ATTITUDE GAME
A study in the increase of bullying awareness in 9-12 years old children

Master Degree Project in Informatics
One year Level 22.5 ECTS
Spring term 2015

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Abstract

This thesis analyses how an increase in bullying awareness can be produced in children aged 9-12 years old playing an iPad serious game called *Attitude Game*. The project is conducted in collaboration with the company IUS Innovation, where two prototypes were developed by the author of the study, one with mechanics empowering not to bully and the other with mirror mechanics empowering to bully other children.

The experiment was conducted with 29 children from a sports club in Göteborg. A pre-measurement of empathy and a pre-test-post-test measurement of attitude towards bullied children were used to gather data, together with a post-interview during the experiment. Students were assigned to 3 groups, based on a random selection and previous knowledge about the game.

The result of the experiment displayed that there was no statistical difference between the change in attitude towards bullied children regarding the empathy level and the prototype tested. The post-interviews displayed that all the participants understood the serious purpose of the game.

**Keywords:** iPhone, iPad, empathy, empathy manipulation, minigames, bullying, attitude, attitude towards bullied children, serious games, Interpersonal Reactivity Index, IRI, affective game design patterns, videogame, Dumb Ways to Die, Wario Ware, 9 year, 12 year, children
Acknowledgement

I would like to express my honest and humbled gratitude to my supervisor Anna-Sofia Alklind Taylor for her support, advice and assistance for this project (and for those many hours answering my army of questions).

Thank you Anna-Sofia, Henrik Engström, Mikael Johannesson and Per Backlund for a life changing and self-growing year.

Thank you to Adrien Donin De Rosière, Athanasios Karavatos, Aurélien Faurel, Clayton Freitas, Emil Bergqvist, Iman Farhanieh, Martin Hagvall, Petter Henriksson, Peter Ajuzie, Rikard Dahlberg and Robert Homewood for a great year of learning and companionship.

Thank you Carlos González Castillo and María Dolores Díaz Lucas for bringing me to this world and giving me so much love. Os quiero mamá y papá.

Thank you Fredrik Andreasson, Erik Ambring and the rest of the amazing people at IUS Innovation. Without you this project would have never been a reality.

A final thank you to the reader that is going through these lines and whose name is not mentioned here. Thank you.
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1 Introduction

Reproduction is one of the vital parts in the life of every living being. As citizens of modern society, we trust the system to take care of our descendants and to educate them into values and knowledge in schools and universities. However, the problem of bullying can be suffered by our children while we are not protecting them. Different research has proven how bullying can be a problem among Scandinavian students in primary and secondary schools, where at least five per cent of the pupils are bullied weekly or more often (Roland, 2000; Roland and Galloway, 2002). And, at the same time, approximately five percent of the pupils bully other that frequently. A variety of approaches have been taken in order to counteract bullying, from school interventions to TV cartoons. With the possibilities of serious games, there is a new field where students can learn by their own or with the company of a teacher how to identify, react and counteract bullying, but also how to understand the problem and have a reasoned opinion about the topic. Previous research has shown that, through empathy manipulation and persuasive principles, there can be a positive change in the attitude towards specific groups. If added emotional engagement to a videogame, it would be possible to manipulate user's empathy and raise the attitude towards a specific group. This could possibly enhance the attitude towards bullied children of an individual after playing a serious game.

The aim of this study was to perform an experiment that evaluates if the use of affective game design patterns in a serious game can manipulate user’s empathy to increase the attitude towards bullied children and to see if they understand the serious purpose of the game. This study was conducted in collaboration with the company IUS Innovation in the Swedish city of Skövde. The aim of the research is to find key aspects of emotional engagement and bullying counteracting in previous multimedia programs. The current study focuses on interaction design on smartphones and tablets, drinking from previous successful game designs in the area. Based upon one hypothesis, an experiment was performed with 29 participants. Two prototypes were developed with mirrored purposes around bullying, one about counteracting bullying and the other one about bullying children. The task the participants were supposed to perform was to play all the minigames during a fixed amount of time, gathering as much points as possible.

The following chapter will present previous research in the area for this study. It will also present the motivations for this present study. In chapter 3, the problem that this study is based upon will be presented, together with the methodology used for the conducted experiment. Chapter 4 presents a pilot study that was conducted before the experiment to acknowledge any risks and other useful information that was used to prepare the experiment. Chapter 5 will present the execution of the experiment while the results and analysis will be presented in chapter 6. In chapter 7, the results of the experiment and the study will be summarized and discussed.
2 Background

The background serves as a presentation of the knowledge and theories used to define the problem statement, the design of the game and the experiment of this study.

2.1 Attitude Project

This study is part of the Attitude Project, from the Swedish word Attityd, developed by the company IUS Innovation (IUS Innovation, 2015). The aim of the project is to perform a social labor for the Swedish society in terms of informing, teaching and discouraging young people about bullying, abuse, drugs and crime (Kareby IS, 2015; Kode IF, 2015). The project consists of several different parts and is made in cooperation with the company Prové (Prové, 2015; Kode IF, 2015) forming a total of 14 different parts in the Göteborg area. These parts include lectures and training about bullying, drugs, values of work for parents and coaches of the children. This way, they will be able to teach their children about the topics described before (Kode IF, 2015). As part of the awareness-raising process, Prové planned using an iPad game that will increase the bullying awareness of the young people in a fun and entertainment mode. For that matter, they hired the services of IUS Innovation for developing a serious game for iPad, naming it “Attitude Game”.

During the progress of the research of this thesis, the author of the study developed a serious game prototype that comprises 6 different minigames, each of them showing a different scene related to the topic of bullying. The primary aim of the project is to develop an iPad game that can be played regularly in a short period of time and increase the bullying awareness of the children between 9 and 12 years old.

The research that I performed during the development showed that affective game design patterns (Dormann, Whitson and Neuvians, 2013) can be used to manipulate the empathy of the players and may be a benefit for the increase of their attitude towards a specific group (Batson et al., 1997; Ruggiero, 2014).

The following subchapters will present knowledge and theories of serious games, bullying, empathy and attitudes. The intention is to explain how a videogame may change the attitude of an individual towards a whole group.

2.2 Serious Games

Games are a key part of the development of the human brain. The reward that games are offering are activating a chemical reaction that is connected to brain structures involved in decision making and organization of behavior (Schultz, 2004). While simple analog games are naturally shown up during the growing up of a human being, any multimedia content is quickly integrated into the cognitive flow of a person (Andrews, Hull and Donahue, 2009). Part of the multimedia revolution that the 20th century brought to society were videogames, electronics games that involves human interaction with a user interface to generate visual feedback on a video device such a TV screen or computer monitor (Wikipedia, 2004).

Nowadays, videogames are a topic ubiquitous in society. Since the first titles developed until today’s wide range of options, several years and generations have passed, improving the design and scope behind them. What is more, since 1996 different authors and publications have used the term “game culture”, categorizing behaviors and trends around videogame consumers
(Shaw, 2010). There are different categories differentiating the mechanics and the design of digital games, such as adventures, first-person shooters, or casual games. The names are conventionally used in entertainment games, which means, games that are focused only on entertaining (which is the most common objective of a game).

However, what if a game has one goal in addition to entertaining? Then, the game falls into the category of Serious Games. Serious games are games that have a purpose beyond entertainment, no matter if it is an analog or digital game (Backlund, Engstrom, Johannesson and Lebram, 2010; Romero, Usart and Ott, 2014). The serious purpose of a serious game can greatly vary, ranging from an educational purpose to an exercising one, going through a purely artistic goal (Devine, 2015). This diversity in purposes leads to sub classifications and naming conventions depending on the purpose: educational games, exergames, art games, advergames, etc.

Experimenting with serious games allow researchers and institutions to understand better how multimedia content interacts with users and in which way that content can be modified to improve its serious outcome. For example, the study of Adams et al. (2012) compared two narrative 3D adventure learning games, Crystal Island and Cache 17. They worked with the Discovery, Narrative and Distraction hypothesis. The Discovery hypothesis states that learning by discovering a realistic environment leads to increased cognitive function. The Narrative hypothesis states that the narration and storytelling of a game makes the game more interesting and improves the motivation of the user to play and complete the game, which will result in better learning. Lastly, the Distraction hypothesis states that game material and activities that are not directly related to the instructional objective can distract the learner from focusing on the key instructional material in a lesson. They find that narration and storytelling is not properly proven to improve the learning outcomes of both games, when compared to an usual slideshow presentation.

In contrast, a study by Andrews, Hull and Donahue (2009), performed a classification of military instructional games, that due to the emotional engagement, were improving player’s immersion and reflection, developing a better understanding of what they are being instructed in, subsequently retaining the knowledge in a more effective way.

As mentioned before, there can also exist games with a different purpose that educating, like making physical exercise. This kind of games are known as “exergames” (Väätänen and Leikas, 2009; Yang, 2010), focusing on making different kind of exercises including strength training, balance, and flexibility activity (Yang, 2010). Exergames can take advantage on a wider variety of technologies than other serious games. For example, in the prototype created in the study of Väätänen and Leikas (2009), the authors use GPS positional tracking in their prototype to make players walk across different parts of a city.

