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Role-playing digital Games

Project Group Number: Group 2

Group Members: Ching-Han Kuo

Xinwen Cui

Ying Tan

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KEYWORDS

Role-playing games, Autonomy, Immersion, Player experience, Character

ABSTRACT

A lot of components of player experience in digital games were measured. However, they are mostly measured separately and only a few studies discuss the possible links between these components of player experience. In this paper, the relationship of two components of player experience, autonomy and immersion, are experimented. 30 participants play a role-playing digital game 'Arena of Valour' in both autonomy and non-autonomy support condition and asked to answer a questionnaire combined player experience of need satisfaction (PENS) and immersive experience questionnaire (IEQ). The results show that players are more immersed when playing in autonomy support condition. Moreover, this experiment indicates a possible path to research autonomy in digital games in the future.

1 INTRODUCTION

With the development of digital games, game developers are looking for certain effective ways to increase the number of people who play games. In 2013, massively multiplayer online role-playing games were designed, such as World of Warcraft, which attracted a large number of players in a short time as they have proven to have quite complex social dynamics (Duchenaud et al., 2006; Chen and Duh, 2007). Obviously, social games are a universal and important digital game. Immersion is an "in-game" experience (Brown and Cairns, 2004). In other words, there is a lot of emotional and cognitive input in the game. Players seem to have the motivation to meet internal needs, and the phenomenon is often referred to as intrinsic motivation (Ryan & Deci, 2000). The game's customizable aesthetics, points, leader boards, badges/achievements, chat features and immersive storyline can foster inner motivation (Ryan, Rigby, & Przybylski, 2006). The players are attracted to play or spend money on digital games by this intrinsic motivation that is critical to the commercial success of the game.

Traditionally, Self-determination theory (SDT) has been used in researching what factors influence inner motivation (Dennie, 2012). SDT proposes that when players engage in various types of tasks in the digital games, they are usually influenced by three innate psychological needs: competence, autonomy and relatedness (Deci & Ryan, 2000), especially focusing on autonomy (Dennie, 2012). Ryan, Rigby and Przybylski (2006), and other more recent researchers such as Sheldon and Filak (2008), Dennie (2012) and Leventhal (2018), cite Deci and Ryan's (1985) self-determination theory as a theoretical framework for understanding the intrinsic motivation for players to play digital games. Therefore, by researching these innate psychological needs, game designers can understand deeply in players' intrinsic motivation, and then design more sophisticated games that meet the players' inner needs. Although competence, relatedness and autonomy are all important to players' inner needs, autonomy was singled out in the current study due to easier to manipulate and lesser kinds of literature to research it.

According to Brown and Cairns (2004), immersion is a powerful experience of gaming, and it is

commonly reported by players, designers, and game researchers alike as an important experience of interaction. Immersion can be understood as the sense of being “in a game” which does not mean in any physical sense but rather about player’s thoughts, attention and goals in and around the game, not anything else, such as what is going on in the room around them (Sanders & Cairns, 2010). Comparing with other common measures of in-game experience, immersion is a much more ordinary experience and can be graded with low and high levels of immersion possible (Sanders & Cairns, 2010). Therefore, there are many pieces of literature to explore the factors affecting immersion in digital games.

Though studying different types of digital games, it has been found that role-playing games and massively multiplayer online games have the greatest impact on players’ autonomy (Ryan & Rigby, 2007). Therefore, we decided to focus on role-playing games. This study can help improve the understanding of the relationship between autonomy and immersion in a role-playing game. In the next sections, the state-of-the-art in relation to our research questions will be presented, followed by an overview of a few experiments about autonomy. In addition, relevant literature on autonomy and immersion will be reviewed to set the stage for the current study. Finally, the hypotheses and a research question will be pointed out.

2 LITERATURE REVIEW

2.1 Autonomy

Autonomy is a view of freedom of choice, and in digital games, autonomy refers that the player has the ability and chance to choose what they want to do. It is an important and less-studied aspect of digital games. Generally, players can feel autonomy in the following aspects: follow the set storyline vs. create their own story, assign a character or task vs. create their own character or task by themselves and single game mode vs. multiple strategy selections (Rigby & Ryan, 2011). Those users who cannot feel too much freedom in their daily lives may particularly enjoy this type of game that meets their autonomy because they are given a strong sense of control (Przybylski et al., 2010).

