

GLASGOW CALEDONIAN UNIVERSITY



# Honours Final Report

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## **The Proteus Effect: The impact of perceived trustworthiness on offline gameplay behavior**

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"Except where explicitly stated all work in this document is my own"

**Signed:\_\_\_\_\_ Date:\_\_\_\_\_**

## Abstract

The Proteus Effect is the process in which players, using an online virtual environment, attune their behaviour to what others would perceive them to be depending on the identity of their avatars (digital self-representation). It is a growing body of research, which this study aimed to further in order to gauge a deeper understanding of The Proteus Effect and its occurrence in an offline environment. Digital media and games especially are ever increasing to allow people into environments where their visual self-representation can easily be changed in expressive ways. In turn this influences the way people can behave. For example previous research suggests participants with a more attractive avatar were more affectionate with others compared with those with unattractive avatars (Yee & Bailenson, 2007). Significant evidence on this small amount of research still needs to be presented to justify whether the Proteus Effect occurs in an offline environment. Using a repeated measures experimental design this research study aimed to identify whether The Proteus Effect can occur in an offline environment as a result of manipulating the perceived trustworthiness (through appearance/impression formation from physical appearance) of player avatars, and how this may have an effect on parameters of player game play behaviour (honest/deceptive decision making). By using the board game "Intrigue" and measuring the amount of honest/deceptive decisions made revealed some interesting results. The general consensus of the study suggests that further research is required to determine whether a real effect of the Proteus Effect can occur in an offline environment. However some minor findings of certain parameters of player behaviour (honest decision making) backed by subjective thoughts on perceived honest avatar appearances and game play behaviours from participants, suggests a possible positive outcome of the Proteus Effect. The results also suggest there may be a connection between the Proteus Effect and player emotions. Additional studies could determine this and possibly further the research into the small area. If achieved successfully research on such avatar appearance changes will benefit game designers to grasp a greater understanding on how players behave in a face-to-face game environment, thus enabling an improved gameplay experience for the end user.

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## Contents

<b>Abstract.....</b>	<b>1</b>
<b>Acknowledgements.....</b>	<b>2</b>
<b>List of Figures.....</b>	<b>4</b>
<b>List of Tables.....</b>	<b>5</b>
<b>List of Appendixes.....</b>	<b>5</b>
<b>1.0 Introduction .....</b>	<b>6</b>
1.1 Background .....	6
1.1.1 The Proteus Effect.....	7
1.1.3 Online and Offline Environments.....	8
1.2 Project Outline & Research Question .....	9
1.2.1 Research Question .....	9
1.2.2 Aims & Objectives .....	9
1.2.3 Secondary Objectives.....	10
1.2.4 Primary Research Objectives .....	11
1.2.5 Hypotheses.....	11
1.3 Report Structure / Contents .....	12
<b>2.0 Literature Review .....</b>	<b>14</b>
2.1 Implications of the Proteus Effect.....	14
2.1.1 Avatars .....	14
2.1.2 The Proteus Effect.....	14
2.1.3 SIDE Theory .....	16
2.1.4 Role Playing.....	16
2.2 Theories of Psychology .....	17
2.2.1 Behavioural Confirmation .....	17
2.2.2 Self-Perception Theory.....	17
2.2.3 Impression Formation.....	18
2.3 Common Appearance Traits in Truthful/Deceptive Appearances .....	19
2.4 Introverted/Extroverted Personality Traits .....	20
2.4.1 The Big Five Model.....	20
2.4.2 Eysenck's Biological Trait Theory .....	21
2.5 Identify Primary Research Methods and Analytical/Data gathering techniques .....	22
2.5.1 Data Gathering Techniques.....	23
2.5.2 Analytical Techniques .....	23
	3

2.6 Literature Review Conclusion .....	24
<b>3.0 Methodology .....</b>	<b>25</b>
3.1 HCI Empirical Methods.....	25
3.2 Primary Research Method .....	26
3.3 Precise Nature of the Experiment.....	26
3.3.1 Participants .....	26
3.3.2 Design.....	27
3.3.3 Measures.....	27
3.3.4 Materials .....	28
3.3.5 Procedures .....	32
<b>4.0 Evaluation / Results .....</b>	<b>34</b>
4.1 Pre Evaluation/ EPQR-S Results .....	34
4.2 Honest/Deceptive Decisions Results .....	35
4.2.1 Effect of Personality type on Decisions Results .....	36
4.3 Post Evaluation Results .....	37
4.3.1 Pre/Post Emotional Results.....	40
4.3.2 Personality types and Perceived Behaviour Results .....	41
<b>5.0 Discussion &amp; Conclusions .....</b>	<b>43</b>
5.1 Brief Summary of Project .....	43
5.2 Final Discussion of Results .....	43
5.3 Project Limitations & Future Work .....	46
5.4 Conclusions .....	47
<b>6.0 References .....</b>	<b>48</b>
<b>7.0 Appendix's .....</b>	<b>52</b>

## List of Figures

Figure 1: Trustworthy/Untrustworthy Appearance Traits.....	19
Figure 2: Eysenck Personality Dimensions.....	21
Figure 3: Trustworthy/Neutral/Untrustworthy Avatar Faces .....	29
Figure 4: Geneva Emotional Wheel.....	30
Figure 5 Overall Honest and Deceptive Decisions .....	36
Figure 6 Effect of Personality Types on Honest/Deceptive Decisions .....	37
Figure 7 Perceived Game Play Behaviours .....	38

Figure 8 Pre/Post Emotions .....	40
Figure 9 Personality Types with Perceived Behaviours .....	41

## List of Tables

Table 1 Example Measures Tally Sheet .....	31
Table 2 Pre Questionnaire Results .....	34
Table 3 Avatar Types with Honest/Deceptive Decisions .....	35
Table 4 Personality Types with Honest/Deceptive Decisions.....	36
Table 5 Perceived Behaviours in each Game.....	37
Table 6 Personality Types with Perceived Behaviours .....	41

## List of Appendixes

Appendix A EPQR-S .....	52
Appendix B Pre GEW .....	53
Appendix C Post GEW .....	54
Appendix D Pre Questionnaire .....	55
Appendix E Pre Questionnaire Results.....	56
Appendix F Post Questionnaire .....	57
Appendix G Post Questionnaire Results.....	59
Appendix H Decisions Measures Tally Sheet .....	63
Appendix I Intrigue Game Rules.....	67
Appendix J Example Game Avatars .....	73
Appendix K SPSS Results.....	75

## 1.0 Introduction

This section contains an initial review of the background for the project, the related research question, and the proposed objectives and hypotheses required for the project to succeed in its aim.

### 1.1 Background

The video games industry has always been under fire from the media on its anti-social implications and the negative effect it has on children and young adolescents. In the past there have been a wide variety of different cases on the effects of playing video games for long periods of time, and the impact it may have with anti-social behaviour. For example Padilla-Walker *et al.* (2009) discusses that during adulthood video games are linked to many risk behaviours such as, social acceptance and relationship quality with friends and family.

Over the years however, there have been numerous articles to support conflicting evidence on these claims that in fact, video games are not anti-social but the complete opposite, millions of people interact with each other using self-representations in online games, (Chan & Vorderer, 2006). For example, reports suggest (The Gazette, 1989) video games allow children to develop their self-worth and help to support the community, especially on online games. A major part, in not only online gaming but also a vast verity of digital sources, is the way people represent themselves in these digital environments and communicate using them. This can span from friends with hand held devices, all the way to businesses such as IBM, using avatars to communicate in virtual conferences Bainbridge, (2007, cited in Dion *et al.* 1972).

There are many different ways self-representations can be presented which are easily editable in expressive ways, these are also known as avatars in the gaming world. There are large inventories of assets available for users on different gaming platforms, that allow them to pick, and from just a click of a button have the identity of their avatar changed. On the Xbox's official website it shows there are a combined total of over 10,000 male and female items to choose from, (Xbox, 2012). (Joy Stiq, 2012) express that in 2010 Xbox Live had over 20 million active players. All of these active accounts would contain an avatar to represent the player. This just shows the vast amount of people on one digital medium that communicate through a self-representation (avatar).

There are even online educating 3D worlds such as Second Life (which is most widely used for education) that can "provide a dedicated environment for learning", that all use self-representations, (Minocha, 2010). Thus it is clearly shown, that in these current times, self-representations are a widely used method, ranging from social use, entertainment purposes, businesses and even teaching and learning. This clearly indicates that this area should be further looked into by researchers as it is such a

widely used entity which can easily be changed in a virtual environment for the support of businesses, educators and other stakeholders.

### **1.1.1 The Proteus Effect**

This current time allows us to represent ourselves on a vast amount of levels in many different forms, from first impressions using self-representations in digital environments, to everlasting statements in the physical world. It is thought that self-representations are able to shape the way people behave (Yee, 2007). The Proteus Effect is the process in which players, using an online virtual environment, attune their behaviour to what others would perceive them to be, depending on the identity of their avatars (digital self-representation), (Yee, 2007). It is a growing body of research forwarded by researchers Nick Yee and Jeremy N Bailenson. For example (Yee & Bailenson, 2007) illustrates participants with a more attractive avatar in an online virtual environment were more affectionate with others in a self-disclosure and interpersonal distance task rather than those with unattractive avatars.

Furthermore, it is also discussed that participants are more confident in a negotiation task when using taller avatars rather than shorter ones. (Yee & Bailenson, 2007). Nonetheless this validates that The Proteus Effect is a current effect in the online virtual environment.

In addition (Yee & Bailenson, 2009) actually validate that The Proteus effect can occur in an online community out with the lab space. Their research discusses that the average user spends 20 hours per week conferring with other avatars online, (Yee, 2006); this in turn suggests players are spending large amounts of time using their avatars so therefore behaving differently. This verifies that in these current times video game characters are having a massive impact on the players. To a great extent they are actually shaping the way people behave. (Meretzky, 2001) suggests having a well-presented, central, main character in a game is one of the best ways to leave a memorable impression. For example, (Blache, and Fielder, 2013) emphasized how important character design was and the relationship produced between player and main character/avatar for the success of the Lara Croft game series. Deciding what characters look like, act and portray and knowing what effect it could have on players is a massive advantage to a designer. This research study could provide a deeper understanding into this area, which could be used by game designers and other digital media developers that contain avatars. Social psychologists and researchers could also find this study beneficial making it worthwhile researching.



### 1.1.3 Online and Offline Environments

However, can it be extended into reality to a face-to face environment? As (Yee, 2007), explains, to help users gain social advantages through behavioural mimicry from the way users behave with avatars in the virtual world could be brought into the real world. For example, research was furthered from their previous experiments which noted there were changes in behaviour, even outside the virtual environment for a short period of time in a “subsequent face-to-face” negotiation task, (Yee & Bailenson, 2009). Participants negotiated for 15 minutes in a virtual environment using self-representations that were either taller or shorter than each other. The negotiation task involved splitting and sharing money with four rounds. It was then followed by a repeated experiment in a face-to-face environment. (Yee & Bailenson, 2009) discovered that the participants that originally had the taller avatar in the virtual environment adopted those negotiation behaviours from the virtual environment and carried them over to reality where the negotiation took place. Participants were asked to sit down so height was eliminated as an interruption to the experiment. The outcomes followed the previous experiment where participants who had taller avatars negotiated more aggressively than participants with shorter avatars. This expresses that The Proteus Effect can occur in “subsequent face-to-face interactions” (Yee & Bailenson, 2009). Therefore this study will further this research to gauge a greater understanding on the Proteus Effect in an offline environment. (Yee & Bailenson, 2009) illustrate that “what we learn in one body is shared with other bodies we inhabit, whether virtual or physical”, which is the area of concern for this study that this report aims to expand on.

In addition to further develop this idea of offline and online environments, game design has a relationship between video games and board games where most of the underlying mechanisms for video games have derived from board games. (Fullerton, 2008) expresses in her book “Game Design Workshop” that even though games don't share the same structure; they share a number of elements in common. For example Fullerton, states that the card game Go Fish and video game Quake, which are two completely different games, but have similar attributes such as players, objectives, rules and resources. (Fullerton, 2008) also states many successful games are based on paper games such as World of Warcraft and Civilization. The point is that there are many elements including avatars, which are used on both mediums. Therefore adapting a board game for this research project will give a further understanding to contribute to both video games and board games. Another point is that developing it with a board is a much faster, cheaper and easier process for developers and could greatly benefit the video games industry.

## **1.2 Project Outline & Research Question**

The outline of the project will involve a repeated measures experimental approach that aims to discover whether The Proteus Effect can occur in an offline gameplay environment. This will be achieved by adapting the board game Intrigue, by applying implications of The Proteus Effect to involve different avatars for each player. This will give an insight into The Proteus Effect and if it occurs in an offline environment, depending on the player's gameplay behaviour when using different types of avatars with (honest/deceptive) characteristic traits. It will provide future developers with extended knowledge of the effects of choosing different characteristic traits for avatars which in turn could change the player's behaviours proving very useful to influence certain gameplay behaviours. A board game has been selected as the underlying mechanisms used in them can easily be incorporated into a video game, making it a cheaper and easier process for developers designing games that are avatar based in the future.

### **1.2.1 Research Question**

The research question presented has been created to relate to the background and answer the projects area of study.

Does the Proteus Effect (players attuning their behaviour to what others would perceive them to be depending on the identity of their avatars) occur in an offline environment as a result of manipulating the perceived trustworthiness (through appearance/impression formation from physical appearance) of player avatars, and what is the effect on parameters of player behaviour (honest/deceptive decision making)?

### **1.2.2 Aims & Objectives**

This section contains the project's aim and states the objectives necessary for investigating the success of the experiment.

The aim of this study is to critically analyse and investigate the impact of The Proteus Effect in an offline environment as a result of manipulating the perceived trustworthiness (through appearance/impression formation/self-perception theory from physical appearance) of player avatars. Through a repeated measures experimental study, it will determine whether this manipulation has an effect on parameters of player behaviour (honest/deceptive decision making).

### 1.2.3 Secondary Objectives

For the project to be successful the study will cover several objectives which include:

1. Review The Proteus Effect and its relation to an offline environment.

#### **Objective Purpose**

This will obtain details on the different implications of the Proteus Effect through a literature review and provide an overview of the given area which can be built on to fully understand how the Proteus effect occurs and how it affects peoples' gameplay behaviour in different ways. This will verify what exactly occurs and prove very useful for the experiment of the project.

2. Identify different aspects of psychology which are linked to The Proteus Effect - Self-perception theory, impression formation and behavioural confirmation.

#### **Objective Purpose**

Researching self-perception theory, impression formation and behavioural confirmation, will clearly identify the link it has to the Proteus Effect and how they can contribute and affect the process in different ways.

3. Analyse which personality traits are common in truthfulness/deceptive appearances.

#### **Objective Purpose**

By identifying the key features of truthful and deceptive appearance traits it will allow the research to have a sound basis for the experimental section of the report. This will reveal personality traits that are common in truthfulness/deceptive appearances that can be used to influence gameplay behaviours in the experiment, which is backed up by relevant literature.

4. Analyse introverted and extroverted personality types.

#### **Objective Purpose**

By analysing introverts and extroverts studies, it can aid the research by giving a deeper understanding into the social interactions made in the game and in relation to The Proteus Effect. It will also be another measure in gameplay behaviour, therefore adding to the scope of the project.

5. Identify primary research methods and Analytical/Data gathering techniques.

#### **Objective Purpose**

By identifying primary research methods and analytical/data gathering techniques would prove very useful as it would highlight the advantages and disadvantages of different techniques so the correct approach can be used for the project to succeed.

### 1.2.4 Primary Research Objectives

1. Adapt the board game “Intrigue” for Avatars.

#### **Objective Purpose**

The board game “Intrigue” will be adapted by adding avatars to each player. The avatars shall be pre-select backed by relevant research literature so they are perceived honest, deceptive or neutral which will illustrate whether participants are conforming to The Proteus Effect, depending on how they behave when playing as the different types of avatars.

2. Conduct a pre evaluation.

#### **Objective Purpose**

Conducting a pre evaluation will identify whether participants are introverted or extroverted and fit the criteria for the experiment. It will also identify how they perceived the avatars to be – honest/deceptive or neutral looking.

3. Conduct an experiment using the board game “Intrigue.”

#### **Objective Purpose**

This will determine whether The Proteus Effect has an impact on the participants in an offline environment, as a result of manipulating the appearances of player avatars (trustworthiness/deceptive) and measure the influence it has on gameplay behaviour. This will be determined by measuring the amount of truthfulness and deceptive decision made in the game by participants with determined avatars (honest, deceptive or neutral).

4. Conduct a post evaluation

#### **Objective Purpose**

Conducting a post evaluation will identify the participant’s gameplay experiences with the different avatars and any changes in opinions on them as a result.

### 1.2.5 Hypotheses

Listed below are the hypotheses which have been developed for the expected outcomes of the project, each with justification in relation to the initial literature review that provides relative discussion to why they are of importance.

H1 The Proteus Effect will occur in an offline environment.

#### **Justification**

(Yee & Bailenson, 2009) conducted an experiment on The Proteus Effect containing a “subsequent face-to-face” negotiation task which took place, first in a virtual environment, then in a face-to-face environment. The same results were produced for

the users in and out of the virtual environment proving The Proteus Effect can occur subsequently in an offline environment.

H2 Participants who have honest avatars will behave more positively and make more honest decisions, in comparison to players with dishonest or neutral avatars.