### 2.2.1 Persuasive Games

Many different kind of serious games have been showed, following all of them the definition stated at the beginning of the text. Furthermore, Bogost (2007) talks about the term “Persuasive games” in his book *Persuasive Games: The Expressive Power of Videogames*. These games are capable of persuading the player thanks to what Bogost names “procedural rhetoric”, which is a type of rhetoric tied to the core affordances of computers: running processes and executing rule-based symbolic manipulation (Bogost, 2007).
Bogost exemplifies the use of persuasion in politics, advertising and education and how games can have an effect on people’s opinion and actions. Since he first wrote about the term persuasive games, other authors have performed studies and experiments trying to make the most of the persuasive power in the procedural rhetoric, explaining how this field hold potential for future work but lacks research in the actual state of the art (Khaled et al., 2007).

Seeing that persuading the player is a purpose beyond entertainment, persuasive games are another type of serious games, therefore I will use the term Serious Game for referring to my study.

2.3 Bullying

At the beginning of this study Scandinavian studies around bullying were researched due to the fact that the game is oriented towards Swedish children. The study of Roland and Galloway (2002) centered on Norwegian primary and secondary schools, looking for metrics to understand the social and hierarchical aspects of bullying in a classroom, as well as looking for the factors that produces negative behavior in the students. This study is of great value to the one I performed due to the fact of the similarities between Swedish society and Norwegian society, being able to extend the result from the study of Roland and Galloway (2002) to the necessities of my study.

Bullying is commonly defined as long-standing, negative behavior conducted by an individual or a group, and directed against a person who is not able to defend her/himself in the actual situation (Roland and Galloway, 2002). Moreover, at least five per cent of the pupils in primary and secondary schools in Norway are bullied weekly or more often. Also, approximately five percent of the pupils bully other that frequently (Roland, 2000; Roland and Galloway, 2002).

The study of Roland et al. started in 1983 on Norway as a social response to the suicide of 3 Norwegian students (Roland, 2000; Roland and Galloway, 2002). As the tragedy was directly associated with bullying, three national programs to counteract bullying in schools were performed. The first one was conducted in 1983, the second one in 1996 and the last one in 2000. The content of these national programs has changed gradually, from being rather intervention focused to being more preventive and comprehensive (Roland, 2000).

Despite of the classical and dominant ‘home conditions-personality-bullying’ concept of influences on bully/victim, their study demonstrate that there is a rather strong relationship between teacher’s management of the class, and the social structure of the class and bullying; even having the home conditions of the pupils included in the analysis (Roland and Galloway, 2002). The 1983 program focused mainly and exclusively on bullying, with an explanation on how teachers could discuss this particular behavior with the pupils to prevent bullying and how they could manage the problem if it came to the surface. This bullying-focused profile is very common in programmes aiming to aware about bullying, and it seems to reduce the amount of bullying among the pupils (Roland and Galloway, 2002).

It is possible to see how understanding the sociological part and educating both the victims and the aggressors is one of the key pillars of the serious game that this text is about. It is for that reason that I search for other serious/persuasive games about bullying that were previously developed to see how they tackle the educational purpose.
2.3.1 Serious Games about Bullying Previously Developed

Regarding the development of Serious Games about bullying, a wide variety of approaches were conducted by different organizations. The Corporation for Public Broadcasting, a private American entity, funded a web project called *It’s my life*, where teens of different ages can find resources in a friendly language to become aware of the problem of bullying (CastleWorks, 2005). Among these resources, there is a web game where the player is racing against a bully in a sci-fi setting. In order to win, the player must answer a three-option questionnaire about bullying at school.

The questionnaire focuses on understanding how bullying works, knowing how to identify an act of bullying on one-self and on others and how to counteract it. Whenever the player answers the right question, the child avatar progresses in the race. However, if the player answers wrong, the bully avatar goes further.

![Figure 1 It’s My Life Web Game (CastleWorks, 2005)](image)

A similar project was developed by the US Department of Health and Human Services with their web cartoon stopbullying.gov. The cartoon is divided into different webisodes introducing a new student in the school that is suffering different types of bullying. Students can reflect on the different characters that appear in the show and learn from the situations there. Also, there is an interactive quiz about the show that intends to improve retention of the learning outcome of the show (U.S. Department of Health & Human Services, 2012).

The cartoon creates a reflection of real life student personalities in the shape of different animal looking characters. The main character arrives at school and encounters different stereotyped personalities interacting with her. The post-episode questionnaire is similar to the one in *It’s My Life*, and tackles how to recognize bullying situations and how to counteract them.
More game-oriented projects were developed by the National Center for Missing and Exploited Children of America, a nonprofit US organization that developed different web games about cyber bullying, cloning mechanics of well renowned games such as Angry Birds, Plants vs. Zombies or Bejeweled (National Center for Missing & Exploited Children and Boys & Girls Clubs of America, 2001). All the games are available on the website NSTeens.org.

Finally, the game Awesome Upstander, developed by the company Health Teacher, mixes serious game development and psychological research. During its development, a psychologist was guiding the team to design a game that will teach students how to react against the different situations that they can encounter when confronting a bully (HealthTeacher, 2012). The game makes aware the player of the fact that you can stand against a bully together with a group, not counteracting violently, but having a firm and consistent standing against bullying as a group, resorting to an adult whenever the bully goes too far away.

What’s more, on the website of the project the authors published educational material for both parents and teachers, transforming the game into a tool to use at home or in a classroom, not only in the spare time of the student.
Finally, after inspecting all the projects described above, I can find some common denominators among them. Firstly, all the projects share the point of looking for help of an adult as a counteraction against bullying. Next, the projects raise awareness about not to confront the bully alone, rather grouping with other students and stand against it firmly. After that, the growing of self-confidence is another common issue that every project tackles with the different situations the characters are facing. Finally, there is constantly presence of one adult to ask for advice and experience, having something similar to the image of a confident partner.

Summarizing into five main points, it can be stated that the similarities are:

1. Tell adults about the fact that they or their friends are being bullied.
2. Don’t face the bully directly alone.
3. Group in big numbers to help each other’s in case of a problem.
5. Share their thoughts with adults

All of these points match with the research of Roland (2000), that was explaining how the bullying counteract program of 1983 was a success following guidelines similar to the ones written above. That is, being in constant communication with the teachers and adults around the classroom environment is a huge plus for a child against a bully.

2.4 Affective Game Design Patterns

A design pattern is defined as a general reusable solution to a commonly occurring problem, being an analysis of practice showing how various forces are constrained and channelled through the design structure to produce desirable outcomes. Through their uses, they become general principles that are then adapted to the specific context (Alexander, Ishikawa and Silverstein, 1977; Dormann, Whitson and Neuvians, 2013).

The definition comes from the work of Alexander, Ishikawa and Silverstein (1977) in the context of architecture. From there, it was applied to software development, user interface
design and, finally, to video games. In game design, patterns have been used as a problem-solving method and as a way of codifying design knowledge (Dormann, Whitson and Neuvians, 2013).

The study of Dormann, Whitson and Neuvians (2013) looks for design patterns related to the affective domain, which will help building serious games with a emotional content. The patterns in their study, comprises emotions, affective representation and socioemotional interactions. They finally build a taxonomy of affective game patterns to sustain socioemotional learning.

However, why focusing around the affective domain on a serious game? How can it potentially improve the serious outcome of my study? According to the studies by Andrews, Hull and Donahue (2009) and Krcmar, Farrar and McGloin (2011), creating an emotional engagement between the player and the in-game character produces a deeper immersion and reflection, resulting in a better attention and retention of the information the game is providing.

Following what was stated in the previous paragraph, the affective game design patterns Avatar Emotional Expression and Emotional Decision Making were selected due to the potential benefit that they could cause to the serious outcome of my study.

2.4.1 Avatar Emotional Expression
This affective design pattern consists in depicting avatars as afraid, remorseful, conflicted or joyous creates a character depth, allowing players to mutually constitute and reinforce their avatar's emotional state to show deeper emotions (Dormann, Whitson and Neuvians, 2013).

The ability to recognize, understand, manage and express emotions appropriately is thus a fundamental component of affective learning. The player can either choose to treat the avatar as a reflection of their own emotions or use them as a conduit for trying out other emotions, encouraging "Emotional Immersion".

To illustrate how an implementation of this pattern might work, and referencing Dormann, Whitson and Neuvians (2013, p. 6): “More interesting, is her example of an art game for the iPhone, where the player can make their character mad by shaking the phone, and alternatively calms the character by touching the iPhone gently, thus influencing the quarrel at the heart of the game.”

2.4.2 Emotional Decision Making
Basically, this affective design pattern consists in affecting player emotions through decision-making processes. This pattern teaches players that in-game decisions can be based on emotions rather than rational decision making, balancing their own welfare and moral integrity (Dormann, Whitson and Neuvians, 2013).