2.2 The Method to Manipulate Autonomy

A large number of studies have shown that there is a positive correlation between autonomy and the intrinsic motivation to perform tasks (Przybylski et al., 2010), but few studies manipulate autonomy in experiments, especially in digital games. In the experience of Deci, Eghrari, Patrick, and Leone (1994), they manipulated autonomy by using high controlling language (like “must” and “should”) and neutral language (like “could” and “would”). This experience only focused on verbal commands to control the participant’s autonomy but not given much more choice of freedom for participants. Another typical experience of autonomy was designed by Sheldon and Filak (2008). They controlled participants’ choice of a task while playing Boggle, a puzzle solving game. One group can choose the colour grid and the order of puzzles, while the control group was not given those options. However, the results showed that most of the participants did not feel they were being controlled because the statements were not coercive (Sheldon & Filak, 2008).

In the past experiences, most methods manipulating autonomy are not related to one's sense of self, while choosing identity by oneself can help to relate autonomy to one's self (Dennie, 2012). According to Dennie (2012), With a manipulation of autonomy that is more related to their identity, a stronger relationship between autonomy and immersion may appear. In the two experiments designed by Dennie (2012) and Leventhal (2018), the experimenter controlled the in-game character's customization. In the autonomy game session, the player had complete control over all aspects of the character (hairstyle, skin colour, face, body shape, clothes etc.). In the non-autonomy game session, a standard character was provided by the experimenter. This is the method to control autonomy in a relatively convenient and efficient way. Therefore, based on the previous experiments, the focus of the control variables in this study is mainly on the players' selection of the character. However, due to the complexity that there are too many options available to players in practice, players may feel frustrated during the limited experimental time, so it is expected to simplify this operation.

2.3 The Aim of Study

It has been shown in the previous researches that autonomy affects the intrinsic motivation of players to play games, and intrinsic motivation is an important factor to influence the decision whether to continue playing games and player's immersion (Ryan et al., 2006). But so far, only a few numbers of studies have investigated the correlation between autonomy and immersion. Therefore, the main purpose of this study is to study whether the choice of characters will affect their autonomy and determine whether autonomy is associated with immersion.

2.4 Hypotheses and Research Questions

There are two main categories of questions in this study. In the role-playing games, does controlling character selection affect the sense of autonomy? Apart from that, Is there a link between autonomy in the form of game character and immersion in role-playing games? Hypotheses for these research questions are as follows:

H1. The control for choosing the character will affect the sense of autonomy

H2. Increased autonomy will be related to increased immersion

3 RESEARCH METHODOLOGY

3.1 Materials

In the previous experiments, researchers mainly used relatively novel games, so no matter what character may be a special experience for them. In this situation, players may not be able to experience the high autonomy through choosing different characters and their attention may be put on exploring gameplay and may ignore the impact of game characters on them (Dennie, 2012). Therefore, in this study, the research focused on players who have certain game experience in a particular game. After testing different types of the game, in order to facilitate the recruitment of participants, we decided to choose a game that has been extremely popular with a large number of user groups – "Arena of Valour". After testing the game, it has been found that when playing the standard PvP match, it took about 20-30 minutes, while the bot match took about 10 minutes. Meanwhile, in the bot match, the

player would not lose, which is a better way to avoid the difference in the player's game experience caused by the game results. After considering various conditions, 3v3 hard mode in bot match has been chosen. In the bot match, since the opponent is the computer, it can avoid the bias caused by different opponents. In order to avoid this bias stricter, we required the player to choose the same teammate when they played the game.