### **Justification**

(Bem, 1972) explains using self-perception theory through an experiment, where the participants have to rate cartoons as funny or not and lie depending if the truth or lie light was displayed. They actually made an observation of their behaviour from an external cue which in turn affected their attitude towards the situation, so when telling the truth with the truth light they actually thought it was funnier. This supports this hypothesis as participants are thought to behave more positively through self-perception theory.

H3 Participants who have dishonest avatars will behave more negatively and make more deceptive decisions, in comparison to players with honest or neutral avatars.

### **Justification**

(Frank and Gilovich's, 1988) research suggests participants in black uniforms in fact act more aggressively than participants in white uniforms. The participants were asked to select 5 games from a list of 20 that they would like to take part in. The outcome was that the participants in black uniforms selected much more aggressive sports over participants in white uniforms. This supports this hypothesis as participants are expected to behave more negatively through self-perception theory.

H4 Extraverted participants are expected to perceive their gameplay behaviour to be more risk taking and trust without scepticism rather than Introverts.

### **Justification**

(Eysenck 1990a, 1990b) study (cited in Bernstein et al. 2008) suggests drawing from his framework of two dimensions from the big 5 model, that extroverts will perform more risk taking behaviours and that introverts are less likely to take part in social activities and can be anxious.

## **1.3 Report Structure / Contents**

Thus far this report has discussed a growing body of literature which expresses a range of different aspects on the relevant background and worth for the project. It has also presented the related research question, objectives and hypotheses with justification alongside it.

## **Literature Review**

The aim of the literature review was to discuss the different implications of the Proteus effect, its relation to an offline environment and the underlying aspects of psychology that are linked to the process, to gain a greater understanding of the topic area. Its purpose was to also analyse introversion/extroversion personality traits and identify personality traits common within truthfulness and deceptive appearances for player avatars. By identifying the different appearance and personality traits a framework was produced that created a foundation in which the experiment could be built upon. By gaining a scaled pre tested set of trustworthy and deceptive avatar faces, it allowed the experiment to reveal whether the Proteus Effect occurred in an offline environment.

## **Methodology**

The purpose of the methods chapter was to provide details on the specific primary research approach and present justification for the selected method. This experimental project was employed and is discussed alongside other techniques to answer whether the Proteus Effect occurs in an offline environment as a result of manipulating the perceived trustworthiness. The methods chapter also includes an in depth description on the precise nature of the experiment describing the participants, design, measures, materials and procedures used to fulfil the experiment.

## **Evaluation**

The purpose of the evaluation chapter was to analyse and present the results of the experiment. It includes a detailed presentation of the honest and deceptive decisions made when participants used a specific type of avatar (honest/neutral/deceptive). The chapter also contains evaluations on the personality types, pre/post emotions and how they have an effect on the Proteus Effect occurring in an offline environment as a whole. Finally results on the participant's perceived behaviours are presented and related. The results suggested above are detailed and discussed in terms of what they mean individually and collectively towards the project.

## **Final Discussions & Conclusions**

The final discussions and conclusions chapter presents the reader with the overall conclusions of the project, drawing answers from the result specified in the evaluation chapter. It discusses a brief summary of the project then presents the final overall findings produced from the experiment. It then discusses the projects limitations and any possible future work which can be carried out to develop the research project further.

## 2.0 Literature Review

This section provides the literature review which aims to address the main features of the project outlined in the objectives section. Listed below are the specific objectives .

1. Review The Proteus Effect and its relation to an offline environment.
2. Identify different aspects of psychology which are linked to The Proteus Effect - Self-perception theory, impression formation and behavioural confirmation.
3. Analyse which personality traits are common in truthfulness/deceptive appearances.
4. Analyse introverted and extroverted personality traits.
5. Identify primary research methods and Analytical/Data gathering techniques.

By completing the given objectives above, the literature review has uncovered the different implications of The Proteus Effect and the different aspects of psychology which are linked to affecting the behaviour of players. It has also revealed a tested framework of truthfulness and deceptive facial appearances, which can be used within the experiment to gain an answer to the research question.

## 2.1 Implications of the Proteus Effect

### 2.1.1 Avatars

In any virtual environment, including outwith the gaming world, an avatar (also known as self-representation) is anything which represents the player. Common examples would include avatars such as the main character from a video game the player controls. (Bailenson & Blascovich, 2004) describe avatars as being a recognizable digital self-representation that has the same behaviors as the human being controlling it usually in real time. This description has been verified by (Peterson 2005) cited by (Falloon 2010) that an avatar is an 'online manifestations of self in a virtual world, and are designed to enhance interaction in a virtual space'. Avatars and the appearance they have is the key element in which The Proteus Effect occurs and affects the player's behaviour in different ways.

### 2.1.2 The Proteus Effect

Yee (2007) defines The Proteus Effect as the process in which players, using an online virtual environment, attune their behaviour to what others would perceive them to be depending on the identity of their avatars (digital self-representation). Development in technology has presented users with the ability to create their own identity, by allowing

them the opportunity to hand pick their personality traits on a vast amount of different platforms.

This study into The Proteus Effect aims to fully understand the different implications of the effect, how it occurs with players and the impact it can have on their behaviour. The Proteus Effect is essentially players behaving differently themselves and to one another depending on the appearance of their avatars. (Yee & Bailenson, 2007) illustrates participants with a more attractive avatar in an online virtual environment were more affectionate with others in a self-disclosure and interpersonal distance task rather than those with unattractive avatars.

Online virtual environments allow individuals to create an ideal version of how they wish to be perceived. In turn this leads to the player adjusting their personalities and without knowing behaving differently. This process is what Yee & Bailenson describe as The Proteus Effect. (Yee & Bailenson, 2007, 2009) supports this theory as their research findings show in money splitting negotiation tasks, taller participants were perceived more confident in that they would be more demanding in their favour when negotiating with the smaller avatars and were also more likely not to agree on splits that were unbeneficial for them. These two studies verify The Proteus Effect is a current process which even occurs out with the lab space in an online virtual community (Yee & Bailenson, 2009).

However this study aims to prove if The Proteus Effect occurs in an offline environment. As (Yee, 2007), explains to help users gain social advantages through behavioural mimicry from the way users behave with avatars in the virtual world could be brought into the real world. (Yee & Bailenson, 2009) research has validated that this effect can take place in an offline environment. However only subsequently with the aid of the participants performing the same task in a virtual environment first. It would then be repeated straight after in a face-to-face setting for The Proteus Effect to occur. The experiment used was much like the previous negotiation task explained above. Participants negotiated for 15 minutes in a virtual environment using a head-mounted display to produce the self-representation and environment. The avatars being used were either taller or shorter than each other. The negotiation task involved splitting and sharing money with four rounds, it was then followed by a repeated experiment in a face-to-face environment. As predicted (Yee & Bailenson, 2009) discovered that the participants that originally had the taller avatar in the virtual environment adopted those negotiation behaviours from the virtual environment and carried them over to reality where the negotiation took place. Participants were asked to sit down so height was eliminated as an interruption to the experiment. The outcomes followed the previous experiment where participants who had taller avatars negotiated more aggressively than participants with shorter avatars. This experimental study shows The Proteus Effect is current throughout the different spaces but there are a couple of different elements which can affect its process in an online environment which might not in an offline face-to-face environment.



### **2.1.3 SIDE Theory**

SIDE Theory is The Social Identity model of Deindividuation effects which is thought to be closely linked to The Proteus Effect as suggested by (Yee & Bailenson, 2009). SIDE theory was presented by such researchers as Zimbardo (1969), to explain aggressive behaviour performed in groups. SIDE theory is used to differentiate between individuated behaviour and deindividuated behaviour. Individuated behaviour is normal social acceptable behaviour. Deindividuated behaviour is where people can act differently within a group as their individual identity is hidden from society. This behaviour can usually be anti-social behaviour within crowds which wouldn't normally be in tune with normal standards of behaviour as an individual. This theory has been proven by Diener's (1976) experiment on children Halloween trick-or-treaters whereby the amount of candy stolen was far greater by children in anonymous/ non-anonymous groups over the children that were anonymous/ non-anonymous alone. It is this theory which can have a small effect of player behaviours as their identities are part of a group in games.

As stated above SIDE theory is closely linked to The Proteus Effect; however it does have some differences worth highlighting. Pointed out by Yee & Bailenson (2009) the SIDE theory focuses on group related activities such as becoming "more hostile on a message board" rather than the individual attuning to the behaviour such as becoming "friendlier in an attractive avatar". There are also more differences between the theories in which the SIDE theory only occurs in groups; however The Proteus Effect occurs while the individual is alone. This is due to Self-perception theory and the player making an observation on him or herself without the need for others to do so. The reason SIDE theory might not have an effect in this experiment is that players will see each other face-to-face so their identities will not be hidden from society. Thus this theory can be ruled out as an impact to The Proteus Effect.

### **2.1.4 Role Playing**

Role-playing is one such element that can be taken into account which could affect the overall player's behaviour intervening with The Proteus Effect. Users playing different roles in games can change the way they act and behave to one another in different situations. Corsini, (2010) defines role playing as people acting to "simulate reality" for entertainment or education. Studies on role-playing have revealed it is widely used for training purposes (McFall & Marston, 1970). There has also been research on role-playing to elicit different emotional reactions or attitudes to things. For example Janis & Mann (1965) suggest role-playing can be used to stop a bad habit like smoking. This research provides relative information that role-playing can purposefully affect the behaviours and attitudes of users to different things. However these changes in behaviour are predictable when enacting a role. This research project aims to focus on

the particular impact different avatar appearances have and the psychological processes involving The Proteus Effect to influence the player actions.

## **2.2 Theories of Psychology**

Thus far this review has discussed a growing body of literature that expresses a range of different aspects on digital self-representations and the process of one way users behave towards avatars in a virtual environment known as The Proteus Effect. There are several aspects of psychology which can be taken into account which relate to The Proteus Effect. Research into them is necessary to develop an understanding in what degree they could affect the way players behave in online and offline games.

### **2.2.1 Behavioural Confirmation**

Behavioural Confirmation is one such psychological aspect which can be related to The Proteus Effect. Behavioural confirmation is a method through which social expectations lead others to behave in a way that validates what is expected by them (Snyder et al 1977). The research produced by Snyder et al (1977) involved male and female students talking over the phone. The female target was caused to behave in a friendlier and more alluring way towards the male due to the male perceiver thinking the female was attractive even though she may not have been. It is this process whereby depending on how the perceiver acts causes the target's behaviour to change accordingly, which is known as behavioural confirmation. This psychological aspect could contribute to The Proteus Effect and this study. For example in relation with this study the perceiver communicating with a target using an avatar which looks untrustworthy could cause them to behave deviously and dishonestly thus making it an important aspect towards the way players will act.

### **2.2.2 Self-Perception Theory**

It is thought that a user's behaviour can directly be affected by the change in their self-representations. There are several processes that all link to this change in behaviour which are discussed below. Self-perception theory is one way in which individuals relate to their inner-self and emotional states that they know, whereby judging on their own behaviours and the situations they are in, they act accordingly, (Bem, 1972). (Bem, 1972), suggests the individual's attitude on the inside is affected by their own observations from a third person perspective that still rely on. Behaviour changes can arise from different situations occurring externally. For example in The Cartoon experiment Bem, (1965; 1964 cited in Bem, 1972) participants were asked to rate cartoons either "This cartoon is very funny" or "This cartoon is very unfunny". However

they were asked to answer truthfully when an amber light went on in the background and lie when a green light went on. The self-perception theory was supported as participants greatly changed their attitudes under the influence of the truth light rather than the lie light. As predicted when participants said, "This cartoon is very funny" in the presence of the "truth" light followed by actually rating the cartoon funnier than if they would have suggested under the influence of the lie light. In other words by viewing the external cue (truth light) the participant came to believe the cartoon was actually funnier from making an observation of their behaviour (telling the truth) which in turn effected their attitude towards it.

Another example is (Frank and Gilovich's, 1988) research on social perception and if black uniforms affect professional sportsmen with aggression. The study suggests that participants in black uniforms in fact act more aggressively than participants in white uniforms. The participants were asked to select 5 games from a list of 20 that they would like to take part in. The outcome was that the participants in black uniforms selected much more aggressive sports over participants in white uniforms. Yee (2007) defines The Proteus Effect "in line with self-perception theory, they conform to the behaviour that they believe others would expect them to have". Thus this research area is a vital part in conjunction with the Proteus Effect that should be of interest for the well-being of the project.

### **2.2.3 Impression Formation**

It has identified that people can change their attitude toward things by simply reacting to their behaviours from external cues. In terms of judging what is truthful and deceptive in appearance of these self-representations, impression formation is one technique used. Impression formation is the way people perceive others through appearance to form first impressions, Schneider (1979, cited in Riggio and Friedman 1986). (Dion *et al.* 1972) explains in terms of impression formation "what is beautiful is good". The research discusses participants judging photographs of different attractiveness, where the outcome was that more attractive people were rated as having a more successful career and were more likely to be married, (Dion *et al.* 1972).

This research is also backed by, (Surawski and Oosoff, 2006) where their research hypothesized that the "Halo Effect", (higher ratings for highly attractive targets) was current when participants rated politicians on first impressions. The research also suggests that vocal attraction was lower in the more physical attractive politicians. In terms of avatars selection this "Halo Effect" could play a big part in this report and prove useful to further research. This would aid in obtaining the correct appearance traits for the creation of physical avatars for the experiment. By taking already researched knowledge on characteristic traits of honest and deceptive looking avatars and have them subjectively rated would give the project a more robust outcome rather than getting participants to plainly subjectively rate the attractiveness of the avatars

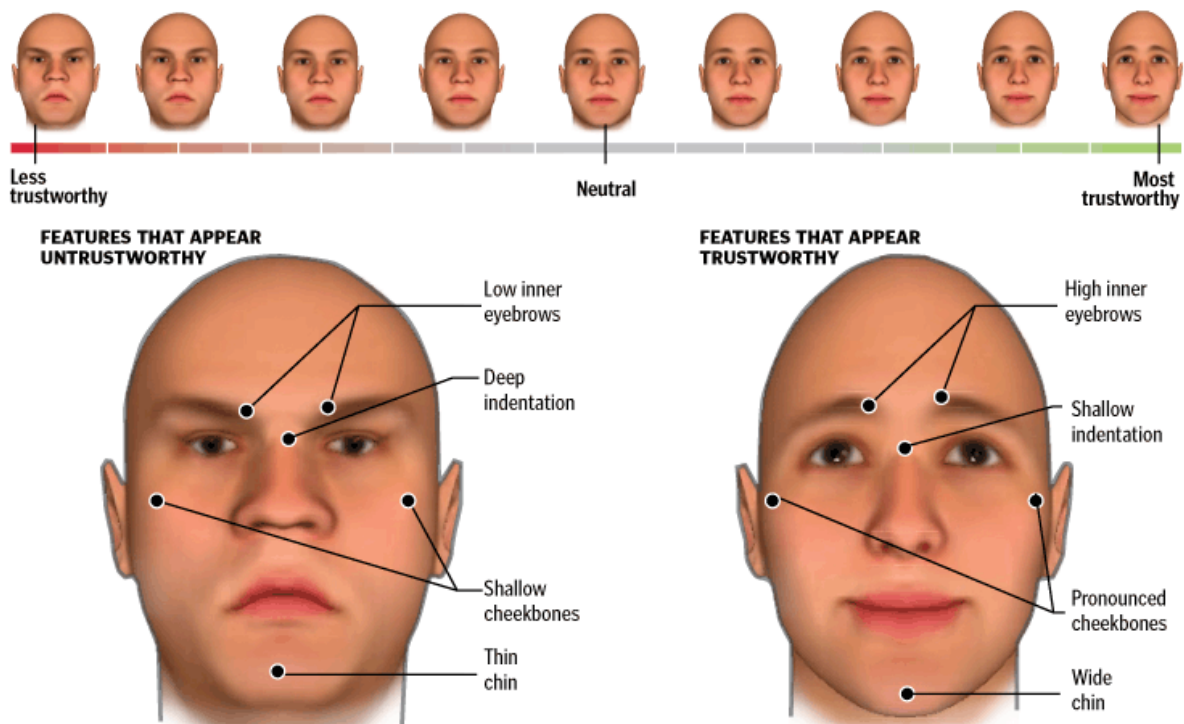
appearances. This project will contribute to the understanding of social interactions offline, by measuring appearance impression formation through appearances of player avatars, and the effect on parameters of player behaviour.

## 2.3 Common Appearance Traits in Truthful/Deceptive Appearances

In any context, the face of a human being or avatar alike could be thought as the first thing anyone identifies when meeting one another. (Uleman et al. 2005) suggests when people are evaluating faces they do it on several different trait dimensions. It is these evaluations which could have an effect on how perceivers could behave around someone. (Todorov et al. 2005) gives a good example of how evaluating faces can have an effect on important world events such as elections or even criminal judgements (Blair et al. 2004).

A main contributor to this research area on evaluation of facial traits in relation to trustworthiness is Alexander Todorov. This study aims to use his research as a framework to base the avatars appearances on. (Todorov et al. 2008) suggests through research there are four main facial features to consider in relation to trustworthiness which include:

Trustworthy faces - high inner eyebrows, pronounced cheekbones, wide chin and



SOURCES: Alexander Todorov, Sean G. Baron, and Nikolaas N. Oosterhof, Princeton University

JAVIER ZARRACINA/GLOBE STAFF

Figure 1: Trustworthy/Untrustworthy Appearance Traits

shallow nose indentation.