Making the player choose whether or not to make an action is an example of an implementation of this pattern. Depending on what the decision is, the player will receive a different outcome.

2.5 Psychometrics
Psychometrics is the field of study concerned with the theory and technique of psychological measurement, involving both the construction of the instruments required for measure
psychological traits and the development of the procedures of measurement (Borsboom, 2005; Michael and Li, 2010; Sijtsma, 2012).

When delving into psychometrics, constructs of interest must be identified. A construct can be any non-measurable characteristic of a player or a game (Lankoski and Björk, 2015). For example, a player’s preference for puzzle games is a construct, but so is a game’s effectiveness at convincing people to change their attitude towards homelessness (Batson et al., 1997; Ruggiero, 2014; Lankoski and Björk, 2015). According to the definition, constructs are non-measurable, consequently the necessity of operationalization becomes imperative. Keeping in line with how the construct is measured as accurate to a representation of the construct as possible also becomes imperative, which is why I use operational definitions to measure constructs in a precise and objective way (Lankoski and Björk, 2015).

![Figure 4 Operationalization (Lankoski and Björk, 2015, p.153)](image)

Following what is written at the beginning of the background section, the constructs I decided to use were the player empathy level and the player attitude towards bullied children. I will describe each of them further in the following subsections.

2.5.1 Empathy

Empathy is described as the process of taking another person’s perspective, commonly referred to as perspective or role taking, and/or experiencing affect that either essentially matches that of another person, or is a response to the other person’s emotion and situation, such as compassion (Batson et al., 1997; Teherani, Hauer and O'Sullivan, 2008; Day, Casey and Gerace, 2010).

Many authors agree on the multidimensional nature on empathy (Davis, 1983, 1994; Day, Casey and Gerace, 2010; Lankoski, 2011). However, they don’t clearly agree on the different dimensions. Despite of not agreeing on the dimensions names, they do agree on the number of dimensions, resulting in this agreement in a total of four dimensions (Teherani, Hauer and O'Sullivan, 2008; Day, Casey and Gerace, 2010).

In the study of Teherani, Hauer and O'Sullivan (2008) they divide empathy into emotive empathy, moral empathy, cognitive empathy and behavioral empathy (Stepien and Baernstein, 2006; Teherani, Hauer and O'Sullivan, 2008). However, in the study of Day, Casey
and Gerace (2010) they divide the empathy episode into four interconnected constructs, with each construct influencing the others. Their study is heavily based on the one by Davis (1994) where he divides the empathy episode into emotional recognition stage, perspective taking stage, emotional replication stage and response decision stage. Together with this division, comes the property of empathy of being an invariant staged process, meaning that the level of empathy that one person has can’t vary (Davis, 1980, 1983, 1994; Day, Casey and Gerace, 2010).

Despite of empathy not suffering any variations because of its psychometrical properties, gathering the player empathy level could be of interest when studying how empathy itself is being manipulated to have an effect over the attitude towards bullied children.

### 2.5.2 Attitude Towards a Group

Attitude can be defined as the way a person views something or tends to behave towards it, often in an evaluative way (Collins English Dictionary - Complete & Unabridged 10th Edition, 2015). In traditional personality and social psychology an attitude was viewed as some internal affective orientation that would explain the actions of a person. Contemporary usage generally entails several components around attitude, namely: cognitive (consciously held belief or opinion); affective (emotional tone or feeling); evaluative (positive or negative); and conative (disposition for action) (Reber, 1995).

The attitude towards a specific group can be use as the main construct of a study, because it can suffer a variation in time, compared to empathy that cannot (Davis, 1994; Day, Casey and Gerace, 2010). Both the studies of Batson et al. (1997) and Ruggiero (2014) use attitude as their main construct, with different operational definitions that they name “Attitude towards the Homeless Inventory”, “Measuring attitudes toward people with AIDS”, “Measuring attitudes towards the homeless” and “Measuring attitudes toward convicted murderers”.

### 2.5.3 Empathy and Increasing Attitude Towards a Group

Previous research has shown that affective game design patterns (Dormann, Whitson and Neuvians, 2013) can be used to manipulate the empathy of the players and may be a benefit for the increase of their attitude towards a specific group (Batson et al., 1997; Ruggiero, 2014).

According to the study of Batson et al (1997), empathy leads to a more positive attitudes towards a stigmatized group: people with AIDS, the homeless and convicted murderers; both for men and woman and regardless of whether the person for whom empathy was induced was or was not responsible for his or her plight.

### 2.6 Related Work

#### 2.6.1 Using Empathy to Improve Attitudes Toward a Group As a Whole

In a study by Batson et al. (1997), they researched if the feeling for a member of a stigmatized group improve feelings toward the group. They realized three experiments measuring the attitude towards individuals belonging to different stigmatized groups: a woman with AIDS infection, a homeless and a convicted murderer. They played faked audiotapes narrating the stories of one of these individuals, measuring how the manipulation of the participants’ empathic feelings was having an effect on the attitude towards that stigmatized group, using questionnaires specifically created for that purpose. Their study displayed that feeling
empathy for a member of a stigmatized group can improve attitudes toward the group as a whole.

2.6.2 The Effect of a Persuasive Game on Attitude Towards the Homeless

The study by Ruggiero (2014) investigates whether a persuasive game may serve as a way to increase attitude towards the homeless. In order to perform the measurement, the author used the questionnaire Attitude Towards the Homeless Inventory (ATHI) (Kingree and Daves, 1997). The subjects of the experiment played a persuasive browser game called Spent (Urban Ministries of Durham, 2011) where players are put in the shoes of an almost-homeless person. The result displayed that the mechanics of a persuasive game are responsible for an increase in the score on the attitude and that change can be measured empirically.
3 Problem

In the previous research found in the background, it is possible to see how bullying is an important topic to tackle in the Scandinavian educational system, and how understanding the problem and preparing the students to counteract in the unfortunate situation of being bullied is of vital importance (Roland, 2000; Roland and Galloway, 2002). The research seems to focus on how different multimedia material is able to manipulate empathy of an individual and affect the attitude towards different specific groups, such as homeless people, AIDS carriers and convicted murderers (Davis, 1983; Batson et al., 1997; Ruggiero, 2014). There currently seems to be an absence of studies on how multimedia material can modify the attitude towards bullied children. More specifically, there does not seem to be any studies that focus on how to modify the attitude towards bullied children using a serious game to stimulate the empathy of the players on smartphones or tablets, which this study is conducted after. Batson et al. (1997) and Ruggiero (2014) (see chapter 2.6) present that is possible to empirically measure a positive change in attitude towards a specific group manipulating subject's empathy. The study of Ruggiero (2014) did that with a persuasive game, highlighting that are the mechanics of a game the ones that are connected with the change in attitude. The research by Andrews, Hull and Donahue (2009) and Krcmar, Farrar and McGloin (2011) displayed that creating an emotional engagement between the player and the in-game characters produced a deeper immersion and reflection, improving the retention of knowledge. For creating emotional engagement with in-game elements, the study by Dormann, Whitson and Neuvians (2013) showed that using affective game design patterns might stimulate the empathy of players and create a stronger link between player and game content.

As mentioned above, the focus in the previous studies seems to be in attitude towards different groups from the one I want to study, and previous serious games developed around the topic of bullying are not addressing the issue of improving attitude towards bullied children manipulating empathy on the players. As author of this thesis, I ask myself the question: “Could it be possible to improve player’s attitude towards bullied children manipulating player’s empathy with a serious game?” In the study by Ruggiero (2014) is shown that a serious game can be used to persuade the player and improve the attitude towards a specific group. However, the mechanics of the game needs to empower in that direction so that the change in attitude is produced. The study by Batson et al. (1997) showed that also a positive change in attitude towards different stigmatized groups can happen when manipulating subjects’ empathy. The important point I want to highlight from this study is the fact that in studying three different groups, thus making its method potentially more generic and extendable to my study. This should have an advantage against using only the mechanics of the game to modify subject’s attitude towards bullied children, following at the same time the conclusions found in the study by Lankoski (2011) and Dormann, Whitson and Neuvians (2013) that showed that stimulating empathy facilitates engagement within a game.

Nevertheless, it is important to state that the study by Ruggiero (2014) made obvious the topic of the persuasive game they were using, that is, they were informing subjects that the game they were going to play was a persuasive game trying to raise awareness about homeless people. In addition, the game was constantly reminding the player about the same fact. It shouldn’t be forgotten that this study was running in collaboration with IUS Innovation (IUS Innovation, 2015), and Attitude Game was in a prototypal stage where it was vital to test the
serious purpose of the game. In other words, test if the participants of the study were understanding that the game was about bullying.

The following research questions were formulated based on the aforementioned studies and facts: Will the participants who played the Attitude Game understand that the game is about counteracting bullying? And: How does the manipulation of empathy produced by a serious game affect the change in the attitude towards bullied children?

