aims and Objectives

The aim of this project is to employ game mechanics – defined as "discrete units that can be created, analyzed and put in relation to others" from the designer's point of view, and as "everything that affords agency in the game world" from the player's point of view (Sicart, 2008) – within a self-developed, brief interactive experience created using the Unity3D engine, in order to evoke feelings of anxiety within participants, to further their understanding of the disorder.

The aim above relies upon the following key objectives:

1. To conduct research into how mechanics, interactions and the overall User Experience (UX) of a game can evoke an emotional response in players.
2. To conduct additional research into anxiety provoking stimuli expanding on the research from the first objective.
3. To apply the research into the development of a 10-15-minute playable prototype created within the Unity3D engine.
4. To distribute the prototype to a sufficient number of participants, followed by a survey asking participants to reflect on their experience.
5. To collect and analyze responses in order to examine effectiveness of stress and anxiety portrayal through game mechanics.

The following five hypotheses are predicted for the outcome of this project;

1. Systems of mechanics can elicit emotions in players without audio/visual/narrative stimuli.
2. Participants will experience anxiety whilst interacting with a purely mechanical gameplay system designed to elicit said emotion.
3. Anxious players are more likely to feel anxiety as a result of playing the prototype.
4. Goal oriented players are less likely to experience stress as a result of the prototype than non-goal-oriented players.
5. Lack of mental preparation is a key factor in eliciting stress within the confines of an interactive system.

2.0 Literature Review

2.1 Introduction

The following section of the report collects research in areas of anxiety triggers, how one can convey emotions through game mechanics and case studies of games which have achieved this effect.

2.2 Anxiety Triggers

In order to design effective mechanics to convey the feelings of stress and anxiety, common anxiety triggers were first researched. The triggers consisted either of underlying psychological processes, or certain events/experiences which triggered the response. According to Dr. Yoder, a behavioral neuroscientist, there exist four key invisible (underlying) anxiety triggers;

1. Too much time to think
2. Lack of goal setting
3. Personal health and news
4. Loss of coping

(Yoder 2018)

As it is much more difficult for a narrative game experience to focus on the third trigger - personal health and news - this one was mostly discarded for the purposes of this project, whilst the other three were taken into serious consideration when designing the prototype mechanics. As the main focus of the experiment was on the social anxiety disorder, additional research was performed into its common triggers. A series of key points repeatedly arose from multiple sources - a common type of social anxiety was triggered by performance and evaluation of conversation, much more so than the act of conversation itself (Watson and Friend 1969). From this, four further points were extracted to employ in the mechanical design, this time in relation to certain social interactions, events or experiences;

1. Public performances
2. Meeting new people
3. Making small talk
4. Stating your opinion

(Cuncic 2018)

In addition to the stated seven triggers, it is important to pay attention to the snowball effect. The Cambridge Dictionary defines this metaphorical statement as "a situation in which something increases in size or importance at a faster and faster rate" (Cambridge Dictionary 2019). This process can be applied to anxiety to further help understand how it becomes such a powerful, often debilitating disorder. This snowball effect can occur in one of two powerful ways. In a situation where a person is presented with a "fight or flight" response - such as a public speech - the person might feel nervous. Due to the feeling of nervousness, they will experience a feeling of worry where the audience may notice that they are nervous, thus reinforcing the feeling of nervousness, and leading to more worry in a short-term reinforcement loop (Anon. 2019). The second form is related to negative reinforcement, where a person avoids an event which is likely to cause anxiety, momentarily reducing the strength of the feeling, only to return later as a stronger feeling.
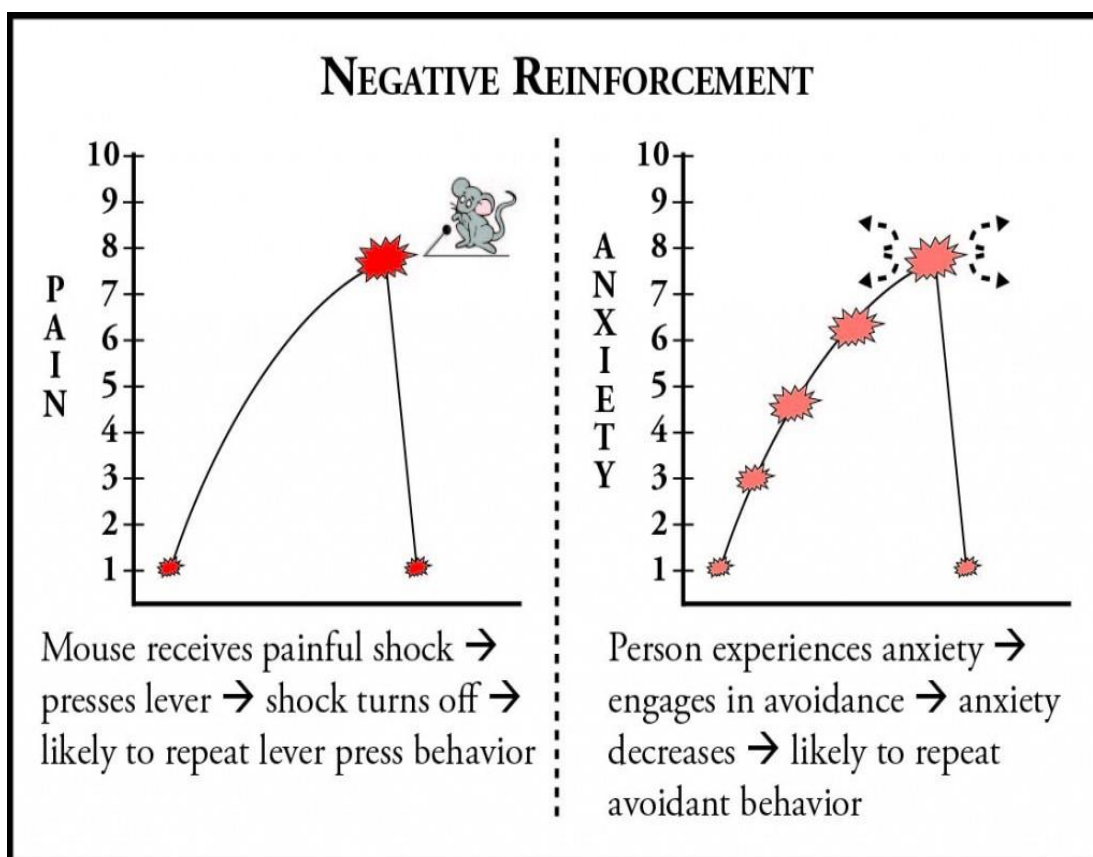

Figure 1: Negative Reinforcement (Kollman 2013)

2.3 Emotional Engineering

All the above points had to be taken into careful consideration when drafting the mechanics for the prototype. They had to be exploitative to take advantage of human nature, without being too overwhelming, frustrating or excessively emotionally abusive. To help design mechanics around these limitations and objectives, several models of game design were employed.

2.3.1 Stephane Bura's Emotional Engineering Model

The model at the forefront of these was that of Stephane Bura's Emotional Engineering model (Bura 2008). This model, based on previous work by Will Wright (Wright 2003) argues that, in general, all possible game dynamic systems can fit into a multi-dimensional taxonomy as illustrated below in Figure 2.

	Freedom	Mastery	Data
Action	Opportunities, Tools and Abilities	Trained reflexes, Tactics	Game world resources and collectibles, Operational rules
System	Exploration, Experimentation, Purpose	Learning skills and using them to gain more control	Preparation, Constitutive rules
Self	Strategy, Creativity	Exploiting skills, knowledge and metagame data	Mementos, Achievements, Memories
Social	Community support, Shared experience	Competition, Cooperation, Teaching skills	Status, Metagame, Implicit rules

Figure 2: Variables for the Emotional Engineering Model (Bura, 2008)

Figure 2 above demonstrates the first part of Bura's model, which contains the categories of variables available to a designer. Each of the vertical variables can be combined with the horizontal variables and applied to a range of interactions within temporary and persistent game states. This can be done for both game-induced and player-induced variable changed. Figure 3 below shows how the "Action" variable is used in terms of game mechanics:

Figure 3: Part of Game Induced Variable Change Table (Bura 2008)

GAME INDUCED VARIABLE CHANGE	Major Decrease		Minor Decrease		Minor Increase		Major Increase	
	Temporary	Persistent	Temporary	Persistent	Temporary	Persistent	Temporary	Persistent
Action — Freedom	End of big action opportunity	Linear path, Difficult to find options (Confusing menus, Quasi-modal controls)	End of action opportunity, Misleading cue, Temporary loss of ability	Avatar death and respawning, Local reset, Simulation conventions (Usable vs. non-interactive objects)	Action opportunity (Timed door opening), Resource gain (if player can choose how to spend it)	New minor persistent ability (Gauge increase)	Big action opportunity (Flying cap in Mario), Large resource gain (if player can choose how to spend it)	New major persistent ability (Orthogonal ability - Harvey Smith)
Action — Mastery	End of big advantage opportunity, Misdirecting affordance	Permanent loss of ability, Inappropriate controls, New controller (Guitar Hero, Steel Battalion)	Temporary loss of ability, Randomness	Difficulty increase	Advantage opportunity (Block + Counter combo), New short-term goal (if game is balanced)	Affordance, New ability to trade resource for preparation (Increased life gauge, Buff)	Big advantage opportunity (Exploiting an enemy's weak points), New medium-term goal (if game is balanced)	Kinesthetic isomorphism (Wii Golf), New persistent ability, Insufficient difficulty increase
Action — Data	Large resource loss	Inability to complete collection (One way journey in Beyond Good & Evil), Iconic / Symbolic content (Super Mario World)	Resource loss	Allow permanent world change (Broken things, NPC death)	Resource available	Allow permanent world change, Collectible available, XP available	Large resource available	Rare collectible available

The rest of the Game Induced Variable Change table as well as the Player Induced Variable Change table can be found in the Appendix 5 and Appendix 6. Based on the research of Nicole Lazzaro, and XEO Design - a company focused on understanding and researching the engagement with play (XEODesign 2004) - Bura further argues that the format of the Variable Change tables can be applied to evoking emotions/feelings/mental states in players, wherein each variable change can be tracked for a response. A part of this table can be seen in Figure 4 below, with the full table accessible in the appendix 7.

EMOTIONS	TOO LOW	LOW			HIGH			TOO HIGH
		Decrease	Stability	Increase	Decrease	Stability	Increase	
Action — Freedom	Disgust, Inescapableness	Fear, Shock, Buyer's remorse	Claustrophobia, Dread	Suspense, Anticipation of change	Distraction, Slapstick humor (with player's avatar), Buyer's remorse	Awareness, Exhilaration, Appreciation of possibilities, Addiction to growth	Disorientation	Fear of choice, Paralysis
Action — Mastery	Discouragement, Hopelessness, Humiliation, Powerlessness	Fear, Desire of revenge, Perseverance	Inadequacy, Loss of concentration, Caution, Nervousness	Gambling impulse, Relief, Hope	Doubt, Rush, Gambling impulse, Feeling challenged, Fear of failure	Confidence, Willingness to take risks, Feeling in control of one's actions, Grace	Fiero, Excitation, Satisfaction, Showing off	Boredom, Pointlessness, Impatience
Action — Data	Discouragement, Unfairness, Infantilization	Loss, Annoyance, Grief, Regret	Trust in the system to remain simple / understandable, Feeling ignored	Reinforcement through positive feedback	Reinforcement through negative feedback	Agency, Expectation (Grinding toward level-up)	Compulsive desire to complete collection, Slapstick humor	Underwhelming success, Infantilization

Figure 4: Part of Emotions Engineering Table (Bura 2008)

2.3.2 MDA Framework

Another model applied to the design stage of the prototype was the MDA (Mechanics-Dynamics-Aesthetics) Framework. This game analysis tool created in 2001 by a trio of game developers provides precise definitions for the three main components which make up the consumption of video games. These components are Mechanics, Dynamics and Aesthetics. The model provides the following definitions for these terms;

1. Mechanics describes the particular components of the game, at the level of data representation and algorithms.
2. Dynamics describes the run-time behavior of the mechanics acting on player inputs and each other's outputs over time.
3. Aesthetics describes the desirable emotional response evoked in the player, when [they] interact with the game system.

(Hunicke et al. 2004)

The MDA Framework then theorizes that games are a two-way communication system using the above terminology between the game designer and the player.
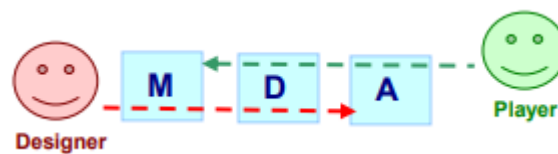
Figure 5: MDA communication Demonstration (Hunicke et al. 2004)

"From the designer's perspective, the mechanics give rise to dynamic system behavior, which in turn leads to particular aesthetic experiences. From the player's perspective, aesthetics set the tone, which is born out in observable dynamics and eventually, operable mechanics." (Hunicke et al. 2004). The aesthetics were then categorized into 8 core vehicles for games and why we play them. The three most relevant to this project being Narrative (where games serve as drama), Expression (where games serve as self-discovery), and Challenge (where games serve as an obstacle course). The MDA Framework neatly contextualizes the design process with a clear goal in mind, and vocabulary to express said goal.

2.4 Mechanics Case Studies

With the mechanical research complete, the next step in mechanical design was to explore and analyze released video games which handle similar topics or are renowned for inducing a form of stress within their players.

2.4.1 Amnesia: The Dark Descent

Frictional Games' horror title "Amnesia: The Dark Descent" launched in late 2010 to critical acclaim (Frictional Games 2010). A key aspect which helped set Amnesia apart from its contemporaries was the sanity mechanic.

Originally, the sanity mechanic within Amnesia was a very quantifiable variable. The player had access to the numeric amount of sanity the playable character possessed and would see it drop down with time spent in the darkness or when experiencing horrific events and go up when drinking potions or progressing through puzzles (Grip 2014). This is very different to the system which eventually made its way into the final game in two key ways which increased the tension and stress experienced by players. The first step was taking away the numeric safety of the system, replacing it with an ambiguous visual representation instead. According to Grip, "It gives the player an informational gap regarding their current situation, making it harder to feel safe" (2014).

Figure 6: Stages of sanity in Amnesia: The Dark Descent (Grip 2014)

In addition to this, a visual representation was added as an overlay to the screen to give the player a "general feel for the descent into madness" and to "have an effect annoying enough to the player so that it wasn't a state they wanted to be in, but not so annoying that it made them quit." (Grip 2014).

The above aligns with Bura's emotional framework - the self-mastery being at a constant low level by not knowing the amount of sanity left leads to anticipation of failure, whereas low mastery of the system level caused by visual impairment and unpleasant noises leads to pretend danger, both with the ultimate effect of stressing the player out (Bura 2008).

As the sanity meter is an aspect directly linked to the health system, the key takeaways from Amnesia supported by Grip himself, is that managing multiple systems with limited information is directly responsible for a negative impact on player mood.

2.4.2 Papers, Please

"Papers, Please" is a 2013 award winning game by solo developer Lucas Pope (Pope 2013). In the game, the player assumes the role of a randomly chosen citizen-turned-immigration-officer for the fictitious, dystopian country of Arstotzka modeled after the Eastern Bloc. The game asks you to control which travelers attempting to gain entrance into the country will be allowed past the border using an ever-increasing amount of cross-checking rules against the traveler's documents all whilst using a purposefully clunky interface. The player's character gets paid daily, based on the number of persons allowed entrance into the country - regardless of their legitimacy. Though your pay varies, it is never quite enough to maintain your poor and sick family back home.

Figure 7: End of Day 8 Screenshot (Anon. 2014)

This naturally puts the player at odds with the varied goals the game presents. The player needs to maintain professionalism and let in the correct people by being thorough, however they also need to act quickly to ensure they are paid enough to support their family. This leads to several emotional responses such as dehumanization (Formosa et al. 2016) and stress (Gault 2013). To tie this in with Bura's model, the player is experiencing a constantly low mastery of the system level, leading to feelings of frustration and loss of trust. Whereas feelings of meaninglessness arise from low data at the systems level, feelings of discouragement and unfairness are formed through low mastery and data at the action level of the player.

2.4.3 Roguelikes, permadeath

Permanent loss is one of the defining features of the increasingly popular genre of roguelikes (or their ever-similar offshoot roguelites) in which players perform "runs" separated by permanent death of a character (Mahardy 2014). Within some of these games, players unlock either new content for each new run, or simply gather knowledge to aid their performance on subsequent tries. Another key factor of these games is randomization, to avoid letting the player enter a routine, thus denying them comfort (Pruett 2016). This forces the user to constantly pay close attention and to be in a heightened state of anxiety (Ahn 2016). In addition, it forces each choice to be considered as important and to weigh heavily

on the player's conscience, as any wrong choice could result in permanent loss. This semi-constant state of emotional arousal raises heart rate, and keeps the player in a tense state, thus directly inducing a physiological response, which in turn keeps the cycle going by raising the heart rate and increasing tension (Pruett 2016).

2.4.4 The Walking Dead

Telltale's "The Walking Dead: Season One" launched in 2012 to widespread critical acclaim and received many awards praising the game's narrative and character development (Telltale Games 2012). In particular, the game's approach to the conversation wheel - a mechanic tied to older BioWare games, such as the Mass Effect series, where the player selected dialogue from a predetermined list of responses arranged in a circular fashion - was lauded as refreshing and upgraded (Gaudette 2017). What Telltale did to update the conversation wheel can be seen in two fundamental ways. Firstly, most key narrative moments feature a visible timer that ticks down, greatly limiting the amount of time a player has to pick a response. Previous games which employed conversation wheels or other such systems allowing the user to make dialogue choices would pause the game until a choice was selected. This allowed for careful planning and decision making. By including a timer, the player has little chance to consider the best course of action and is often forced to make narratively permanent, impactful choices based on instinct rather than calculation (Williams 2018).

Figure 8: Telltale's narrative wheel (Gaudette 2017)

This timer mechanic is combined with a single line of text displayed towards the upper left of the screen to turn the conversation system into a truly emotion-evoking experience. Occasionally, when the player makes impactful choices during an exchange, the text "[Character the player is speaking to] will remember that". This clear white font informs the player that the choices they commit to will have an impact. It is not clear what exactly the character will remember - whether the player's response, wording, tone, or actions will be considered in future story developments. This uncertainty combined with the additional misdirection of this text not showing up when consequential choices are being "unsettles the player and keeps them on their toes" (Smethurst and Craps 2014).

All five episodes of The Walking Dead begin with the trademarked Telltale introduction screen - white words on a black background stating that the game reacts to the choices you make, and that your actions will have direct consequences on the game itself - as can be seen in Figure 9 below.
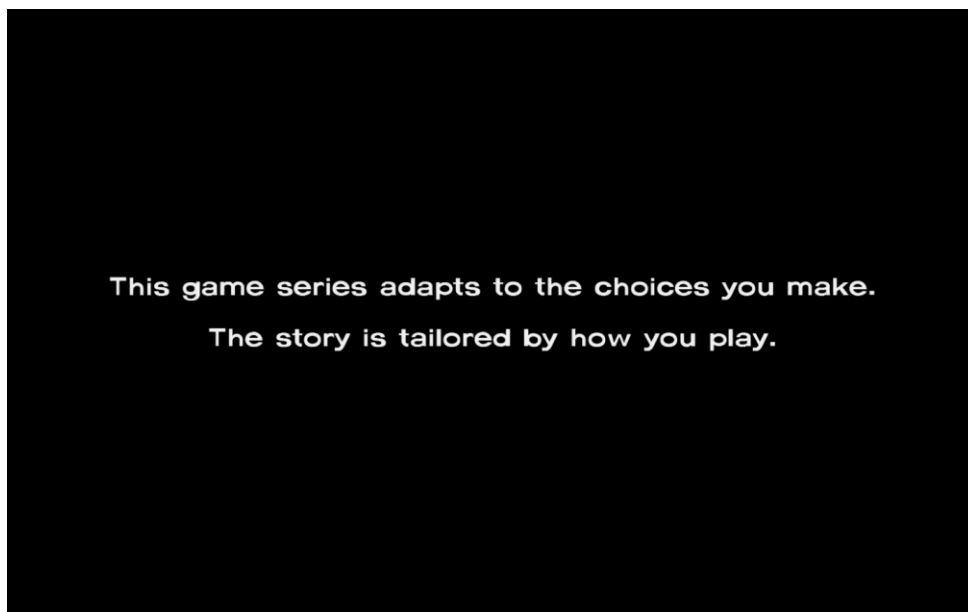

Figure 9: Telltale Games Introduction Screen (The Scientific Gamer 2012)

This introduction message is only true to an extent however. As can be seen from the visual guide for The Walking Dead: Season One created by GamesBeat, ultimately none of the choices lead to a different conclusion, and in most cases only split the narrative momentarily (GamesBeat 2013).

3.0 Design

3.1 Introduction

This section of the report incorporates the research from section 2, alongside new research into player types, in order to support the design of a playable prototype to elicit an anxious response from players.