Untrustworthy faces - low inner eyebrows, shallow cheekbones, thin chins and deep nose indentation.

Todorov et al (2008) experiment consisted of participant's judging their first impressions on 192 generated faces from 1 very untrustworthy to 8 very trustworthy. The faces were bald Caucasian and mostly male to rule out any ethnic stereotypical judgements and bald females didn't look socially normal. There were sixty-one features that could be tweaked differently of an ( $\pm 2$  s.d.). All the faces were generated emotionally neutral and mouth shape natural, so there could be a fair judgement plainly on appearance traits. A mean value of facial features which had correspondence to the trustworthy judgement was calculated and four main features were produced - "high inner eyebrows, pronounced cheekbones, wide chin and shallow nose indentation" (Todorov et al 2008). As stated above it is these pre-defined features of trustworthiness that this project will use to determine the appearances of the avatars used to adapt the board game "Intrigue".

There are other studies which support this outcome and further it by suggesting attractiveness plays an important part with correspondence to the judgments made on both trustworthiness and valence (Oosterhof & Todorov, 2008; Todorov, 2008). Todorov, (2008) also points out that facial expressions of positivity and negativity effect the perceived trustworthiness on both ends of the spectrum. This means avatars which look happy will be perceived more trustworthy than angry looking avatars. When the emotional expressions are not clear to one's perceiver (Oosterhof & Todorov, 2008) argues "faces are evaluated in terms of their similarity to expressions of anger and happiness in an attempt to infer the person's intentions". Thus having avatars with different levels of shaped mouths in this study will prove useful to display different levels of trustworthiness.

## **2.4 Introverted/Extroverted Personality Traits**

### **2.4.1 The Big Five Model**

Researchers (McCrae & Costa, 2004), suggest personality can be grouped into five personality dimensions including: Openness to experience, Conscientiousness, Extraversion, Agreeableness and Neuroticism. It is thought to be one of the most widely used models for personality spanning over more than twelve countries (Allik & McCrae, 2004; Ashton et al., 2004; Yamagata et al., 2006) cited in (Bernstein et al. 2008). This also proves it's a major asset to this field of research as it is being used to examine personalities from all over the world from different cultures, (Carver & Scheier, 2004).

### 2.4.2 Eysenck's Biological Trait Theory

Eysenck furthers this research by providing the big-five model with a framework that personality traits can be related to. Eysenck suggests this framework is built up of two main dimensions – introversion-extroversion and emotionality-stability (Eysenck 1990a, 1990b) as cited by (Bernstein et al. 2008):

1. "Introversion-extroversion. Extroverts are sociable and outgoing, enjoy parties and other group activities, they are risk takers and love excitement and change.

Introverts tend to be quiet, thoughtful, and reserved, enjoying solitary pursuits and avoiding excitement and social involvement.

2. Emotionality-stability. At one extreme of the emotionality-stability dimension are people who display such characteristics as moodiness, restlessness, worry, anxiety and other negative emotions. Those at the opposite end are calm, even-tempered, relaxed and emotionally stable. (This dimension is also often called neuroticism.)"

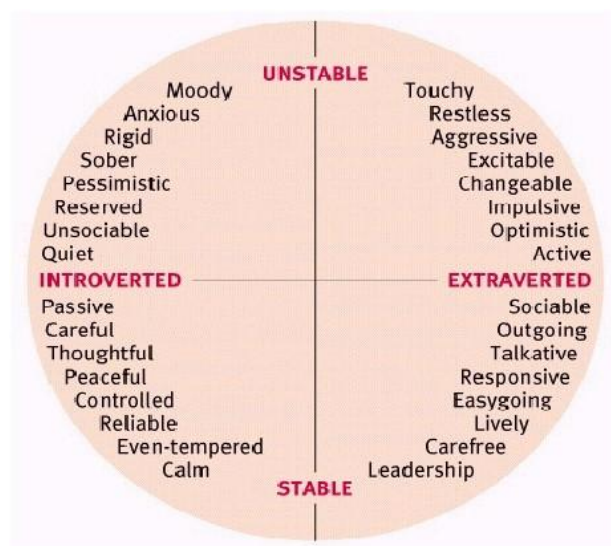


Figure 2: Eysenck Personality Dimensions

Eysenck's Biological trait theory has been popularised in ways to look at individuals' personalities and their use in video games. Certain studies have suggested extroversion/introversion personality types are linked to different aspects of social behaviour in games and in fact deal better at different things (Pokorski et al 2012). For example Pokorski et al (2012) suggest extroverted players take part in more online activities with cooperation of other players. The research also expresses that players

are involving themselves in more extroverted behaviour in stressful gaming environments as they are gaining social skills like being more approachable and interacting with others, which can be forwarded in reality (Pokorski et al 2012). Research into this area has revealed introversion/extroversion personality types may cause players to behave differently and make different types of decisions (honest/deceptive). Thus could contribute to the Proteus Effect occurring in an offline environment.

To determine the personality type of someone an Eysenck Personality Questionnaire-Revised Short Form (EPQR-S) can be used, devised by Eysenck (1990a, 1990b). The EPQR-S consisted of 48 questions that assess in 4 traits - neuroticism, extraversion, psychoticism, and lying. It has 12 questions for each of the traits whereby the user must answer 'yes' or 'no' which can be counted as binary responses 1 and 0. The scores are grouped and measured against a scale - 12 being the maximum and 0 being the minimum score. For introversion and extroversion 1-4 was low, 5-8 medium and 9-12 high. See Appendix A for EPQR-S. Someone is determined introverted or extroverted depending on the highest score in the sections. If the score was tied they were noted as both or balanced.

## **2.5 Identify Primary Research Methods and Analytical/Data gathering techniques**

To identify the project primary research methods this literature review will examine and compare two keys papers which have contributed to the research on The Proteus Effect.

In the study conducted by (Yee & Bailenson 2007; Yee & Bailenson 2009) the research method used was the between-subjects design. This is when one group of participants are measured under one condition and another group under another condition. In this case (Yee & Bailenson 2007; Yee & Bailenson 2009) conducted two studies in the project measuring the effects of avatar appearances and height. Other research studies have suggested this is a preferred primary research method due to there being less interference between the conditions and the participants taking part (Greenwald1976; Stam & Spanos 1980). Due to the nature of the experiment, it meant Yee & Bailenson had to use the between-subject design as they were measuring two different levels of variable (Yee & Bailenson 2007; Yee & Bailenson 2009).

However, as this research project is only changing one variable in one environment a repeated measures design, also known as within-subjects design, will be employed. A within-subjects experiment is when participants are measured under one condition and then repeated on the other conditions. It is thought to be preferred over between-

subjects design as it contains advantages such as the need for fewer participants (Greenwald1976; Stam & Spanos 1980). This means it saves times, it is easier to recruit fewer participants and there are fewer explanations, demonstrations and practicing for the experiment. Another advantage to a within-subjects design, as (Greenwald1976; Stam & Spanos 1980) suggests is that since there are fewer participants there is less variance between them as they are the same throughout the different test conditions. This also means this study can follow the participants throughout the different avatar conditions and measure the difference in gameplay behaviours throughout.

### **2.5.1 Data Gathering Techniques**

For the project to be successful the appropriate techniques must be used to gather data from the experiment. (Yee & Bailenson 2007; Yee & Bailenson 2009) have used techniques such as observations and video recording equipment. These techniques have advantages such as the researcher can make direct judgements in real time as the experiment is happening. The downside is that the observer may not be able to keep up with the experiment and evaluate everything. However videoing the experiment means nothing will be missed. In turn this could be a lengthy process to re-evaluate the footage. As (Yee & Bailenson 2007; Yee & Bailenson 2009) have done it successfully it is this technique this project will use.

There are also other ways to gather data such as think aloud protocol. It is the process whereby participants discuss out loud to the observer what they are thinking at that time in the experiment. It helps to gather information which a user would be thinking when interacting with something. This particular technique cannot be used in this research project as participants will be playing a board game. If players were thinking aloud their moves in the game it would interfere with all the participants' gameplay behaviour.

There are also other techniques which are very effective to gather data from the user, such as questionnaires and interviews. Kirakowski (2000) discusses that questionnaires and interviews instantly give the researcher feedback from the user's point of view. This will be very effective in this study, especially when using such an emotional questionnaire as the Geneva Emotional Wheel as this gives a visual aid easy for users to select an emotional state.

### **2.5.2 Analytical Techniques**

#### **ANOVA/MANOVA**

In the research conducted by Yee & Bailenson (2009) repeated measures analyses of variance (ANOVA) was used to analyse the data produced from the experiment. ANOVA is where one dependant variable is compared between multiple independent groups. Multivariate analysis of variance (MANOVA) is where multiple variables are compared



between multiple independent groups. Due to the nature of this research project and taking evidence from Yee & Bailenson (2009) study, which has been successful using an ANOVA technique the same method will be applied in this project.

## **2.6 Literature Review Conclusion**

This literature review has analysed and discussed the different implications of The Proteus Effect and its relation to an offline environment and other aspects which could affect the overall process. It has revealed that The Proteus Effect is a current element of player behaviour produced by the appearance of the avatars, which can be manipulated for different outcomes. Other elements that could affect it have been ruled out due to the nature of this experiment being in an offline environment.

The literature review has also acknowledged underlying contributors of psychology, which could have a massive impact on the process occurring offline. Self-perception theory is on each contributor as it is a third party observation made by the player on themselves, meaning it will happen regardless of being online or offline whilst using different avatars. The literature review has also revealed a tool to determine whether participants are introverted or extrovert by using a EPQR-S, which will be used within the experiment.

The Literature Review has also affirmed the given trustworthy characteristics of an avatar as shown in figure 1. This information can be used to develop avatars for the experiment.

In addition, the literature review has produced advantages and disadvantages of research methods and analytical and data gathering techniques which will aid the experiment. This will be incorporated and explained in the methods section.

### 3.0 Methodology

Discussed below is the primary research method, which is justified as to why the particular method was selected over alternative approaches. The precise nature of the experiment is also discussed including example materials and measures for the project.

#### 3.1 HCI Empirical Methods

The chosen methodology is a repeated measures evaluation. Firstly, this chapter looks at HCI evaluation methods as even though there is no human computer interface in the experiment, most of the underlying techniques used can be used within this experiment. Dix et al, (2004), expresses the HCI evaluations can be grouped under Empirical Methods which is the use of human participants and Analytical Methods, a systematic process which will not be used as it focuses on the system including no human participants.

Dix et al, (2004), illustrates an empirical method is evaluating how a user operates when using a system. There are several techniques which can be used to achieve this evaluation such as an experiment, queries and cognitive processes. This experiment shall use all three, using the underlying techniques for this experiment's advantage.

Conducting an experiment using human participants will enable hypothesis testing for the project. It will be beneficial as it will allow a large amount of data to be collected by evaluating the participants. However, the participants shall have to be carefully selected. If they lack experience with the system or in this case the board game Intrigue results can differ due to the learning curve.

When evaluating, Quizzes are used to gain different opinions from the participants on an interface. In this case this methodology shall use questionnaires to gain feedback on player opinions on perceived behaviours within the game. The advantage of this is that the participants can give qualitative and quantitative feedback on a specific area of choice in the evaluation. However a large quantity of responses are needed for the approach to be effective, (Meira, 2004).

When the evaluator observes users operating a system and takes notes or films it, it is known as a cognitive process. Such examples of a cognitive process are "Think Aloud" and "Remote Testing." "Think Aloud" is the process whereby participants describe out loud what they are thinking about and how they feel about certain things, (Green, 1996). This technique can't be used within this project's method as the participants are playing a board game whereby they must keep their thoughts and actions to themselves to play the game properly. "Remote Testing" is the process of an evaluator indirectly observing the participant operating a system. This technique shall be used but will observe the players playing a board game. The advantage of this technique is that the evaluator can receive qualitative feedback and also direct observations and thoughts in real time which they may not otherwise. Nevertheless, the downside to this technique is that participant's actions or performance can differ due to feeling uncomfortable as they are being observed, (Meira, 2004).

## 3.2 Primary Research Method

The project will contain a repeated measures evaluation experiment. The experiment aims to establish whether The Proteus Effect can occur in an offline environment as a result of manipulating the perceived trustworthiness of player avatars, and what is the effect on parameters of player behaviour (truthfulness/deceptive decision making). The primary research method used will be a repeated measures design, also known as a within-subjects design.

A repeated measures experiment is when participants are measured under one condition and then repeated under other conditions. It is also known as within-subjects design. The alternative method to repeated measures (within-subjects) design is between-subjects design. This is when one group of participants are measured under one condition and another group under another condition. Although there is a risk of practice effects occurring due to the participants repeating the experiment several times, the nature of the experiment will combat this by providing the participants with randomly selected avatar types each game.

A within-subjects design has been employed for this research project as there are advantages such as fewer participants will be needed for the experiment compared to a between-subjects design needing double the amount. Studies suggest this is a great advantage as it saves time, it is easier to recruit fewer participants and there are fewer explanations, demonstrations and practicing for the experiment (Greenwald 1976; Stam & Spanos 1980).

In addition another advantage to a within-subjects design, as (Greenwald 1976; Stam & Spanos 1980) suggest that since there are fewer participants there is less variance between them as they are the same throughout the different test conditions. This also means this study can follow the participants throughout the different avatar conditions and measure the difference in gameplay behaviours throughout.

## 3.3 Precise Nature of the Experiment

### 3.3.1 Participants

The target demographic for this research project was 25 students but only 21 were able to participate (15 male and 6 female). They were all over the age of 18 and some of them were experienced in the board game "Intrigue" and everyone was generally interested in playing board games. Participants were randomly selected from the university and evenly balanced into groups built up of introverted and extroverted personality types.

### 3.3.2 Design

Using a repeated measures design participants were randomly assigned an honest, neutral or deceptive avatar and asked to play the board game Intrigue. The experiment will then be repeated two more times to ensure they played the game a total of three times, playing in different conditions - using each type of avatar (honest/neutral/deceptive). This is so that differences can be measured between participants throughout to gain a clearer understanding of the effect. The board game "Intrigue" was selected as it provided a gameplay environment which influenced truthful and deceptive decision making and behaviours which can be easily measured to determine whether there is an occurrence of the Proteus Effect in an offline environment. As (Yee & Bailenson, 2009) suggest through their experiment conducted in a "subsequent face-to-face environment" The Proteus Effect took effect.

For the experiment the board game "Intrigue" will be adapted to include avatars so a measure can be taken to determine (honest/deceptive) decisions made when using a specific type of (honest/neutral/deceptive) avatar. A conclusion can then be made whether players conformed to The Proteus Effect in an offline environment and whether or not they made more honest decisions when using an honest looking avatar.

By adapting the board game "Intrigue" it meant that there were no changes to the gameplay mechanics or objectives in anyway apart from each player having a physical avatar representing them. The avatars used to represent each player were placed in-between the player's palace so it could be clearly seen by them and the other players.

### 3.3.3 Measures

#### *Background information*

The measures taken within the experiment include background information on the participants to gain whether there is an effect on the Proteus effect with gender and age.

#### *Introvert/Extrovert Personality Type*

Using an Eysenck Personality Questionnaire-Revised Short Form (EPQR-S) the participant's personality type was measured to see whether introverted or extroverted participants behaved differently as (Eysenck 1990a, 1990b) study (cited in Bernstein et al. 2008) suggests extroverts will perform more risk taking behaviours and that introverts are less likely to take part in social activities and can be anxious.

#### *Pre emotion*

Participants' emotions were measure before the experiment to gain an understanding whether their emotions had an effect in The Proteus Effect occurring. As Bem, (1972) suggests through self-perception theory, people judge their emotional states and change their behaviours to act accordingly.

#### *Honest/deceptive decisions*

The main purpose of the experiment was to measure the amount of honest and deceptive decisions made by the participants with specific avatar types - (honest/neutral/deceptive). As (Yee & Bailenson, 2009) suggest through their

experiment conducted in a “subsequent face-to-face environment” The Proteus Effect took effect, which this experiment shall try to recreate without having a virtual environment involved.

#### *Post emotion*

Participant's emotions were measure after the experiment to gain an understanding whether there was a change in emotion with the Proteus effect.

#### *Post questionnaire*

The post questionnaire measured from the experiment what the participants perceived their game play behaviour to be, how honest they perceived their avatar to look and how that effected their gameplay. Measures were also taken on how risk taking the participant's behaviour had been and if they trusted without scepticism.

### **3.3.4 Materials**

#### *Board game – Intrigue*

Game Summary: The aim of the game is to send your scholars to other palaces and try and place them in high salary positions. Each player has a palace with 4 sections in them - £1,000, £3,000, £6,000 and £10,000. In order to successfully apply for the positions and secure a high income the players must convince each other through bribes, promises, threats, persuasiveness and flattery - and every promise can be broken. Players make money through collecting wages from all of their scholars employed in other player's palaces and bribes from other players when they apply to your own palace. The player with the most money after 5 rounds wins the game.