3.1 Aim

The aim of this study is to investigate and explore how the manipulation of empathy using a serious game can affect the change of attitude towards bullied children and how well participants are understanding the serious purpose of the game.

As manipulating empathy has a direct effect on the positive change of attitude towards a specific group, it would possibly improve the user’s engagement and therefore increase the attitude towards bullied children. In addition, and as other studies did, I separated the subjects into High and Low Empathy level (Batson et al., 1997). From these statements, the following hypothesis was formulated.

Hypothesis: Participants in the higher empathy group will reveal a higher increase in attitude towards bullied children after playing the Attitude Game prototype compared to participants in the lower empathy group.

3.2 Methodology

3.2.1 Prototype and Hardware

For this study two prototypes were developed with the purpose of evaluating if subjects understand the serious purpose of the game and if empathy manipulation produces a positive change in attitude towards bullied children. The reason to have two prototypes is to be able to do a comparison between a game with Anti-Bullying mechanics and another with Pro-Bullying mechanics to discover the differences in user understanding of content and change in attitude towards bullied children.

The prototypes were identical to each other with respect to design and mechanics; there were 6 minigames on each prototype, but with mirrored mechanics and message. In other words, one version of the game encourages to counteract bullying and the other encourages to bully children. The motivation for this is to create a similar test that allows to minimize the differences between the two testing groups. To manipulate player empathy I used the affective game design patterns Avatar Emotional Expression and Avatar Decision Making (see chapter 2.4). This way, the avatars react to player interaction by changing their mood to a different one, going from “Happy” to “Ultra Sad” in a discrete form. The different status that an avatar was able to have were “Happy”, “Happy-Normal”, “Normal”, “Serious”, “Sad”, Ultra-Sad”, “Running-Away” and “Scared” (as shown in figure 5). Moreover, every mini game represents a different choice the player must take in order to complete it, following the pattern Avatar Decision Making. The player can decide to perform or not the action the minigame is requiring, earning points doing it and loosing one life for deciding not to do it. This allows, for example, that subjects playing the Pro-Bullying version could decide not to complete one of the minigames, avoiding to bully at the expense of loosing one life.
The game mechanics were similar to the games called “Wario Ware” and “Dumb ways to die”, where the player needed to complete a series of minigames, each less than 10 seconds long (Nintendo, 2003; Frost and Baird, 2013). If the player passes 4 minigames, the game gets faster and more difficult. If the player failed one minigame, they lost 1 life, having 3 of them at the beginning. Finally, all the game was score based, meaning that the faster was the game, the more points the players earned by passing minigames. The choice for the base mechanics was suggested by IUS Innovation (2015).

The hardware on where the testing was performed were the tablets iPad and iPad Air. For that reason, I decided to develop the prototype with the engine Unity 3D to make use of all the multiplatform capabilities that the engine provides. The programming of the scripts was done in C# and Git was used for version control. No additional plugins were used in the development of the prototype.

### 3.2.2 Participants
The participants for this study were Swedish children between 9 and 13 years old, volunteering from a sports club in Göteborg (Kareby IS, 2015). The required authorisation was gathered from their parents or tutors and all participants remained anonymous in this study so no sensitive private information was disseminated through this study. The subjects were all native Swedish speakers, and for the purpose of allowing a correct communication between me and them during the experiments, IUS Innovation (2015) provided me with various helpers that were translating the instructions and solving uncertainties among the subjects.

### 3.2.3 Procedure
Each test session was performed in the same sports club that the participants were belonging to. The participants were gathered into one central room and, together with their teachers, they were explained about the study, but not about the purpose of the game. The participants then were divided into two different groups, depending on the use of the prototype with Anti-Bullying mechanics or Pro-Bullying mechanics. The division was randomized letting the...
participants roll a dice, being the ones with a score above three the ones that will test the Pro-Bullying version of the game. All the participants were explained that the study was a competition, and that they needed to score the highest score possible in their group in order to receive a secret prize (a bag of candies). The teachers and helpers from IUS Innovation (2015) were assisting the subjects at all moment during the experiments. If for any reason there were subjects that already tested the game, they were distributed in a separate group where they were repeating the whole experiment but without mixing with the others. This approach allowed me to differentiate between their data easily and see how they reacted after a second exposure to the game.

Concerning the measurement of the constructs, the operationalization of both player empathy level and attitude towards bullied children was needed. With respect to player empathy level, the study by Davis (1983) defined a questionnaire to measure the empathy of an individual following the multidimensional approach of empathy that he researched (see chapter 2.5.1). This questionnaire is called the Interpersonal Reactivity Index (IRI), and it contains 28 items answered on a 5-point Likert scale ranging from “Does not describe me well” to “Describes me well”.

Although the work of Davis is well-validated among adults, it is not the case with children (Garton and Gringart, 2005). For that matter, Garton and Gringart (2005) developed in their study a new IRI-based scale for children aged between 9 to 11 years old consisting of 12 items. Compared to the 28 of the original one, is an important improvement. In addition, all of the points were rephrased into a less complex language so that the children could understand it. This was the version I used during the experiment to collect the empathy level of the subjects (see Appendix A and B).

Regarding the change in attitude, Batson et al. (1997) and Ruggiero (2014) used different pre-test and post-test questionnaires for measuring attitude score. The study by Batson et al. (1997) used three questionnaires, one for each experiment they performed, having all of them the same structure and differentiating in one or two questions. The study by Ruggiero (2014) used the questionnaire Attitude Towards the Homeless Inventory (ATHI) (Kingree and Daves, 1997), that is a previous developed questionnaire with a different structure to empirically measure the conduct. Following the results of both of the studies, I created my own questionnaire mixing elements from both structures, selecting and rephrasing the questions so that the children could understand them easily. The final document is named Attitude Towards Bullied Children, containing 14-items answered on a 5-point Likert scale ranging from “Strongly disagree” to “Strongly agree” (see Appendix F). The translation to Swedish of both the Interpersonal Reactivity Index for Children and Attitude Towards Bullied Children was performed by employees at IUS Innovation (2015).

With both construct operationalization clear, the next step in the procedure was to actually distribute the questionnaires among the subjects in both groups. After gender, age and a temporal testing ID, the first construct to measure was empathy, letting all the subjects complete the IRI for children questionnaire. Next, a random couple was selected in each group to test the prototype, because of the limited amount of iPads available. The subjects completed the questionnaire Attitude Towards Bullied Children before and after playing the prototype. Each couple had three minutes to play the prototype in each group, being 3 minutes the estimated playing time before reaching the Game Over screen.
After the couple finished playing and completed the post-test questionnaire, their in-game highest score was recorded and they were given the opportunity to pick one random candy from the prize bag. This was meant to give the subjects a motivator to wait until the end of the experiment. When all the participants in a group are finished with the software, a post-interview was held and notes were taken where participants present their own experience of the test session and what they understood from the game as a group. The interview questions were written in English and but helpers from IUS Innovation (2015) held the interviews in Swedish (See Appendix G).

**Figure 6  Final Experiment Procedure Diagram**
3.2.4 Ethical Considerations

As this study was conducted on human participants, more specifically children, ethical considerations were considered following the Game Research Methods Ethical considerations guidelines (Lankoski and Björk, 2015). By this, no participant was harmed or disgraced by any manner during this study and no personal information was gathered. In addition, and because of working with children, the guardians’ consent of the children was obtained and they were provided with details about the study so that they could make an educated decision whether their children participate or not.

Moreover, and because of having one group of subject playing a version of the game that is encouraging to bully, the experiment needed a common debriefing at the end with all the participants. The debriefing was performed by their instructor, being this figure a well-known adult that they trust and know. In addition, the instructor followed the six phases for quality debriefing (Kriz, 2010).

3.2.5 Limitations

In this study, no long term retention of information and change in attitude towards bullied children was performed due to time restrictions. Furthermore, and during the final experiment, no individual interview was possible because of the absence of time. Instead, a group interview was performed and documented.

3.2.6 Expected Results

There are two results that can be expected in this study. The first expected result in this study is that the manipulation of empathy will improve the attitude towards bullied children of the participants, resulting that a child will learn how to counteract bullying. The reason for these expected results is that the manipulation of empathy lead to a positive change in attitude towards a stigmatized group (Batson et al., 1997) and that game mechanics have an impact over attitude towards homeless people (Kingree and Daves, 1997). Having a High Empathy level helps the user to emotionally engage with the in-game avatars and increase the attention and retention of knowledge (Andrews, Hull and Donahue, 2009). Based upon this, the participants with a High Empathy level in the test session should score higher in the post-test attitude towards bullied children questionnaire.