3.2 Player Types

It is in our nature to play. Our culture is formed on play and evolves as play thrives (Huizinga 1955). Play as a concept spans across all ages, demographics and groups and can be adapted to fit most situations which involve a list of rules. This list of rules and existing within it was coined "the magic circle" by Erik Zimmerman in 1999 and popularized by Zimmerman and Katie Salen in their 2003 book "Rules of Play" (Salen and Zimmerman 2003). The magic circle refers to a space in which everyday world rules are suspended and replaced by an artificial game world reality. Entering the magic circle occurs when the game begins, which in turn occurs "[...]when one or more players decide to play" (Salen and Zimmerman 2003). Players enter play for various reasons and motivations, and whilst designing it is important to keep those in mind to alienate the smallest number of potential participants. This is difficult, as "games in general have both systems and stories, [and] different approaches to game design can emphasize one or the other element, especially when it comes to moral themes and skills. This difference in emphasis leads to two different approaches to game design" (Juul 2002).

The potential issue with a systemic design paired with a semi-narrative goal of eliciting emotional responses comes from the various player types. Zimmerman and Salen explore this by touching upon the various types of games and why one would engage with them. Three core types that align with this experiment to be considered are:

1. Games as Play of Pleasure
2. Games as Play of Meaning
3. Games as Narrative Play

(Salen and Zimmerman 2003)

Whilst there are other types, and none of the above are exclusive (any game can be a combination of any of the types), they provide a basic framework of the different types of play. Two types are of particular interest, those being meaning and narrative. Play of pleasure is mentioned mostly as an unachievable status in the context of this experiment - it is unlikely players will derive pleasure from a system specifically designed around evoking stress and anxiety. It is important to mention, however, as pleasure is one of the key reasons people play games, and the lack of it can severely impact on the player's interaction and immersion.

This leaves Play of Meaning and Narrative Play as the two key types to focus on. Play of Meaning, according to Zimmerman and Salen, states that there is a direct relationship between games and representation, which can be thought of in two ways; "games can represent" and "games are representations" (Salen and Zimmerman 2003). Games can represent by creating depictions, whereas games are representation when an idea is conveyed by a game - for instance Pong, one of the first video games ever, is a representation of Table Tennis. Narrative Play chooses to focus on the story above anything else. The example used within Rules of Play portrays this cleanly - "[...]the card game War [is] an epic battle between the forces of good and evil, waged with a deck of cards and the laws of probability." (Salen and Zimmerman 2003). Both of these topics are very relevant to the experiment created for this study as they relate to portraying representations of real-life phenomena (in this case anxiety) and being able to form a narrative from seemingly unrelated gameplay mechanics and systems.

However, this all connects to the players mentioned above. People play games for various reasons, and some types of players find it easier to connect with certain types of games than others. Though studies such as Ferro's 2018 analysis of players' personality type and preferences for game elements and mechanics have failed to find conclusive evidence that player personalities affect their game preferences (Ferro 2018), it is important to be aware that many studies have looked at various player types trying to find a correlation between their personality with mechanics. Kocadere's and Çağlar's 2017 study considered gamification from the perspective of four player archetypes (originally established by Richard Bartle in 1996) - killers, achievers, socializers and explorers. This study also arrived mostly at inconclusive results, however, amongst other things, the researchers found that players might exhibit characteristics different from their player type depending on the design features of the game environment (Kocadere and Çağlar 2017).

3.3 Research summary

When it came to designing the mechanics of the experiment it was crucial to consider the anxiety triggers listed in section 2.2, and combine them with the research on mechanical storytelling and emotion through gameplay from sections 2.3 – 2.4. Before this could be accomplished, a short set of principles were noted down to aid in the design process. Figure 10 below is the original list of notes created:
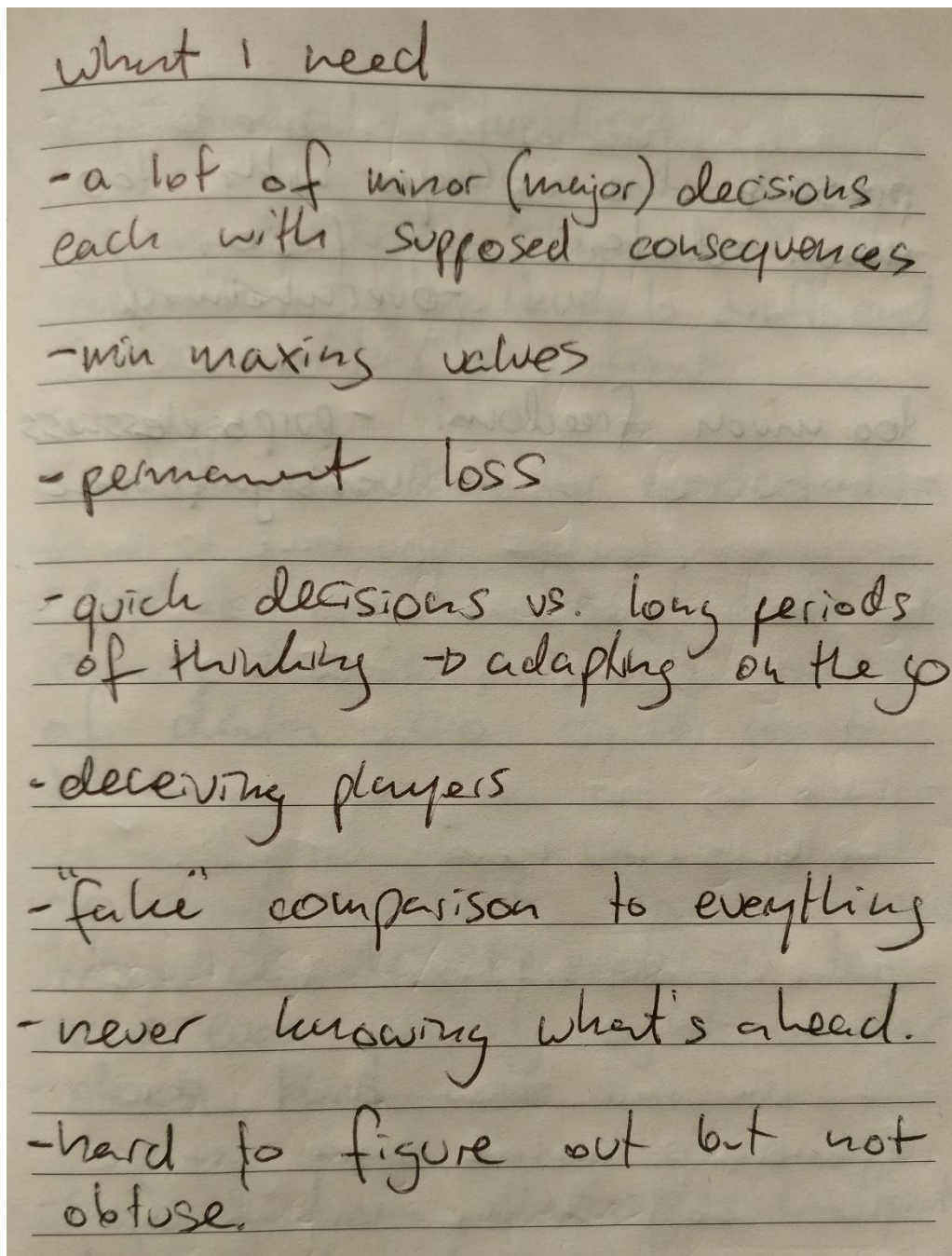

Figure 10: Scan of notes taken during initial design phase

Applied to Bura's terminology the prototype had to present the player with the following key emotions, which will be referred to numerically as "emotion [#]" throughout the rest of this section;

1) Unpredictability
   a) Provide the player with negative feedback
   b) Have the systems be inconsistent/random on purpose
   c) Present involuntary gameplay switches
2) Caution
   a) Player constantly taking risks
   b) Misdirecting affordance
3) Anticipation of failure
   a) Pretend danger present
   b) Player perceives the game to be cheating
   c) Present opportunities for recurring mistakes
4) Overwhelmed and confused
   a) Too much data
5) Purposelessness/insignificance
   a) Too much freedom

These five key feelings are in reference to the anxiety triggers discussed in section 2.2 and will be used to try and elicit the feeling in participants. With enough backing research to support the design of individual mechanics, initially some pages of notes were created which can be seen in Appendix 8. The notes focused on a simulated "social" experience, where the player exists in a virtual space with four named characters. Although they are not instructed to do so, it should be apparent that the goal of the game is to befriend these four characters. Players can earn friendship with each individual character by engaging in a conversation minigame, which can only be executed once per in game day. The player has 30 of these in-game days to increase their friendship as much as possible. At the same time, they are indirectly competing with two other fake players, which usually perform better than the player can. The player's friendship with each character can be seen in the form of UI sliders which increase or decrease depending on the conversation. As in-game days progress, mechanics to stress the player out will be introduced - such as a timer or stamina meter. The goal is to overwhelm the player with the amount of information and choices but guide them enough so that through paying close attention the system can be figured out.

The game needed to take place from a first person perspective to avoid playing as a character but rather through the eyes of a player-turned-character which greatly increases immersion (Denisova and Cairns 2015).

3.4 Mechanics Definition

Following on from the above, eleven key mechanics were established that were used in the final version of the prototype and the survey. Below is a description of and reasoning for each mechanic.

	Mechanic # and Name	Mechanic Description	Mechanic Reasoning
System 1	Mechanic 1: Mouse Button Mashing	The player will have to "mash" a displayed mouse button as quickly as possible to keep the conversation going.	This mechanic represents "engagement" in a conversation. Much like the visible timer in The Walking Dead discusses in section 4.4, it causes the player to think less rationally. In addition, as the resource continuously ticks down the player anticipates failure, and knows that ultimately there is nothing that can be done to prevent it. This leads to long time stress over the duration of the prototype.
	Mechanic 2: Mouse Scroll wheel	The player will occasionally have to use the mouse scroll wheel to maintain a flow of conversation.	This mechanic represents the "flow" of conversation. Maintaining flow and keeping engagement going simultaneously is very difficult to do due to how the mouse is designed. As mashing the mouse button visibly extends the duration of the conversation, players will choose to focus on the engagement meter,

			rather than the flow meter, despite the fact that the flow is more important during score calculation. In this way the game misdirects affordance.
	Mechanic 3: Key Inputs	The player will have to press a keyboard key every couple of seconds from a limited group of keys.	This mechanic represents "responding" during a conversation. This is yet another thing the player has to keep track of, however it changes on a daily basis. The player not only has to respond quickly enough, but also remember what keys were correct to press on each day. The System Data is too high leading to confusion and a sense of overwhelming.
	Mechanic 4: Topic Selection	The player will have to pick a topic of conversation before the conversation begins.	In terms of scoring, the topic selection is worth very few points. However, the topic is the only easily readable and recognizable idea presented to the player - in that it is formed of english words one would use in conversation rather than abstract portrayals - in addition the topics discussed in-game show up in numerous areas, making the player believe they are more important than they really are. Picking a topic is one of the only times in the game with no timing constraint, where the player is left time to think. This involuntary gameplay switch leads to unpredictability and over-analysis.

	Mechanic 5: Characters Having Human Names	The characters the player talks to have human names which are used throughout the prototype.	Giving the characters names humanises them and contextualizes any attachment the player may experience.
System 2	Mechanic 6: Daily Timer	From day 5 onwards a timer limits how much time the player has to complete their daily tasks.	As discussed in section 4, time has a large impact on our decision making. This leads to a constantly low Action Mastery, leading to discouragement and hopelessness, as well as fear and powerlessness. It also gives the player no time to prepare, keeping the System Data very low - thus causing feelings of meaninglessness and apathy.
	Mechanic 7: Stamina Meter	From day 8 onwards the player will have limited stamina to walk around the level and approach the characters.	This mechanic partially represents how engaging in a conversation can be exhausting and a strain on a person's energy. In terms of emotional impact however, is mostly another misdirection in affordance leading to caution (which cannot be managed due to the timer). The stamina meter is purposefully very generous and will rarely deplete fully.
	Mechanic 8: Character Death	On day 16 a random character will die, and the player will be unable to engage in conversation with them from this point forwards.	This mechanic isn't foreshadowed at all and the randomness of it occurring leads to feelings of unpredictability, accompanied by pretend danger. It can trigger the fight/flight response in participants as they start to suspect more permanent changes to game (which never come).

	Mechanic 9: Update Log	Every major event that occurs in the game will be sent to an update chat log system for the player to have an overview of what has happened.	The update log tracks everything going on, giving the player constant negative feedback since the other players are usually performing better. This also leads to a perception that the game is cheating, causing an anticipation of failure. Additionally, it overwhelms the player with data, without giving enough time to study and understand it all, leading to long term stress.
System 3	Mechanic 10: Players 2 and 3	There will be two computer-controlled players indirectly competing with the participant. They will be able to score but will not exist visually aside from the Update Log.	Much like the update log, the other players lead to negative feedback and perceived game cheating. As the player is negatively affected by this, they open themselves up for opportunities for recurring mistakes. By providing a low social mastery it leads to feelings of hate. The low social freedom additionally causes peer pressure.
	Mechanic 11: Typing "ok" to Acknowledge Worse Results	When both Player 2 and Player 3 have achieved a higher score at the end of the day, the player will have to acknowledge this by typing "ok".	This mechanic leads the player to reflect on why they're performing so badly and what they could be doing better. It is the other time during the prototype where time freezes, giving the player time to think and reflect, in a very negative context. Due to the random nature of Player 2 and 3 scoring, the player can't actually improve and get better or avoid this screen. This causes feelings of guilt and further anticipation of failure.

Table 1: Explanation and Justification of Mechanics

3.5 Prototype Design

These mechanics were combined into a comprehensive prototype design. The player had 30 in-game days to try and maximize friendship with four characters, whilst two other fake players competed with them. Everyone's performance was logged in a Chat/Update Log window displayed at all times in the prototype's User Interface (UI). Players would be left to discover the relationships between mechanics on their own, with very little guidance provided.

4.0 Implementation

4.1 Introduction

This section covers the implementation of the aforementioned mechanics into a playable prototype, to be used in conjunction with a survey to conduct the experiment and test the proposed hypotheses.

4.2 Software Used

The implementation of the above design was executed using the Unity engine [Unity 2018.3.13f1] via both Windows and Macintosh operating systems serving as development, testing and deployment platforms. The prototype was coded using the C# language within Microsoft's visual studio [Visual Studio 2017 15.9.3]. In addition, online image editing software Photopea was used for sprite creation and editing (Photopea 2019). Unity's Collaborate service was employed as version control software, allowing for data backup, and simultaneous work to be executed across various computers (Unity Technologies 2019).

To kickstart development, Unity Content Team's "Standard Assets" package was imported into the project, giving access to some basic gameplay functionality - mainly the first-person character controller. (Unity Technologies Content Team) A description of implementation of each mechanic from section 3.4 can be found in section 4.3.

4.3 Developed Mechanics
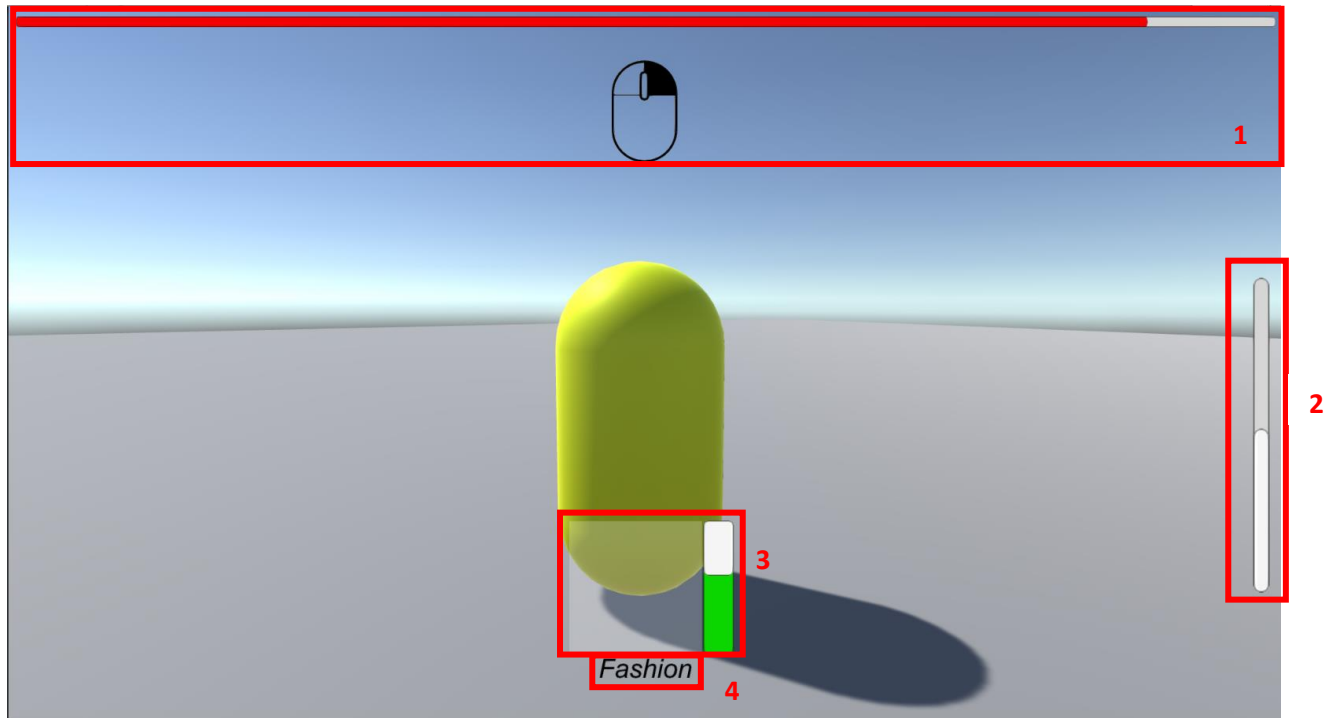
4.3.1 System 1: Conversation System

Figure 11: Screenshot of Conversation System in Finished Prototype

Figure 11 is an in-game screenshot of the conversation system in the final version of the prototype. Elements of the UI are highlighted with a red box and number, and description for each system are found below.

1) This is the implementation of the Mouse Button Mashing mechanic. The red bar at the top of the screen reduces continuously. If it reaches 0, the conversation is over. The player can extend this bar by rapidly pressing the indicated mouse button, although this will only slow the decrease and not prevent it.

2) This is the Mouse Scroll Wheel mechanic as a Flow Slider. Every now and then an arrow on the side of the Flow bar will indicate a direction for the player to scroll the mouse wheel. Once they reach the invisible threshold this indicator will disappear, and the player will be "in flow".

3) This is the area used for the Key Inputs mechanic. Every two seconds the green bar will count down, during this time the player is meant to press a keyboard key as indicated by the Friendship Panel which opens before conversation starts.

4) This line of text simply displays what topic of conversation is currently being

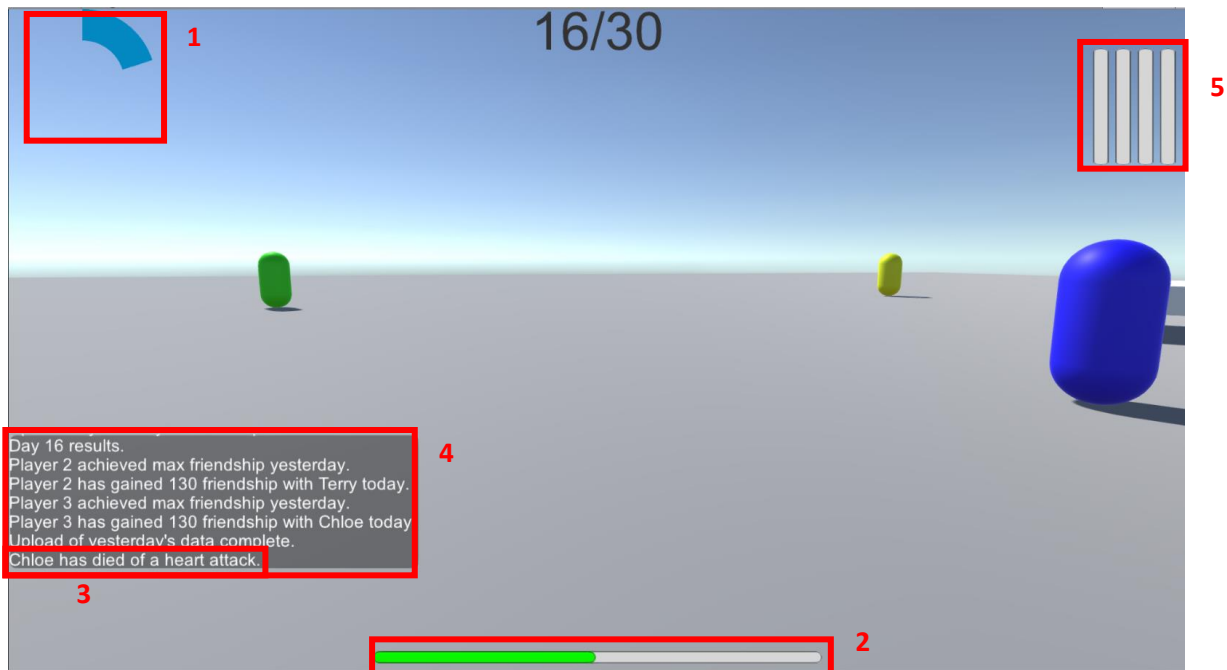discussed.