An honest and deceptive decision can be determined within the game, when the player either keeps or breaks a promise with another player. For example in the game when two players agree on giving their £10,000 positions in their palaces to each other, player 1 would place player 2s scholar in their palace. Once its players 2 turn they have the choice between putting player 1s scholar in their £10,000 position. It is this decision which could be honest or deceptive as player 2 could stay honest and put the scholar in the £10,000 position or brake the promise and put the scholar in a lower paying positions e.g. £1,000,£3,000 and £6,000.

Another example is if player 1 has player 2s scholar in their £10,000 position and player 3 applies for it. Player 1 has the choice to make an honest decision towards player 2 and keep them in or a deceptive decision and kick them out and replace them with player 3s scholar. For more information and detail on the board game “Intrigue” please see Appendix I – Intrigue Game Rules.

#### *The lab space*

The experiment will take place in a clean, friendly environment such as a seminar room in the university to assure that there are no complications from background noise and it is a natural, well lit environment to play a board game in.

### *Evaluating Equipment*

To evaluate the board games taking place a camera on a tripod will be positioned to view the whole game space, avatars and human participants. A pen and tally sheet shall be used to make observations on the number of honest and deceptive decisions made by each player.

### *Avatars*

The avatars this research experiment is using as discussed in the literature review are pre tested and selected from Database 3: Trustworthiness Face Data Set, (Princeton University Social Cognition & Social Neuroscience database 2008). The database includes twenty-five (trustworthy/neutral/untrustworthy) randomly created faces from FaceGen a program which allows the user to create realistic faces (<http://facegen.com/>) Singular Inversions (2005). The faces were bald Caucasian and mostly male to rule out any ethnic stereotypical judgements, to avoid any other interferences involving hair and bald females did not look socially normal. See Figure 3.



Figure 3: Trustworthy/Neutral/Untrustworthy Avatar Faces

### *Pre Questionnaire*

The purpose of the pre questionnaire was to gather background information on the participants. It asked questions including: Name, Gender, Age, Preferred Game Genre and Favourite Game Character (Avatar). See Appendix D – Pre Questionnaire.

Participants' emotions were also measured before the experiment to gain an understanding whether their emotions had an effect in The Proteus Effect occurring. The emotions were measured using a Geneva Emotional Wheel (GEW), See Figure 4. The GEW gathers emotions from a participant by allowing them to pick from 20

different emotions using a 1-5 Lickert scale to judge the intensity of it. It also gives the option of selecting another emotion felt or no emotion felt. Sacharin, (2010) suggests the model is good as it is designed to measure emotional reactions to objects, events and situations so it can be easily applied to various scenarios such as this experiment. It also has very low technical requirements as it can be used on pen and paper and is more aesthetically pleasing. See Appendix B Pre GEW.

### Geneva Emotional Wheel

Sacharin (2010)

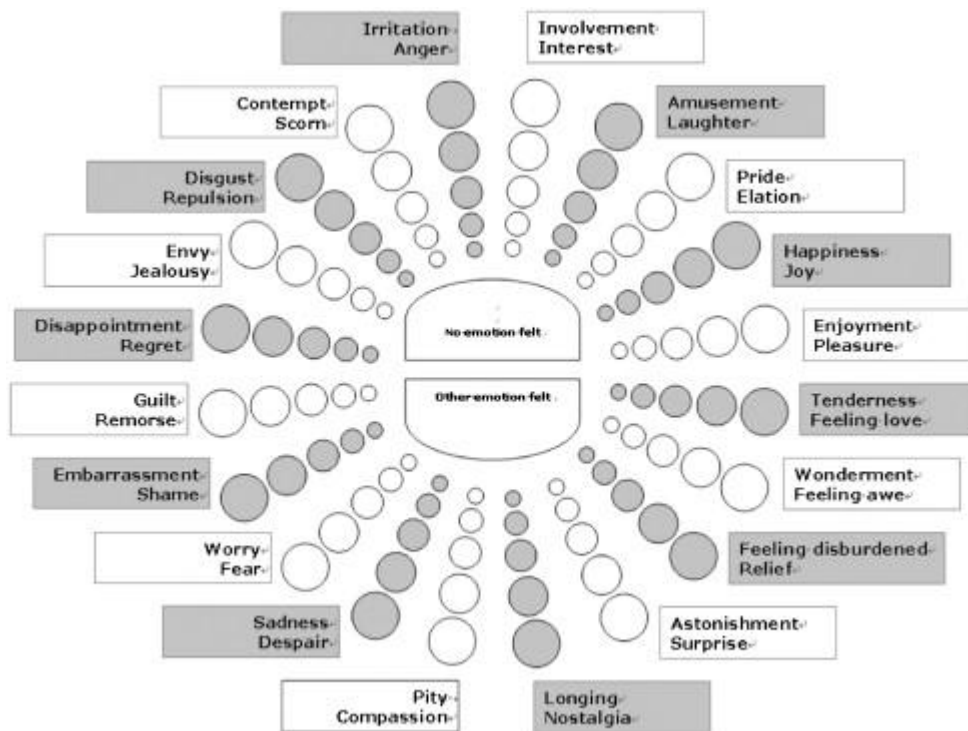


Figure 4: Geneva Emotional Wheel

### Introverted/Extroverted Personality Types

To determine the personality type of the participants an Eysenck Personality Questionnaire-Revised Short Form (EPQR-S) was used (Eysenck 1990a, 1990b). The EPQR-S consisted of 48 questions that assess in 4 traits - neuroticism, extraversion, psychoticism, and lying. It has 12 questions for each of the traits whereby the user must answer 'yes' or 'no' which can be counted as binary responses 1 and 0. The scores are grouped and measured against a scale - 12 being the maximum and 0 being the minimum score. For introversion and extroversion 1-4 was low, 5-8 medium and 9-12 high. See Appendix A for EPQR-S. A participant was determined introverted or extroverted depending on the highest score in the sections. If the score was tied they were noted as both or balanced.

### *Honest/Deceptive Decisions*

The amount of honest and deceptive decisions made by each player was counted by the observer using a tally sheet. See table 1. An honest and deceptive decision can be determined within the game, when the player either keeps or breaks a promise with another player. As Meira, (2004) suggests being able to observe the participants and take qualitative/quantitative measures is very beneficial to gain feedback in real time. The experiment was also filmed to ensure nothing was missed. See Appendix H for Decisions Tally Sheet.

### **Example Measures Sheet**

<b>Game 1</b>	<b>Honest/ Neutral/ Deceptive Avatar</b>	<b>Truthful Decision</b>	<b>Deceptive Decision</b>
<b>Participant 1</b>	Honest	III	II
<b>Participant 2</b>	Neutral	II	I
<b>Participant 3</b>	Deceptive	IIII	I
<b>Participant 4</b>	Honest	I	IIII
<b>Participant 5</b>	Deceptive	II	III

Table 1 Example Measures Tally Sheet

### *Post Questionnaire*

The post evaluation will contain another Geneva Emotional Wheel the participants will have to fill out to gauge a difference in their emotional state if any. See Appendix C for Post GEW.

Finally the participants will take part in a retrospective perception questionnaire where their feelings and experiences will be noted and how they perceived their avatars and if their behaviours were affected. The post questionnaire will contain question listed below. See Appendix F for Post Questionnaire.

1. How deceptive did you perceive your game play behaviour to be when playing the game?
2. How honest did you perceive your game play behaviour to be when playing the game?
3. How honest did you think your avatar looked?
4. Did you think the appearance of the avatar affected your behaviour?
5. When playing the game did you perceive your game play behaviour to be risk taking?



6. When playing the game did you perceive our game play behaviour to trust without scepticism?

As discussed above the Queries technique from HCI evaluation are used to gain different opinions from the participants on player experience and behaviours. As Meira, (2004) suggests the project can gain qualitative and quantitative feedback on a specific area of choice in the evaluation. This questionnaire will gather results, which will contribute to the hypotheses and research question.

After the three games have been played the amount of truthful and deceptive decisions can be counted and related to the different types of avatars and the personality types (introvert/extrovert) playing them. They will be evaluated to determine if there is a relationship between the types of avatars and decisions made.

### **3.3.5 Procedures**

First randomly selected participants were given an EPQR-S, to determine whether they were Introverted or Extroverted. They were then evenly split into different groups so there was a mix of extroverts and introverts in each experimental group. The groups were made up of 4 or 5 so there were for example 3 extroverts and 2 introverts in a group and vice versa for other groups.

When participants arrived in their groups they were then greeted, briefed and asked to fill out a consent form, background pre questionnaire and a Geneva Emotional Wheel (GEW), under exam conditions to collect information such as gender, age and emotional state etc. Participants were then reminded they could leave at any time of the experiment.

Participants were then randomly given a picture of their avatar and asked to take part in the board game "Intrigue." The avatars ranged in appearance from honest, neutral and deceptive. Using a repeated measures design the participants had a different type of avatar each game. All participants were briefed on the game rules by the lead examiner and shown examples of gameplay. They were then asked to take a few minutes to look at their avatar and get to know it. The game then commenced and was played out until a winner emerged after 5 rounds. Honest and deceptive decisions were observed and noted by the lead examiner.

Next the participants were asked to fill out a post questionnaire to gather information on their experiences and gameplay behaviours.

Participants were then given a different type of avatar and asked to play the game for a second time and the lead examiner observed and noted the honest/deceptive decisions.

The participants were then asked to fill out another post questionnaire to record the results for that game.

The participants were then given their third and final avatar and asked to play a final time. Like before the honest/deceptive decisions were observed and noted. The participants then filled out a final post questionnaire and GEW to measure their emotional state after the experiment.

The results were then collected and the participants were thanked.

## 4.0 Evaluation / Results

The evaluation section of the report contains the results from the experiment conducted for the research study. The aim of the experiment was to discover whether The Proteus Effect (players attuning their behaviour to what others would perceive them to be depending on the identity of their avatars) occurs in an offline environment as a result of manipulating the perceived trustworthiness of player avatars, (through appearance/impression formation from physical appearance), and what is the effect on parameters of player behaviour (truthfulness/deceptive decision making). It is important to acknowledge if The Proteus Effect occurred in an offline environment and the details of perceived behaviour within, but it is also important to consider whether the different personality types and emotions contributed to the overall effect occurring. The results are split up into sections which are in line to how they were measured which are outlined above in the methods section.

### 4.1 Pre Evaluation/ EPQR-S Results

Listed below in table 2 are the details collected from the pre-questionnaire including the age, gender and the results from the Eysenck Personality Questionnaire-Revised Short Form (EPQR-S) that was used (Eysenck 1990a, 1990b). Overall the main contributor was male and of 21 years old. The EPQR-S revealed that there were 10 introverts, 6 extroverts and 5 that were both. See Appendix A for EPQR-S Results. The pre emotions are detailed in the post evaluation with the post emotions so they can be easily compared.

		Total
<b>Age</b>	20	2
	21	13
	22	3
	23	1
	52	1
	54	1
<b>Gender</b>	Male	15
	Female	6
<b>Personality Type</b>	Introvert	10
	Extrovert	6
	Both	5

Table 2 Pre Questionnaire Results

## 4.2 Honest/Deceptive Decisions Results

A one-way repeated measures analysis of variance (ANOVA) was conducted to compare the amount of honest and deceptive decisions made with each avatar type (Honest/Neutral/Deceptive). The means and standard deviations are presented in table 3 shown below. The ANOVA revealed there was no significant effect between the avatar types and honest/deceptive decisions. Another test of between-subjects factors was also taken using factors of age, gender resulting in no significant effect. Thus resulting evidence suggests further research must be conducted to prove a significant effect of The Proteus Effect occurring in offline environment.

Avatar Type	Honest Avatar		Neutral Avatar		Deceptive Avatar	
	M	SD	M	SD	M	SD
<b>Honest Decisions</b>	4.43	1.165	3.33	1.111	4.19	1.209
<b>Deceptive Decisions</b>	2.00	1.225	2.71	1.102	1.81	1.078

Table 3 Avatar Types with Honest/Deceptive Decisions

Nevertheless table 3 shows there was a much larger amount of honest decisions made across the board using each avatar type (honest/neutral/deceptive) than deceptive decisions. Although no significant effect was proven the greatest amount of honest decisions were made using an honest avatar, ( $M = 4.43$ ,  $SD = 1.165$ ). This supports hypotheses 2 whereby participants who have honest avatars will behave more positively and make more truthfulness decisions, in comparison to players with dishonest or neutral avatars. Surprisingly more honest decisions were made using a deceptive avatar, ( $M = 4.19$ ,  $SD = 1.209$ ), as an opposed to neutral avatars ( $M = 3.33$ ,  $SD = 1.111$ ).

However the greatest amount of deceptive decisions were made using a neutral avatar, ( $M = 2.71$ ,  $SD = 1.102$ ), and in fact scoring the least amount of deceptive decisions was made using deceptive avatars, ( $M = 1.81$ ,  $SD = 1.078$ ), as opposed to, ( $M = 2.00$ ,  $SD = 1.225$ ) deceptive decisions made using honest avatars. These result suggest further research must be undertaken to provide statistically sound evidence to support hypothesis 3 - Participants who have dishonest avatars will behave more negatively and make more deceptive decisions, in comparison to players with honest or neutral avatars.

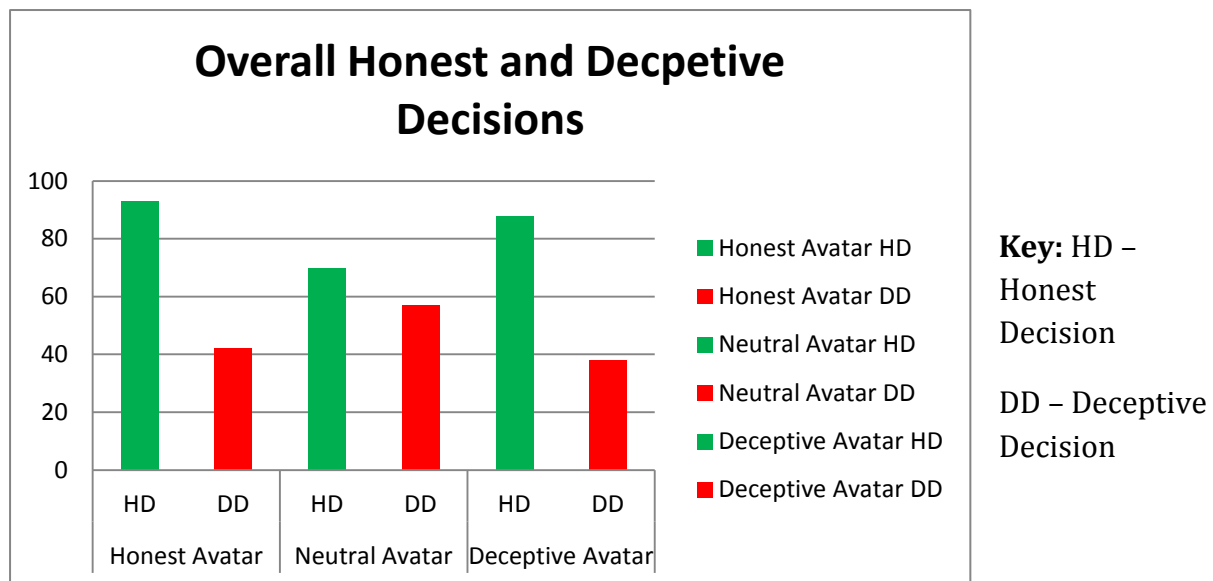


Figure 5 Overall Honest and Deceptive Decisions

The graph above displayed in figure 5 clearly shows the difference in the overall honest and deceptive decisions made by each type of avatar, (honest/neutral/deceptive). The graph which displays the results from the experiment graphically reiterates the discussion above. For full breakdown of honest/deceptive decisions made see Appendix H Decisions Tally Sheet.

#### 4.2.1 Effect of Personality type on Decisions Results

A one-way repeated measures analysis of variance (ANOVA) was conducted to compare the amount of honest and deceptive decisions made by each personality type (introvert/Extrovert/Both). The means are presented in table 4 shown below. The ANOVA revealed there was no significant effect between the personality types on the honest/deceptive decisions. Thus resulting evidence suggests further research must be conducted to prove a significant effect of personality types in contribution to The Proteus Effect occurring in offline environment.

		Introvert	Extrovert	Both
Decisions	Honest (M)	4.1	4.1	3.7
	Deceptive (M)	2.3	2.3	1.9

Table 4 Personality Types with Honest/Deceptive Decisions

In addition the graph below shown in figure 6 clearly shows the effects of personality types on honest and deceptive decisions made in the experiment. It illuminates two aspects which include the mean values of honest, ( $M = 4.1$ ) and deceptive, ( $M = 2.3$ ) decisions were the same for introverted and extrovert personality types.