The second expected result is that the participants will understand that the game is about counteracting bullying. The reason for this result is that the design, aesthetics and mechanics of the game will allow the participants to understand the topic without the need of an explanation. Because of this, participants who played the Anti-Bullying version of the game will show an understanding that the game is about counteracting bullying during the post-interview, compared to participants who played the Pro-Bullying version that will show an understanding that the game is about bullying children during the post-interview. And is for this reason that it would be possible to say that the games conveys a message to the player, and therefore, tells the player about its topic.
4 Pilot Study

Before conducting the experiment, a pilot study was conducted. The aim of the pilot study was to test the operational definitions researched and the procedure of the experiment at that point of the study. In this pilot study, I was testing the Interpersonal Reactivity Index for Children (Garton and Gringart, 2005) and expecting a correlation between their empathy level and the understanding of the serious purpose of the prototype at the moment of the pilot study. The first of the research questions was already formulated: Will the participants who played the Attitude Game understand that the game is about counteracting bullying? (see chapter 3). During this pilot study the aim was also to discover what were the reactions of the target audience to the first iteration of the prototype, and to discover if the estimated amount of time to play the game was enough to allow subjects enjoy the game.

![Main Menu of the Attitude Game Prototype I](image)

**Figure 7** Main Menu of the Attitude Game Prototype I

4.1 Prototype

The first iteration of the Attitude Game Prototype was a minigame collection game developed for iPad devices. The aim of the game is to counteract bullying having, at the moment of the pilot study, a total of 3 minigames showing different scenes related to the topic of bullying. Every time the player completes one of the minigames, (s)he earns a fixed amount of points. Whenever the player successfully completes 3 minigames, the speed of the game increases, the fixed amount of points to earn increases and the difficulty increase. If the player fails one minigame, (s)he loses 1 life. When all of the lifes are lost, the player reaches Game Over.

The prototype is developed with two-dimensional visuals and every minigame requires the player to interact differently. In the minigame **Avoid Exclusion** (see Figure 8), the player needs to tilt the iPad to get together all the in-game avatars, being the purpose of the scene to aware of the fact that is better to meet new children and accept them into an usual group of friends. The minigame **Heal the Buddy** (see Figure 9) requires the player to drag with one finger all the bandages to the wounds that the avatar is showing to heal its damage. Finally, in the minigame **Press Smiley** (see Figure 10) the player needs to select always the happy smiley with one finger.
4.2 Equipment

Two iPads were used for both the completion of the questionnaires and the prototype testing. The questionnaires were completed online using the Google Forms web technology. Extra equipment was used together with two iPads to be able to document and record information about the interaction of each participant. During the pilot study, each couple was recorded by a Samsung Galaxy S3 mobile phone connected in front of them to video record the reactions of the participants and their interactions with the different minigames.
4.3 Participants

A total of nine participants applied for the study, 6 male and 3 female. The participants in the pilot student were students between 9 to 13 years old from the Sports Club Kode IF (Kode IF, 2015). All of them applied voluntarily in the school, obtaining the pertinent authorization from their parents or tutors. The participants were told to test a videogame for iPad without mentioning the topic of the game. The pilot study was conducted in the installations of Kode IF in Göteborg, in a room with the constant presence of their instructors and one helper from IUS Innovation (2015). The participants were selected in couples for testing the prototype at a time due to fact that I only had available two devices. In addition, they were asked if they felt comfortable with the camera recording them and giving them the choice to shut it down or not. As a motivator, the participants were promised a secret prize (a bag of candies) for the subject that obtained the highest score during the test session.

4.4 Pilot Test Session

During the test session of the pilot study a random couple of participants were selected following a simple game such as “the first two to sit down on the floor”, “the first two to do a complete 360º turn” or “the first two to jump on their feet”. After the couple was selected, they were asked to fill an online survey on Google Forms containing questions about which is their favorite animal, because of the inability to gather personal information from the children, their age and their empathy level, using the IRI questionnaire for children (see Appendix A and B). Then, the couple was told to play the game as many times as they wanted for a maximum of 3 minutes, while recording them with the Samsung Galaxy S3 mobile phone. When the session was over, both participants in the couple received a random candy and their highest score was recorded. After, a post-interview in Swedish was conducted by the helper from IUS Innovation (see Appendix C). In the post-interview, questions were raised to collect information regarding the following topics of each couple:

- The participant’s understanding of the serious purpose of the game.
- The participant’s enjoyment.
- Feedback on what needs and should be improved in the prototype.

Finally, when the last couple was done, the winner of the competition was announced and the bag of candies was given away to the winner.
4.5 Result

4.5.1 Compilation of Data

Data on the age and empathy level of the participants was collected through the questionnaires and put into a table. From the questionnaires it was possible to collect the numerical value of the empathy level of each participant. The empathy level of the participants can be observed in Figure 12. The maximum that a subject can reach in the empathy questionnaire is 60, but the maximum level reached was 52 by the subject nicknamed Fågel Grön.
For those who responded this survey, higher level empathy was correlated with higher age, having $r=0.029$, which can be considered as a result of no relationship. Figure 13 shows in a scatter plot the absence of relationship of the correlation. This means that there was no relationship between the empathy level and the age of the subjects.

![Correlation Empathy-Age](image)

**Figure 13** Correlation Empathy-Age

### 4.5.2 Compilation of Post-Interviews

All the interviews were held in Swedish and transcribed into English by the helper from IUS Innovation (2015). The compilation of the interviews will be included in the subtitles below.

#### Understanding of the Serious purpose of the Game

All of the participants (9/9) understood that the game was about treating other children well or helping other children. They didn’t mention the word bullying, but they were talking about the classroom environment.

#### Enjoyment

All of the participants (9/9) answered that they liked and enjoyed the game, asking for more minigames.

#### Feedback of Improvement

All of the subjects (9/9) asked for more minigames, giving different ideas for new designs. 2 participants mentioned ideas that were already sketched by the designers of IUS Innovation before the pilot study. 5 subjects proposed new ideas, such as 2 children connecting their hands together by drawing a line on the iPad. On the other hand, the participants were complaining about the misunderstanding of the first mechanic in the minigame *Avoid Exclusion*, needing in most of the cases my help to understand what to do to complete the minigame.
4.5.3 Conclusion

This pilot study was not entirely correctly performed. Firstly, the selection of the couples was not appropriately randomized. As the children were divided in couples according to the result of simple games were the winners were selected by me, the randomization was making this pilot study not completely impartial. Furthermore, the numerical answers to the questionnaires showed a predomination of middle values, having the necessity to avoid them in the final experiment. Some of the subjects complained about the phrasing in the empathy questionnaire, needing an additional verbal explanation from the helper from IUS Innovation. Moreover, the statistic test selected for the pilot study was not a correct choice for measuring the relationship between the variables or answering the research questions proposed, suggesting a change to a 2-way ANOVA test for the final experiment. Finally, even though the interview showed that the participants enjoyed and understood the purpose of the game, there was not anything to contrast if that was the case. After the pilot study, it was concluded that a good option to study if the game transfers any knowledge to the players was by developing an opposite version of the game, known in this study as the Pro-Bullying version.

Even though this study was not entirely correctly performed, there was some useful information that emerged from it. First, the competition procedure helped the participants to be motivated to play the game, and the minigames tested during the pilot study pleased the subjects, showing an interest in a wider variety of minigames following the same design patterns, as shown in the post-interview.
5 Experiment

As mentioned in chapter 3.2.1, two similar prototypes were developed to provide a comparison for the understanding of the serious purpose of the game. Both prototypes share the same minigames and mechanics, but mirroring the goal making one version the opposite to the other. That is resulting in having one version of the game with the purpose of counteracting bullying and the other with the purpose of bullying children. The prototypes were developed and expanded with the feedback that was acknowledged from the test session of the pilot study (see chapter 4). Three more minigames were added to the prototype presented in the pilot study, making a total of six minigames, and another version with six minigames with opposite goals was developed.

In addition, the method suffered several changes compared to the one in the pilot testing. As mentioned in chapter 3.2.2, a new questionnaire called Attitude Towards Bullied Children was added (see Appendix F), that was completed before and after the gameplay session, with the objective of measuring a change in attitude. Moreover, the IRI for children experienced some minor changes, rephrasing part of it (see Appendix E). Following the feedback from the pilot study, the answers in both questionnaires were adjusted from 5-point Likert scale to 6-point Likert scale to avoid middle values.

5.1 Prototypes

The prototypes were a continuation of the prototype used in the pilot study, using the Unity 3D game engine (see chapter 3.2.1). The prototypes were developed with a two-dimensional environment and used different art assets. The art and animations in the prototype were developed by the author of the study, as well as the programming behind it. Despite of the fact that audio effects were recorded and edited by the author of the study, the music tracks were borrowed from different artists on the website Jamendo.com (Jamendo SA, 2005), making sure that the music was licensed with the Creative Commons Attribution license (Creative Commons, 2001). A total of six minigames were developed for each prototype, being the first three the same ones that were present in the pilot study. The three new minigames were designed to convey the knowledge from the background research (see chapter 2.3).