4.3.2 System 2: Daily Mechanics

Figure 12: Screenshot of Prototype

Figure 12 is an in-game screenshot representing the daily mechanics which occur outside of conversation. The red highlighted mechanics are explained below;

1) This mechanic is the Daily Timer. Active from day 4 onwards, it is a visual representation of how much time the player has left in a day. Once the timer reaches 0 the player's character "passes out", the player loses any friendship points earned, and the next day starts with the timer ticking down anew.

2) The green bar towards the bottom is the Stamina Meter. This mechanic is active from day 8 onwards and limits how far the player's character can walk. The meter running out causes the same effect as the timer running out.

3) The Character Death mechanic is only triggered on the 16th day. One of the characters dies and is permanently removed from the prototype for the remaining 14 days. No players can earn friendship points with that character.

4) The Update Log informs the player of everything going on within the prototype's systems. This ranges from the grade and friendship each

player achieved and with whom, to the events which occur during the prototype playthrough. The fake players only exist within this space.

5) This is a visual representation of each character's Friendship meter. The meter goes from 0 to 1000 and indicates to the player how much progress has been made with each character. The sliders are colored the same as the respective character.

4.3.3 Miscellaneous Systems

If the real player performs worse on a given day than both of the fake players, the screen shown in figure # is displayed upon the day ending. The only way to progress past this screen is to type "ok" into the space provided.
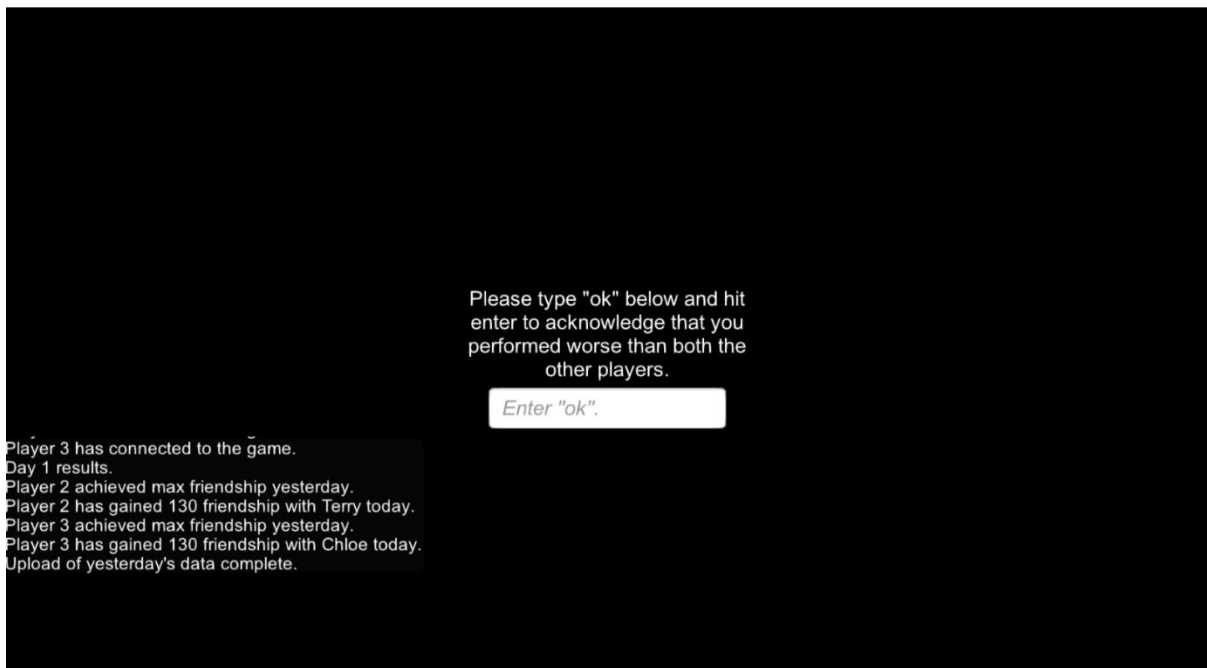
Figure 13: Screenshot of achieving lowest score

The last system which needs mentioning is the Friend Panel. This panel shows up for 5 seconds every time a player tries to initiate a conversation with a character – only if they talked to the character at least once before. The panel can be seen in Figure 14, with descriptions of each numbered mechanic following.
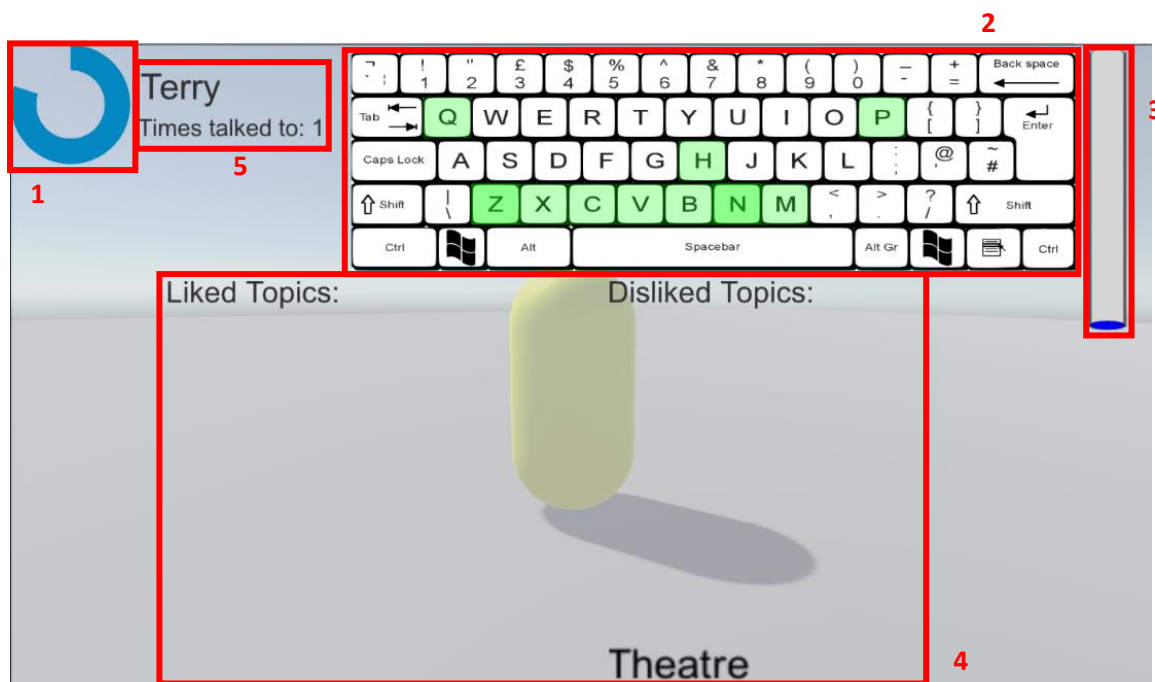
Figure 14: Friend Panel UI

1) This indicates how much time is left for the Friend Panel to remain open. The player cannot close the panel themselves, as they have 5 seconds to study the panel for information.

2) This image indicates to the user what keyboard keys can be used in the Key Inputs mechanic during conversation. These change every day and differ from character to character.

3) The slider to the side is simply an enlarged slider from the standard UI showing how close the player is to completing friendship with the chosen character.

4) At the end of every conversation, the topic discussed is either liked or disliked by the character. This section of the Friend Panel shows the player whether the character likes talking about certain previously discussed topics (increasing score) or doesn't (decreasing score). However, this information is only displayed on subsequent days.

5) These two lines of text are for character information – displaying their name and how many times the player engaged in a conversation with this character.

4.4 Design Process

Figure 15: Iterative Design Process (Fullerton 2006)
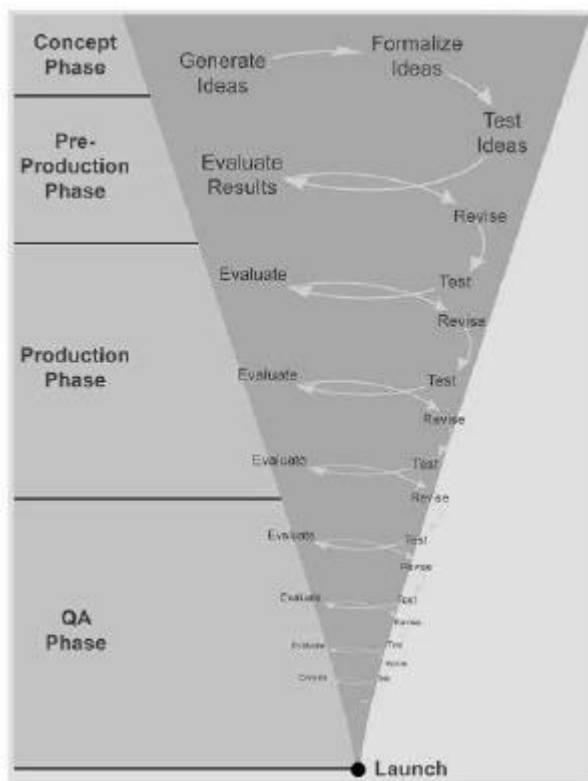
An iterative design process was employed throughout the duration of development. This process relies on continuously testing, evaluating and revising ideas. Due to the usage of this process, many minor and major design decisions were spotted and improved throughout development. As each mechanic was prototyped, only through play testing would it become apparent whether the mechanic worked or if it had to be altered.

4.5 Game Flow

Figure 16 represents a flow chart of the entirety of the prototype playthrough from a participant's perspective.
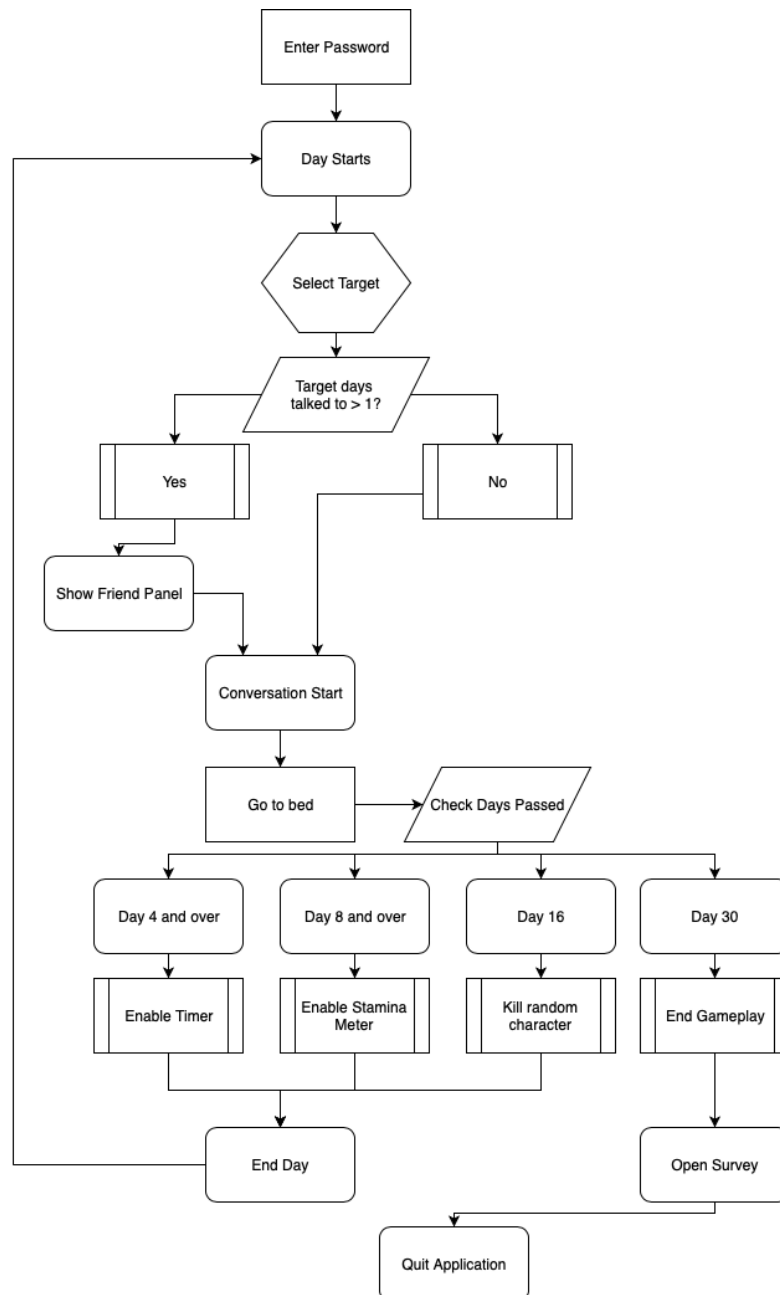

Figure 16: Flow Chart of Prototype Playthrough

5.0 Methodology

5.1 Introduction

The following section will cover the non-development part of the project, from survey creation to the experiment proceedings.

5.2 Survey Questions

The survey was hosted by an online service "SurveyHero". This service was chosen as it was amongst the only services that enabled the researcher to use more than 10 questions within its free package. Additionally, the overall layout and design of the service was easier to use than other services tested at the start of the project such as SurveyMonkey or Google Forms.

The questions were written in a way to assist in answering the hypotheses later discussed in section 7.1. A combination of quantitative and qualitative questions was used. The questions were arranged into groups to flow neatly for the participants. The full survey can be found in the Appendix 3.

5.3 Participant Sampling

The participants for this study were acquired via a combination of convenience, snowball and expert sampling. As participants for the study had to be familiar with video games, most of the participants acquired in the final study came from targeted sampling. Qualifying persons were contacted personally to take part in the study at a time of convenience. Additionally, the link to the experiment was shared on relevant social media channels - personal Twitter and LinkedIn profiles, official game developer Discord servers, and game industry slack channels. Lastly, the survey was shared on online survey sites where users can receive participants by participating in other studies themselves. SurveyCircle and SurveyTandem were the two services used for this purpose, where it was explicitly stated that only users who have played video games before should take part. REFERENCE SURVEYCIRCLE AND SURVEYTANDEM.

5.4 Ethics and Risk Assessment

Before the experiment began its design and development stages, ethics and risk assessment forms were filled out. These can be found in Appendix 2. Due to the sensitive nature of this experiment, these documents were especially important. The end of the survey included a debrief to cover the focus of the study and explain relevant details to participants. This debrief can be found in Appendix 4.

5.5 Experiment Flow

Initially, participants were sent a link to the Participant Information Sheet - the tiny.cc service was used to shorten the link and make it more accessible, easier to remember, and quicker to share. REFERENCE TINY.CC Upon typing this URL into their browser, the potential participant was taken to the participant information sheet uploaded to the researcher's google drive. The participant information sheet can be found below in Appendix 1. The participant sheet covered all relevant basic information the participant needed to be aware of, without communicating information regarding the nature of the experiment itself and thus potentially influencing the result. The bottom of said information sheet contained two download links for the executable Unity Prototype - one for Windows operating systems and one for the Macintosh operating system. As downloading the folders cannot be executed accidentally, the user is informed that by doing so they consent to participate in the study. There was also an additional safeguard put in place to confirm their consent at a later point in the experiment.

Once downloaded, the participant had access to the executable and the Readme file. The participant was instructed to go through the Readme file in the Participant Information Sheet - without reading it they cannot enter the password necessary to access the prototype.

Upon launching the game, the participant is met with a black screen asking for a password input. The password is obtained within the Readme document, downloaded alongside the executable. The purpose for the password is twofold. Firstly, by inputting a string of numbers the participant explicitly gives consent to participate in the study. Access cannot be gained randomly and without ignoring the experiment procedures, which is a workaround for an online experiment without the researcher present to provide a form to sign. The secondary function of the password is to ensure that each participant has paid

attention to the readme document, as the prototype itself contains no tutorial or instructions. The Readme document also explicitly states that a participant can stop the experiment at any time and for any reason by hitting the "ESC" key on their keyboard and selecting the "Quit Game" option.

If a participant selects the Quit Game option, the game executable closes, and their default web browser opens with the survey loaded. If a participant reaches the end of the prototype, the same process takes place.

5.6 Limitations

There were some key limitations that prohibited the Methodology from reaching its full potential, which should be addressed for any future study. As the experiment was delivered online, the results are less reliable than if the experiment were conducted in person. Participants couldn't ask questions, and didn't behave in experiment conditions which produced different answers than if that were the case. It can be assumed that many participants took part in the experiment whilst in a loud, distracting environment rather than dedicating their full attention to the study. The experiment was carried out online in order to gather a large sample size, but ended with the rather low amount of 30 data points. A larger sample size would produce more interesting and statistically significant results.

In addition, the survey often asked participants to self-diagnose themselves which by nature produces less reliable results as the results are skewed and biased.

Lastly, the Readme turned out to be insufficient guidance, as many participants got confused and quit the experiment early. Running the experiment in person would have helped this issue, however an in-prototype tutorial would have led to better results, and a better overall experience for those taking part in the study.

6.0 Results

6.1 Introduction

This section will cover the general results achieved by the survey. The sample size consisted of 30 participants who engaged in the experiment and completed the survey, and their combined answers are displayed in the section below. The full report with all answers can be found in the Appendix 9.

6.2 Survey Questions

The first four questions of the survey were focused on gaining basic information about the participants themselves, asking for their age, weekly average of hours spent playing video games, their preferred gaming genres and whether they enjoy stressful games.

Q1) What is your age range?
Number of responses: 30

35 to 44: 3x chosen (10.00%)

18 to 24: 14x chosen (46.67%)

25 to 34: 13x chosen (43.33%)
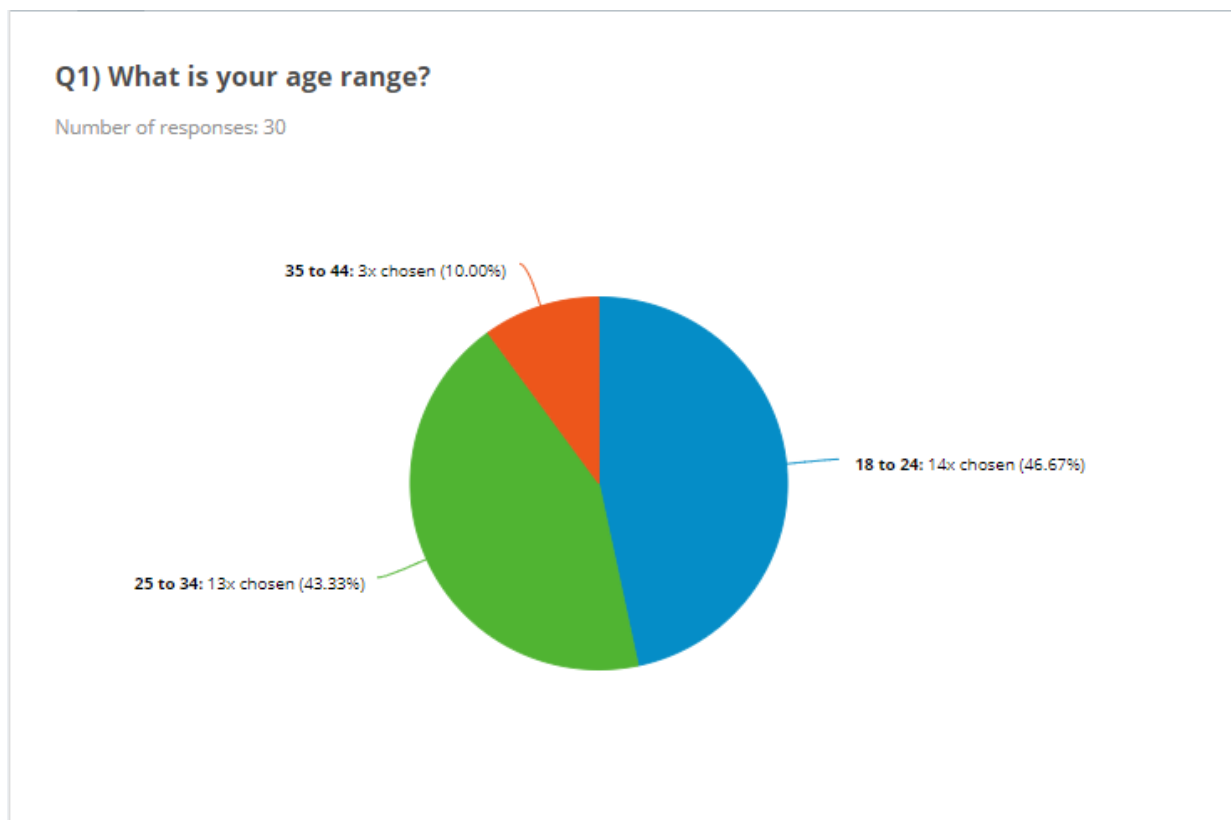
Figure 17: Results of Question 1

Q2) How many hours per week on average do you spend playing video games?