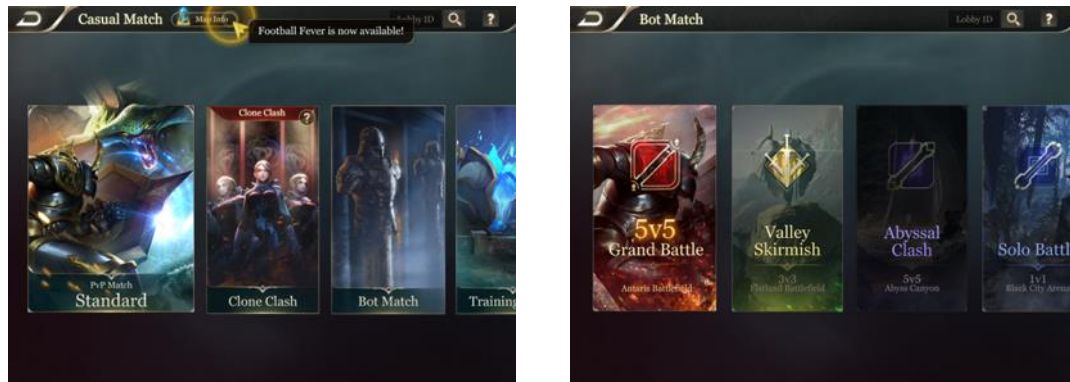


Figure 1. Arena of Valour Menu Screen

The main devices used in this study included mobile phones and the iPad, which were very convenient to download “Arena of Valour” in the App Store and the Google Store. There are basically no differences in the gameplay between different mobile phone and iPad. Since the participants all had experience in this game, we required them to use the device that they usually used to play this game in the experiment. During the proceeding, participants were required to complete Qualtrics surveys using the web browser. The consent form was provided at the beginning and signed before participating. The instruction that introduced the requirement and procedure of the experiment was present at all times on the table or the computer screen. Participants needed to read the instruction before proceeding and confirmed that they understood how to play and what they were doing.

3.2 Participants

In order to recruit players with certain game experience in “Arena of Valour”, the method of “snowball sample” was used to recruit volunteers. There were 33 participants, of which 3 participants’ data were unusable due to incomplete surveys. Thus, the total participants in this study were 30, of which 17 were male (56.7%) and 13 were female (43.3%). The ages ranged from 18 to 30, and most participants were in the 22 to 30 range. All participants have a certain experience to play “Arena of Valour”, 20 of whom had more than one-year experience. Apart from that, because the game “Arena of Valour” was the most famous game in China, 27 participants were Asian.

3.3 Design

The experiment was designed as a one-way within-subjects in two main dependent variables (autonomy and immersion) at two levels of one independent variable (character choice or no character choice). Correlation between two dependent variables was also measured in the experiment. This within-subjects design was a better way to measure different player experience in different conditions in each player. Participants were randomly assigned to play one condition first and then play another.

Choice of character was autonomy-supportive, while no character choice was non-autonomy-supportive.



Figure 2. Various Characters in 'Arena of Valour'

3.4 Variables and Measures

The dependent variables were autonomy and immersion. Autonomy was measured with the autonomy part of the Social Presence in Gaming Questionnaire (PENS) scale created by Rigby and Ryan (2007) and immersion was measured with the Immersive Experience Questionnaire (IEQ) scale. After that, the result of the PENS scale and the IEQ scale was combined to determine the relationship between perceived autonomy and immersion.

The following measures were utilized:

Demographics Questionnaire: This questionnaire collected the information about participants' gender, age, ethnicity and proficiency in playing "Arena of Valour" no personally identifiable information.

PENS: This scale focuses on the player's psychological needs. It is multi-dimensional and has three main components: competition, autonomy, and relatedness. In this study, we used the part of in-game autonomy scale. It uses 3-item scales ranked on a 5-point Likert scale ranging from "Strongly Agree" to "Strongly Disagree" to measure the degree of feeling free. This questionnaire has been statistically validated (Denisova, Nordin, & Cairns, 2016) (Rigby & Ryan, 2007). Using this scale to confirm whether the conditions in the study truly manipulated the sense of autonomy.

IEQ: It is widely used in different scenarios and game types (Cox, Cairns, Shah & Carroll, 2012) (Thompson, Nordin & Cairns, 2012) (Sanders & Cairns, 2010). Also, it has been tested much more empirically. IEQ focuses on the immersion when the player plays a game, and it consists of 31 Likert scale questions using both positive statements and negative statements with 5-point possible answers ranging from "Strongly Agree" to "Strongly Disagree", adding extra accuracy (Jennett et al., 2008).

3.5 Procedure

In order to make the player as far as possible in the real game environment, the experiment was mainly carried out in two methods. One was face-to-face with the participants, and the other was to do experiment through the Facetime. In these two methods, participants were both provided with an

informed consent form to read and sign before the experiment. Also, participants were given an instruction regarding how to play the game. The instruction included the mode that participants need to choose in “Arena of Valour” and some matters needing attention. Participants were given about 2 minutes to read the instruction and then ask questions to ensure an accurate understanding of how to play.

After understanding the whole process of the experiment, participants were asked to fill in the first part of the questionnaire - Demographics Questionnaire. After completing, the participant was assigned randomly one mode to play (self-selecting a character or assigned a character). If the participants were assigned to choose the character by themselves, they can play it as usual, while if the participants were assigned to choose the character randomly, the researchers will use the dice to specify the player to select a character. After finishing the game in the first mode, the players were asked to fill in the PENS scale and IEQ scale. When the system appeared “Now, please play the game by choosing the character you want/Now, we will randomly assign you a character to play”, the players can start the game again in the other mode. After finishing the game, the players continued to fill in the same questionnaires (PENS scale and IEQ scale). All participants played only two modes of a game, and the order was randomly assigned. Once the final survey was completed, the experiment ended, and the entire experiment lasted for about half an hour.