The first of the new incorporations among the minigames is named Hug the Buddy, requiring the player to slide both arms of the green avatar to hug another one (see Figure 14). The second minigame is called Switch the Object!, and requires the player to change the dangerous object that the bullies are offering to a non-dangerous one (see Figure 15). The last minigame added is called Escape the Bully, where the players are required to tap many times the screen of the device and find protection under the supervision of an adult (see Figure 16).
The Pro-Bullying version of the game (see Figure 17), as already mentioned in this text (see chapter 3.2.1), is containing the same minigames as the Anti-Bullying version but with mirrored mechanics and message. In the minigame `Exclude the buddy!`, the player needs to tilt the iPad excluding from the group one of the in-game avatars. The minigame `Hurt the Buddy` requires the player to drag with one finger all the bandages out of the wounds that the avatar is showing to open the injuries on the skin. In the minigame `Press the Sad Smiley` the player needs to select always the sad smiley with one finger. The minigame named `Trap the Buddy`, requires the player to slide both arms of the green avatar to trap another one. The next minigame is called `Switch the Object!`, and requires the player to change the non-dangerous object that the bullies are offering to a dangerous one. The last minigame added is called `Chase`
the Bully, where the players are required to tap many times the screen of the device to catch an avatar before it can run away.

![Figure 17 Pro-Bullying Version Minigames](image)

As mentioned previously in this text, the design of the minigames and the avatars is made following the Affective Game Design Patterns to manipulate participants empathy, looking for a positive change in the attitude towards bullied children (see chapter 3.2.1). The prototypes were installed in the iPads without any technical obstacle. However, there was one issue with the game loading time in older iPad models compared to the newer ones. This was caused because of the slower CPU clock in the older models, and also due to the absence of code refactoring in the prototypes where memory allocation and resource management were not as efficient as possible. This was mainly caused by the time restrictions to develop the prototypes.

The scoring system was made similar as the one found in the prototype in the pilot study (see chapter 4.1). However, the number of minigames required to increase the speed and difficulty of the game was increased from three to four, because of the new amount of games introduced. The life system was the same, giving the players three lifes at the beginning of the gameplay session and removing one of the lifes every time they failed on one minigame. Whenever they lost all of the three levels, the Game Over screen was shown together with the total score obtained.

### 5.2 Equipment

During the final experiment, I was granted more iPads compared to the pilot study. A total of four iPads was used to interact with the prototypes. No recording device was used this time to record the testing session, due to the time restrictions on the experiment. Moreover, the questionnaires were printed on paper to save time during the experiment because of the same time restrictions. Three helpers from IUS Innovation (2015) came with me to the experiment to give support during the testing session.
### 5.3 Participants

**Table 1** Participants

<table>
<thead>
<tr>
<th>Position in Table</th>
<th>ID</th>
<th>Age</th>
<th>Gender</th>
<th>Version Tested</th>
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<tbody>
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<td>Anti-Bullying</td>
</tr>
<tr>
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<td>Zebra Gul</td>
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<td>Male</td>
<td>Anti-Bullying</td>
</tr>
<tr>
<td>3</td>
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<td>Anti-Bullying</td>
</tr>
<tr>
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<td>Anti-Bullying</td>
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<td>Male</td>
<td>Pro-Bullying</td>
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</tbody>
</table>

A total of 29 participants volunteered for the test sessions. Among the participants who volunteered there were 19 male children and 10 female children between the ages of 9 to 12. As mentioned in chapter 3.2.2, the participants were students from the sports club Kode IF (Kode IF, 2015), having the pertinent authorization from their parents to be part of the experiment. In contrast to the pilot study, the participants were separated into three groups depending of which version of the game they were going to test and if they already tested the game during the pilot study. It occurred that all the participants from the group that already tested the game during the pilot study played the Pro-Bullying version of the game, instead of
playing half the Anti-Bullying version and the Pro-Bullying version. This was a mistake that was made as it was forgotten to change the prototypes in the last couple in the group that already played the game during the pilot study.

5.4 Experiment Test session

As already said in chapter 3.2.3, the test session begun in the installations of the sports club Kode IF (Kode IF, 2015) identifying participants that already tested the prototype and preparing a group for them. Then, the participants that were new to the experiment were randomly divided into two groups. One group would play the Anti-Bullying version and the other would play the Pro-Bullying version of the game. All the participants were told that there was a competition and to gain the prize they needed to obtain the highest score possible in the game. When the groups were formed, paper questionnaires were distributed among all the participants and the Anti-Bullying Group was sent to another room with me and one helper of IUS Innovation, together with two iPads with the prototypes. Two helpers from IUS Innovation remained in other room with the Pro-Bullying participants and the subjects that already participated in the pilot study. Next, all the participants started filling the paper questionnaires, gathering the ID (their favorite animal and a color), age, gender and empathy level (see Appendix E). Then, random couples were selected to play the prototypes in a different room. Whenever a couple entered the testing room, they were given the instruction to complete the pre-test Attitude Towards Bullied Children (see Appendix F and G) on the paper questionnaire and then play the game for a maximum of 3 minutes. After that, they were asked to complete the post-test Attitude Towards Bullied Children on the paper questionnaire and to leave the room, receiving one surprise random candy as a motivator. The participants were not told at any moment that there were two versions of the game or the topic of the game.

When all of the participants finished in a version, a group interview was organized in comparison to the couple interview during the pilot study due to the fact that I had only 2 hours to perform the whole experiment. During the post-interview (see Appendix H) the same questions as in the pilot study were raised to gather the following information from the group:

- The group’s understanding of the serious purpose of the game.
- The groups’ enjoyment.
- Feedback on what needs and should be improved in the prototype.

After all the group interviews were finished, we gather all the participants into one big room and a common debriefing about bullying was performed, following the ethical considerations explained in chapter 3.2.4. The prizes were given to the participants with the highest score in each group. There was one issue with the group that played the game in the pilot study, containing four participants. This group only played the Pro-Bullying prototype instead of testing both of them, due to a human mistake.
6 Results and Analysis

6.1 Compilation of Data

The data that was saved from the questionnaires completed by each participant was used to extract measurement such as: the participants’ empathy level, the participant’s pre-test attitude towards bullied children score and the participants’ post-test attitude towards bullied children score. The data of each participant was calculated together, summarized and put into a table (see Appendix D). As mentioned in chapter 3.2.3, the groups will be known as the “Anti-Bullying Group” and the “Pro-Bullying Group”, depending on the prototype they tested during the experiment. The empathy levels will be known as “High-empathy” and “Low-Empathy”, depending if their empathy score was lower than 3.5. To display if there were any significant differences in the results between the groups, a 2-way ANOVA test was conducted on the game groups and on the empathy groups. This is in order to study if there was any relationship between their level of empathy and the post-test attitude score, or between the version of the game and the change in attitude score. The following results of the data are presented together with bar graphs. It is important to notice that the group that was present during the pilot study was removed from the population due to the issues described in the previous chapter, together with some subjects that did not answer all the questions. That left a total population of 22 subjects, dividing the Anti-Bullying group in 6 participants with Low-Empathy and 4 with High-Empathy; and the Pro-Bullying group in 5 subjects with Low-Empathy and 7 with High-Empathy.
In the post-test attitude towards bullied children score, the mean score was 4.23 for participants with low level of empathy in the Anti-Bullying version and 5.30 for participants with a high level of empathy in the Anti-Bullying version. For the participants in the Pro-Bullying version of the game, the mean post-test attitude towards bullied children score was 4.54 for the Low Empathy segment and 4.66 for the high-empathy one. Even though the positive difference of the post-test mean score between the low and High Empathy group in the Anti-Bullying version may be of statistical significance (see Figure 18), the p-value in the 2-way ANOVA resulted in 0.25 ($p > 0.05$). This result displays that there are no significant differences in the post-test attitude towards bullied children score between the low and High Empathy groups, in both versions of the game.
The change in attitude towards bullied children score was measured with a questionnaire before and after the gameplay session. For the group that played the Anti-Bullying game, the mean score before playing the game was 4.88 points and after playing the game the mean score was 4.86 points. For the group that played the Pro-Bullying game, the mean score before the gameplay session was 4.65 points and after the gameplay session was 4.61 points. In Figure 19 we can see that after playing the game the change in the attitude is negative and the p-value in the 2-way ANOVA test resulted in 0.914 (p > 0.05). This result displays that there are no significant differences in the change in attitude towards bullied children score in both versions of the game.

### 6.1.1 Comparison Between the Groups

The data reveals that there is no statistical significance in any of the tests performed. In the 2-way ANOVA conducted between the empathy group and the game group the independent variables were the type of game (Anti-Bullying or Pro-Bullying) and the empathy group (low or High Empathy). The dependent variable was the post-test attitude towards bullied children score. The results of the 2-way ANOVA showed that there was no statistical significance (see Appendix I), meaning that there was no meaningful difference between the scores. The p-value of the test was p=0.250, being p bigger than 0.05. After that, I analyzed the main effects of the test. I first checked the p-value of the group, resulting in a value p=0.227, that is above 0.05. I then checked the p-value of the empathy group, being p=0.117 (p>0.05).
Next, I conducted another 2-way ANOVA between the change in attitude towards bullied children score and the game group, where the independent variable was the Game Group, and the dependent variables were the pre-test score and the post-test score. The data displayed no significant differences after the subjects were exposed to the gameplay session, in any of the versions of the game (see Appendix I). The p-value of the comparison between the game group and the change in attitude was $p=0.914 \ (p>0.05)$. Looking at the main effects was of not use to the study, because the p-value of the Game Exposure (change in attitude score after being a participant expose to the game) was $p=0.708 \ (p>0.05)$.