Number of responses: 30
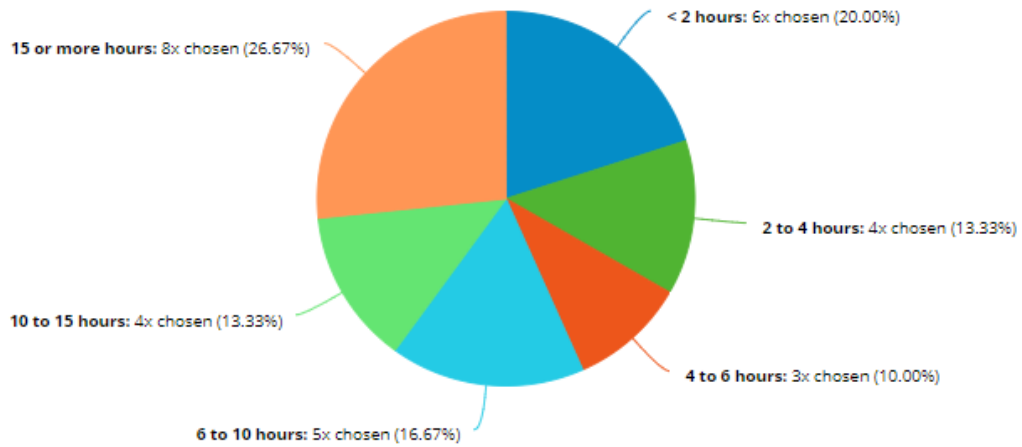
Figure 18: Results of Question 2

Q3) What genre of games do you play the most?

Number of responses: 30
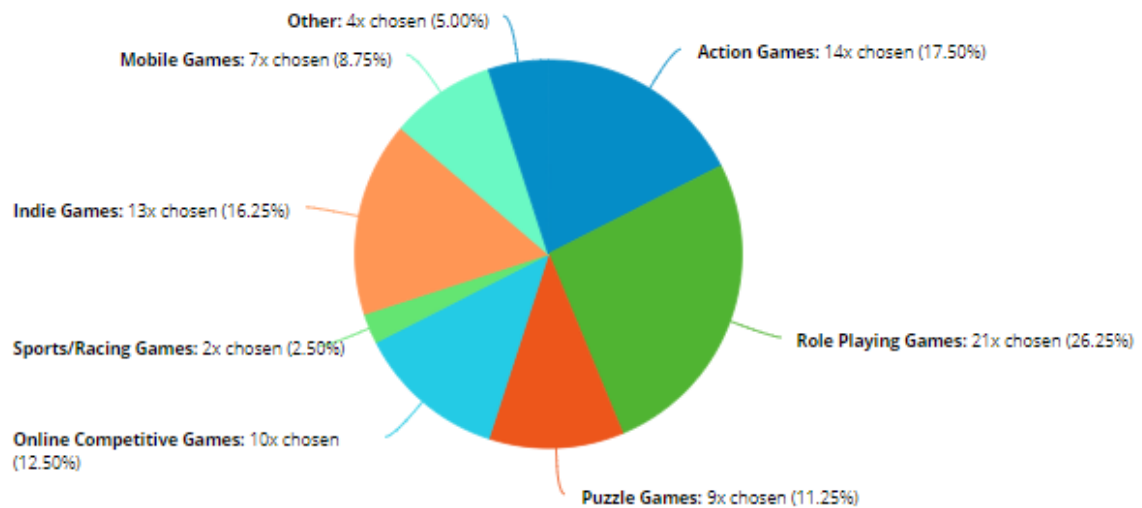
Figure 19: Results of Question 3

Q4) Do you typically enjoy stressful / difficult games?

Not at all (1)	Rarely (2)	No Preference (3)	Frequently (4)	Always (5)	Mean	Standard Deviation
2 (6.67%)	13 (43.33%)	2 (6.67%)	10 (33.33%)	3 (10%)	2.99	1.2

Table 2: Results of Question 4

The next four questions were general questions about the prototype. Whether the participant knew what the experiment was about - since many participants were in contact with the researcher before the prototype was finished they would know what the experiment was trying to accomplish. Whether they played till the end (Day 30), and if not how come, and lastly to explain the experiment in their own words.

Q5) Did you know what the experiment was about before taking part?

Number of responses: 30

No: 14x chosen (46.67%)
Yes: 16x chosen (53.33%)

Figure 20: Results of Question 5

Q6) Did you get to the end of the prototype (Day 30)?

Number of responses: 30

No: 10x chosen (33.33%)

Yes: 20x chosen (66.67%)
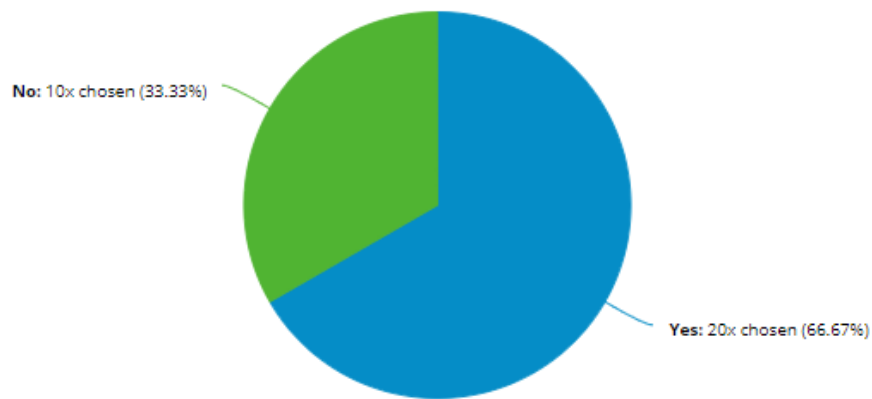
Figure 21: Results of Question 6

The responses to questions 6i and 7 can be found in the Appendix 9.

The next two questions related to the individual mechanics in the prototype and to what extent - if any - they elicited an emotional response.

Q8) Rank the following mechanics in terms of emotional impact during your time playing the prototype

Number of responses: 30

Rank	Choice	Distribution	Score
1.	Mouse Scrollwheel - Flow Slider		211
2.	Mouse Button Mashing - Engagement Slider		207
3.	Daily Timer (From Day 4 onwards)		190
4.	Typing "ok" to acknowledge worse results		190
5.	Key Presses - Giving Responses		159
6.	Player 2 and Player 3 competing against you		158
7.	Death of a random Character (Day 16)		149
8.	Topic Selection		135
9.	Characters having human names		128
10.	Stamina Meter (From Day 8 onwards)		123
		Lowest Highest	

Figure 22: Results of Question 8

The response to question 9 can be found in the Full Report of Answers in Appendix 9.

The next two questions dealt with key emotions experienced by players within a general and more specific context.

Question 10 was designed in order to allow the researcher to perform social science coding on all 30 participants, in order to group them into categories to enable further analysis. The question asked participants to describe what feeling they experienced the most during the prototype. Based on the language expressed participants were placed into one of four groups based on perceived key emotional response;

1. Stress
2. Frustration
3. Stress and Anger
4. Other

To achieve this split of results, each response was studied for words relating solely to feelings/emotions. This was then matched to the above four groups to best place a participant within a group.

12 participants identified stress as they key emotion experienced (40%). 9 experienced frustration the most (30%). 3 used language evocative of both stress and anger (1%) raising the total of the stress group to 15 (50%) and the frustration group to 12 (40%). The remaining 6 participants (10%) chose other emotions such as upset, confusion or tiredness. The most common keywords for the first group were "stress"/"stressful" and "pressure", whereas the most common keywords for the second group were "frustration" and "anger".
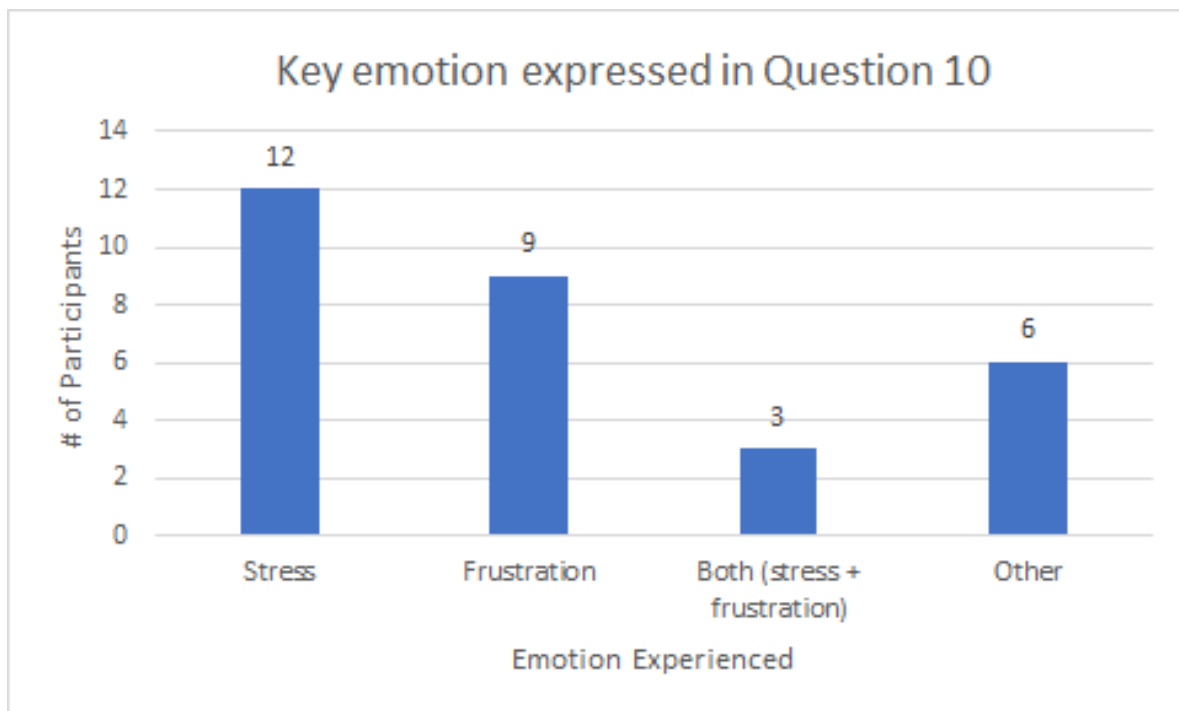
Figure 23: Social Science Coding of Question 10
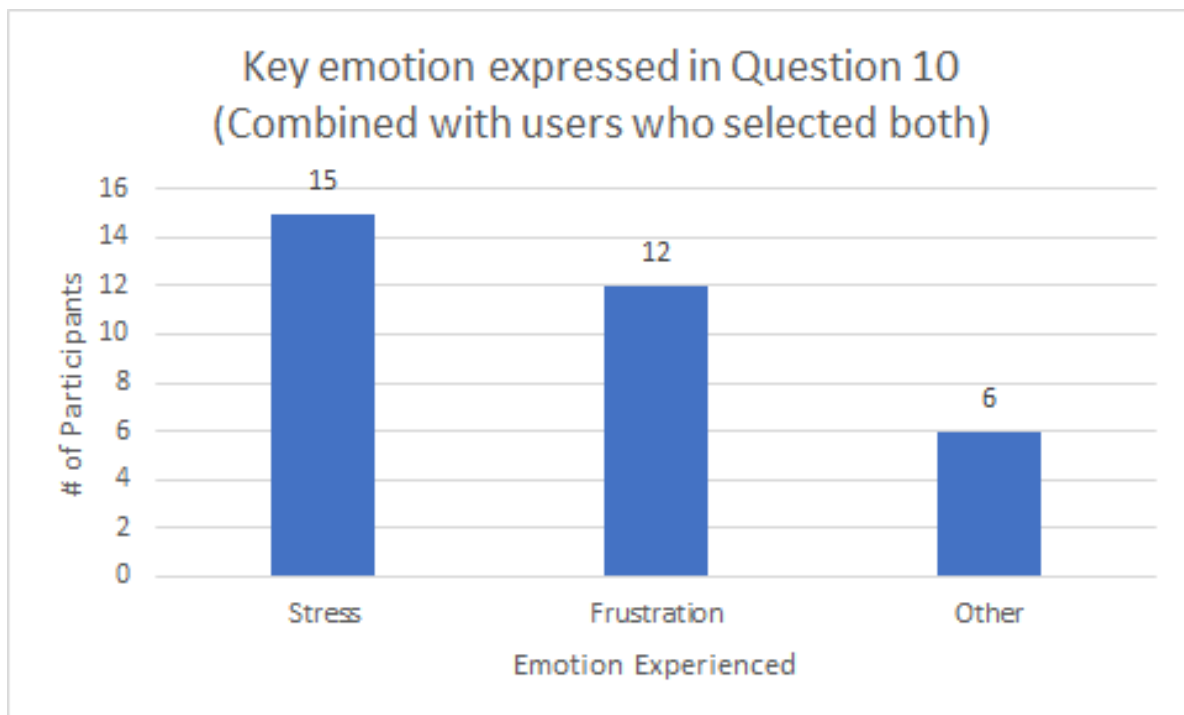
Figure 24: Combined Results of Question 10

Based on player type research from section (3.2), it can be assumed that participants experiencing frustration as the key emotion do so because they belong in the "Achiever" player type (Bartle 1996). A trend within their answers emerged stating that not being able to perform well, achieve a high score or "win" was the lead cause behind frustration - even though the prototype was presented with no context of winning or clear instructions, participants were simply asked to do their best. The stressed group can mostly be attributed to share qualities with the "Explorer" type due to their exploration of systems, paying close attention to detail and trying to solve the puzzle that was the prototype's conversation system. (Bartle 1996)

The next question was a series of Likert scales relating to how the participant felt about the experiment. Question 11 produced a lot of vital results as the overall stress levels, confusion, timing and feelings of the participants were gathered. 70% of participants agreed that the experiment made them stressed, whilst only 13% disagreed which was very important to achieve in the experiment.

The next question provided the participants a quick break from thinking about the experiment and their performance as it asked them to rank how important they think portraying narrative through mechanics is and whether or not games should pursue this

more commonly. Majority of participants agreed with both statements, as was largely to be expected.

The final three questions all related to the participant experiencing feels of anxiety. Each of the questions asked the participant to rank on a scale from -100 to 100 how anxious they feel/felt during the following situations:

1. Day to day life.
2. During the prototype.
3. During a hypothetical situation where the mechanics of the prototype would be implemented into a game supported with audio, narrative and game-like visuals.

7.0 Analysis

7.1 Introduction and Hypotheses

This section will apply the results from the survey to the established hypotheses and using statistical and descriptive analysis, evaluate their correlations.

There were a number of hypotheses established before the results of the experiment were collected. These hypotheses will be analyzed first. In addition to this, topics for future study have been identified through data analysis and will be discussed in section 7.7. The hypotheses are as follows;

1. Systems of mechanics can elicit emotions in players without audio/visual/narrative stimuli
2. Participants will experience anxiety whilst interacting with a purely mechanical gameplay system designed to elicit said emotion
3. Anxious players are more likely to feel anxiety as a result of playing the prototype
4. Goal oriented players are less likely to experience stress as a result of the prototype than non-goal oriented players
5. Lack of mental preparation is a key factor in eliciting stress within the confines of an interactive system

7.2 Hypothesis 1 – Systems of mechanics can elicit emotions in players without audio/visual/narrative stimuli

In order to address the first hypothesis, the results from question 11.a were analyzed, regarding to what extent the experiment made the participants feel stressed according to a Likert scale. The corresponding results can be seen below in Table 3.

	Strongly Disagree (1)	Somewhat Agree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)	Average	Standard Deviation
The experiment made me feel stressed	6.67%	6.67%	16.67%	30%	40%	3.9	1.19

Table 3: Question 11a Results

Of the 30 participants, 21 (70%) agreed at least somewhat that the experiment induced feelings of stress. Only four participants (13.3%) indicated a disagreement with the statement. These four participants each mention a different emotion than that of anger or stress as their answer to question 10. Additionally, two of the participants stated that they didn't complete the prototype due to misunderstanding the game.

Although the numbers from Table # show that the prototype was successful at eliciting a negative emotion, the survey's results also show that participants would have had a larger emotional impact from a fully polished game that did include audio, visual and narrative stimuli. This was found by comparing participants' answers to questions 14 and 15 which asked participants to rank their anxiety level during the prototype playthrough, and a hypothetical anxiety level if the prototype mechanics and systems were applied to a full game. Both questions asked participants to rate their anxiety on a scale from -100 to 100 with 10 value increments. The average anxiety levels as stated by participants for both questions can be seen below:

Q13) Average Anxiety during prototype	Q14) Average Anxiety in hypothetical game
14.0	32.6

Table 4: Average Anxiety During Prototype and in Hypothetical Full Game

The average anxiety levels as stated by participants increased by 232.86% in a supposed full game which employed the prototypes' mechanics and systems. Considering the above, whilst the hypothesis that mechanics can elicit emotion without audio/visual/narrative stimuli can be accepted, it is also suggested that it will not produce as

significant an impact as that experienced by the player of a full game utilizing the aforementioned mechanics.

7.3 Hypothesis 2 - Participants will experience anxiety whilst interacting with a purely mechanical gameplay system designed to elicit said emotion

One of the objectives of this study was to try and communicate to a player that does not suffer from an anxiety disorder, what living with one would feel like. To test this hypothesis, an analysis of questions 13, 14 and 15 was conducted. These three questions were in relation to three scenarios; a participant's (self-diagnosed) levels of anxiety within their day-to-day life, during participation of the experiment, and if the systems/mechanics present in the experiment were to be found in a fully developed video game. The charts for each of the questions can be seen below in figures 13, 14 and 15.

Q13) How anxious do you consider yourself in day to day life?

Number of responses: 30
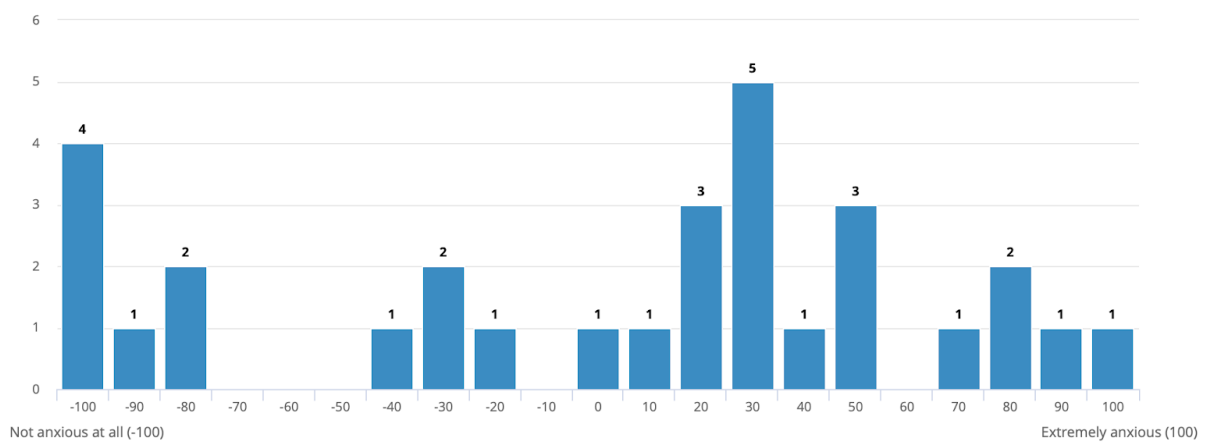
Figure 25: Bar Chart of Results to Question 13

Q14) How anxious did you feel during the Prototype?

Number of responses: 30
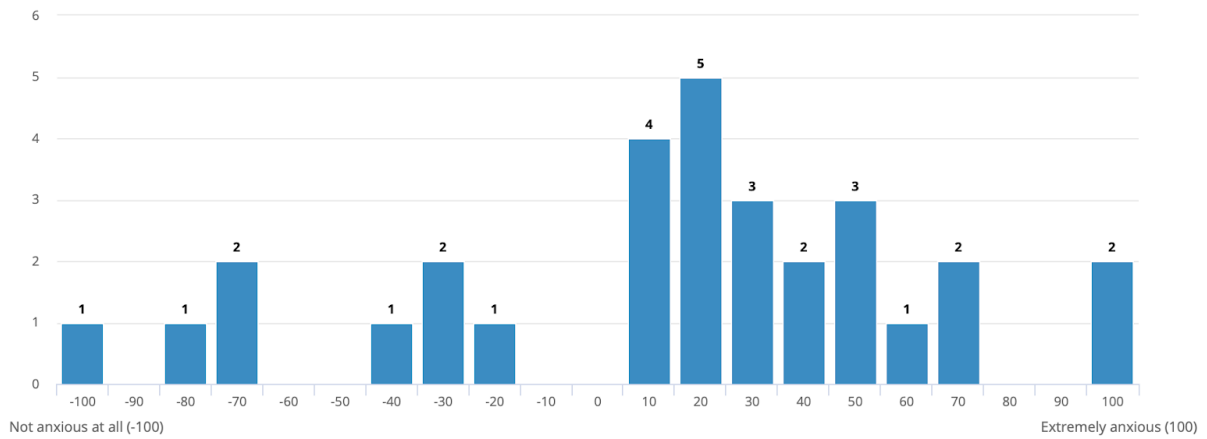
Figure 26: Bar Chart of Results to Question 14

Q15) How anxious do you think you would have felt if this prototype included fully animated and voiced human models, alongside sounds and visual polish?