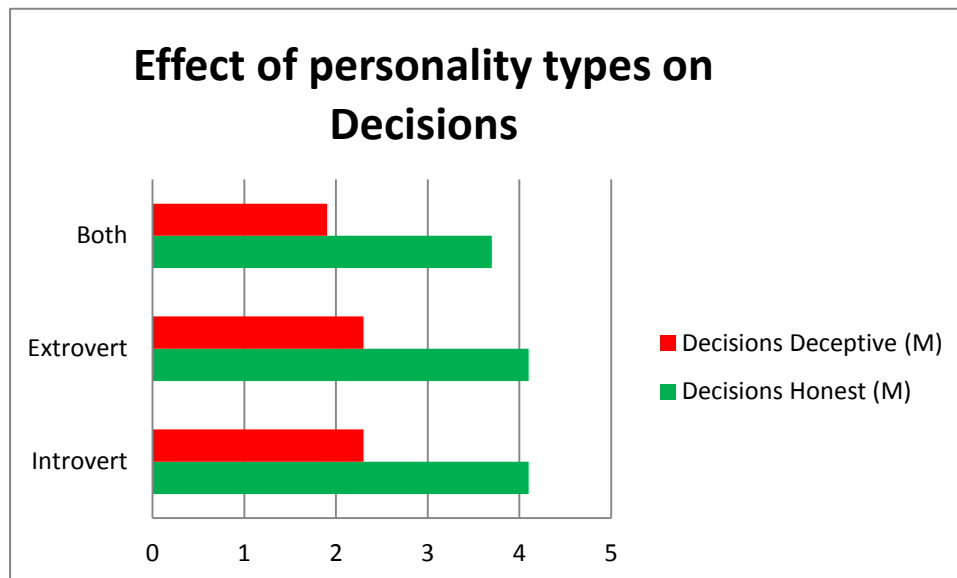


Figure 6 Effect of Personality Types on Honest/Deceptive Decisions

It also revealed Both personality types scored slightly lower in both honest, ( $M = 3.7$ ) and deceptive, ( $M = 1.9$ ) decisions. This evidence suggests different personality types have little or no effect on honest/deceptive decision making within a game environment. Nonetheless the results shall be discussed later to determine a conclusion.

### 4.3 Post Evaluation Results

The post evaluation section contains results from the post questionnaires after each game played, the pre and post emotions felt before and after the experiment and an ANOVA test on whether personality types has an effect on risk taking behaviour and

	Game 1		Game 2		Game 3	
	M	SD	M	SD	M	SD
<b>Perceived Deceptive Gameplay Behaviour</b>	2.52	1.123	2.67	1.278	2.81	1.436
<b>Perceived Honest Gameplay Behaviour</b>	3.57	1.165	3.48	1.504	3.62	1.431
<b>Perceived Honest Avatar Appearance</b>	3.19	1.030	3.05	1.465	3.38	1.532
<b>Perceived Risk Taking Behaviour</b>	2.86	1.153	2.95	1.071	3.19	1.078
<b>Perceived Trusting Without Scepticism Behaviour</b>	2.48	1.250	2.19	1.030	2.38	1.071

Table 5 Perceived Behaviours in each Game

trusting without scepticism, to support hypothesis 4.

During the experiment the participants had to complete the questionnaire (see Appendix G Post Questionnaire Results) after each game. A one-way repeated measures analysis of variance (ANOVA) was conducted to compare the perceived behaviours in, (1) deceptive gameplay; (2) honest gameplay; (3) honest avatar appearance; (4) Risk taking and (5) trusting without scepticism in each game(game1, 2 and 3). The means and standard deviations are presented in table 5 shown above.

The ANOVA revealed there was no significant effect between the different behaviours throughout the games. In addition the graph below shown in figure 7 also displays the mean and standard deviations of the game play behaviours perceived by the participants throughout the different games.

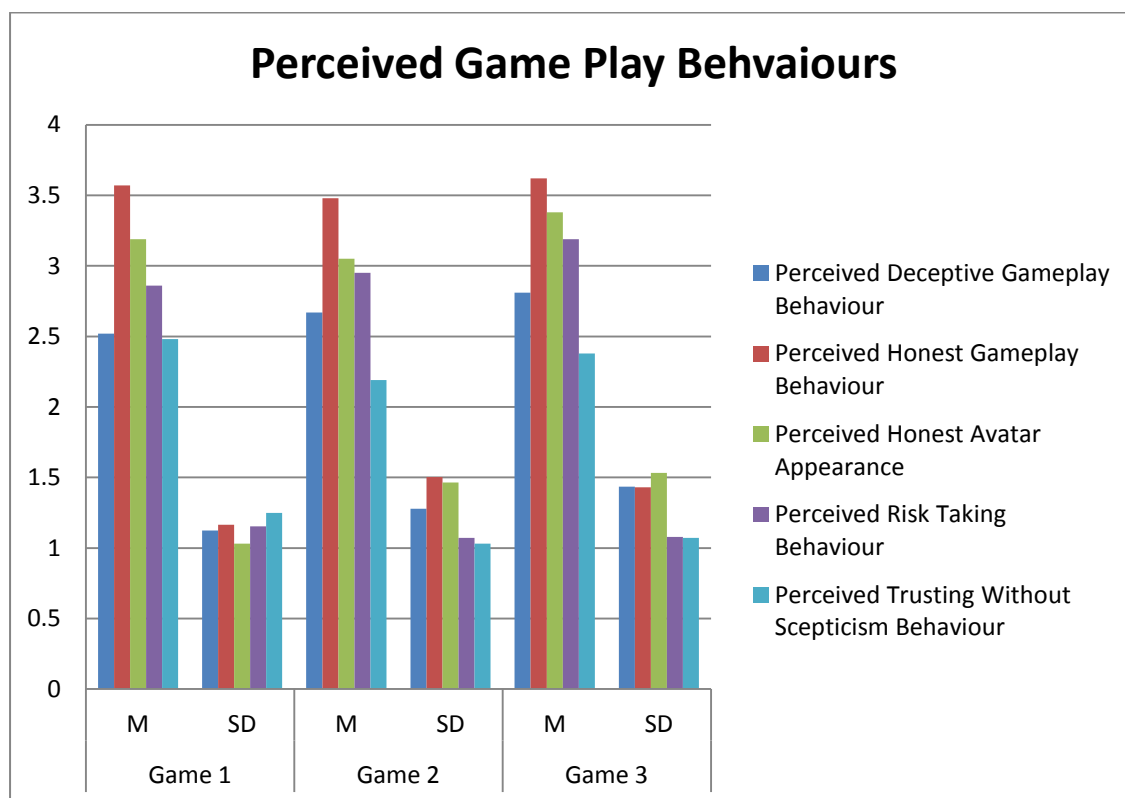


Figure 7 Perceived Game Play Behaviours

The graph clearly shows that the perceived honest gameplay behaviour is significantly greater than perceived deceptive game play behaviours throughout each game. As perceived honest gameplay (M = 3.5) or greater in each game and perceived deceptive game play behaviour (M = 2.81) or less. This falls in line with the greater amount of honest decisions the participants were making. An important observation to make is that generally in each game, participants thought their avatar appearance looked more

honest scoring over ( $M = 3$ ) in each game and they perceived their game play behaviour to be more honest scoring ( $M = 3.5$ ) or higher and did actually make more honest decisions. The results also show generally perceived risk taking behaviour and trusting without scepticism are closely the same throughout each game. Both means are between 2 and 3 apart from perceived risk taking on the third game which was ( $M = 3.19$ ). Thus no major change in results to report on perceived risk taking and trusting without scepticism.

The post questionnaire also included an open ended question:

Did you think the appearance of the avatar affected your behaviour?

The question was asked to gain subjective feedback on whether the players themselves felt were affected by the avatar being present. See Appendix G – Post Questionnaire Results. Participants replied with mixed results however the real consensus included results such as:

“Nope, little attention paid; stimulus minor and non-constant. “

“No, I did not really pay attention to the avatars. As this was my first time playing the game - I concentrate more on understanding the concept and the rules, the behaviour of the other players rather than the avatars.”

“No, I paid a little more attention to my avatar at the beginning of the game but it didn't come into play mid to late game.”

“No, i was focused on the players rather than the avatars”

“No, I didn't pay much attention to my avatar when playing the game.”

This evidence suggests players didn't perceive their game play behaviour to change having different game avatars. These comments shall be discussed in the final section below. Although a few answers that said yes included:

“Yes a little bit, imagined myself being like his expression”

“yes he was friendly”

“yes cause he's nice”

These results suggest in light of The Proteus Effect, they may have been conforming to the effect. However as small as a few subject thoughts don't prove anything significant, which will be furthered discussed in the final section.



### 4.3.1 Pre/Post Emotional Results

In the experiment a Geneva Emotional Wheel (GEW) was given out at the start and end of the experiment. See Appendix B Pre GEW, Appendix C Post GEW. The purpose of the GEW was to gauge a change in emotion of the participants and whether it would affect or contribute to the occurrence of The Proteus Effect.

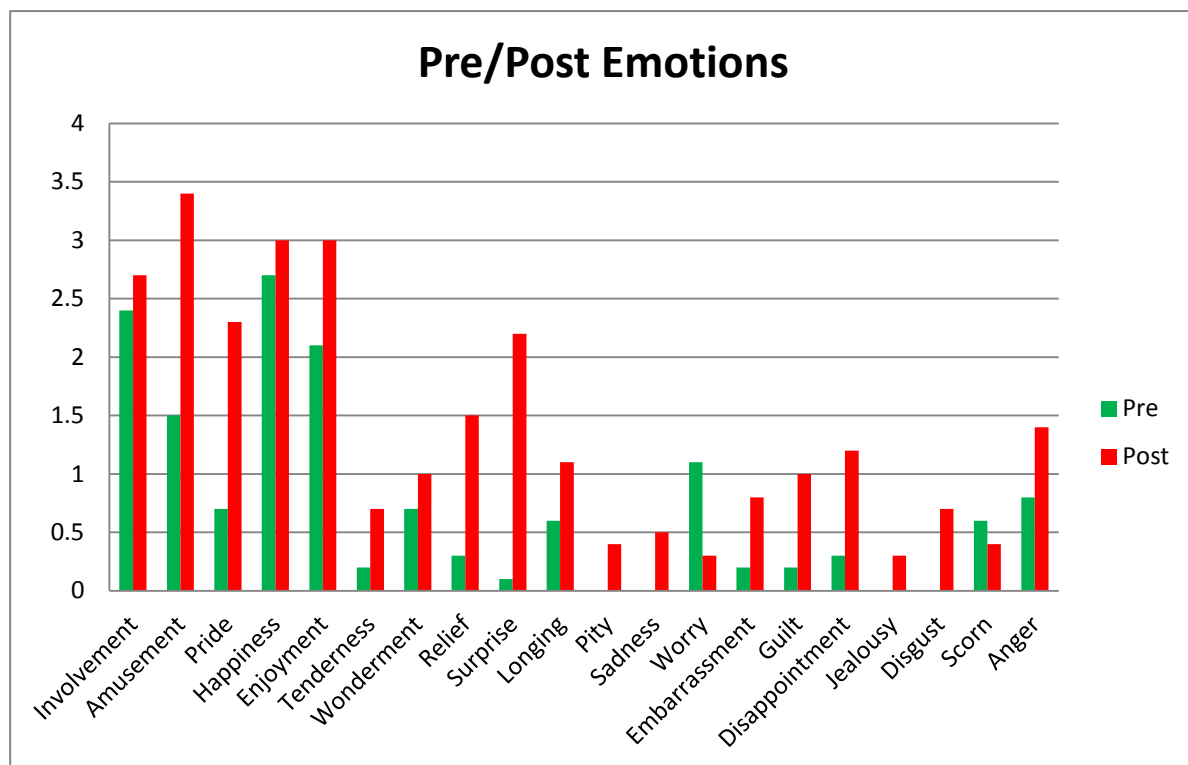


Figure 8 Pre/Post Emotions

The graph in figure 8 shows the overall average of pre and post emotions felt by the participants. It also shows the intensity of the emotions ranging from 1-5 as a Lickert scale is used within the GEW. Looking at the graph, it shows there was a much larger scope in emotion felt after the games than before and the intensity of them increased too. For example Surprise increased from (0.1 to 2.2) and Disappointment (0.3 to 1.2.) This can be thought as quite normal as for example Intrigue the board game can elicit such mix emotions due to certain game play out comes. In other words, winning or losing.

There is also certainly a much larger group of positive emotions felt pre and post rather than negative, Involvement (2.4, to 2.7), Amusement (1.5, to 3.4), Happiness (2.7, to 3), and Enjoyment (2.1, to 3), as opposed to Guilt (0.2 to 1), Disappointment (0.3, to 1.3), jealousy (0, to 0.3) and Disgust (0, to 0.7). These results could show a positive

correlation between the honest decisions made and positive emotions felt as the results discussed above show that there were a lot more honest decisions made rather than deceptive decisions.

Furthermore there was a low amount of negative emotions felt anger being the very highest averaging out at only 1.4 post test. Thus there could be a negative correlation with negative emotions and deceptive decisions as there were less of both.

#### 4.3.2 Personality types and Perceived Behaviour Results

A one-way repeated measures analysis of variance (ANOVA) was conducted to compare the amount of risk taking and trusting without scepticism behaviours by each personality type (introvert/Extrovert/Both). The means are presented in table 6 shown below. The ANOVA revealed there was no significant effect between the different behaviours and personality types.

		Introvert	Extrovert	Both
<b>Perceived Behaviour</b>	Risk Taking(M)	3	2.5	3.6
	Trust without scepticism(M)	2.2	3	1.9

Table 6 Personality Types with Perceived Behaviours

In addition the graph below shown in figure 9 clearly shows the effects of personality types on the different behaviours. Although no significant effects were found the graph shows that in fact introverted personality types rated their perceived risk taking behaviour, (M = 3) higher than extroverted personality types, ( M = 2.5). However Both personality types actually rated their perceived risk taking gameplay behaviour to be the most at, (M = 3.6).

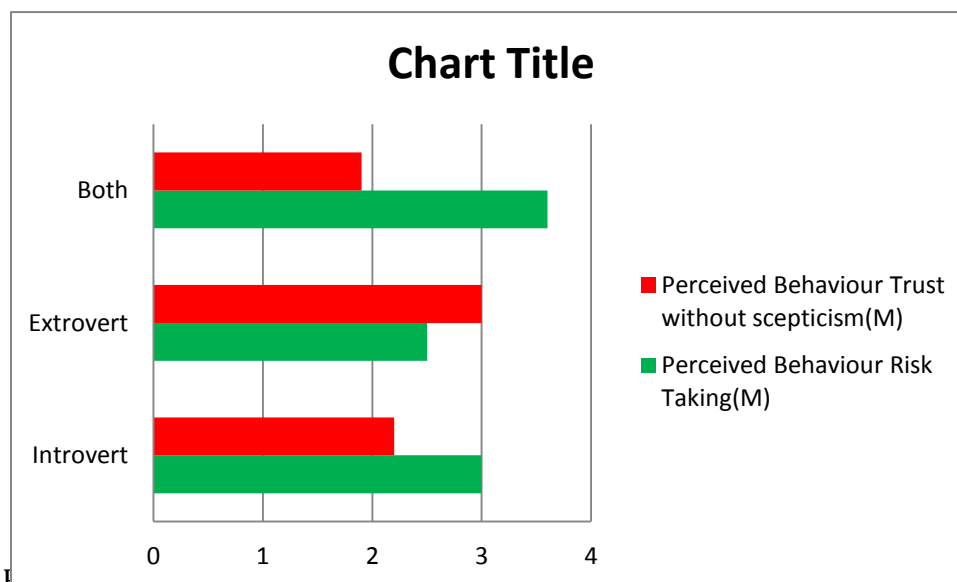


Figure 9 Personality Types with Perceived Behaviours

Nevertheless extroverted personality types actually perceived their gameplay behaviour to be more trusting, ( $M = 3$ ) rather than introverted personality types, ( $M = 2.2$ ) and Both, ( $M = 1.9$ ). This evidence seems to partly support hypothesis 4 - Extraverted participants are expected to perform more risk taking behaviour and trust without scepticism rather than Introverts. However the mixtures of results haven't made it a definite outcome and further discussion is required to gain reasons to the outcome.

## 5.0 Discussion & Conclusions

This final section of the report will discuss a brief summary of the project then present the final overall findings produced from the results section detailed in the evaluation section above and then discuss and draw conclusions from them, to gain an answer to the research question and hypotheses. Furthermore it will discuss the projects limitations and future work this research study could conduct following this project.

### 5.1 Brief Summary of Project

The aim of this study was to critically analyse and investigate the impact of the Proteus Effect in an offline environment as a result of manipulating the perceived trustworthiness (through appearance/impression formation from physical appearance) of player avatars. This study provides future developers with an extended knowledge of the effects of choosing different characteristic traits for avatars which in turn could change the player's behaviours proving very useful to influence certain gameplay behaviours. A board game was selected as underling mechanisms used in them can easily be incorporated into video games, making it a cheaper and easier process for developers designing games that are avatar based in the future.

A repeated measures experimental study was carried out to determine whether the manipulation of player avatars had an effect on parameters of player behaviour (truthfulness/deceptive decision making). This was achieved by adapting the board game Intrigue, by applying (honest/neutral/deceptive) avatars to each player and seeing if The Proteus Effect took effect by counting the amount of (honest/deceptive) decisions players made using each type of avatar. Measures were also taken on emotions and personality type to determine whether they had an effect on the overall process of the Proteus Effect occurring differently which have produced results discussed below.