6.2 Compilation of Post-Interviews

As mentioned in chapter 5.4, the interviews in the final experiment were made to the group as a whole due to the time restrictions of the experiment. In contrast to the transcription of the interviews in the pilot study, in the final experiment I only had notes from the interviewers because of the time constraint. The compilation of all the interviews will be divided into different subtitles below.

6.2.1 Understanding of the Serious Purpose

The group that played the Anti-Bullying version of the game, described in general the game as a game similar to DumbWays to Die (Frost and Baird, 2013) but kinder. They mentioned also the word “Bullying” and that “people were doing bad stuff but you needed to switch to kind stuff”. The general opinion of the group that played in the Pro-Bullying version of the game was that the game was about counteracting bullying, but with a confusing gameplay.

6.2.2 Enjoyment

The group that played the Anti-Bullying game agreed that they enjoyed the game, but that in certain moments of gameplay they were not understanding it. After they completed a couple of minigames and comprehend the mechanics, they started to enjoy the prototypes. The group that tested the Pro-Bullying game was pleased with the game, but they were complaining about the fact that during the minigames the player needed to help the bully instead of other children.

6.2.3 Feedback of Improvement

The participants that tested the Anti-Bullying version of the game were asking for an option to change the language of the game into Swedish. In addition, they were complaining about the absence of realism in the in-game characters. They proposed new ideas for minigames, such as a game where the player would need to help a child that fell down while running, or another one where the player would need to punch a bully before the bully strikes first. The participants that played the Pro-Bullying game where agreeing that switching the goal of the minigames from helping the bully to help the bullied children would improve the version they played. Soon after, they were giving ideas on how to design the minigames, and all the thoughts they expressed were present in the actual minigames in the Anti-Bullying version of the game.
6.3 Interpretation of Results

Interpreting the data from the statistical there is no statistical significance in any of the interaction or main effects in the tests. There does not seem to be any results that display that by manipulating player’s empathy a positive change in the attitude towards bullied children will be produced. This implies that using affective game design patterns in a serious game will not make the user raise awareness towards bullied children. It does not seem that the scores on the empathy or attitude towards bullied children affect the outcome of the study.

From the post-interview, it was possible to observe that all the participants enjoyed the game and were engaged in giving away new ideas and even asking for functionalities that they were feeling that the game was needing, like the language option implementation. Is also encouraging to see that, overall, both groups understood the serious purpose of the prototypes. It was also noticeable that the participants that played the Pro-Bullying prototype were confused by the fact that they needed to bully children, suggesting that the game would improve its design if the goal would be the opposite one.

Regarding the empathy manipulation, it seems that there is a difference in how the participants on the Pro-Bullying version felt empathy towards the in-game avatars in comparison to the Anti-Bullying one. They were stating that they were not understanding why they needed to bully other children, and that they were feeling an emotional discomfort while doing the actions of a bully. It may suggest that the use of affective game design patterns makes them create a link with the in-game avatars, activating a moral response towards the actions they perform. However, there is not enough data to support this assumption and the one that is present is pointing to the opposite direction.

Unfortunately, there did not seem to be any strong evidence in the post-interview that could help to corroborate the relation between empathy manipulation and a positive change in the attitude towards bullied children.

6.3.1 Hypothesis

Hypothesis: Participants in the higher empathy group will reveal a higher increase in attitude towards bullied children after playing the Attitude Game prototype compared to participants in the lower empathy group.

The data displayed that the participants in the High Empathy group did not increase more the attitude towards bullied children than the participants in the Low Empathy group, in both of the Anti-Bullying and the Pro-Bullying version of the game. A reason for this could be that the affective design patterns where not a manipulator of empathy strong enough to produce a change in attitude, or that there was not enough time to see a change. To consider this hypothesis confirmed or rejected, it is possible that this study should have been conducted with a longer gameplay session, or in different sessions where participants would repeat the exposure to the experiment several times. The purpose for this is to discover if a serious game can manipulate empathy to produce a positive change in the attitude towards bullied children.

Despite the previous statement, the qualitative data gathered during the post-interview and analyzed in this text displays that the participants understood the serious purpose of the game, in both the group that played the Anti-Bullying prototype and the group that played the Pro-
Bullying prototype. This result seems to answer one of the research questions formulated in chapter 3: Will the participants who played the Attitude Game understand that the game is about counteracting bullying?
7 Conclusions

7.1 Summary of Results

In this study, an experiment was performed with a total of 22 participants. Two prototypes were developed with the difference that one was having the purpose of raising awareness on how to counteract bullying and the other was having the purpose of raising awareness on how to bully other children. The participants were in two different groups. The group testing the prototype about counteracting bullying was called the “Anti-Bullying Group” while the group who tested the prototype about bullying children was called the “Pro-Bullying Group”. The results of the study did not show that there were any statistical significant differences in the change of attitude towards bullied children because of the participants’ empathy manipulation. The empathy level of the different participants did not seem to affect the result in any way where some of the subjects were having a lower empathy level and not showing any noticeable change in attitude towards bullied children score compared to the ones having a High Empathy level. One observation from the interviews is that the group that played the Pro-Bullying game showed an emotional discomfort with the goal of their version while that discomfort was not present in the Anti-Bullying Group. This does not confirm that the emotional manipulation did happen, but could possibly be a study for future research.

The hypothesis used in this study cannot be completely confirmed or rejected. The result did display that there are no meaningful differences between the attitude towards bullied children because of the empathy manipulation or the version of the game tested. It could be possible that the participants needed a longer gameplay session in order to record any noticeable change in attitude towards bullied children. It could be possible that the game needed a different content or interaction design. It could be possible that a 2-way ANOVA was the wrong statistical test for this study.

Nevertheless, the information gathered from the post-interviewes showed that the serious purpose of the game was understood by all the participants in the study, no matter the version of the game tested.

7.2 Discussion

From the result presented, it does not seem that manipulating participants empathy with a serious game increases the attitude towards bullied children. As affective design patterns can stimulate player empathy (Dormann, Whitson and Neuvians, 2013), those who showed a higher empathy level should have been able to show a higher increase in attitude towards bullied children score than the ones that showed a lower empathy level. There are many possible reasons why this was not the case. It could be that the participants were not emotionally engaged with the in-game avatars. It is also possible that participants were not enough time playing the prototypes. It might by that a bigger number of participants was needed in order to find statistical significance. Another reason may be that the design of the minigames was not the appropriate one to manipulate player empathy. It could be also that the participants needed to repeat the gameplay session several times during a regular interval of time to show any indication of empathy manipulation. There is also the possibility that the language of the game was difficulting immersion and engagement, therefore reducing attention and retention of knowledge. This last option is partially supported by the post-
interviews, where participants were suggesting the option to implement an in-game language selection functionality.

The information gathered during the post-interviews showed that both the Anti-Bullying Group and the Pro-Bullying Group enjoyed the game and understood the serious purpose of the game. This is most probably due to the design and aesthetic of the game, although the affective game design patterns may have had an impact on the comprehending of the serious purpose. However, it might be the case that despite of understanding that the game was about countering bullying, the participants didn’t learn how to counteract bullying. This could a possible reason why there was not any change in the attitude towards bullied children, as they were not retaining the knowledge the game was trying to convey. The debriefing performed at the end of the experiment might also have an impact on the learning outcome. It might be that the questionnaires chosen to perform this study were not the appropriate ones. Despite of the popularity of IRI-based questionnaires, it might be a bad choice overall in a study like this. It could also be that the Attitude Towards Bullied Children questionnaire is not properly designed, needing statistical validation.

It is important also to highlight all the methodological problems during the final experiment. First of all, there was a remarkable time restriction where the experiment needed to be done in 2 hours. That was meaning testing two different versions of the Attitude Game prototype while gathering data from 29 children between 9 and 12 years old. By all means, working with pre-teens was also a possible factor for the results. The participants were needing constant supervision, and even having that supervision, they were playing, shouting, jumping and, basically, behaving as pre-teens. There is a very high chance that despite all the efforts to avoid any contamination between subjects that already tested the game and subjects that didn’t, the participants run to tell their friends about the game and how to get more points than others, even to the group that was playing the opposite version. In addition, I could notice that some of the participants were looking at each other’s answers while completing the paper questionnaires. Any of the methodological problems could have been decisive to the actual result of this text. It could also be that simple that affective design patterns does not stimulate player empathy to produce an increase in the attitude towards bullied children.