Number of responses: 30
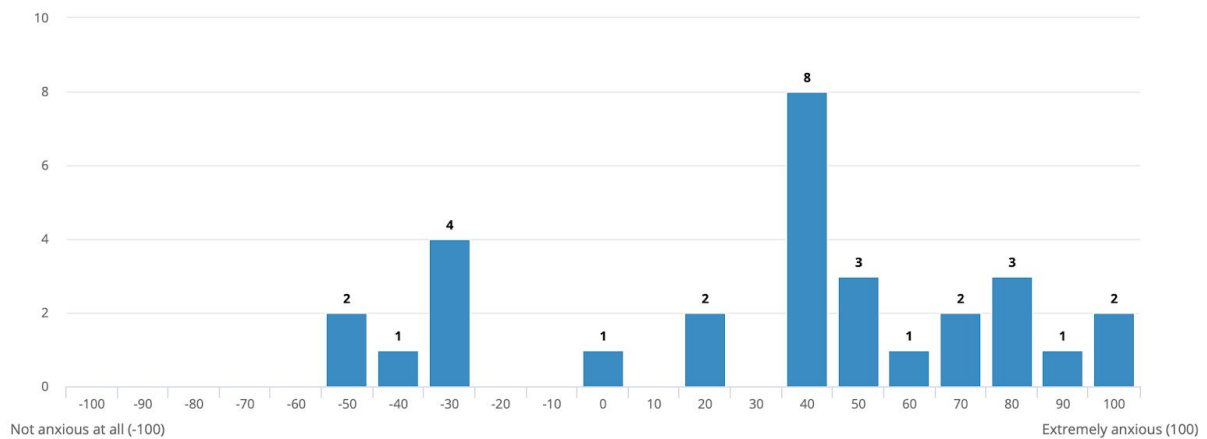
Figure 27: Bar Chart of Results to Question 15

From analysis of individual responses, participants were divided into three groups based on the numerical difference between their stated anxiety levels in questions 13 and 14, which was calculated by subtracting the values of question 14 from the value in question 13 (subtracting the daily anxiety from anxiety experienced during prototype playthrough). The grouping was either negative (anxiety decreased whilst playing the prototype), positive (anxiety increased whilst playing the prototype), or neutral (no change in anxiety between daily life and prototype playthrough was experienced). The full table of these calculations can be found in Appendix 10 although an example is provided in Table 5.

Example Results	Q13) Daily Anxiety (-100 to 100)	Q14) Anxiety During Prototype (-100 to 100)	Anxiety During Prototype - Daily Anxiety	Resulting Grouping of Participant
Participant A	- 80	- 20	60	positive
Participant B	50	10	- 40	negative

Table 5: Example Table of Anxiety Grouping per Participant

According to the aforementioned grouping guidelines, the number of participants in each group was as follows:

Group Name	Number of Participants
Positive	15
Negative	10
Neutral	5

Table 6: Total amount of participants per anxiety group

In addition, an effect size calculation was carried out between the positive and negative group to see how much the two groups differ from one another, and therefore how significantly the hypothesis can be rejected. The effect size was calculated using the Hedges' g calculation due to the sample size being different and smaller than 20 for both groups. The resulting g value is 2.15, indicating a significant standard deviation of 2.

Combining the g value of 2.15, and the positive group consisting of 50% of the total participants, the hypothesis can be rejected. Participants were asked to self-diagnose their anxiety which will yield vastly inaccurate results and reduce their validity. In addition to this self-diagnosis, it is expected that the results will vary greatly on a daily/weekly/monthly basis. As the study took place during a stressful time for many of its participants (May being the season of exams/university year ending), the results regarding anxiety may be inflated and higher than they normally would be (it should be stated that no question was asked about participant occupation/educational situation; thus, this is speculative based on how the

participant sample was acquired). Lastly, people often play games to relax, so they could be entering this experiment in a relaxed state of mind, reducing the anxiety that they would experience. No question was asked about the participants' average anxiety whilst playing games however, so again this can't be proven. With the above points considered, this hypothesis can be rejected.

7.4 Hypothesis 3- Anxious players are more likely to feel anxiety as a result of playing the prototype

For this hypothesis to be tested, players were divided into two groups based on their answer to question 13, that being "How anxious do you consider yourself in day to day life?". Users who selected an answer of 0 or lower were placed into the "non-anxious" group, whereas users who selected a score of 1 or higher were placed into the "anxious" group. Table 7 displays the number of participants in each aforementioned group.

Non-anxious	Anxious
12 (40%)	18 (60%)

Table 7: Amount and Percentage of Anxious v. Non-Anxious Participants

The average day-to-day anxiety of each group was then compared against the average anxiety experienced during the prototype. The results can be seen in Table 8:

	Non-anxious	Anxious
Average Day to Day Anxiety	-64.17	46.11
Average Prototype Anxiety	-13.33	32.22
Difference in Anxiety levels	50.83 increase	13.89 decrease

Table 8: Comparison of Average Daily Anxiety v. Prototype Anxiety

The results show an increase in anxiety amongst the non-anxious participants, whilst the anxious participants reported a decrease in anxiety.

In order to further test this hypothesis, the data of these two groups was used to perform two Paired Two Sample T-Tests to find a p-value for the non-anxious and the anxious groups. The results of the T-Tests can be seen in Tables 9 and 10 below:

Anxious			Non Anxious		
t-Test: Paired Two Sample for Means			t-Test: Paired Two Sample for Means		
	Variable 1	Variable 2		Variable 1	Variable 2
Mean	46.1111	32.22222	Mean	-64.1666667	-13.3333333
Variance	731.046	888.8889	Variance	1390.15152	3933.33333
Observations	18	18	Observations	12	12
Pearson Correlation	0.20838		Pearson Correlati	0.38229325	
Hypothesized Mean	0		Hypothesized Me	0	
df	17		df	11	
t Stat	1.64446		t Stat	-2.96146959	
P(T<=t) one-tail	0.05922		P(T<=t) one-tail	0.00647062	
t Critical one-tail	1.73961		t Critical one-tail	1.79588482	
P(T<=t) two-tail	0.11844		P(T<=t) two-tail	0.01294124	
t Critical two-tail	2.10982		t Critical two-tail	2.20098516	

Table 9: T-Test for Anxious Group   Table 10: T-Test for Non-Anxious Group

The tests showed that the non-anxious players produced more significant data than the anxious group which proved to be more random. Thus, the hypothesis can be rejected. According to this study, anxious players are not more likely to experience anxiety as a result of playing through a series of stressful, anxiety-inducing mechanics. Quite differently, it shows that anxious players had a reduction of anxiety during the prototype playthrough. Although no qualitative participant data was collected in order to explain this, it can be theorized that playing through a representation of a personal issue can be calming and supportive as it contextualizes issues for a player and increases their awareness of others suffering from the same problems. This reinforces that anxious participants are not solitary in their feelings, and as such could lead to an improvement in mood and a reduction in symptoms.

The rejection of this hypothesis somewhat supports the aim of the study, which was to raise awareness through inducing symptoms of anxiety amongst non-anxious participants. It can be theorized that now that non-anxious participants are more aware of the experience of anxiety by having taken part in an interactive representation of the social anxiety disorder, they are less likely to misunderstand its symptoms when presented in a situation where social anxiety arises.

7.5 Hypothesis 4 - Goal oriented players are less likely to experience stress as a result of the prototype than non-goal oriented players

From the aforementioned social science coding in section 6.2, participants were divided into three groups based on the key emotion they experienced during the prototype.

Emotion Group	Number of Participants
Stress	15
Frustration	12
Other	6

Table 11: Social Science Emotion Group Sizes

Participants belonging to the Frustration group were also assigned to a classification of being "Achievers" as per Bartle's taxonomy (Bartle 1996). This was due to many participants from the Frustration group expressing their inability to win or achieve a high score as a key focus of their experience in the answer to question 10. Players from the other groups mentioned different factors for experiencing emotions landing them in the "Explorer" group.

Achievers are players that are goal oriented by nature, hence this hypothesis was to test whether such players are less likely to experience stress due to their pursuit of completion, rather than emotional engagement with the systems.

None of the participants categorized as Achievers 'disagreed' in their answer to question 11.a – "To what extent does the participant agree that the experiment made them feel stressed". Only one participant chose the "neutral" option on the Likert scale, with the other 11 choosing "somewhat agree" or "strongly agree". By converting the answer options on the Likert scale to numerical values where "Strongly Disagree" is equal to 1, and "Strongly Agree" is 5, the average for the Frustration group, otherwise labelled as Achievers, is 4.25.

The Stress group had an average score of 3.8, whilst the Other group had an average score of 2.8.

According to these results, the Achiever group became the most stressed. This is supported by the answers to question 3, where participants indicated on a Likert scale how often they enjoy stressful games. Again, a numerical value was assigned ranging from 1 to 5

based on their answer. The Stress group averaged highest at 3.3, with the Other group in second place with an average of 3.0, and the Frustration group last with an average of 2.8.

This indicates that members of the Achiever group enjoy stressful games the least, and as a result scored highest on the average stress experienced during the prototype playthrough, thus rejecting the hypothesis and proving the opposite - goal oriented players are more likely to be stressed when interacting with the prototype. This is likely because they are failing to perform as well as they'd hope to which induces stress, rather than the content of the prototype itself.

7.6 Hypothesis 5 - Lack of mental preparation is a key factor in eliciting stress within the confines of an interactive system

The amount of information communicated to participants regarding the experiment was purposefully limited before and during the prototype gameplay. Since many stressors and a high degree of emotional impact arises from the unknown and uncertainty, where possible the participants' knowledge was kept to a minimum. This was done in order to test to what extent preparation and surprise can influence the eliciting of an emotional response the player.

Some participants were aware of what the experiment was about before playing through the prototype as they had been in contact with the researcher prior to participating. Others would have read about it in the participant information sheet and decided that this limited knowledge was enough to inform them about the nature of the experiment.

Question 5 asked participants whether or not they knew what the experiment was about prior to taking part. 16 participants selected yes, with the remaining 14 participants selecting no.

This formed the basis of the two groups of participants analyzed for this hypothesis. Firstly, the average response of each group was calculated in relation to question 11a - a Likert scale converted to a numerical value ranging from 1 to 5 (1 being the lowest and 5 the highest) as to how stressed each participant felt. The results are in Table 12 below:

Unaware Group	Aware Group
3.57	4.19

Table 12: Average Stress Scale for Unaware v. Aware Group (1-5)

These results show that the group which knew what the experiment was about beforehand was more stressed on average. It's interesting to combine these results with those from Question 6 where participants indicated whether or not they finished the prototype (by reaching and completing day 30). These results are shown below in Table X.

Aware and Finished Group	8 (50%)
Aware and Not Finished Group	8 (50%)
Unaware and Finished Group	12 (85.7%)
Unaware and Not Finished Group	2 (14.3%)

Table 13: Participant Split Between Unaware v. Aware Group Divided Into Finished v. Not Finished

A much larger proportion of the Unaware group of participants reached the end of the prototype, than the Aware group. As the Aware group knew roughly what to expect from the prototype, they might have felt satisfied sooner during the prototype playthrough, as they tried to imagine roughly what was coming. Based on these results, the hypothesis cannot be accepted.

7.7 Additional Findings

In addition to the five hypotheses discussed above in sections 7.2 through 7.6, further interesting findings arose from analysis of the data. These will be discussed in the remainder of this section.

7.7.1 Impact of Age on Stress

An interesting observation which arose during data analysis is the impact that age can have on stress levels in an interactive game environment. The first question of the survey asked participants into which age group they belong. Participants' responses are recorded in Table 14 below:

18 to 24	25 to 34	35 to 44
14 (46.67%)	13 (43.33%)	3 (10%)

Table 14: Participant Age Groups

An investigation into the correlation between each group and their responses to question 11a – how stressed the experiment made them feel – was conducted. This consisted of a Likert scale question with answers ranging from 1 to 5 - 1 being the lowest, and 5 being the highest. This cross analysis found a variety of interesting results.

In the 18 to 24 group only 2 participants (14.3%) disagreed with feeling stressed. The remaining 12 (85.7%) participants selected 4 or 5 as their answer - indicating strong feelings of stress. The overall average stress rating for the 18 to 24 group was 4.0.

The participants within the 25 to 34 age group on the other hand had only 6 participants (46.2%) express agreement with feelings of stress. The remaining 7 participants (53.8%) remained neutral or disagreed. This group's overall average stress rating was 3.7.

Lastly, the participants within the 35 to 44 age group all agreed that the experiment made them feel stressed, with an average stress rating response of 4.3.

These results show a possible correlation between age and experiencing stress in interactive media. Although this study does not have enough data to form a clear conclusion, it can form the basis from which future research can be conducted.

7.7.2 Impact of Average Hours per Week Spent Playing Games on Stress During Gaming

Another observation formed through data analysis is that of how the number of hours spent per week can correlate with the amount of stress experienced whilst playing through a stressful prototype. The second question of the survey asked participants how many hours on average per week they spend playing video games. The results are in Table 15 below:

< 2 hours	2 to 4 hours	4 to 6 hours	6 to 10 hours	10 to 15 hours	15+ hours
6 (20%)	4 (13.3%)	3 (10%)	5 (16.7%)	4 (13.3%)	8 (26.7%)

Table 15: Participant Average Hours Per Week Spent Playing Games

Cross-checking these groups against their answer to question 11a - how stressed the participant felt during the prototype on a scale from 1 to 5 - shows that none of the participants from the largest group (15+ hours per week) disagreed with feeling stressed.

8.0 Evaluations and Conclusion

8.1 Critical Evaluation of Prototype

Despite the prototype being completed successfully with no bugs or crashes reported, there are some key improvements which would benefit the prototype, experiment and results of the study if repeated.

A very useful feature to implement would have been Unity's in-built Analytics service, which would provide the researcher with detailed information of how each participant played the game. Their individual behaviors, patterns, and interactions would have been made accessible, providing the study with additional, detailed information.

The largest pain point for a variety of participants was the confusion of controls and not knowing exactly what to do. Although the prototype was purposefully vague and overwhelming, an in-game tutorial would have been preferred to the attached Readme file, which is easy for participants to skim read or ignore entirely. If the introduction of the vital mechanics was accompanied by a brief description in-game, the prototype could still maintain its ambiguous nature, but prevent participants from becoming frustrated/confused.

8.2 Critical Evaluation of Testing

The testing process went smoothly and was mostly successful, although again there are some principal enhancements to be considered.

Overall, the relatively low sample size of participants made it difficult to arrive at many definitive conclusions. A lot of suggested hypotheses during the analysis stage of the project arrived at an inconclusive outcome, unable to prove/disprove correlations.

There was additionally a lack of several meaningful statistics/answers and the variety of data forms was also somewhat limited.

An additional piece of information which would have strengthened the results of the study would be a heart rate monitor - however this would limit the experiment to be conducted exclusively in person, greatly limiting the participant sample and enforcing strict time restraints on the project as a whole.

8.3 Conclusion

The aim of the project was to investigate the eliciting of an emotional response employing only mechanics and gameplay as stimuli. In addition, the project was intended to help convey the symptoms experienced by anxious people to non-anxious people, to raise awareness and increase understanding of the disorder. The motivation behind this project is the ever-increasing prevalence of this disorder and its subtypes among modern society. This study was successful in achieving these goals, as its 30 participants expressed feelings of stress and anxiety, with non-anxious participants experiencing the symptoms the most. The study also proved, however, that despite mechanics being competent metaphors for narrative, they work most effectively when paired with other traditional game elements. As Pruett, an Oculus engineer and horror game expert, explains – games are most effective when a player thinks of them in narrative context, rather than of underlying games systems (Pruett 2016).

Future study recommendations are to focus on designing game mechanics to be unique narrative devices, rather than generic systems, in order to truly explore the interactive capabilities of the video game medium.

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10.0 Appendices

10.1 Appendix 1: Participant Information Sheet

Participant Information Sheet

The title of the research project

Conveying Emotion Through Gameplay Mechanics

Invitation to take part

You are being invited to take part in a research project. Before you decide to participate, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Feel free to ask the researcher if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

What is the purpose of the project?

The purpose of this project is twofold. The first purpose of the project is to raise awareness and/or increase understanding of negative mental traits or symptoms within modern day life. The secondary purpose is to test the effectiveness of communicating emotion and ideas entirely through interaction with game mechanics and systems.

Why have I been chosen?

You have been chosen to take part in this study as you are over 18 years of age and have previous experience playing video games, or interacting with virtual interfaces and systems.

Do I have to take part?

It is up to you to decide whether or not to take part. You can withdraw from participation during the gameplay session at any time and without giving a reason. If you decide to withdraw from the experiment entirely, any of your collected data will be deleted. You can choose to end the gameplay portion of the study early and still participate in the survey, at which point your data will be treated normally. Once the survey is completed, you may still be able to withdraw your data up to the point where the data is analysed and incorporated into the research findings or outputs. You will be assigned an individual ID number – by contacting the researchers with this number, your data will be deleted. Your information will always be kept as anonymous, so your identity cannot be determined, and it may not be possible to identify your data within the anonymous dataset. Deciding to take part or not will not have any personal impact.

What would taking part involve?

Taking part in this experiment is divided into two sections. Firstly, you will be asked to play through a game prototype developed by the researcher. The prototype will require any modern computer, with an external mouse and keyboard, and roughly 10 minutes of your time. The game should be played in a quiet room if possible, with no other distractions. Playing through the game can lead to experiencing a heightened amount of stress and discomfort. Upon completion or early withdrawal of the game, you will be linked to fill in a survey describing your experience, feelings and thoughts on the game you just played. The form should be completed immediately after playing, and again should take up no longer than 10 minutes of your time. The form will be made accessible to you after the first section of the experiment is completed, and can be filled out on any modern machine capable of running an internet browser.

What are the advantages and possible disadvantages or risks of taking part?

Whilst there are no immediate benefits for those participating in the project, it is hoped that this work will demonstrate the power of interactivity as a form of narrative and emotional storytelling, alongside providing an accessible and universal way for people to share their experiences with mental disorders.
The possible disadvantages of taking part are negative and/or uncomfortable feelings associated with stress which may arise during your play session. Please take note that any of these feelings will be addressed in the debrief at the end of the experiment.

What type of information will be sought from me and why is the collection of this information relevant for achieving the research project's objectives?

Information sought from you will come in the form of survey responses. These responses will address the open ended questions asked of each participant. The questions will relate to your experience with video games and digital interfaces, the feelings/thoughts/reactions or experiences during the first section of the experiment – playing the game – and finally questions about yourself. All data collected will be anonymous and when collated with that of other participants will be crucial in addressing the purpose of this project.

Will I be recorded, and how will the recorded media be used?

You or your actions will not be recorded in any way, shape or form. The only information gathered about you during the experiment will be in the form of your responses to the survey at the conclusion of the experiment.

How will my information be kept?

All the information we collect about you during the course of the research will be kept strictly in accordance with current data protection legislation. Research is a task that we perform in the public interest, as part of our core function as a university. Bournemouth University (BU) is a Data

Controller of your information which means that we are responsible for looking after your information and using it appropriately. BU's Research Participant Privacy Notice sets out more information about how we fulfil our responsibilities as a data controller and about your rights as an individual under the data protection legislation. We ask you to read this Notice so that you can fully understand the basis on which we will process your information.

Publication
You will not be able to be identified in any external reports or publications about the research without your specific consent*.   Otherwise your information will only be included in these materials in an anonymous form, i.e. you will not be identifiable.

Security and access controls
BU will hold the information we collect about you in hard copy in a secure location and on a BU password protected secure network where held electronically.

Except where it has been anonymised your personal information will be accessed and used only by appropriate, authorised individuals and when this is necessary for the purposes of the research or another purpose identified in the Privacy Notice. This may include giving access to BU staff or others responsible for monitoring and/or audit of the study, who need to ensure that the research is complying with applicable regulations.

The information collected about you may be used in an anonymous form to support other research projects in the future and access to it in this form will not be restricted. It will not be possible for you to be identified from this data. Anonymised data will be added to BU's Data Repository (a central location where data is stored) and which will be publicly available.

Retention of your data
All personal data collected for the purposes of this study will be held for a maximum of 2 years from the date of collection. Although published research outputs are anonymised, we need to retain underlying data collected for the study in a non-anonymised form for a certain period to enable the research to be audited and/or to enable the research findings to be verified.

Contact for further information

If you have any questions or would like further information, please contact Jacek Mackiewicz via i7620268@bournemouth.ac.uk.