### 5.2 Final Discussion of Results

This section discusses each conclusion from the results in line with the hypotheses presented in the first section. The study identified in the report was to determine whether the Proteus Effect (players attuning their behaviour to what others would perceive them to be depending on the identity of their avatars) occurred in an offline environment as a result of manipulating the perceived trustworthiness (through appearance/impression formation from physical appearance) of player avatars, and what was the effect on parameters of player behaviour (truthfulness/deceptive decision making). The results suggest that further evidence must be provided to determine whether the Proteus Effect occurs in an offline environment. Unfortunately the evidence

produced from this experimental project doesn't successfully indicate the Proteus Effect occurs purely in an offline environment. Although the most amount of honest decisions were made using an honest avatar ( $M = 4.43$ ), the most amount of deceptive moves weren't made using a deceptive avatar, but a neutral avatar, ( $M = 2.71$ ). There are a number of possible causes for this outcome. For instance a lot of the responses from the participants suggested that they were more focused on the board game, interacting with the other players and what they had to do to win rather than paying attention to the game avatars. However a select few did indicate a marginally small effect could have taken place due to their thoughts including suggestions like "Yes a little bit, imagined myself being like his expression", which suggests they were attuning their behaviour depending on the identity of their avatar. Thus the Proteus Effect may have occurred, however sufficient evidence isn't provided throughout the test groups to justify this hypothesis.

Another reason could be that as it was in a competitive game environment players weren't able to relax and allow their natural behaviours to come out. As most of Yee & Bailenson, (2009) research on The Proteus Effect was either using a self-disclosure and interpersonal distance task or in a massively multiplayer online (MMO) conferring with other avatars, (Yee, 2006). Where there was no competitive aspect involved. The only competitive aspect was the money negotiation task (Yee & Bailenson, 2009), which was subsequently offline. Furthermore as no virtual environment was evident in this experiment, the player's identities were viewable for everyone to see thus, in line with SIDE theory, (Zimbardo 1969) there was no deindividuated behaviour so players didn't act differently with different avatars as their identity was hidden. The fact that the player's identity wasn't hidden within this experiment may have greatly affected the types of decisions players made due having it on their conscience as other players know who they are.

Despite this, evidence supports hypothesis 2 - Participants who have honest avatars will behave more positively and make more truthfulness decisions, in comparison to players with dishonest or neutral avatars. The results suggest that the most amounts of honest decisions were made when participants had an honest avatar. Thus this successfully shows some form of the Proteus Effect occurring. However looking further into the results and due to requiring further evidence to justify the Proteus Effect occurring in an offline environment, these honest decisions could be down to players just being honest and nice as the public in general could be thought as usually nice. Another aspect is that each player had to play the game 3 times so for learning purposes they were honest in the first game to grasp an idea of the rules and how other players were behaving.

Nevertheless hypothesis 3 - Participants who have dishonest avatars will behave more negatively and make more deceptive decisions, in comparison to players with honest or neutral avatars, was unsuccessfully justified as evidence illustrates neutral avatar types made the most amount of deceptive decisions, ( $M = 2.71$ ) as opposed to players using a

deceptive avatar made ( $M = 1.81$ ) deceptive decisions. The amount of deceptive decisions made with an honest avatar, ( $M = 2.00$ ) was in fact greater than made with a deceptive one. A possible cause for this could be due to self-perception theory, (Bem, 1972) whereby the player wasn't able to interact with their avatar or see the avatar reacting to decisions the player was making. Thus the player couldn't make a third person observation on themselves when using the avatar and perceive their behaviour to be in a certain way and therefore behave differently or accordingly.

In addition evidence partly supports hypothesis 4 - Extraverted participants are expected to perceive their gameplay behaviour to be more risk taking and trust without scepticism rather than Introverts. The results show that extroverted personality types don't actually perceived their gameplay behaviour to be more risk taking scoring ( $M = 2.5$ ) than introverts scoring ( $m = 3.0$ ). Both personality types actually scored the highest scoring ( $M = 3.6$ ) as there was a smaller amount of Both personality types. However extroverted personality types did perceive their game play behaviour to trust more without scepticism scoring ( $M = 3$ ) rather than introverts scoring ( $M = 2.2$ ). This supports Eysenck (1990a, 1990b) findings in which extroverted personality types do trust more without scepticism even in a competitive game environment as trust is a large part within the game mechanics of the board game Intrigue.

An important finding as detailed in the results section, which relates to the occurrence of The Proteus effect in an offline environment is that evidence suggest participants perceived the appearance of their avatar looked more honest scoring over ( $M = 3$ ) in each game and they perceived their game play behaviour to be more honest scoring ( $M = 3.5$ ) or higher and did actually make more honest decisions using an honest avatar ( $M = 4.43$ ). This alone conveys an underlying link between each aspect which could be a spark of what this project has set out to find. Very interesting yet again not enough sufficient evidence exists across the whole test group using honest and deceptive decisions with each avatar type to present a final conclusion on the matter. Future work will have to be carried out which will be discussed in the next section.

Nevertheless the emotions measured by the GEW have revealed a positive correlation between positive emotions felt and honest decisions made throughout the experiment. The graph on p 40, figure 8 clearly shows the amount of positive emotions felt pre and post whilst in relation to greater amount of honest decisions made with every type of avatar, (honest/neutral/deceptive) p36 figure 5. These results discovered could be further analysed to determine a thorough correlation between the two and could provide evidence that could potentially contribute to the outcome of the Proteus Effect in different ways. Such as more positively charged players could perform more honest moves or vice versa.

### 5.3 Project Limitations & Future Work

There were a few limitations to the project which were worth noting. The game avatars used from Database 3: Trustworthiness Face Data Set, (Princeton University Social Cognition & Social Neuroscience database 2008) were all bald and male. The project does give its reasons for selecting these however if participants were able to create the base appearance of their own avatar they could have made a greater connection to them. Future work would involve participants creating their own avatar to combat this limitation. Furthermore gathering from the results, participants didn't pay much attention to the avatars at all. Thus this could be down to the way the avatars were presented to the player or the context itself i.e. the board game – Intrigue. Future work could include making the participants dress up in outfits they would like their avatar to look like in the game so they are directly involved with the game, much like them controlling an avatar in a virtual environment. This would mean their identity would be hidden so SIDE theory wouldn't be an interference to the results and if given honest/deceptive looking costumes could directly affect their behaviours.

In addition the chosen board game for this project may have limited the results of the Proteus Effect occurring. Even though it produces an array of different behaviours and includes honest and deceptive decisions, it may have been too competitive for a conclusive measure of the Proteus Effect to be taken. The first games also consisted of participants learning the rules so they were generally being honest to figure out how the game was played. As discussed above this may be the answer to the greater amount of honest decisions made. Future work could include a less competitive environment with a more social task which didn't affect the outcome of player's behaviour to win the game. Instead would include a task with no external stimulus extrinsically motivating the participants to behave in a certain way just to win.

Another limitation to the results was the lack of participants which took part in the experiment. To gain more significant results and to be able to measure a greater change in effect size with the Proteus Effect occurring in an offline environment a larger test group shall have to be used. In addition a limitation on gaining a deeper understanding of the effect of emotion on the Proteus Effect was that a measure wasn't taken after each game. Future work should involve a measure of emotion after each game so a change can be evaluated more closely by each participant within each game.

Finally the lack in knowledge of the Statistical Packages for the Social Sciences (SPSS) made it very difficult to gain descriptive conclusions as certain tests weren't able to be produced in the given time frame. Future work would include a thorough examination of the program to fully understand the analytical techniques available, which can be used to fully evaluate the findings from the experiment and gain meaningful results.

## 5.4 Conclusions

The general consensus of the study, as outlined above is that further research is required to determine whether a real effect of the Proteus Effect (players attuning their behaviour to what others would perceive them to be depending on the identity of their avatars) can occur in an offline environment as a result of manipulating the perceived trustworthiness of player avatars. The results suggest the avatars used within the study were ineffective to the player's behaviour whilst they were taking part in the board game Intrigue.

However the project did successfully produce minor findings of certain parameters of player behaviour (honest decision making) backed by subjective thoughts on perceived honest avatar appearances and game play behaviours from participants, suggests a possible positive outcome of the Proteus Effect. The project also revealed a high rate of positive emotions in correlation with honest perceived behaviour which could be very interesting to conduct further work on to determine if there is a real connection to the occurrence of the Proteus Effect in an offline and virtual environment.

The underlying rationale for this research project was providing future developers with extended knowledge of the effects of choosing different appearance traits for avatars, which in turn could change the player's behaviours proving very useful to influence certain gameplay behaviours in offline board games and in online virtual environments, as a lot of the underlying mechanisms can be used in both domains. (Yee & Bailenson, 2009) support this as they illustrate "what we learn in one body is shared with other bodies we inhabit, whether virtual or physical". Thus aiding the design process making is easier to understand game play behaviour.

Nevertheless the projects findings could be useful to researchers currently working on avatar based theories in offline and virtual environments. The study also contributes to the different psychological processes which occur through behaviour change, which are used in this study such as – SIDE theory, self-perception theory, behavioural conformation and impression formation. Finally the project also contributes to the small yet growing body of research forwarded by (Yee & Bailenson, 2009) which is known as The Proteus Effect – a very insightful theory which can be observed in virtually any virtual environment.



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## 7.0 Appendix's

### Appendix A EPQR-S

Appendix B Pre GEW

Appendix C Post GEW

## Appendix D Pre Questionnaire

## Background Questionnaire

The purpose of this questionnaire is to gather some background information on the participants taking part in the experiment. The information shall be used for the research project - The Proteus Effect: The impact of perceived trustworthiness on offline game play behavior.

**\* Required**

**Name? \***

**Gender? \***

☐ Male

☐ Female

**Age?**

**Preferred Game Genre?**

RPG, Action, Shooter, Sports, Boardgame, etc.

**Favourite Game Character (Avatar)?**

Please state game and character - e.g. SuperMario - Mario

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## Appendix E Pre Questionnaire Results

	A	B	C	D	E	F
1	Timestamp	Name?	Gender?	Age?	Preferred Game Genre?	Favourite Game Character (Avatar)?
2	3/25/2013 17:17:15	1	Male	21	sports	squirt
3	4/4/2013 15:37:59	2	Male	21	sports	yochi
4	3/25/2013 17:19:41	3	Male	21	Sports	Spyro
5	3/25/2013 17:21:23	4	Male	21	sports	Batman
6	3/25/2013 17:22:34	5	Female	20	ACTION	dora the explorer
7	3/26/2013 11:22:13	6	Male	21	FPS	FarCry Bad Guy
8	3/26/2013 11:23:19	7	Male	21	Adventure	Bowser
9	3/26/2013 11:24:26	8	Male	21	RPG	Kaim
10	3/26/2013 12:42:21	9	Male	23	RPG	Alan Wake - Alan Wake
11	3/28/2013 20:51:23	10	Male	52	platform	mario
12	3/28/2013 20:52:27	11	Female	21	Boardgame	Spyro the Dragon
13	3/28/2013 20:53:26	12	Female	54	mystery	monopoly dog
14	3/28/2013 20:54:03	13	Female	21	action	princess peach
15	4/2/2013 10:23:22	14	Female	21	FPS, RPG	Queen of Blades (StarCraft)
16	4/2/2013 10:26:00	15	Male	22	Fighter	Sonic
17	4/2/2013 10:28:09	16	Male	21	Action RPG	Solaire of astora
18	4/2/2013 10:29:01	17	Male	22	RPG	Samus Aran - Metroid Prime
19	4/5/2013 11:19:32	18	Male	20	shooter	Black ops - David Mason
20	4/5/2013 11:38:13	19	Female	22	boardgame	
21	4/5/2013 11:43:30	20	Male	21	RPG	The Hero (Fable)
22	4/5/2013 12:25:41	21	Male	21	RPG	Leon Kennedy

Appendix F Post Questionnaire

## Post Questionnaire

The purpose of this post questionnaire is to gather some information on the participants taking part in the experiment. The information shall be used for the research project - The Proteus Effect: The impact of perceived trustworthiness on offline game play behavior.

**\* Required**

**Name? \***

**What is your gender? \***

- ☐ Male  
☐ Female

**What age are you? \***

**Game Number \***

- ☐ 1  
☐ 2  
☐ 3

**How deceptive did you perceive your game play behaviour to be when playing the game? \***

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Very

**How honest did you perceive your game play behavior to be when playing the game? \***

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Very

**How honest did you think your avatar looked? \***

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Very

**Did you think the appearance of the avatar affected your behavior? \***

Yes/No Why?

**When playing the game did you perceive your game play behaviour to be risk taking? \***

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Very

**When playing the game did you perceive our game play behaviour to trust without scepticism?**

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Very

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#### Appendix G Post Questionnaire Results

	D	E	F	G	H
	How honest did you perceive your game play behavior to be when playing the game?	How honest did you think your avatar looked?	What age are you?	Game Number	Did you think the appearance of the avatar affected your behavior?
1	5	3	4	1 no	m
1	5	4	2	1 naa	m
3	4	4	2	1 a little	m
5	1	3	3	1 yes	m
3	4	4	2	1 yes	fei
				I thought about it a little more this round but no major effect	fei
5	1	5	1	2 no not really	m
1	5	4	2	2 no more into the game	m
2	5	4	2	2 no	m
3	5	5	5	1 didnt pay attention to it	m
4	4	2	4	3 no	m
1	5	1	4	i didnt pay much attention to it, so	m
4	2	3	3	1 no	m
5	1	5	1	3 not much	fei
1	5	5	1	3 no	m
2	5	1	4	3 no	m
				no he looked to bad for me to act like	m
1	5	4	1	1 him	m
3	4	2	4	1 yes he looked kind	m
2	2	1	1	1 on the game	m

	D	E	F	G	H
	How honest did you perceive your game play behavior to be when playing the game?	How honest did you think your avatar looked?	What age are you?	Game Number	Did you think the appearance of the avatar affected your behavior?
2	2	1	1	1 on the game	
4	4	3	1	1 no	
				i was more interested in the game	
4	1	2	3	2 game	
1	5	4	2	2 no my behaviour wasnt effected	
3	3	1	1	2	
1	5	1	5	2 Maybe a little	
				A little more this round however i was into the game	
2	4	5	1	3 more	
				no i was concentrating on the game and other players	
1	5	5	1	3 no	
2	4	1	3	3 no	
2	2	4	21	1 yes he was friendly no because he looked evil	
1	4	1	52	1 No. I think I was more caught up in the individual	
2	4	2	21	1 players.	

	D	E	F	G	H
	How honest did you perceive your behavior to be when playing the game?	How honest did you think your avatar looked?	What age are you?	Game Number	Did you think the appearance of the avatar affected your behavior?
2	4	2	21	1	No. I think I was more caught up in the individual players.
3	2	4	54	1	no. not influenced by a person's outward appearance.
2	4	4	21	2	No. I was more affected by the individual players
1	1	1	21	2	acting.
4	4	4	52	2	no hes nice
2	2	4	54	2	happy
2	2	5	21	3	no.
4	3	1	52	3	yes cause hes nice
2	3	4	54	3	no
2	4	3	21	3	No
4	4	3	21	1	i actually think it did somewhat the avatar seemed very middle of the road and blank faced, and i feel like i tried to play logically.

	D	E	F	G	H
	How honest did you perceive your behavior to be when playing the game?	How honest did you think your avatar looked?	What age are you?	Game Number	Did you think the appearance of the avatar affected your behavior?
1	4	3	21	1	i actually think it did somewhat the avatar seemed very middle of the road and blank faced, and i feel like i tried to play logically.
1	2	5	22	1	Nope. little attention paid. stimulus minor and non-constant.
3	3	3	22	1	No. I didn't pay much attention to my avatar when playing the game.
3	4	4	21	1	No. I did not really pay attention to the avatars. As this was my first time playing the game - I concentrate more on understanding the concept and the rules, the behaviour of the other players rather than the avatars.

D	E	F	G	H
How honest did you perceive your game play behavior to be when playing the game?	How honest did you think your avatar looked?	What age are you?	Game Number	Did you think the appearance of the avatar affected your behavior?
5	4	21	2	The end result seemed to reflect the avatar. I didn't notice this time however.
5	4	21	2	The end result seemed to reflect the avatar. I didn't notice this time however.
5	4	21	2	Not so much - I did pay more attention to it, but still I can say it affected me as I couldn't see everyone's avatars throughout the game.
3	3	22	2	No, I paid a little more attention to my avatar at the beginning of the game but it didn't come into play mid to late game.
5	3	22	2	No, I paid a little more attention to my avatar at the beginning of the game but it didn't come into play mid to late game.

D	E	F	G	H
How honest did you perceive your game play behavior to be when playing the game?	How honest did you think your avatar looked?	What age are you?	Game Number	Did you think the appearance of the avatar affected your behavior?
3	3	22	2	No, I paid a little more attention to my avatar at the beginning of the game but it didn't come into play mid to late game.
5	3	22	2	No, I paid a little more attention to my avatar at the beginning of the game but it didn't come into play mid to late game.
5	3	22	2	No, I paid a little more attention to my avatar at the beginning of the game but it didn't come into play mid to late game.
1	5	21	3	No, I was more interested in the way the other players were playing, rather than the avatars affecting the game or my behaviour.
4	4	21	3	No, my avatar didn't look honest but I played an honest game.
2	2	22	3	Nope again, small, non-continual stimulus.
2	5	22	3	Nope again, small, non-continual stimulus.