One interesting observation that was found in the post-interview was the emotional discomfort of the group that played the Pro-Bullying version of the game. They were complaining about the goal of the minigames, insisting that the game should have exactly the opposite purpose to the one that was having. It may also be that the participants were corrupted by their friends and were thinking that answering that was the right action to perform. Regarding corruption in the data, there was one part of the original population for the final experiment that already had a contact with the game during the pilot study. This could have caused a possible corruption in all the group, telling their friends what was the game about and how to win the competition.

Nonetheless, I think that the participants were answering honestly when they were asked about their enjoyment and understanding of the serious purpose during the post-interviews. Some of them stated that at the beginning of the gameplay session, they were not comprehending the game, but after playing some minigames they did. It could have been also good that they were comparing the Attitude Game prototype with the inspirational game Dumb Ways to Die (Frost and Baird, 2013).
7.3 Future Work

There are multiple possibilities for future work. One future study could perhaps be to rearrange this study in order to try to confirm or reject the presented hypothesis. A possible method for this could be to do an experiment that was testing the change in attitude towards bullied children over time. The study by Ruggiero (2014) found that the change over a long time in attitude towards a specific group is significant, compared to an immediate or short time change. This could possibly enhance the result and perhaps confirm or reject the hypothesis. Another study might be to allow participants to change the language to the one they feel more comfortable with in-game to discover if that has an effect on players during gameplay. Other research might be to solve some of the methodological problems encountered during the experiment of this study. That means, for example, to have a more consistent method, avoiding any trace of corruption among the participants. How would this affect the outcome of the study? Having a bigger dataset can be another research branch of this study, to see if more participants can change the result of the experiment. It would also be interesting to study the outcome of the experiment if the testing was recreated with a different set of questionnaires to measure the constructs. Or even one research to validate the ones I am using in this text (see Appendixes A, E, F and G). It might be that performing personal interviews could give answer to some of the questions formulated in this text too.

Finally, one last suggestion would be to perform the study with one group playing both versions of the game to see how the experience affects the empathy manipulation and the change in attitude towards bullied children, compared to two groups playing one version each.
References


Creative Commons, 2001. *Creative Commons License.* [online] Available at: <http://creativecommons.org/licenses/>.


Nintendo, 2003. *WarioWare Franchise*.


Appendix A - Interpersonal Reactivity Index (IRI) in English

1. Emergency situations make me feel worried and upset
2. I get very worried and upset when I see someone who needs help in an emergency
3. I want to help people who get treated badly
4. I often get affected by things I see happen
5. I often feel worried about people that are not as lucky as me, and feel sorry for them
6. I am quite a soft-hearted person
7. I sometimes try to understand my friends better by pretending I am them
8. I think people can have different opinions about the same thing
9. When people around me are nervous or worried, I get a bit scared and worried too
10. When I am angry or upset at someone, I usually try to imagine what he or she is thinking or feeling
11. Sometimes I feel helpless when people around me are upset
12. When I am arguing with my friends about what we are going to do, I think carefully about what they are saying before I decide whose idea is best
Appendix B - Pilot Study Interpersonal Reactivity Index (IRI) Translation into Swedish

1. Nödsituationer gör att jag känner mig oroad och upprörd
2. Jag blir väldigt oroad och upprörd när jag ser någon i nöd som behöver hjälp
3. Jag vill hjälpa människor som blir illa behandlade
4. Jag blir ofta känslosmässigt påverkad av saker som jag ser.
5. Jag oroar mig mycket för människor som inte har det lika bra som jag, och tycker synd om dem.
6. Jag är en ganska ömsint person
7. Jag försöker ibland förstå mina vänner genom att låtsas att jag är dem
8. Jag tycker att man kan ha olika åsikter om ett ämne
9. När människor i min närhet är oroade och nervösa, blir jag lite rädd och oroade jag med
10. När jag blir arg eller upprörd på någon, är det vanligt att jag försöker tänka efter vad han eller hon känner och tänker
11. Ibland känner jag mig hjälplös när människor runt omkring mig är upprörda
12. När jag och mina vänner argumenterar över vad vi ska göra, lyssnar jag noga efter vad de säger innan jag bestämmer mig för vems idé som är bäst
Appendix C - Pilot Study Post-Interview Questions

1. How the game you played was called?
2. What was the game about?
3. Did you like it?
4. If you could, would you change something?
5. Any idea for new minigames?
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<th>ID</th>
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<th>Gender</th>
<th>Version tested</th>
<th>In-Game Score</th>
<th>Empathy Level (Pre-test)</th>
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Appendix E - Experiment Interpersonal Reactivity Index (IRI) Translation into Swedish

1. Jobbiga situationer gör att jag känner mig oroad och upprörd
2. Jag blir väldigt oroad och upprörd när jag ser någon som behöver hjälp
3. Jag vill hjälpa människor som blir illa behandlade
4. Jag blir ofta känslosmässigt påverkad av saker som jag ser
5. Jag oroar mig mycket för människor som inte har det lika bra som jag, och tycker synd om dem.
6. Jag är en ganska omtänksam person
7. Jag försöker ibland förstå mina vänner genom att låtsas att jag är dem
8. Jag tycker att man kan ha olika åsikter om ett ämne
9. När människor i min närhet är oroade och nervösa, blir jag lite rädd och oroad jag med
10. När jag blir arg eller upprörd på någon, är det vanligt att jag försöker tänka efter vad han eller hon känner och tänker
11. Ibland känner jag mig hjälplös när människor runt omkring mig är upprörda
12. När jag och mina vänner argumenterar över vad vi ska göra, lyssnar jag noga efter vad de säger innan jag bestämmer mig för vems idé som är bäst
Appendix F - Experiment Pre-Test and Post-Test Attitude towards Bullied Children

1. Bullied kids don’t have the fault of their problems. (1 = strongly Disagree, 5 = Strongly agree)
2. Bullied kids can have the help of the teachers. (1 = strongly Disagree, 5 = Strongly agree)
3. Bullied kids are a big problem in the school. (1 = strongly Disagree, 5 = Strongly agree)
4. Bullied kids choose to be bullied. (1 = strongly Disagree, 5 = Strongly agree)
5. Bullied kids are weird. (1 = strongly Disagree, 5 = Strongly agree)
6. For most bullied kids, it is their own fault that they are bullied (1 = strongly disagree, 5 = strongly agree)
7. How much do you personally care about the problems of the bullied kids? (1 = not at all, 5 = very much)
8. Our class does not do enough to help bullied kids. (1 = strongly disagree, 5 = strongly agree)
9. Compared with other school problems we face today (study, education, food, sickness, homework, exams), how would you rate the importance of helping bullied kids? (1 = not at all important, 5 = extremely important)
10. Our class should do more to protect bullied kids. (1 = strongly disagree, 5 = strongly agree)
11. In general, what are your feelings toward bullied kids? (1 = extremely negative, 5 = extremely positive)
12. Most bullied kids just don’t want to have friends (1 = strongly disagree, 5 = strongly agree)
13. Most bullied friends could find friends and finish with their problems if they wanted to. (1 = strongly disagree, 5 = strongly agree)
14. Most bullied kids choose to be alone (1 = strongly disagree, 5 = strongly agree)
Appendix G - Experiment Pre-Test and Post-Test Attitude towards Bullied Children Translation into Swedish

1. Det är inte de utsatta barnens fel att de blir mobbade.
4. Mobbade barn väljer att bli mobbade.
5. Mobbade barn är konstiga.
7. Hur mycket bryr du dig om problemen som mobbade barn har?
8. Vår klass gör tillräckligt för att hjälpa mobbade barn.
9. Jämfört med andra skolproblem (plugga, skolmat, sjukdom, läxor, prov), hur viktigt är det att hjälpa mobbade barn?
10. Vår klass borde göra mer för att skydda mobbade barn.
11. I allmänhet, vad tycker du om mobbade barn?
12. De flesta mobbade barn vill inte ha vänner.
13. De flesta mobbade barn kan hitta vänner och sluta ha problem om de ville.
Appendix H - Experiment Post-Interview

a) What was the game you played called?
b) What was the game about?
c) Did you like it?
d) If you could, would you change something?
e) Any ideas for new minigames?
Appendix I - Comparison between the Groups

EMPATHY GROUP * GAME GROUP

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<th>Between-Subjects Factors</th>
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**Dependent Variable:** AttitudePostTest(1-6)

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## Tests of Between-Subjects Effects

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a. R Squared = .206 (Adjusted R Squared = .074)
b. Computed using alpha = .05

### 4. Group * Empathy group

Dependent Variable: AttitudePostTest(1-6)

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CHANGE IN ATTITUDE TOWARDS BULLIED CHILDREN * GAME GROUP

Within-Subjects Factors

Measure: MEASURE_1

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Between-Subjects Factors

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### Multivariate Tests

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a. Design: Intercept + Group

Within Subjects Design: GameExposure

b. Exact statistic
c. Computed using alpha = .05

**Estimates**

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