In case of complaints
Any concerns about the study should be directed to Jacek Mackiewicz at i7620268@bournemouth.ac.uk. If your concerns have not been answered, you should contact Professor Tiantian Zhang, the Deputy Dean of Research and Professional Practice for Science and Technology via tzhang@bournemouth.ac.uk, or Bournemouth University by email to researchgovernance@bournemouth.ac.uk.

Finally

Thank you for considering taking part in this research project.

Below are the links for the downloadable Unity Project and a readme file to lead you through the process.

Windows 10: https://drive.google.com/open?id=1pwJ4GHENyjvWWSxSSkenQPCYgIY35FEh

Mac: https://drive.google.com/open?id=12q_ujwQhJPGDQHEEAndDZJDm0ZINymoi

By downloading either of the folders you are giving consent to participate in the study.

10.2 Appendix 2: Ethics Checklist

Bournemouth University

Research Ethics Checklist

About Your Checklist

Reference Id	24142
Date Created	06/12/2018 21:53:39
Status	Approved
Date Approved	31/01/2019 12:16:36
Date Submitted	07/12/2018 18:39:20

Researcher Details

Name	Jacek MacKiewicz
Faculty	Faculty of Science & Technology
Status	Undergraduate (BA, BSc)
Course	BSc Games Technology
Have you received external funding to support this research project?	No

Project Details

Title	Conveying Anxiety Through Gameplay Mechanics
Start Date of Project	05/10/2018
End Date of Project	22/05/2019
Proposed Start Date of Data Collection	07/03/2019
Original Supervisor	Charlie Hargood
Approver	Ethics Programme Team

Summary - no more than 500 words (including detail on background methodology, sample, outcomes, etc.)

This project aims to convey feelings of anxiety exclusively through interacting with gameplay mechanics. The purpose of this is to raise awareness and understanding of the increasingly prevalent disorder through a medium intrinsically designed to communicate and evoke responses within users by virtue of personal interaction.

Participants will be contacted through various online communities. The communities contacted will all be based around video games and their development. Places such as gaming/development subreddits, industry slack channels, gaming communities on social media and posters within the Bournemouth University will be used.

Participants will be informed that they need to be at least 18 years old, and have previous experience with video games or interactive systems. This is crucial as participants need to have an understanding of a contextualised instance of a virtual environment - due to the stressful nature of the experiment, participants must be aware that any emotion exists within the context of the play session. Regardless, participants will be warned that they should be in a healthy mental state while taking part in the experiment. Participants will then be able to contact me to receive access to the experiment information. Within this email will be the participant information and agreement sheets alongside the experiment's link.

After reading and accepting the consent form, the participant will be able to proceed onto the experiment itself. Within the forms the

participant is informed that they should carry out the experiment in a peaceful environment with no distractions.

The link will lead to a website with a video game prototype created to convey the feelings of anxiety within the player. This will be carried out through interacting with the game systems and mechanics. The gameplay session will last roughly 10 minutes, though participants will be able to interrupt it earlier if they feel uneasy or uncomfortable. Only once this session is concluded, the participant receives a link to the second part of the experiment - the survey. Before the survey is accessed the game will display a debriefing of the experiment, alongside relaxing music indicating to the participant that the stressful part of the study is finished.

The survey will be hosted online, using Google Forms. The questions will be qualitative in nature, asking the participant to describe their feelings and experiences with the game. This secondary part of the study should also take roughly 10-15 minutes, for a total estimated time of 25 minutes. At the end of the survey, participants will receive a debrief document informing them about what they've been through, and containing relevant information about anxiety, what the disorder is, how to treat it, and other such information.

It's crucial that participants of this experiment have previous knowledge of video games, as due to the stressful nature of the gameplay, they need to understand that the game exists within its own frame, and that it will cause no permanent consequences. Any emotions or feelings experienced during the game session will be local to that session.

Human Participants

Participants
Describe the number of participants and specify any inclusion/exclusion criteria to used
No specific amount of participants is required, though ideally a participant pool of 100+ will be obtained for the study.As for participant criteria, only participants aged over 18 who have experience interacting with video games/interactive systems will be sought out. Additionally participants with health complications (psychological, physical, or otherwise) likely to be adversely affected by additional stress, fear, or anxiety brought on by a game will be warned about participating.

Are your participants considered vulnerable?	No
Is a Disclosure and Barring Service (DBS) check Required?	No

Recruitment
Please describe how participants will be identified, approached and recruited. Include details of any relationship between researcher(s) and participant(s), e.g. teacher-student
Participants will be recruited mainly through online means. The study will be advertised through communication channels aimed at video game communities. The link and explanation of the study will be posted on various online forums (such as subreddits related to games and their development), on game industry slack channels which include game developers from around the world, within the university campus in the form of posters, and through social media.

Do you need a Gatekeeper to access your participants?	No

Data Collection Activity	
Will the research involve the completion of a questionnaire/survey? If yes, don't forget to attach a copy of the questionnaire/survey or sample of questions.	Yes
How do you intend to distribute the questionnaire?	
online	
If online, do you intend to use a survey company to host and collect responses?	Yes
If yes, please provide details of survey company.	
The survey will be hosted on Google Forms. Google Forms has unlimited responses and some of the best anonymity options when it comes to free survey hosts. One major disadvantage with Google Forms is their lack of analytics - though with the majority of the data being qualitative this is less of an issue as the data will have to be studied by hand anyway.Access to the survey will be granted once playing the game is complete.	

Will the research involve interviews and/or focus groups? If yes, don't forget to attach a copy of the interview/focus group questions or sample of questions.	No
Will the research involve the collection of audio materials?	No
Will your research involve the collection of photographic materials which will identify a participant?	No
Will your research involve the collection of video materials?	No
Will the study involve discussions of sensitive topics (e.g. sexual activity, drug use, criminal activity)?	No
Will any drugs, placebos or other substances (e.g. food substances, vitamins) be administered to the participants?	No
Will the study involve invasive, intrusive or potential harmful procedures of any kind?	No
Could your research induce psychological stress or anxiety, cause harm or have negative consequences for the participants or researchers (beyond the risks encountered in normal life)?	Yes

Please provide details and measures taken to minimise risks

The light anxiety inducing based project will be handled with warnings before interacting with the game, and debriefing. No use of subliminal messaging or other banned/questionable practices will be employed within the game. Additionally, the participants will be able to stop the game at any point. The focus will be placed on anxiety symptoms and triggers within a "safe space" ensuring that no lasting effects are felt once the study is over.

Will your research involve prolonged or repetitive testing?	No

Consent

Describe the process that you will be using to obtain valid consent. If consent is not to be obtained explain why

Before the start of the experiment, all participants will need to sign a consent form which will be presented after reading through an introduction and explanation of the experiment. Without the acknowledgement of giving consent to participate in the study, the game will be inaccessible. Participants will be made aware that the experiment can lead to feeling uncomfortable or uneasy throughout the duration of the study and will need to agree to being subjected to this before continuing.

If participants are minors or for other reasons are not competent to consent, describe the proposed alternative source of consent

No minors will be taking part in this experiment.

Will it be necessary for participants to take part in your study without their knowledge and consent?	No

Participant Withdrawal

Describe how the participants will be informed of their right to withdraw from the study	Participants will be explicitly told to interrupt the experiment if they feel uncomfortable. Participants will be made aware that the game can be quit at any time. The game will present a menu from which the participant can end their interaction with the game and move onto the survey. Participants can also withdraw from the study fully and not continue.Participants can withdraw after the study - each participant will be assigned an "ID" number, the corresponding data will be deleted.
Explain what will be done with the participants' data if they withdraw	If participants withdraw from the experiment before the survey their data will not be collected. The participants in question will still be debriefed about their experience, though their data won't be collected. If participants choose to end the game early but continue to the survey their responses will be treated as any other response would. Withdrawing after the survey will lead to their data being deleted.

Participant Compensation

Will participants receive Financial compensation (or course credits) for their participation?	No
Will financial or other inducements (other than reasonable expenses) be offered to participants?	No

Personal Data

Will identifiable personal information be collected, i.e. data which identifies or could enable identification of the research participant?	No

Storage, Access and Disposal of Personal Data

Will any data be stored on the BU's Data Repository "BORDaR"?	No

Risk Assessment

Have you undertaken an appropriate Risk Assessment?	Yes

Attached documents

debriefing_draft.doc - attached on 06/12/2018 21:57:49
Survey Q examples.docx - attached on 06/12/2018 21:57:53
Participant Agreement Form.docx - attached on 06/12/2018 21:58:02
Participant Information Sheet Template.docx - attached on 07/12/2018 18:39:04

10.3 Appendix 3: Survey

SurveyHero.com

Jacek_M_GT_FYP19_Survey

Q1) What is your age range? *

○ 18 to 24

○ 25 to 34

○ 35 to 44

○ 45 to 54

○ 55 or older

Q2) How many hours per week on average do you spend playing video games? *

○ < 2 hours

○ 2 to 4 hours

○ 4 to 6 hours

○ 6 to 10 hours

○ 10 to 15 hours

○ 15 or more hours

Q3) What genre of games do you play the most? *

You can select multiple options.

☐ Action Games

☐ Role Playing Games

- [ ] Puzzle Games
- [ ] Online Competitive Games
- [ ] Sports/Racing Games
- [ ] Indie Games
- [ ] Mobile Games
- [ ] Other

Q4) Do you typically enjoy stressful / difficult games? *

Not at all	Rarely	No Preference	Frequently	Always
◯	◯	◯	◯	◯

Q5) Did you know what the experiment was about before taking part? *

◯ Yes	◯ No

Q6) Did you get to the end of the prototype (Day 30)? *

◯ Yes	◯ No

Q6 i) If you selected "No" above, why didn't you get to Day 30?

Q7) In your own words what do you think the experiment was about? Can you describe the kind of character you were playing?

*

[   ]

Q8) Rank the following mechanics in terms of emotional impact during your time playing the prototype *

| Mouse Button Mashing - Engagement Slider |
| Mouse Scrollwheel - Flow Slider |
| Key Presses - Giving Responses |
| Topic Selection |
| Player 2 and Player 3 competing against you |
| Daily Timer (From Day 4 onwards) |
| Stamina Meter (From Day 8 onwards) |
| Death of a random Character (Day 16) |
| Characters having human names |
| Typing "ok" to acknowledge worse results |

>

1.

Q9) To what extent do you agree that the following mechanics were emotionally impactful during your time with the prototype?

*

| Strongly Disagree | Somewhat Disagree | Neutral | Somewhat Agree | Strongly Agree |

Mouse Button Mashing - Engagement Slider	○	○	○	○	○
Mouse Scrollwheel - Flow Slider	○	○	○	○	○
Key Presses - Giving Responses	○	○	○	○	○
Topic Selection	○	○	○	○	○
Player 2 and Player 3 competing against you	○	○	○	○	○
Daily Timer	○	○	○	○	○
Stamina Meter	○	○	○	○	○
Death of a random character	○	○	○	○	○
Characters having human names	○	○	○	○	○
Typing "ok" to acknowledge worse results	○	○	○	○	○

Q10) In your own words, what feeling did you experience the most and what do you think caused this response? *

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Q11) To what extent do you agree with the following statements? *

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
The experiment made me feel stressed	○	○	○	○	○

The chat / log system made me think about my performance	○	○	○	○	○
The variety of mechanics was overwhelming	○	○	○	○	○
I felt I was able to achieve the results I set out to	○	○	○	○	○
There was enough time to process all the information	○	○	○	○	○
The conversations felt tiring to engage in	○	○	○	○	○
I felt I was being judged on my performance	○	○	○	○	○

Q12) To what extent do you agree with the following statements? *

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
Games need to explore sensitive issues more often	○	○	○	○	○
Mechanics can be just as successful at eliciting an emotional response as narrative/aesthetic	○	○	○	○	○

Q13) How anxious do you consider yourself in day to day life? *

Not anxious at all   Extremely anxious

Q14) How anxious did you feel during the Prototype? *

Not anxious at all   Extremely anxious

[   ]

Q15) How anxious do you think you would have felt if this prototype included fully animated and voiced human models, alongside sounds and visual polish?

*****

Not anxious at all   Extremely anxious

[   ]

Explanation of Mechanics

Please Note: You were not actually playing online against other players. Your opponents were fake and no online communication was performed. This also means none of your data was actually uploaded. This was only done to increase the stress/self-doubt of the participants.

Now that you have completed the experiment here is a breakdown of the mechanics and grading.

The grading for the conversation came in a couple of steps.
If it was your first time talking to a character, you were graded on the % of time you spent within Flow and how often you clicked the correct mouse keys (taken by the total amount of correct mouse clicks / length of conversation).
For this first conversation the flow carried a 60% weight, whereas the mouse carried 40% weight when grading.

This was then converted to a grade ranging from an "F-" with 0 points awarded to an "A" with 120 points awarded.
Additionally, the topic was worth 10 additional points if it was liked and -10 points if it wasn't liked.

Talking to the same person in subsequent days always resulted in -20 points.

Similarly, choosing the same topic with the same character for subsequent days also resulted in a point reduction.

From the second conversation onwards, key presses were included in the conversation. For this system it was calculated how many times you pressed the correct key. This % of correct key presses was included in the weighting with the new weights being:
Flow amount 50% / Mouse clicks 20% / Key Presses 30%.

If either the timer on the upper left of the screen or your character's stamina ran out the day ended with 0 points being earned and your enemies both earning full points respectively (130 points)
On days where you didn't pass out, the other players gained between -10% and +10% of what you earned that day.

Everything else in the game is driven by random chance - who your opponents score points with, the character that dies, all the topics liked/disliked by all the characters, and keys to press every day.

10.4 Appendix 4: Debrief

Study Debriefing

This study focused on conveying negative emotion – mainly stress and social anxiety through mechanics and gameplay. It is based upon previous studies that have looked into conveying narrative and story through gameplay, game mechanics as a metaphor, and the idea of the medium being the message. Video games have the unique ability to convey meaning and evoke feelings through interaction, and this study sought to prove that a complex mental disorder such as anxiety could be conveyed to a player simply through interacting with a game's systems.

How was this tested?

You were asked to participate in two sections of this study – the first being to play through the game, and the second being the survey you completed. Within the game stage you were instructed to follow the instructions as you would in a normal game, and perform to your best ability – reach the highest score and do what you assumed to be correct within the context of the game. Following your completion of the game, you answered questions about your experiences within a prepared survey. All other participants went through the same sections in a similar fashion.

Hypotheses and main question:

The expectation was that through interacting with various competing and conflicting systems, which were contextualized to artificially increase their impact, the player would experience feelings of anxiety and stress. Games have always been able to cause emotional responses within their audiences, though it was often accomplished by a holistic combination of narrative, aesthetic, gameplay and auditory elements. The hypothesis of this study therefore, was to prove that a video game could lead to a strong, emotional responses purely through the usage of it's systems and mechanics.

Why is this important to study?

Anxiety is becoming increasingly prevalent in modern societies. Despite this fact, many people struggle to understand it's symptoms, empathize with those affected, or accurately recognize it within their own lives. As it's prevalence is showing no signs of slowing down, it's increasingly important that we understand the symptoms, and the effects it can have on others. Games are a very accessible form of entertainment, and are a more powerful medium to communicate with a consumer due to their interactive nature. This study aims to increase awareness and understanding of the disorder as there's no better way of understanding something than experiencing it yourself.

If you have concerns about your rights as a participant in this experiment, please contact the researcher at i7620268@bournemouth.ac.uk

Thank you again for your participation.

Redeem Survey Code with one click: https://www.surveycircle.com/2DRK-PFH9-175Z-KL9Y

10.5 Appendix 5: Stephane Bura Game Inducted Variable Change Table

GAME INDUCED VARIABLE CHANGE			Major Decrease		Minor Decrease		Minor Increase		Major Increase	
			Temporary	Persistent	Temporary	Persistent	Temporary	Persistent	Temporary	Persistent
Action	**Freedom**		End of big action opportunity	Linear path, Difficult to find options (Confusing menus, Quasi-modal controls)	End of action opportunity, Misleading cue, Temporary loss of ability	Avatar death and respawning, Local reset, Simulation conventions (Usable vs. non-interactive objects)	Action opportunity (Timed door opening), Resource gain (if player can choose how to spend it)	New minor persistent ability (Gauge increase)	Big action opportunity (Flying cap in Mario), Large resource gain (if player can choose how to spend it)	New major persistent ability (Orthogonal ability - Harvey Smith)
	Mastery		End of big advantage opportunity, Misdirecting affordance	Permanent loss of ability, Inappropriate controls, New controller (Guitar Hero, Steel Battalion)	Temporary loss of ability, Randomness	Difficulty increase	Advantage opportunity (Block + Counter combo), New short-term goal (if game is balanced)	Affordance, New ability to trade resource for preparation (Increased life gauge, Buff)	Big advantage opportunity (Exploiting an enemy's weak points), New medium-term goal (if game is balanced)	Kinesthetic isomorphism (Wii Golf), New persistent ability, Insufficient difficulty increase
	Data		Large resource loss	Inability to complete collection (One way journey in Beyond Good & Evil), Iconic / Symbolic content (Super Mario World)	Resource loss	Allow permanent world change (Broken things, NPC death)	Resource available	Allow permanent world change, Collectible available, XP available	Large resource available	Rare collectible available
System	**Freedom**		Non interactive scene, Railroading	Deadlock, Hidden depth (Negative feedback for early experimentation)	Guidance (Goal highlighted on map)	Clear goal, Simulation conventions (Most NPCs have no memory)	Concurrent goals, Parallel challenges	Unlocking content, Easter egg (Hidden content)	Alternative methods, Parallel challenges with mutual assistance (Noah Falstein)	Safeguards, Error catching
	Mastery		Increasing difficulty of current challenge	Inappropriate complexity, Cheating opponent or AI, Hidden rules	Involuntary gameplay mode switch (Stealth / Flight)	Complexity increase, Negative feedback (Catch-up), Inconsistent or random behaviors, Balance, Homeostasis	Hint, New long-term goal (if player has agency)	Positive feedback (Limit moves), Negative feedback (Catch-up)	Lowering difficulty of current challenge (Dynamic Difficulty Adjustment - Daniel Arey, Evan Wells)	Consistent behaviors from game entities, Insufficient complexity increase, Iconic / Symbolic content with clear affordance (Super Mario World)
	Data		High cost of failure	Lack of structure, Large score penalty, Unusable resource (Gold excess in Zelda TP)	Preparation erosion (Time-limited buffs, Evolving conditions)	Score penalty, Hidden useful information	Preparation (Buff, Choosing the right equipment for a given challenge, Tactical positioning), Easter egg (Rules data)	Tutorial, In-game help, Score increase (Conditional bonus)	Emergent behavior	Consistent behaviors from game entities, Large score increase (Conditional multiplier)

		(severe negative)	(negative)	(mild negative)	(mild negative)	(mild positive)	(mild positive)	(positive)	(positive)
Self	**Freedom**	Tedious tasks, Inability to pause or save game	Repetitiveness, Lack of depth, Expensive game *(Add-on, Fee)*, Time-consuming game	Bad context description *(No access to mission briefing, No map, Invisible trigger)*	No surprises	Checkpoint	Giving player time to think, Low pressure, Numerous checkpoints	Automated quicksave, Shortcut, Sequence of discrete challenges *(Planets in Super Mario Galaxy)*	Short levels, Quicksave and Instant reload mechanisms, Short game
	Mastery	Unwinable challenge *(Without the player's clear understanding that he must lose) (Must be detected to trigger story event in stealth game)*	Confusing rules with no feedback for wrong interpretation, Inappropriate difficulty, Inefficient interface, Unpredictable behavior, Deception *(Unfair Platformer)*	Pretend danger *(Non-attacking enemies)*	Violating cultural rules or meanings	Game opponent with obvious AI flaw	Acknowledgement of player's progress, Encouragement	Teaching a design meta-rule *(Enemies can't hurt you until you engage them in combat)*	Clear context *(Display current mission briefing after loading game)*, Status, High score, Emergent behaviors
	Data	Lack of progress feedback, Lack of context in loaded game	Lack of content, Lack of variety, data loss, Short game, Recycled content *(Fight same boss twice)*, Violating IP rules	Minor bug, Mode hiding data from another mode	Breaking the fourth wall, Crash, Losing data	Progress feedback *(Map update)*, Data management in menus, Options configuration, Easter egg *(Metagame data)*	Customization *(outside abilities)*, Merchandising, Achievements, Metagame data *(Play stats)*	Introduction to new setting, Story exposition	Save game, Journal, Respect for IP
Social	**Freedom**	Badly designed matchmaking, Being kicked, Server down	Alliance, Cooperation, Being banned, Unreliable service, Online game closes down	GM arbitration, Toading	Enforced community etiquette	Facilitating player communication between challenges	Modding support	Good matchmaking	User-created content repository or sharing facilitation
	Mastery	Irresponsive GMs, Not restricting access to newbie-unfriendly areas	Cheating allowed, Exploits, Lack of community management, Lack of community self-management tools	Allow ganging up	Difficulty to communicate with other players, Lack of real-time communication tools or customization	Player ranking for one challenge *(Podium)*	Newbie support *(Asheron's Call's allegiance system)*, Training grounds for groups	Cooperative modes, Group achievements, Newbie greeting ritual	Ranks, Badges, Ladders, Automatic publication of high score, Elder game, Complementary roles *(Classes in MMOG)*
	Data	Lack of official response to problems or rumors	Community data loss, Other players' anonymity	Allow spam	Lack of community nexus	Acknowledgement of players' interactions *(TF2, Burnout Revenge)*	Player association customization *(Insignia)*, Metagame data *(FAQ)*, Group achievements	Beta testing, Meme, Viral marketing	Reputation system, Player association support, Social network tools