	D	E	F	G	H
3	How honest did you perceive your game play behavior to be when playing the game?	How honest did you think your avatar looked?	What age are you?	Game Number	Did you think the appearance of the avatar affected your behavior?
2	5	1	22	3	Nope again, small, non-continual.
2	3	3	22	1	yes, looked feminine and weak
2	4	3	20	1	No, i did not pay much attention to my avatar
2	4	3	21	1	Not really
2	5	4	21	1	No, I did not really notice my avatar and kinda forgot it was there
3	3	1	21	2	Not too much, but more so then the last (more deceptive)
3	3	5	20	2	Maybe because i feel i was more honest than in the previous game
2	2	1	21	2	No
4	2	2	22	2	yes, looked more mean
4	2	2	20	3	No, i was focused on the players rather than teh avatars

E	F	G
How honest did you think your avatar looked?	What age are you?	Game Number
2	20	
4	21	
4	21	
4	22	

Appendix H Decisions Measures Tally Sheet

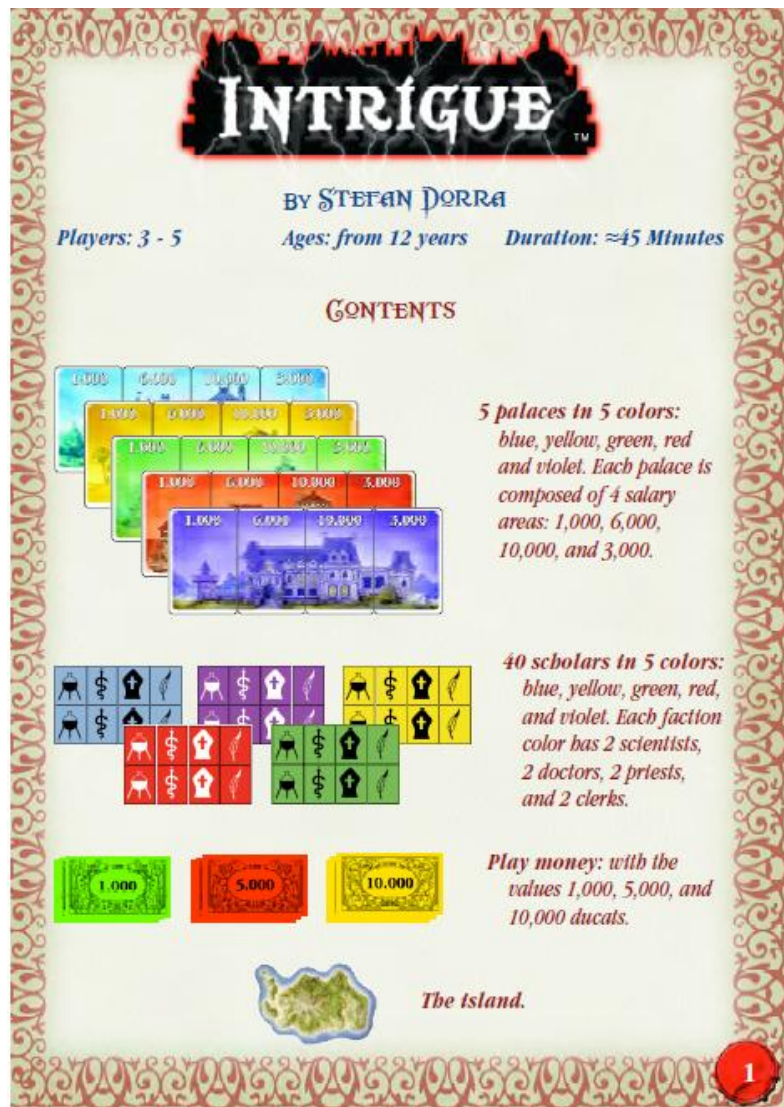


	A	B	C	D
1	Participants	Type of Avatar	Honest Decision	Deceptive Decision
2	1	Honest	3	1
3	2	Honest	4	2
4	3	Honest	4	0
5	4	Honest	5	3
6	5	Honest	3	2
7	6	Honest	6	2
8	7	Honest	4	1
9	8	Honest	6	4
10	9	Honest	4	2
11	10	Honest	6	2
12	11	Honest	3	2
13	12	Honest	5	2
14	13	Honest	4	3
15	14	Honest	4	3
16	15	Honest	4	0
17	16	Honest	6	1
18	17	Honest	6	3
19	18	Honest	4	2
20	19	Honest	5	1
21	20	Honest	2	5
22	21	Honest	5	1

	A	B	C	D
1	Participants	Type of Avatar	Honest Decision	Deceptive Decision
2	1	Neutral	2	2
3	2	Neutral	2	2
4	3	Neutral	2	3
5	4	Neutral	6	2
6	5	Neutral	4	3
7	6	Neutral	4	2
8	7	Neutral	2	4
9	8	Neutral	4	1
10	9	Neutral	2	4
11	10	Neutral	4	2
12	11	Neutral	4	2
13	12	Neutral	4	3
14	13	Neutral	5	2
15	14	Neutral	3	2
16	15	Neutral	2	6
17	16	Neutral	3	2
18	17	Neutral	4	4
19	18	Neutral	4	2
20	19	Neutral	3	3
21	20	Neutral	3	3
22	21	Neutral	3	3

	A	B	C	D
1	Participants	Type of Avatar	Honest Decision	Deceptive Decision
2	1	Deceptive	4	0
3	2	Deceptive	4	2
4	3	Deceptive	3	1
5	4	Deceptive	4	2
6	5	Deceptive	3	0
7	6	Deceptive	6	2
8	7	Deceptive	6	2
9	8	Deceptive	4	2
10	9	Deceptive	4	3
11	10	Deceptive	7	2
12	11	Deceptive	3	2
13	12	Deceptive	5	2
14	13	Deceptive	4	0
15	14	Deceptive	5	1
16	15	Deceptive	3	1
17	16	Deceptive	4	3
18	17	Deceptive	2	4
19	18	Deceptive	5	1
20	19	Deceptive	5	3
21	20	Deceptive	3	3
22	21	Deceptive	4	2

## Appendix I Intrigue Game Rules



### GAME SUMMARY

You begin the game with a palace (encompassing 4 areas) and 8 scholars in your color. You send your scholars to foreign palaces and try to place them in high-salary positions. In order to successfully apply for positions at other palaces (and try to ensure a high income), you must convince the palace owner of your scholar's excellent qualities. Competition for each position is fierce, and even a hired scholar can be replaced. Everything is allowed—a little bribe under the table, promises, threats, persuasiveness, and flattery—and every promise can be broken.

You make money in 2 ways during the game. You collect wages from all of your scholars employed in other players' palaces. You also make money from the bribes that you collect every time someone applies for a position in your palace.

The player with the most money—collected by whatever means possible—after 5 rounds wins the game!

### GAME PREPARATION

Take the palace of your color and place it face-up in front of you. Place the 1,000-ducat card to the left, the 6,000-card to the right of the first card, the 10,000-ducat card further right, and finally the 3,000-ducat card on the far right. (Use the palace picture to guide your card set-up.)

Take the 8 scholars of your color and place them to the side or underneath your palace cards.

Place the island in the middle of the table.

You receive 32,000 ducats (2 of each type of bill) as your starting capital. Keep your available cash secret from the other players. You can make change at any time.

After everyone receives their starting money, place the remaining money in the middle of the table. This is the bank.

### THE PALACES AND CONFLICTS

Before we discuss the actual game rules, we need to explain several important game concepts. Conflicts arise when several players want to fill in a position in a certain area, or when a scholar is sent to fill an empty position in another palace. You will find more complete explanations for these conflicts and the conflict-resolution sequence on page 6.

You must take in foreign scholars who apply for work at your palace. Place the applicants who arrive at your palace above your palace cards. If you accept an applicant, place him on the palace card corresponding to the salary you have chosen for him (or set by a previous scholar of the same type). Banish the applicants you refuse or fire immediately to the island in the middle of the table, where they remain placed (unused) until the end of the game.

Only 1 scholar may occupy each of the 4 salary areas of your palace. When you fill a position at your palace, you must choose from all of the applicants. Your decision will be based primarily on the bribes and other promises offered by the applicants' owners.

**Very important:** Only 1 scholar from each occupation (scientist, doctor, clerk, priest) may be employed at a given palace at any given moment!



*The Blue Palace*



*The 8 Blue Scholars*



*32,000 Ducats*



*Example of the game set-up for 4 persons*

*In the example, the players sit (clockwise) in the sequence: red, yellow, green, and blue. We use this seat sequence below for future examples.*









The owner of the green palace has already distributed the 3,000-area to the red priest. If hired, the blue scientist who is applying at the green palace must be placed in one of the 3 remaining areas. The green player can choose any of the 3 remaining areas for the blue scientist—either the 1,000-area, the 6,000-area, or the 10,000-area.

An **INTERNAL CONFLICT** occurs when 1 or more applicants of the same occupation arrive at a palace where a scholar of that occupation is already employed. Once you establish an occupation in 1 of your palace areas, then that occupation remains assigned to that area in your palace until the end of the game. Once assigned, a scholar may never leave his area. If another scholar with the same occupation applies, a conflict occurs and you must decide whether or not to kick out the old scholar in the area and replace him with the new applicant. In either case, you banish the losing scholar to the island.

*A yellow scientist applies for a position at the red palace.*  
*Since there is already a scientist (green) in the 10,000-area, an internal conflict occurs. The red palace owner must decide whether he keeps the green scientist in the 10,000-area, or whether he replaces the green scientist with the yellow scientist in the same salary area. The red palace owner immediately banishes the rejected scientist to the island. The choice is entirely up to the red palace owner!*



**Internal conflict: Here comes trouble!**  
**Will the green scientist lose his position?**



**External conflict:**  
**There can only be one priest!**

3 priests (yellow, red, green) apply for a place at the blue palace. The palace owner must banish 2 applicants to the island and take in the selected priest at 1 of the 3 remaining salary levels. The palace owner must decide which applicant is hired, and which 2 are banished to the island.

**GAME PLAY**

Randomly determine which player will begin. The person who is taking his turn is the active player. The active player must complete 3 steps on his turn:

1. Collect salaries.
2. Consider applications, resolve conflicts, and take in scholars.
3. Send 2 of your scholars out to apply at other palaces.

When the active player accomplishes all 3 steps, the player to the left (clockwise) becomes the new active player and executes the 3 steps of his turn. Once each player has taken a turn, 1 round of the game is complete. A game consists of 5 such rounds, followed by a final salary round and the end of the game.

**1. Collect salaries**

It's now your turn. You collect salary (the area amount) for each scholar you have working in another player's palace. Draw this salary from the bank, not from the other players' treasuries.



=


*Yellow is the active player. One of his yellow scientists is currently employed in the 10,000-area of the red palace. His second scientist is in the green 3,000-area, and he also has a doctor in the green 6,000-area. Yellow receives a total salary of 19,000 ducats from the bank.*

**First round note:** No one will have any scholars employed during the first round, so there will be no salaries paid during your first turn.

**2. Consider applications, resolve conflicts, take in scholars**

You must consider applications from—and resolve conflicts between—all of the applicants that apply at your palace.

When hiring scholars, you must consider applications from, and resolve conflicts between, all applicants in the following sequence: First, you must take in all applicants with uncontested applications (i.e., those who are applying for an unfilled occupation in your palace and have no competition, so there is no conflict). Second, you must resolve all external conflicts. Finally, you must resolve all internal conflicts.

**Note:** For the very first active player, during the first round there will be no applicants, so he will skip the second step of his turn.

**First, you must accept all uncontested applications at your palace.**

You must take in all applicants for occupations with neither an external nor an internal conflict. Beginning with the player on your left and proceeding clockwise, discuss their applicants' specific salary requests. This is an open, public discussion. You should discuss any future promises, threats, and influences in front of all the players. Finally, the applicant must publicly offer you an immediate cash bribe (of no less than 1,000 ducats).

**Note:** Each applicant must offer his potential employer a cash bribe during each negotiation. The minimum bribe is 1,000 ducats. It must be offered (and given) in addition to any other promises or offers made. Once a player has handed the active player his bribe, his applicant may not offer any further bribes.

After you have negotiated with and received bribes from each of the unchallenged applicants, you must decide where to assign them. You then hire them as scholars in the designated position and at your appointed salary.

**Note:** You have to take into account all threats, negotiations, promises, and bribes when placing applicants, but you do NOT have to honor any agreement. Similarly, no agreement is binding on other players for any actions that you take with their applicants.

**A little conflict**

You are yellow and it's your turn. You've previously accepted an applicant in the 6,000-area. Looking at the 4 new applicants this turn, only the blue clerk is making an uncontested application. Blue says: "I'll give you 5,000 ducats, and you put my clerk in the 10,000 area, OK? During the next round, I also promise to hire one of your people into my 10,000-area. Just send someone over!" You answer: "If you pay me 8,000, then we're in business!" Blue nods agreement and announces that he is paying 8,000 ducats to yellow. You smile shyly. You then puts the blue clerk in the 1,000-area instead of the promised 10,000-area! Blue swears bitter revenge. (Note that you could not refuse to hire blue's clerk, as you had not yet hired a clerk.)

**After resolving all uncontested applications and placing all the applicants with no conflict, resolve all external conflicts in the same way.**

Beginning to your left, you negotiate with all players who have sent applicants to your palace that are involved in an external conflict. Each applicant must negotiate with, and eventually bribe, you. Then you decide which applicant involved in each external conflict you want to hire. You immediately banish all the losing applicants to the island.

**External conflict**

You are yellow and it's your turn. The red and the green scientists apply for the same unfilled position at your palace. They are involved in an external conflict. Green sits on your left, so you begin negotiations with him. You discuss his offer and listen to his pleas, threats, etc. Green then offers you a bribe. Green states he would be content with the 3,000-area, and then pays you a 4,000 ducat bribe. Red is very eager to get into the 10,000-area. After a short negotiation and a swearing of long-term friendship, gives you 12,000 ducats. You take pity on red and banish the green scientist to the island. You don't



*feel enough pity for red, however, to give him the desired 10,000-area. Instead, you place the red scientist in the 3,000-area.*

¶ Finally, you resolve all of the internal conflicts between applicants using the same process.

For internal conflicts, begin your negotiations with the player who owns the currently-employed scholar affected by the conflict. Then proceed clockwise from your left and negotiate with all of the other involved players. Once you conclude negotiations and receive your bribes, you decide, using any criteria that you desire, whether to keep the old scholar in the area or hire a new applicant.

When you face several different internal conflicts, handle each one individually, starting with the smallest salary and working up. (This may mean that you negotiate with other players several different times. An example on page 10 illustrates this scenario.)

**Inner Conflict**  You are yellow and it's your turn. The blue and the green priests are in the middle of an internal conflict. Green would like to remain in the 6,000-area, but figures his scholar is about to take a permanent island vacation. He pays you the minimum bribe of 1,000 ducats. Now blue smells his chance to cheaply snatch the 6,000-area and offers you a bribe of 4,000 ducats. You feel that the salary is worth a bit more and demand 8,000 ducats. Blue is not ready to double his commitment and leaves his bribe at 4,000 ducats, which he hands over to you. Unimpressed, you introduce the Blue priest to island life. Blue is deeply insulted and vows eternal enmity.

**Note:** It is possible to face all 3 types of applicants on a turn, or no applicants at all. Simply follow the order described above (no conflict, external conflict, internal conflict in order of salary), as needed. (More examples of possible conflict situations follow on pages 9 and 10.)

### 3. Send 2 of your scholars out to apply at other palaces

You must send any 2 of your scholars, who are still beside your palace, out to apply at foreign palaces. Place these applicants in front of the palace(s) of your choice. Your applicants can be 2 of the same type of scholar, or different scholars; both can be sent to a single palace, or each can apply at different palaces.

**Note:** A scholar can never find employment in the palace of his own color.

## FINAL PAYMENT AND THE END OF PLAY

The 5 rounds (and the end of the game) play out as follows:

- During the first round, only steps 2 (resolve applicants) and 3 (send out scholars) take place.
- In the second to fourth rounds, all steps of a turn take place.
- During the fifth round, only steps 1 and 2 occur, since all scholars have already been sent out. At the end of the fifth round, there are no more applicants. All of the scholars are either working in palaces or banished to the island!
- Finally, all players receive 1 final salary payment from the bank for all of their scholars employed in palaces.

¶ The game now ends. The winner is the player with the most ducats.

## TWO MORE CONFLICT EXAMPLES

For the following 2 examples, there are 5 players. The clockwise seat sequence is: Red, Yellow, Green, Blue, and Violet.

*You are red and it's your turn. 5 scholars apply at your red palace. The violet priest faces no conflict.*

*Both scientists and both clerks face external conflicts.*

*You first negotiate with violet. You come to an agreement and he pays you a bribe. You must now take in the violet priest in 1 of your 3 free palace areas.*

*You then turn to the external conflicts. You negotiate with the applicants according to the seat sequence. Yellow provides you with the first bribe, then green, blue, and finally violet. After receiving all your bribes, you must hire a scientist and a clerk for your palace. The refused scientist and the refused clerk are immediately whisked away to the Island of Misfit Scholars.*

**Note:** The green doctor spends another round in your 3,000-area, since no one applied for his doctor's position.



**10**



Four scholars apply at your yellow palace. You must resolve 2 internal conflicts. The first conflict is in the 3,000-area. Here, red (as the current employee) must negotiate with you and pay you a bribe. Green follows suit. Then you ship a scientist of your choice off to study coastlines and beaches for the rest of the game. You place the other scientist in your 3,000-area.

Now resolve the internal conflict in your 10,000-area. First violet pays his bribe, then (going clockwise) red, green, and blue. Three of the four applicant priests obtain a new non-career in seaside proselytizing.