4 RESULTS

4.1 Hypothesis 1

In order to confirm if the experimental manipulation we set had the desired effect, average autonomy score in PENS was compared under the two conditions. It was hypothesized that the control for choosing the character will affect the sense of autonomy. There was a significant difference in autonomy. From Figure 1, it can be seen that the trend is as expected with average autonomy score increasing in autonomy support condition. The difference was significant, with a two-tailed test, $t=7.84$, $df=29$, $p<0.001$, and the effect size defined by Cohen’s d is 2.26. Therefore, hypothesis 1 was supported.

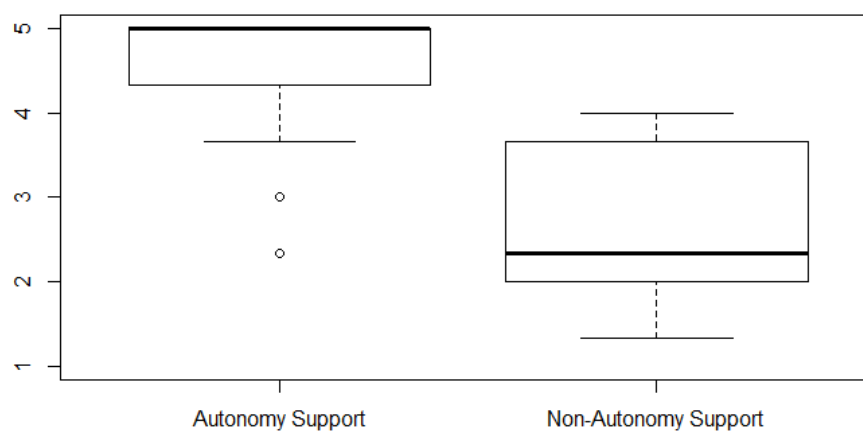


Figure 3. Boxplot of average autonomy score

4.2 Hypothesis 2

The secondary hypothesis predicted that Increased autonomy will be related to increased immersion. The primary aim of the experiment was to explore whether autonomy affected immersion. In addition, according to Jennett et al. (2008), there are five components in immersion, cognitive involvement, emotional involvement, real world dissociation, challenge and control. Therefore, not only just a total average immersion score in IEQ but also the scores representing these factors were separately compared under the two conditions. Summary of the results can be read in Table 1.

Table 1. Summary of results of the game played with and without autonomy support

	Autonomy		Non-Autonomy		t (30)	p	d
	Mean	Std.Dev.	Mean	Std.Dev.			
Immersion	3.77	0.43	3.41	0.42	3.122	0.004	0.844
Cognitive involvement	4.24	0.62	3.84	0.61	2.247	0.032	0.64
Emotional involvement	4.05	0.68	3.58	0.67	2.558	0.016	0.691
Real world dissociation	3.14	0.51	2.91	0.45	1.968	0.059	0.466
Challenge	3.25	0.58	3.08	0.38	1.284	0.209	0.341
Control	3.69	0.67	3.18	0.54	3.666	0.001	0.829

The results supported the hypothesis that autonomy relates to immersion. Immersion in the condition with autonomy support was found to be significantly higher (see Figure 4) than with non-autonomy, as shown by the two-tailed t-test ($t=3.122$, $df=29$, $p=0.004$) and Cohen's $d=0.844$.