PLAYER INDUCED VARIABLE CHANGE		Major Decrease		Minor Decrease		Minor Increase		Major Increase	
		Temporary	Persistent	Temporary	Persistent	Temporary	Persistent	Temporary	Persistent
Action	Freedom	Loss of big action opportunity	Trading resources in large amounts	Loss of action opportunity	Trading resources (Buying abilities with XP, items with gold)	Experimenting with controls	Acquiring minor action skill (Long jump in Mario)	Big action opportunity (Flying cap in Mario)	Acquiring major action skill (Rocket jump)
	Mastery	Loss of big advantage opportunity, Failure to complete a challenge	Inability to complete a challenge, Grinding	Taking a risk, Tactics	Difficulty increase (Choosing the difficulty level)	Exploiting advantage opportunity (Ongoing combo)	Trained reflexes	Exploiting big advantage opportunity (Exploiting an enemy's weak points)	Highly trained reflexes, Known interface metaphor (Drag and drop)
	Data	Large resource waste	Inability to complete collection	Resource waste, Reward perceived as too small	Permanent world change (Broken things, NPC death)	Resource collected	Permanent world change, Collectible found, XP won	Large resource gain	Rare collectible found, Collection completed
System	Freedom	Local resolution	Game over	Sticking to tactics (Setting up an ambush)	Purpose, Clear chosen goal	Generating opportunities, Pursuing concurrent goals	Unlocking content	Trying alternative methods	Aimless wandering
	Mastery	Failure of wrong plan	Inadequate mental model	Losing the lead	Opponent's negative feedback (Opponent catch-up), Inefficient rote learning	Exploiting preparation, Taking the lead, Voluntary gameplay mode switch (Stealth / Kill)	Completing a challenge, Chunking, Statistical analysis	Lowering difficulty of current challenge (Choosing the difficulty level)	Grokking the rules, Exploiting emergent behavior, Winning, Min-maxing
	Data	Costly failure of right plan	Pursuing costly wrong plan	Loss of preparation, Mistake	Forgetting a rule	Preparation (Buff), Opponent's mistake	Ability customization, Learning a rule, Score increase	Loss of understanding	Learning meta-rules, Perceptual breakthrough, Large score increase

Self	**Freedom**	Misunderstanding feedback, Doing tedious tasks	Quit, Grinding, No experimentation	Being stumped by a puzzle, Being unaware of a choice, Being lost in a world	Favorite tools or methods	Speculating, Experimenting	Setting one's own challenges, Playing a role	Planning, Strategy, Taking a shortcut (Teleporting)	Making new content, tools or rules, Apophenia
	Mastery	Pareidolia, Misunderstanding the rules, Big recurring mistake	Perceived cheating on the part of the game, Apophenia, Misunderstanding the rules	Recurring mistake	Blind spot	Reactivity, Correct prediction of opponent's choice	Training, Exploring rules and content	Correct prediction of opponent's strategy	Mastering a skill, Learning a pattern (Raph Koster), Obtaining high score, Looking for emergent behaviors
	Data	Losing access to data	Losing data, Violating IP rules	Temporary forgetting data	Forgetting data	Options configuration, Own progress record (Drawings in Zelda PH)	Customization (outside abilities), Using metagame data (Reading a FAQ), Things, Achievements	First encounter with content type or rule system	Save game, Journal, Appreciation of IP use
Social	**Freedom**	Cooperation	Alliance, Team play	Short-term cooperation (Medic in TF2)	Community etiquette, Pledge	Discussing about experience	Group setting one's own challenges, creating own interpretation or mythology, Roleplaying to an audience	Multiplayer Planning	Betrayal, Sharing new content, tools or rules, Anticonformism (Non-violent Warrior character)
	Mastery	Being subjected to griefing	Anticonformism (if shunned) (Roleplayer on PvP server), Community feuds	Humiliation, Violating cultural rules or meanings, Low signal to noise ratio	Bad reputation, Failing to attend group activity	Bluff, Deception, Recurring opponent's mistake, Being group tactician	Dominating an opponent, Mentoring, Teaching a skill, Good reputation, Correct response to cultural cue	Psychological warfare, Cooperation, Multiplayer training	Status, Publishing high score, Sharing secret exploits, Team victory, Being a leader
	Data	Losing access to community (Server / matchmaking down), Trolling	Player association dissolution, Losing community data	Blocking chat channels / users	Player association reorganization, Unmanageable community size / dynamics	Managing social network, Online trading and game objects auctions	Creating metagame data (Writing a FAQ, Community record keeping), Achievements, Team achievements	Community event, Rumor, Meme, Past experiences of playing the same game with the same people	Community lore, Community rituals, Roles, Reputation, Relationships, Whuffie, Player association

10.7 Appendix 7: Stephane Bura Emotions Table

EMOTIONS		TOO LOW	LOW			HIGH			TOO HIGH
			Decrease	Stability	Increase	Decrease	Stability	Increase	
Action	Freedom	Disgust, Inescapableness	Fear, Shock, Buyer's remorse	Claustrophobia, Dread	Suspense, Anticipation of change	Distraction, Slapstick humor (with player's avatar), Buyer's remorse	Awareness, Exhilaration, Appreciation of possibilities, Addiction to growth	Disorientation	Fear of choice, Paralysis
	Mastery	Discouragement, Hopelessness, Humiliation, Powerlessness	Fear, Desire of revenge, Perseverance	Inadequacy, Loss of concentration, Caution, Nervousness	Gambling impulse, Relief, Hope	Doubt, Rush, Gambling impulse, Feeling challenged, Fear of failure	Confidence, Willingness to take risks, Feeling in control of one's actions, Grace	Fiero, Excitation, Satisfaction, Showing off	Boredom, Pointlessness, Impatience
	Data	Discouragement, Unfairness, Infantilization	Loss, Annoyance, Grief, Regret	Trust in the system to remain simple / understandable, Feeling ignored	Reinforcement through positive feedback	Reinforcement through negative feedback	Agency, Expectation (*Grinding toward level-up*)	Compulsive desire to complete collection, Slapstick humor	Underwhelming success, Infantilization
System	Freedom	Loss of trust, Arbitrariness, Feeling manipulated, Despair	Feeling constrained, Perseverance	Fatigue, Feeling fated, Self-doubt	Surprise, Relief, Hope	Purpose, Comfortable routine	Zen, Trust in the system to provide solutions	Forward thrust ("*Living off the land*"), Adapting to conditions without planning, Rush	Fear of choice, Paralysis, Loss of agency
	Mastery	Loss of trust, Disgruntlement, Overwhelmed by complexity, Rage, Stress	Frustration, Self-deprecating humor, Bravery	Feeling of randomness, Feeling stupid	Pleasure of learning, Relief, Hope	Unpredictability, Surprise	Agency, Trust in rules logic, Coherence, Projection, Trust in the system to be fair, Willingness to experiment, Zoning out, Gambling impulse, Caillois' ludus	Feeling smart, Breakthrough, Insight, Meta-humor	Lack of challenge, Predictability, Boredom
	Data	Meaninglessness, Apathy	Self-aggravation	Detachment, Scapegoating	Curiosity	Mystery	Belief in the game world, Empathy, Interest for complexity	Feeling unique, Situation comedy	Confusion, Overwhelmed by complexity

Category		Col1	Col2	Col3	Col4	Col5	Col6	Col7	Col8
Self	**Freedom**	Apathy, Impatience, Disinterest, Anguish over overwhelming duty *(Micromanagement)*	Stubbornness, Remorse, Caillois' ilinx *(Vertigo)*	Concentration, Importance, Duty, Involvement, Enjoying the ride, Being carefree, Caillois' mimicry* *(Paracosm)*	Doing the impossible, Curiosity, Being inspired	Purpose, Focus	Comfort, Certainty, Escapism, Creativity, Caillois' paida *(Sandbox play, Garry's mod)*	Feeling lost, Reflection, Transformation, Caillois' ilinx *(Realizing the breadth of the experience)*	Purposelessness, Insignificance
	Mastery	Surrender, Anger	Frustration, Self-deprecating humor	Anticipation of failure, Caillois' alea *(if no applicable probabilities)*	Vindication, Discovery, Pleasure of finding things out, Self-improvement	Shame *(ill gotten gain)*, Laziness *(Choosing an easy path)*	Ambition, Anticipation of accomplishment, Self-esteem, Willingness to learn, Caillois' agon**	Ambition, Authorship, Pride	Inflated ego
	Data	Sense of wasting energy and time	Disorientation from lack of context	Feeling stuck, Unease, Sadness	Anticipation of local resolution, Compassion	Identification, Aesthetic appreciation, Aesthetic rejection	Familiarity, Interest for variety, Immersion, Contentment, Caillois' mimicry* *(Simulation)*	Wonder, Awe, Joy	Obsession, Wastefulness
Social	**Freedom**	Aloofness, Shyness, Anguish over community duty *(Too many friends or social obligations)*	Justice, Peer pressure	Duty, Honor, Righteousness, Involvement, Caillois' mimicry* *(Roleplaying)*	Guilt, Breaking taboos	Feeling Honorable *(Commitment, Doing the right thing)*, Egoboo	Belonging to a clique, Caillois' paida *(Nomic, Calvinball)*	Injustice, Being accepted, Caillois' ilinx *(Realizing the breadth of the game as a medium)*	Insignificance, Detachment
	Mastery	Hate	[Observed] Schadenfreude	Anticipation of group failure	Group vindication	Shared shame *(ill gotten gain)*, Needing to blame someone	Anticipation of group accomplishment, Dignity, Respect, Superiority, Caillois' agon**	Pride, [Observed] Naches, [Observed] Admiration, [Observed] Appreciation of the fortune of others, Taunting	Contempt, Scorn for opponent
	Data	Fanatism through secrecy	Disorientation from lack of connectivity	Anonymity, Isolation, Appreciation of rarity / secrecy / uniqueness	Feeling of human connection (*ESP Game*), Compassion	Affinity, Meta-humor, Appropriation	Belonging, Intimacy, Immersion, Love, Caillois' mimicry* *(Shared fantasy)*	Bragging rights, Completeness *(Great choreography in competitive / cooperative gameplay)*	Feuds, Arrogance, Sectarianism, Fanatism

10.8 Appendix 8: Design Notebook notes

what I need

- a lot of minor (major) decisions
each with supposed consequences

- min maxing values

- permanent loss

- quick decisions vs. long periods
of thinking → adapting on the go

- deceiving players

- "fake" comparison to everything

- never knowing what's ahead.

- hard to figure out but not
obtuse.
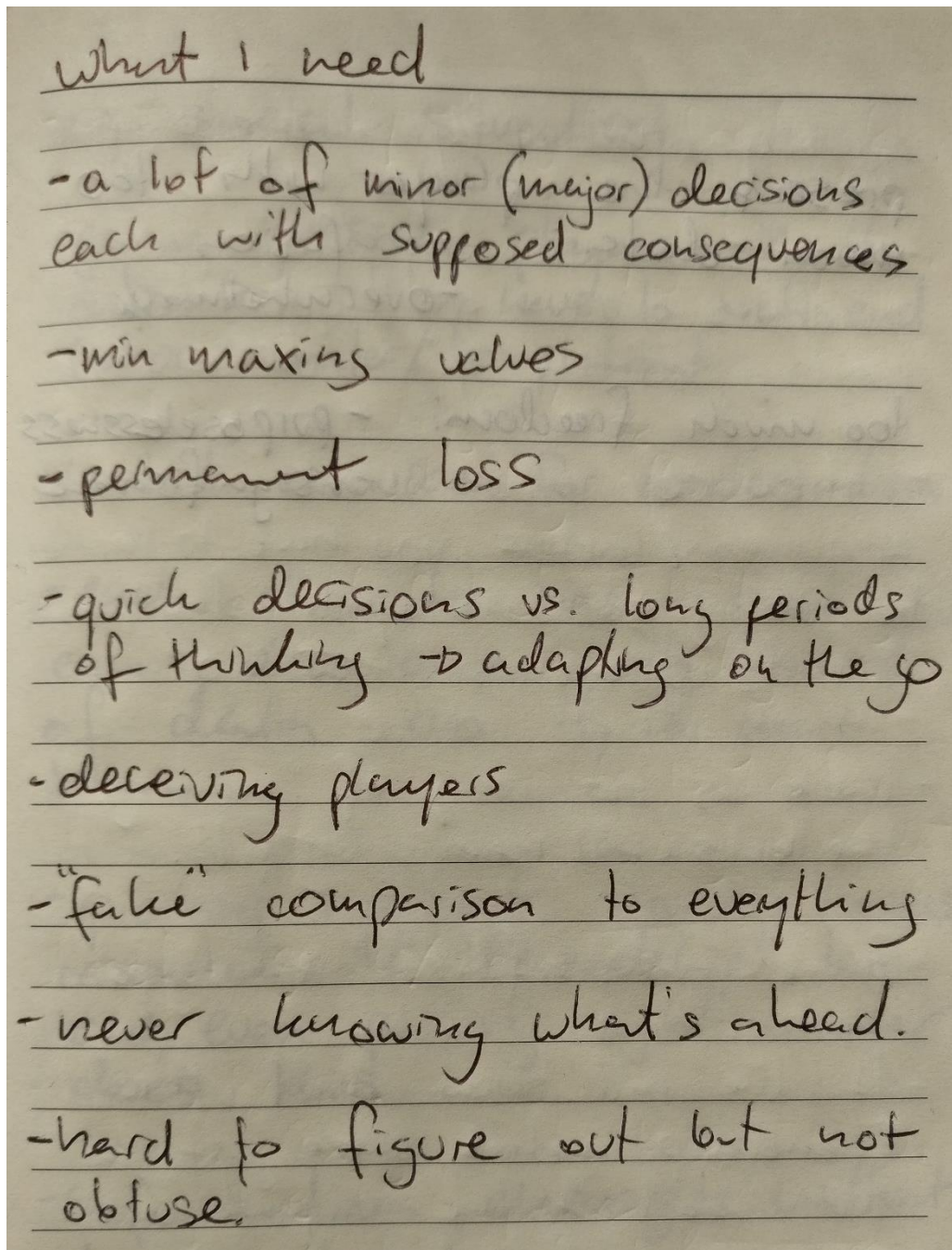
e.g. social situation

-game presents players with 4 characters they have to befriend (show meter/ completion)

-limited resources for conversation

- each character has a sheet you can view once with loads of data on it, for short time

- picking incorrect answers lowers resource. If "friendship" too low, even picking right answer does this

-information changes without player knowing

-show "live" updates about how

quickly other players are befriending

- access. occasionally gameplay
switches over → e.g. quick time
events / sudden quick decisions

- introduce other mechanics and
numbers / meters you have to maintain
but doing so uses your "day" and
friendship meters close, drop.

- there is no way of "winning"
the bars will never be full.

- Game ends after "x" days.

- At the end show that the
friendship meters were just in
your head & the actual numbers
are much different.

- head the player towards "never doing anything wrong

- task is impossible

- antagonize them with fake other players

- at the end of day show "average" of how far players normally get.

- when picking dialogue options it shouldn't be a language - rather have players figure it out

└ perhaps like a timed puzzle. always the same puzzle but solution varies between characters and changes day by day.

- focusing on talking to 2 other characters decreases your stats

- have algorithm to check how often you talk to & which character.
  ↳ e.g. continuoosly talking to same character won't be as efficient
  ↳ talking to same character makes others more apprehensive towards you.

- make player believe they're not fully in control!
  ↳ routine is comforting, avoid it.

- failure needs to be meaningful!!
  ↳ e.g. have one of the characters die, never being able to befriend them

- all conversations are essentially turn based systems → use this principle for mechanics

- simple low poly environment to walk in first person between the characters locations

↳ stamina bar that drains?
   ↳ doesn't actually run out?
      ↳ just a stressor?

- when fake other players show up force players to type ▮▮ ▮▮ "ok" to accept?
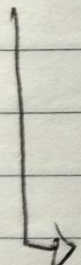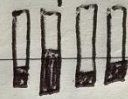
═
═ ↑ fade in other players

↳ when players do badly force them to type "sorry"

- going to "sleep" causes a screen full of information showing player performance vs. others?!

10.9 Appendix 9: Full Report of answers

SurveyHero.com

Jacek_M_GT_FYP19_Survey

Q1) What is your age range?

Number of responses: 30

35 to 44: 3x chosen (10.00%)
18 to 24: 14x chosen (46.67%)
25 to 34: 13x chosen (43.33%)

Q2) How many hours per week on average do you spend playing video games?

Number of responses: 30

15 or more hours: 8x chosen (26.67%)
< 2 hours: 6x chosen (20.00%)
2 to 4 hours: 4x chosen (13.33%)
10 to 15 hours: 4x chosen (13.33%)
4 to 6 hours: 3x chosen (10.00%)
6 to 10 hours: 5x chosen (16.67%)

Q3) What genre of games do you play the most?

Number of responses: 30

● Amount
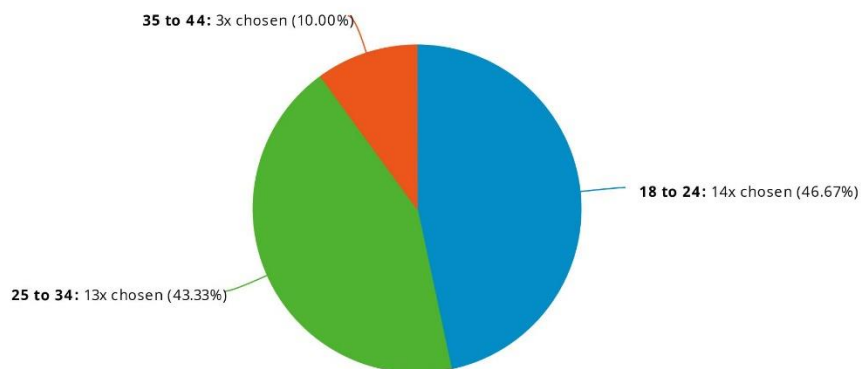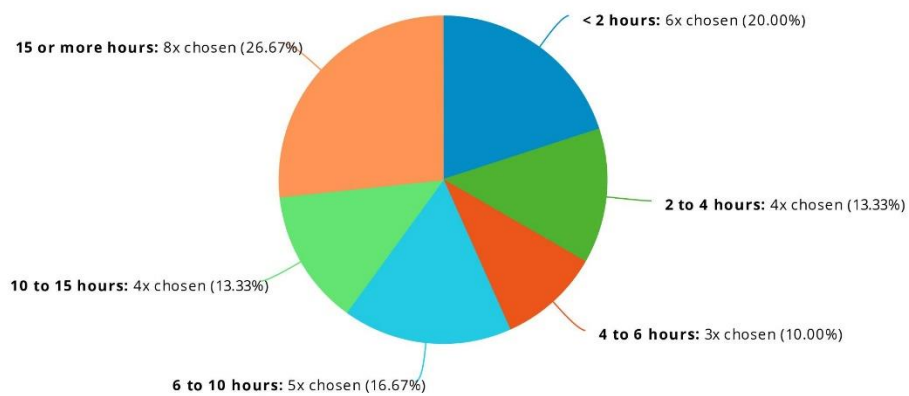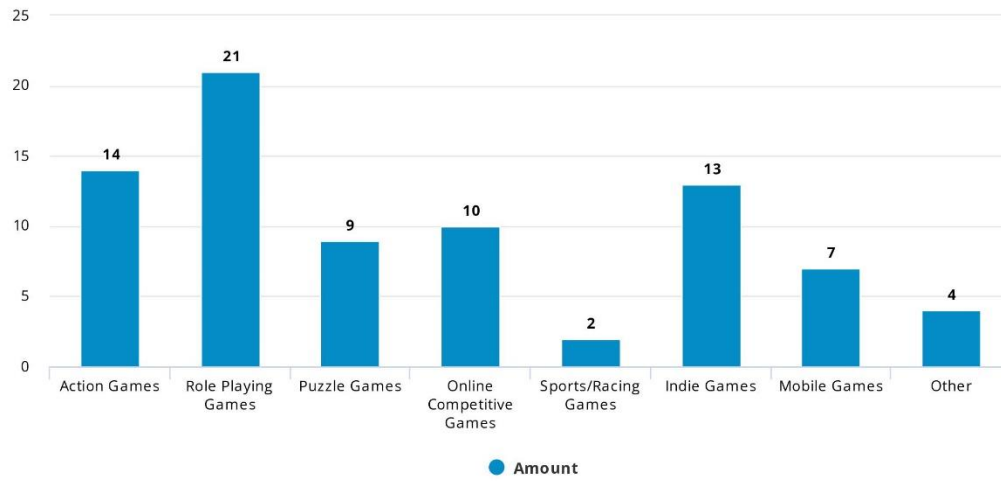
Q4) Do you typically enjoy stressful / difficult games?