**Note:** The red clerk spends another round in your 6,000-area, since no other clerks apply for his job.

**TIPS & TACTICS**

- ⚡ **Special Rule:** If you are broke, you may only offer the minimum bribe of 1,000 ducats. The bank pays your bribe.
- ⚡ **Be Careful:** If you assign scholars the 2 lowest salaries in your palace, the other players may take advantage of the situation to pay a small bribe for a lucrative salary.
- ⚡ In order to hang onto a 10,000-area salary until the end of the game, try to cut a deal with another player to trade 10,000-area salaries. Remember the **Intrigue Golden Rule:** *As long as I keep my post, you keep yours.*
- ⚡ As you send your scholars out (and accept scholars in your palace), keep an eye on which scholars remain. If you have doctors applying at your palace, and no more doctors are in the game, try to extract additional bribes, since no one will be able to replace them. Also pay attention for opportunities to move your scholars against occupants of high salaries that may be in weak bargaining positions.
- ⚡ Take every opportunity to deflect the conversations and negotiations of other players. Ask, threaten, implore, flatter, and swear. Everything is allowed; but don't forget that the goal is cold, hard cash. There's no arrangement that cannot be broken. But, remember that trustworthiness and loyalty are often necessary to ensure some predictable income flow.
- ⚡ Don't forget, as you backstab (or are backstabbed): it is only a game! After the game is over, offer your hand in friendship to your opponents, no matter how much blood and dirt got on them during the game!

**11**

You have bought a product of the highest quality that we can provide. However, if you have any problems or missing components, please let us know!

**Mayfair Games, Inc.**  
 Skokie IL, USA  
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Appendix J Example Game Avatars





**Appendix K SPSS Results**

GET

FILE='H:\RESULTS1.sav'.

DATASET NAME DataSet1 WINDOW=FRONT.

GLM HAHD HADD NAHD NADD DAHD DADD WITH inex

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/METHOD=SSTYPE(3)

/EMMEANS=TABLES(AvatarTypes) WITH(inex=MEAN)COMPARE ADJ(LSD)

/EMMEANS=TABLES(Decisions) WITH(inex=MEAN)COMPARE ADJ(LSD)

/EMMEANS=TABLES(AvatarTypes\*Decisions) WITH(inex=MEAN)

/PRINT=DESCRIPTIVE

/CRITERIA=ALPHA(.05)

/WSDSIGN=AvatarTypes Decisions AvatarTypes\*Decisions

/DESIGN=inex.

**General Linear Model****Notes**

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Comments	
Input	Data H:\RESULTS1.sav

	Active Dataset	DataSet1	
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	Weight	<none>	
	Split File	<none>	
	N of Rows in Working Data File		21
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.	
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.	
Syntax		GLM HAHD HADD NAHD NADD DAHD DADD WITH inex  /WSFACTOR=AvatarTypes 3 Polynomial Decisions 2 Polynomial  /METHOD=SSTYPE(3)  /EMMEANS=TABLES(AvatarTypes) WITH(inex=MEAN)COMPARE ADJ(LSD)  /EMMEANS=TABLES(Decisions) WITH(inex=MEAN)COMPARE ADJ(LSD)  /EMMEANS=TABLES(AvatarTypes*D ecisions) WITH(inex=MEAN)  /PRINT=DESCRIPTIVE  /CRITERIA=ALPHA(.05)  /WSDESIGN=AvatarTypes Decisions AvatarTypes*Decisions  /DESIGN=inex.	
Resources	Processor Time		00 00:00:00.047

Elapsed Time	00 00:00:00.316
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[DataSet1] H:\RESULTS1.sav

### Within-Subjects Factors

Measure: MEASURE\_1

AvatarTypes	Decisions	Dependent Variable
1	1	HAHD
	2	HADD
2	1	NAHD
	2	NADD
3	1	DAHD
	2	DADD

### Descriptive Statistics

	Mean	Std. Deviation	N
Honest Avatar Honest Decisions	4.43	1.165	21
Honest Avatar Deceptive Decisions	2.00	1.225	21

Neutral Avatar Honest Decisions	3.33	1.111	21
Neutral Avatar Deceptive Decisions	2.71	1.102	21
Deceptive Avatar Honest Decisions	4.19	1.209	21
Deceptive Avatar Deceptive Decisions	1.86	1.108	21

**Multivariate Tests<sup>b</sup>**

Effect		Value	F	Hypothesis df
AvatarTypes	Pillai's Trace	.102	1.026 <sup>a</sup>	2.000
	Wilks' Lambda	.898	1.026 <sup>a</sup>	2.000
	Hotelling's Trace	.114	1.026 <sup>a</sup>	2.000
	Roy's Largest Root	.114	1.026 <sup>a</sup>	2.000
AvatarTypes * inex	Pillai's Trace	.102	1.025 <sup>a</sup>	2.000
	Wilks' Lambda	.898	1.025 <sup>a</sup>	2.000
	Hotelling's Trace	.114	1.025 <sup>a</sup>	2.000
	Roy's Largest Root	.114	1.025 <sup>a</sup>	2.000
Decisions	Pillai's Trace	.364	10.874 <sup>a</sup>	1.000
	Wilks' Lambda	.636	10.874 <sup>a</sup>	1.000
	Hotelling's Trace	.572	10.874 <sup>a</sup>	1.000
	Roy's Largest Root	.572	10.874 <sup>a</sup>	1.000
Decisions * inex	Pillai's Trace	.002	.030 <sup>a</sup>	1.000
	Wilks' Lambda	.998	.030 <sup>a</sup>	1.000

	Hotelling's Trace	.002	.030 <sup>a</sup>	1.000
	Roy's Largest Root	.002	.030 <sup>a</sup>	1.000
AvatarTypes * Decisions	Pillai's Trace	.114	1.157 <sup>a</sup>	2.000
	Wilks' Lambda	.886	1.157 <sup>a</sup>	2.000
	Hotelling's Trace	.129	1.157 <sup>a</sup>	2.000
	Roy's Largest Root	.129	1.157 <sup>a</sup>	2.000
AvatarTypes * Decisions * inex	Pillai's Trace	.002	.019 <sup>a</sup>	2.000
	Wilks' Lambda	.998	.019 <sup>a</sup>	2.000
	Hotelling's Trace	.002	.019 <sup>a</sup>	2.000
	Roy's Largest Root	.002	.019 <sup>a</sup>	2.000

**Multivariate Tests<sup>b</sup>**

Effect		Error df	Sig.
AvatarTypes	Pillai's Trace	18.000	.378
	Wilks' Lambda	18.000	.378
	Hotelling's Trace	18.000	.378
	Roy's Largest Root	18.000	.378
AvatarTypes * inex	Pillai's Trace	18.000	.379
	Wilks' Lambda	18.000	.379
	Hotelling's Trace	18.000	.379
	Roy's Largest Root	18.000	.379
Decisions	Pillai's Trace	19.000	.004
	Wilks' Lambda	19.000	.004
	Hotelling's Trace	19.000	.004
	Roy's Largest Root	19.000	.004



Decisions * inex	Pillai's Trace	19.000	.865
	Wilks' Lambda	19.000	.865
	Hotelling's Trace	19.000	.865
	Roy's Largest Root	19.000	.865
AvatarTypes * Decisions	Pillai's Trace	18.000	.337
	Wilks' Lambda	18.000	.337
	Hotelling's Trace	18.000	.337
	Roy's Largest Root	18.000	.337
AvatarTypes * Decisions * inex	Pillai's Trace	18.000	.981
	Wilks' Lambda	18.000	.981
	Hotelling's Trace	18.000	.981
	Roy's Largest Root	18.000	.981

a. Exact statistic

b. Design: Intercept + inex

Within Subjects Design: AvatarTypes + Decisions + AvatarTypes \* Decisions

### Mauchly's Test of Sphericity<sup>b</sup>

Measure: MEASURE\_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
AvatarTypes	.927	1.366	2	.505
Decisions	1.000	.000	0	.

**Mauchly's Test of Sphericity<sup>b</sup>**

Measure: MEASURE\_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
AvatarTypes	.927	1.366	2	.505
Decisions	1.000	.000	0	.
AvatarTypes * Decisions	.907	1.765	2	.414

**Mauchly's Test of Sphericity<sup>b</sup>**

Measure: MEASURE\_1

Within Subjects Effect	Epsilon <sup>a</sup>		
	Greenhouse-Geisser	Huynh-Feldt	Lower-bound
AvatarTypes	.932	1.000	.500
Decisions	1.000	1.000	1.000
AvatarTypes * Decisions	.915	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b. Design: Intercept + inex

Within Subjects Design: AvatarTypes + Decisions + AvatarTypes \* Decisions

**Tests of Within-Subjects Effects**

Measure: MEASURE\_1

Source		Type III Sum of Squares	df	Mean Square
AvatarTypes	Sphericity Assumed	2.226	2	1.113
	Greenhouse-Geisser	2.226	1.864	1.194
	Huynh-Feldt	2.226	2.000	1.113
	Lower-bound	2.226	1.000	2.226
AvatarTypes * inex	Sphericity Assumed	2.252	2	1.126
	Greenhouse-Geisser	2.252	1.864	1.208
	Huynh-Feldt	2.252	2.000	1.126
	Lower-bound	2.252	1.000	2.252
Error(AvatarTypes)	Sphericity Assumed	31.399	38	.826
	Greenhouse-Geisser	31.399	35.412	.887
	Huynh-Feldt	31.399	38.000	.826
	Lower-bound	31.399	19.000	1.653
Decisions	Sphericity Assumed	19.519	1	19.519
	Greenhouse-Geisser	19.519	1.000	19.519
	Huynh-Feldt	19.519	1.000	19.519
	Lower-bound	19.519	1.000	19.519
Decisions * inex	Sphericity Assumed	.053	1	.053
	Greenhouse-Geisser	.053	1.000	.053
	Huynh-Feldt	.053	1.000	.053
	Lower-bound	.053	1.000	.053
Error(Decisions)	Sphericity Assumed	34.106	19	1.795

	Greenhouse-Geisser	34.106	19.000	1.795
	Huynh-Feldt	34.106	19.000	1.795
	Lower-bound	34.106	19.000	1.795
AvatarTypes * Decisions	Sphericity Assumed	4.559	2	2.279
	Greenhouse-Geisser	4.559	1.829	2.492
	Huynh-Feldt	4.559	2.000	2.279
	Lower-bound	4.559	1.000	4.559
AvatarTypes * Decisions * inex	Sphericity Assumed	.076	2	.038
	Greenhouse-Geisser	.076	1.829	.042
	Huynh-Feldt	.076	2.000	.038
	Lower-bound	.076	1.000	.076
Error(AvatarTypes*Decisions)	Sphericity Assumed	60.146	38	1.583
	Greenhouse-Geisser	60.146	34.753	1.731
	Huynh-Feldt	60.146	38.000	1.583
	Lower-bound	60.146	19.000	3.166

### Tests of Within-Subjects Effects

Measure: MEASURE\_1

Source		F	Sig.
AvatarTypes	Sphericity Assumed	1.347	.272
	Greenhouse-Geisser	1.347	.272
	Huynh-Feldt	1.347	.272
	Lower-bound	1.347	.260
AvatarTypes * inex	Sphericity Assumed	1.363	.268
	Greenhouse-Geisser	1.363	.268

	Huynh-Feldt	1.363	.268
	Lower-bound	1.363	.258
Decisions	Sphericity Assumed	10.874	.004
	Greenhouse-Geisser	10.874	.004
	Huynh-Feldt	10.874	.004
	Lower-bound	10.874	.004
Decisions * inex	Sphericity Assumed	.030	.865
	Greenhouse-Geisser	.030	.865
	Huynh-Feldt	.030	.865
	Lower-bound	.030	.865
AvatarTypes * Decisions	Sphericity Assumed	1.440	.250
	Greenhouse-Geisser	1.440	.250
	Huynh-Feldt	1.440	.250
	Lower-bound	1.440	.245
AvatarTypes * Decisions * inex	Sphericity Assumed	.024	.976
	Greenhouse-Geisser	.024	.969
	Huynh-Feldt	.024	.976
	Lower-bound	.024	.878

### Tests of Within-Subjects Contrasts

Measure: MEASURE\_1

Source	Decisions	Type III Sum of Squares	df	Mean Square
AvatarTypes	Linear	.013	1	.013

	Quadratic		2.213	1	2.213
AvatarTypes * inex	Linear		.276	1	.276
	Quadratic		1.976	1	1.976
Error(AvatarTypes)	Linear		11.962	19	.630
	Quadratic		19.437	19	1.023
Decisions	Linear		19.519	1	19.519
Decisions * inex	Linear		.053	1	.053
Error(Decisions)	Linear		34.106	19	1.795
AvatarTypes * Decisions	Linear	Linear	.077	1	.077
	Quadratic	Linear	4.482	1	4.482
AvatarTypes * Decisions * inex	Linear	Linear	.042	1	.042
	Quadratic	Linear	.034	1	.034
Error(AvatarTypes*Decision s)	Linear	Linear	24.910	19	1.311
	Quadratic	Linear	35.236	19	1.855

### Tests of Within-Subjects Contrasts

Measure: MEASURE\_1

Source	Decisions	F	Sig.
AvatarTypes	Linear	.020	.889
	Quadratic	2.163	.158
AvatarTypes * inex	Linear	.438	.516
	Quadratic	1.932	.181
Decisions	Linear	10.874	.004
Decisions * inex	Linear	.030	.865
AvatarTypes * Decisions	Linear	.059	.811

	Quadratic	Linear	2.417	.137
AvatarTypes * Decisions * inex	Linear	Linear	.032	.860
	Quadratic	Linear	.018	.893

### Tests of Between-Subjects Effects

Measure: MEASURE\_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	253.581	1	253.581	164.007	.000
inex	2.496	1	2.496	1.614	.219
Error	29.377	19	1.546		

### Estimated Marginal Means

#### 1. AvatarTypes

**Estimates**

Measure:MEASURE\_1

AvatarTypes	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	3.214 <sup>a</sup>	.178	2.841	3.587
2	3.024 <sup>a</sup>	.130	2.752	3.295
3	3.024 <sup>a</sup>	.166	2.676	3.372

a. Covariates appearing in the model are evaluated at the following values:

Introvert Extrovert = 1.76.

**Pairwise Comparisons**

Measure:MEASURE\_1

(I) AvatarTypes	(J) AvatarTypes	Mean Difference (I-J)	Std. Error	Sig. <sup>a</sup>
1	2	.190	.199	.351
	3	.190	.173	.285
2	1	-.190	.199	.351
	3	2.220E-16	.220	1.000
3	1	-.190	.173	.285
	2	-2.220E-16	.220	1.000

**Pairwise Comparisons**

Measure:MEASURE\_1



		95% Confidence Interval for Difference <sup>a</sup>	
(I) AvatarTypes	(J) AvatarTypes	Lower Bound	Upper Bound
1	2	-.226	.607
	3	-.172	.553
2	1	-.607	.226
	3	-.460	.460
3	1	-.553	.172
	2	-.460	.460

Based on estimated marginal means

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

#### Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.
Pillai's trace	.079	.773 <sup>a</sup>	2.000	18.000	.476
Wilks' lambda	.921	.773 <sup>a</sup>	2.000	18.000	.476
Hotelling's trace	.086	.773 <sup>a</sup>	2.000	18.000	.476
Roy's largest root	.086	.773 <sup>a</sup>	2.000	18.000	.476

Each F tests the multivariate effect of AvatarTypes. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

## 2. Decisions

### Estimates

Measure:MEASURE\_1

Decisions	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	3.984 <sup>a</sup>	.180	3.608	4.360
2	2.190 <sup>a</sup>	.144	1.889	2.492

a. Covariates appearing in the model are evaluated at the following values: Introvert Extrovert = 1.76.

### Pairwise Comparisons

Measure:MEASURE\_1

(I) Decisions	(J) Decisions	Mean Difference (I-J)	Std. Error	Sig. <sup>a</sup>
1	2	1.794 <sup>*</sup>	.239	.000
2	1	-1.794 <sup>*</sup>	.239	.000

**Pairwise Comparisons**

Measure: MEASURE\_1

		95% Confidence Interval for Difference <sup>a</sup>	
(I) Decisions	(J) Decisions	Lower Bound	Upper Bound
1	2	1.294	2.293
2	1	-2.293	-1.294

Based on estimated marginal means

\*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

**Multivariate Tests**

	Value	F	Hypothesis df	Error df	Sig.
Pillai's trace	.748	56.456 <sup>a</sup>	1.000	19.000	.000
Wilks' lambda	.252	56.456 <sup>a</sup>	1.000	19.000	.000
Hotelling's trace	2.971	56.456 <sup>a</sup>	1.000	19.000	.000
Roy's largest root	2.971	56.456 <sup>a</sup>	1.000	19.000	.000

Each F tests the multivariate effect of Decisions. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

**3. AvatarTypes \* Decisions**

Measure: MEASURE\_1

AvatarTypes	Decisions	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
1	1	4.429 <sup>a</sup>	.256	3.894	4.964
	2	2.000 <sup>a</sup>	.273	1.429	2.571
2	1	3.333 <sup>a</sup>	.248	2.813	3.853
	2	2.714 <sup>a</sup>	.247	2.198	3.230
3	1	4.190 <sup>a</sup>	.262	3.642	4.739
	2	1.857 <sup>a</sup>	.240	1.355	2.359

a. Covariates appearing in the model are evaluated at the following values: Introvert  
Extrovert = 1.76.