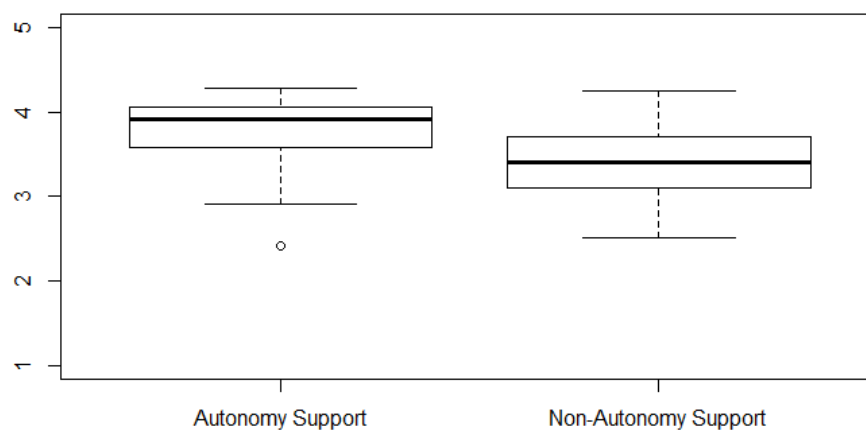


Figure 4. Boxplot of average immersion score

For the components in immersion, it can be seen that there were three of them showed a significant difference under the two condition, and this can be demonstrated by two-tailed tests and Cohen's ds: Cognitive involvement (Figure 5), $t=2.247$, $df=29$, $p=0.032$ and Cohen's $d=0.64$; Emotional involvement (Figure 6), $t=2.558$, $df=29$, $p=0.016$ and Cohen's $d=0.691$; Control (Figure 7), $t=3.666$, $df=29$, $p=0.001$ and Cohen's $d=0.829$. Control was demonstrated to be impacted the most by the conditions among these three factors, and cognitive involvement was less impacted.

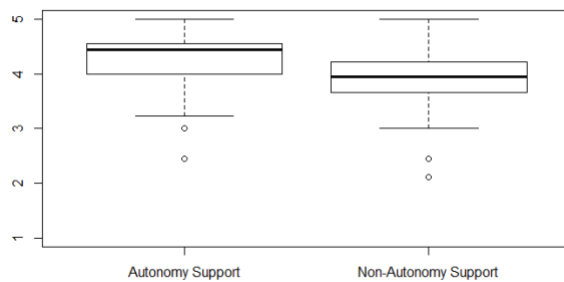


Figure 5. Boxplot of cognitive involve score

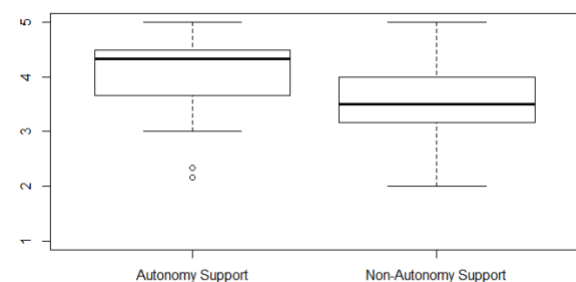


Figure 6. Boxplot of emotional involve score

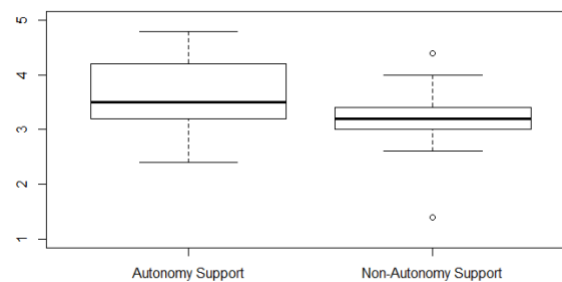


Figure 7. Boxplot of control score

Two factors showed no significant difference in two conditions which are confirmed by t-tests: Real world dissociation (Figure 8), $t=1.968$, $df=29$, $p=0.059$; Challenge (Figure 9), $t=1.284$, $df=29$, $p=0.209$. It can be noticed that statistical number in real world dissociation score is close to have a statistical difference, and the effect size (see in Table 1) is nearly 0.5. Therefore, it may able to be considered that the condition has small effect on RWD score.

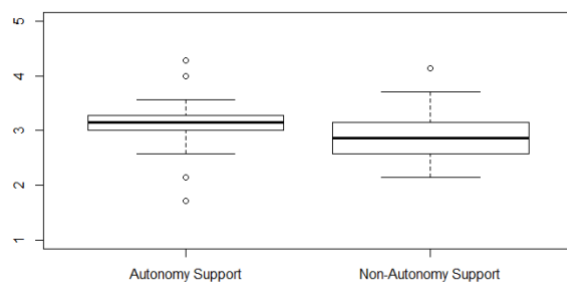


Figure 8. Boxplot of real-world dissociation score

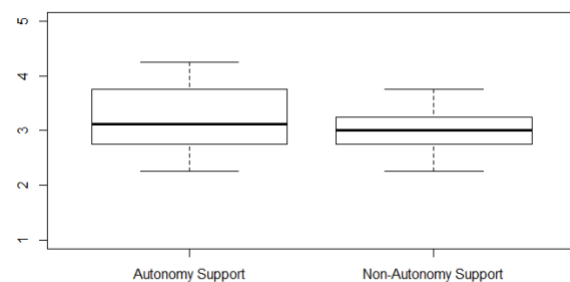


Figure 9. Boxplot of challenge score

5 DISCUSSION

This study set out to examine whether autonomy in the form of game character affects players' immersive experience in role-playing games. From previous studies, two gaps emerged. One was that there were no effective methods to manipulate players' feeling of autonomy, and another was that there was not much discussion about the links between autonomy and immersion in role-playing games. In this experiment, it might provide possible paths to fill these two gaps.