Number of responses: 30

	Not at all 1		Rarely 2		No Preference 3		Frequently 4		Always 5			
Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Ø	±
2	6.67%	13	43.33%	2	6.67%	10	33.33%	3	10%	2.97	1.2

Q5) Did you know what the experiment was about before taking part?
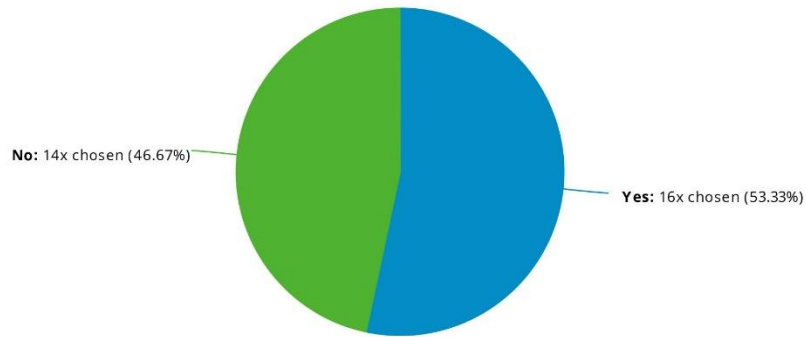
Number of responses: 30

No: 14x chosen (46.67%)   Yes: 16x chosen (53.33%)

Q6) Did you get to the end of the prototype (Day 30)?

Number of responses: 30

No: 10x chosen (33.33%)   Yes: 20x chosen (66.67%)
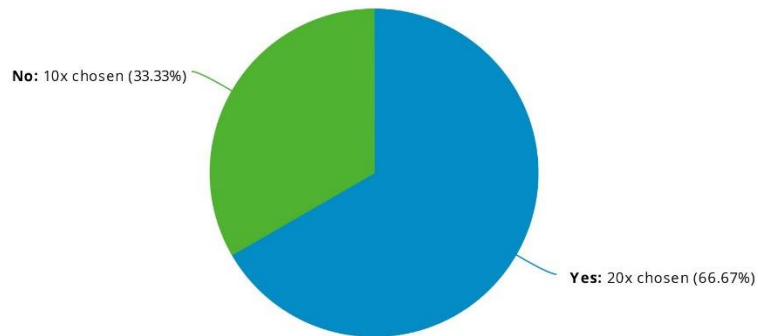
Q6 i) If you selected "No" above, why didn't you get to Day 30?

Number of responses: 12

Text answers:

I stopped playing as I felt stressed and anxious, so as per the participant information sheet I stopped prematurely.

I don't know what day I got too! sorry

The game was really glitching after day 10 and it kept passing me out for some reason.

I struggled to keep up with the conversations (my mouse is not the best as the scrollwheel barely works) and felt like I was getting progressively less likely to be able to keep up/avoid the 'ok' screen as more mechanics were introduced

I got stuck -- I tried to run to the edge of the world, and then couldn't turn around or move back. They only thing I could do was exit the game.

Each conversation wasn't ending - I was mashing too quickly for the red timer to time out. I WAS THERE FOR AGES (seriously like half an hour before I realised I wasn't doing it right) and ran out of time. BUT I did understand the concept and felt that although I don't get anxious in real life, I could appreciate why it would trigger that response.

n/a

Lack of performance feedback, nasty control scheme when not in fullscreen, not generally fun.

The controls were very confusing. I wasn't sure if I was playing it correctly and each day seemed very similar.

Did not understand the purpose of the game.

I was frustrated and confused by day 5 so I decided to quit before I stress out.

NA

Q7) In your own words what do you think the experiment was about? Can you describe the kind of character you were playing?

Number of responses: 30

Text answers:

I believe the character was wanting to make friends with those around him/her, however was struggling to keep up with the increases in friendship achieved by the other characters. The experiment seemed to focus on social anxiety and the associated resulting feelings, i.e. feeling out of depth and unable to keep up with those around you.

Was it about multitaskin?

I was trying to get to know the people and what they liked, and the more I got to know them, the more they would open up and talk to me about deeper topics

The experiment was simulating the stress and anxiety of keeping up with conversations

Someone trying to make friends, no idea what the experiment is about

Making the player confused and feel a bit rubbish at the game?

Someone going through the struggle of making new friends

It seemed like I was trying to beat the other players involved in the game with me by increasing my friendship rating with the other characters in my game.

The experiment may have been about doing lots of things at once, and worrying about lots of different things to make sure the person liked you.

An adult, juggling between the stress of making social connection and their own state of constant tiredness

Difficult to fully pin down - maybe an introvert who gets exhausted easily by social interactions (hence the physical activity involved in the conversation mechanics and the need to rest after each conversation) or someone who gets anxious (struggling to keep up with and navigate conversations and then needing to retreat after each one).

It felt like an experiment about emotional responses to social interacting, focusing on stress and futility (aka feeling that everything you do is futile and you are inadequate). I felt the player character was an ordinary person trying to connect with others.

An everyday person trying to make friends and have a successful social life

I think the experiment was about the social stress of maintaining friendships and peer competition. In short.
I didn't feel particularly emotionally or narratively attached to the character but then I might have done if I'd played longer.

The experiment felt like I was playing a character who was trying to fit in by analyzing what topics people liked the most and trying to communicate with them about those topics in order to better their friendship with that character.

Anxiety and social pressure. Character is increasingly stressed

How to get a person to play a game with frustrating controls.

Different types of stress. The character seemed personality-less.

Some sort of capsule dating sim mixed with twitch reflex-based controls.

I believe the experiment was about an individual who had a hard time making friends, and due to mental disorders, were it depression or etc., found it very difficult and draining to connect with another person. The event of talking to another individual was a stressful and ultimately a game of trying to talk about the correct things and increase the connection with the other person. The game was a representation of social anxiety and the effort and toll it takes on the character to speak with others.

I think the experiment aimed to utilise common game mechanics as metaphors for the stresses and fatigue of elements of daily life, and how as we grow older, interactions with others can become more and more difficult as we lose interest, whilst seeing our peers succeed makes that even more difficult.

Its about trying to make friends while at a serious disadvantage to the other players. They maxed out their points every day whereas the minigame was designed to be impossible by your own player

Perhaps it was about how we establish social bonds/relations with people while having specific amount of time/resources? I tried maxing out my "friendship" with at least one of the players. That was my primarily goal.

It was about getting an emotional response through game mechanics without verbally telling the player and only with visual cues and some negative texts. My character probably is an introvert and the game mechanics represents the struggles of this character's attempt to converse with people and as one conversation is tiring for an introvert, he has to rest to try again the next day. However in his mind, negative thoughts creates this illusion in the form of being able to see how other players are doing, the fact that they are doing better than you and the fact that you have to admit that you are worse.

I think the experiment was about displaying the perceived difficulty of creating, managing and upholding positive social interactions, from the point of view of a person that struggles with insecurities.

Creating relationships in gameplay

In my opinion and experience it was about how your brain has piece together multiple actions at once under a time constraint.

Maybe someone with a social disorder

Definitely about the struggles of communication and how exhausting that can be.

Making the player feel Anxious

Q8) Rank the following mechanics in terms of emotional impact during your time playing the prototype

Number of responses: 30

Rank	Choice	Distribution	Score	Times Ranked	Times n/a
1.	Mouse Scrollwheel - Flow Slider		211	30	0
2.	Mouse Button Mashing - Engagement Slider		207	30	0
3.	Daily Timer (From Day 4 onwards)		190	30	0
4.	Typing "ok" to acknowledge worse results		190	30	0
5.	Key Presses - Giving Responses		159	30	0
6.	Player 2 and Player 3 competing against you		158	30	0
7.	Death of a random Character (Day 16)		149	30	0
8.	Topic Selection		135	30	0
9.	Characters having human names		128	30	0
10.	Stamina Meter (From Day 8 onwards)		123	30	0

Lowest   Highest

Q9) To what extent do you agree that the following mechanics were emotionally impactful during your time with the prototype?

Number of responses: 30

	Strongly Disagree 1		Somewhat Disagree 2		Neutral 3		Somewhat Agree 4		Strongly Agree 5			
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Ø	±
Mouse Button Mashing - Engagement Slider	3	10%	0	0%	3	10%	14	46.67%	10	33.33%	3.93	1.15
Mouse Scrollwheel - Flow Slider	3	10%	0	0%	5	16.67%	12	40%	10	33.33%	3.87	1.18
Key Presses - Giving Responses	3	10%	1	3.33%	7	23.33%	10	33.33%	9	30%	3.7	1.22
Topic Selection	4	13.33%	5	16.67%	9	30%	6	20%	6	20%	3.17	1.29
Player 2 and Player 3 competing against you	4	13.33%	5	16.67%	4	13.33%	10	33.33%	7	23.33%	3.37	1.35
Daily Timer	1	3.33%	1	3.33%	8	26.67%	10	33.33%	10	33.33%	3.9	1.01
Stamina Meter	4	13.33%	3	10%	12	40%	7	23.33%	4	13.33%	3.13	1.18
Death of a random character	4	13.33%	1	3.33%	7	23.33%	12	40%	6	20%	3.5	1.23
Characters having human names	2	6.67%	4	13.33%	12	40%	9	30%	3	10%	3.23	1.02
Typing "ok" to acknowledge worse results	1	3.33%	5	16.67%	2	6.67%	12	40%	10	33.33%	3.83	1.16

Q10) In your own words, what feeling did you experience the most and what do you think caused this response?

Number of responses: 30

Text answers:

I felt stressed and like I was unable to keep up with the demands/requirements set by the game. The timers and

engagement sliders affected this the most.

Anger

The tiredness of having to engage in conversations that would take up all my stamina and having to go to sleep after

Annoyance and frustration every time there was a new variable introduced, I had a system of tackling the sequence and I had to keep adapting

Tiring button mashing, while trying to do two other mechanics. the day timer makes you feel more under pressure. Annoying knowing you did everything you could and some days you were the worst.

It was a bit stressful as I felt I was doing it all wrong!

Frustration, it was hard to keep a conversation going

Typing "ok" to acknowledge worse results emotionally impacted my experience as I had to admit that I failed consistently. It made me experience some form of anxiety and frustration when doing so.

Worry about clicking the mouse button as well as scrolling the mouse wheel, and making sure I remember which letters to press during the conversation.

Frustration, too many thing happening at once, can't focus on a single thing, hard to tell if things are bug or feature which lead to not knowing what is part of the system or the rules governing the system.

Agitation/frustration - having to race to find someone to talk to and keep an eye on the various mechanics was quite stressful

It made me feel frustrated. I enjoy games for escapism, and this was a version of the pressure of social interaction packaged up as a game. Not so fun.

Staying focused and on alert because of the introduction of mechanics that needed to be figured out with very tight constraints

I thought the mechanics were very clever because I could tell they were structured in a way to push the stress barrier. It's interesting to see what triggers anxiety in people and I can see that having a group of people 'in a room' that you 'supposed' to befriend and then maybe 'fail' at making friends would trigger emotional stress, even in a game.

A sense of rushing due to the time-limiting factors and red bar counting down their interest.

Stress and pressure- the timer seemed too short and lots of mechanics to pay attention and react to

Frustration. Lack of ability to win.

Confusion caused by complicated controls.

Confusion.

Stress because the more I tried to make friends with the characters, the harder it felt; the friendship levels did not increase easily and it was hard to form any connections. The button-mashing was stress inducing too.

A frustration that I was kept from performing as well as I could be despite how hard I tried, and stressed as more of these mechanics appeared over the various days

Frustration at not being able to complete the minigame.

Overall, it was a mixture of feeling accomplished (maxing out results with one player) and disappointment (not being able to achieve max results with all three players).

Anger due to frustration and confusion on what to do, why i can't succeed each day. Then the added difficulty after a few days.

Honestly, it'd have to be resignation. I felt like I was doing really good in a particular conversation about a favourable topic, it was perhaps my longest one yet.. My hands were hurting from the strain of button mashing, I was beginning to feel accomplished, anticipated the first time getting a really good grade... and then, after going to bed I was hit with "type "ok", to acknowledge, that you performed worse than both other players". It really gave me pause.

Probably stress the most, having to keep the scroll bar at the right place was the main cause

I felt stressed most of the time. Giving the blobs human names makes them relatable and will naturally attract you to whatever name appeals to you and adding the timer and metre as well as button mashing just adding to the stress and choices. Then having to acknowledge that you've done badly adds to the stress.

Intrigue because I wanted to see if anything would happen if I got the bar to the top but that character died

Stressful times. There's far too much to keep track of. The fact you don't have enough hands only compounds it.

Stressed

Q11) To what extent do you agree with the following statements?

Number of responses: 30

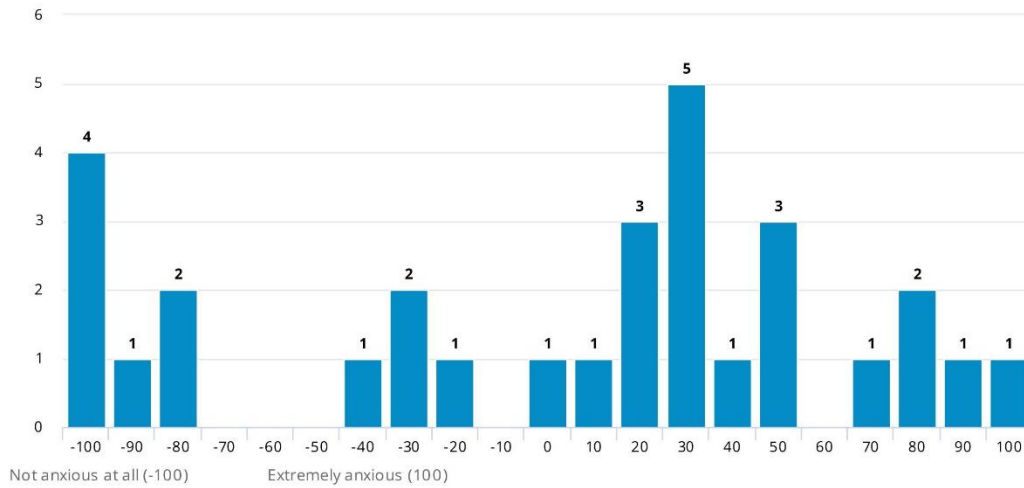|	Strongly Disagree 1		Somewhat Disagree 2		Neutral 3		Somewhat Agree 4		Strongly Agree 5			
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Ø	±
The experiment made me feel stressed	2	6.67%	2	6.67%	5	16.67%	9	30%	12	40%	3.9	1.19
The chat / log system made me think about my performance	1	3.33%	4	13.33%	6	20%	9	30%	10	33.33%	3.77	1.15
The variety of mechanics was overwhelming	0	0%	2	6.67%	2	6.67%	7	23.33%	19	63.33%	4.43	0.88
I felt I was able to achieve the results I set out to	11	36.67%	10	33.33%	6	20%	2	6.67%	1	3.33%	2.07	1.06
There was enough time to process all the information	12	40%	14	46.67%	2	6.67%	2	6.67%	0	0%	1.8	0.83
The conversations felt tiring to engage in	0	0%	2	6.67%	4	13.33%	12	40%	12	40%	4.13	0.88
I felt I was being judged on my performance	2	6.67%	0	0%	4	13.33%	11	36.67%	13	43.33%	4.1	1.08

Q12) To what extent do you agree with the following statements?

Number of responses: 30

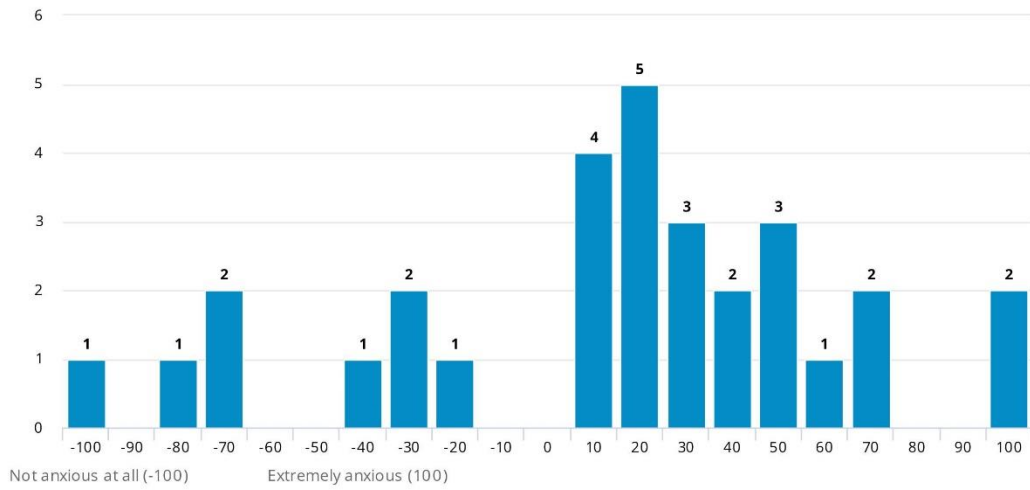|	Strongly Disagree 1		Somewhat Disagree 2		Neutral 3		Somewhat Agree 4		Strongly Agree 5			
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Ø	±
Games need to explore sensitive issues more often	0	0%	1	3.33%	4	13.33%	12	40%	13	43.33%	4.23	0.8
Mechanics can be just as successful at eliciting an emotional response as narrative/aesthetic	0	0%	1	3.33%	2	6.67%	7	23.33%	20	66.67%	4.53	0.76

Q13) How anxious do you consider yourself in day to day life?

Number of responses: 30

Not anxious at all (-100)   Extremely anxious (100)

Q14) How anxious did you feel during the Prototype?

Number of responses: 30

Not anxious at all (-100)   Extremely anxious (100)

Q15) How anxious do you think you would have felt if this prototype included fully animated and voiced human models, alongside sounds and visual polish?

Number of responses: 30

Not anxious at all (-100)   Extremely anxious (100)
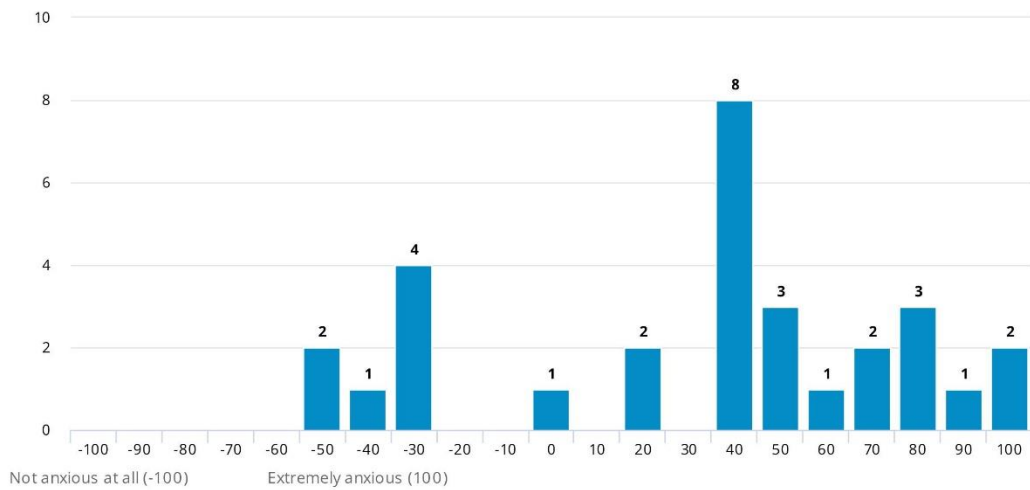
10.10 Appendix 10: Table of participants anxiety increase (Q14 – Q13)

Participant #	Q13) Daily Anxiety (-100 to 100	Q14) Anxiety During Prototype (-100 to 100)	Anxiety During Prototype - Daily Anxiety	Resulting Grouping of Participant
1	20	60	40	positive
2	100	100	0	neutral
3	80	20	-60	negative
4	30	50	20	positive
5	-100	-80	20	positive
6	-20	20	40	positive
7	-80	-20	60	positive
8	90	10	-80	negative
9	0	50	50	positive
10	10	10	0	neutral
11	40	30	-10	negative
12	30	40	10	positive
13	30	10	-20	negative
14	-100	-70	30	positive
15	-90	-70	20	positive
16	30	20	-10	negative
17	50	70	20	positive
18	-40	-40	0	neutral
19	-100	100	200	positive
20	20	40	20	positive
21	-30	30	60	positive
22	-30	-30	0	neutral
23	50	10	-40	negative
24	-80	50	130	positive
25	80	20	-60	negative
26	20	-30	-50	negative
27	50	20	-30	negative
28	-100	-100	0	neutral

| 29 | 70 | 30 | -40 | negative |
| 30 | 30 | 70 | 40 | positive |