5.1 Hypotheses 1 and 2

In previous studies, choosing a character or not was the main way used to manipulate autonomy, and Some of the results showed that there was no significant difference. In this experiment, choosing character was still the manipulation method, however, the choice of participants and game was different from previous studies. Instead of letting participants play a new game, in this experiment, participants all had experience on the game, and they all already had fully understood how the game works before they came to do the experiment. Results showed that this manipulation method has desired effect that there was a significant difference in autonomy score between with or without the ability to choose the character they want. From this, it may indicate that the sense of autonomy in role-playing games related to how long have they been engaged in and how much they have known about the game, and it may be hard to manipulate it when facing a brand-new game.

Results supported the hypothesis 2 that autonomy can affect immersion. Immersion score increased significantly in autonomy support condition, and when looking deep into the components of immersion, it can be seen that control was affected the most. This is expected because people can feel more control if people play in a character that they've already familiar with. Cognitive and emotional involvement score increased in autonomy support condition too. This can be explained that players would involve in games more cognitively and emotionally when they play the game in the way they are willing, in this case is choosing the character they want. Although score of real-world association does not show significant difference in two condition, but it is close. Therefore, there might still be small effect. Challenge score does not show significant difference, this may indicate that choosing players' desired character may not affect how they hard they feel of the game.

Nevertheless, because only one method of autonomy manipulation was used in this experiment, it cannot be said that the way of effects on the components of immersion showed like this is because of the autonomy manipulation or because of this specific manipulation (although the correlation can be found in this experiment). This manipulation may affect not only autonomy but also other factors, such as proficiency. In other words, in the process of controlling the player's selection of the character, some unexpected effects may occur. For example, the player generally chose the character that he or she was familiar with, while the assigned character might completely strange for the player. There was an extreme difference in the proficiency of the character, and this difference might also affect some components of immersion. Therefore, in order to explore more accurate in the impact of autonomy on each component of immersion, it can be suggested that in future work, more methods of autonomy manipulation should be studied.

5.2 Limitations

Several limitations still existed in this experiment. In this study, a number of obvious limitations include Participants, materials,

5.2.1 Participants

The research samples cannot represent the general population. Because the game which was chosen to do the experiment was famous in China, most of the participants were Asian. In addition, the small sample size is also a limitation.

5.2.2 Materials

PENS scale was mainly designed for traditional video games, while the game we used in this study was a role-playing mobile game not the video game. Therefore, the data collected by the PENS questionnaire might not be completely accurate. Apart from that, to enhance ecological validity, participants played the game in different environment, and they also played it on their own device. This variability may cause a small effect.

5.2.3 Experiment design

In this study, the experiment was designed as a one-way within-subjects, so each participant had to play the game in two conditions (autonomy and non-autonomy). Although the order of two conditions was randomly assigned in the procedure, participants may have a chance to aware what this experiment was about when switching the conditions and gave us answers that they thought we desired. In addition, all participants had to fill out the PENS and IEQ scale twice. It is possible that some participants felt bored and annoyed when they were asked to fill them out for the second time and then gave a biased answer.

5.3 Implications and Future work

This study found interesting correlations between autonomy in form of character and immersion, which provided a solid foundation for further research in this field. There are some interesting new questions worth exploring. What other game factors might affect autonomy? How to improve the validity of PENS scale to measure autonomy in mobile games? How to avoid the impact of other factors when controlling autonomy? Which kinds of games are more representative in studying autonomy?

At present, the research on autonomy in digital games is still in its infancy. These issues have a significant meaning to understand the relationship between autonomy and immersion more systematic and deeper. Future research priorities may be focus on how to control autonomy effectively.

6 CONCLUSION

Immersion plays an important part for the player in digital games, and autonomy stands an important need for a human in real life. From this experiment, there are two contributions can be provided. First, it provides a possible path to research and manipulate autonomy in digital games. Second, it seemed that when our real-life need (autonomy) is satisfied in digital games, we could immerse ourselves in them more. Therefore, there is a new suggestion for game designer to design a more attractive game.

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