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Representation of Gay and Bisexual Women in Video Games and Players' Attitudes: An Empirical Study

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Abstract: The aim of this empirical study was to examine how players' explicit and implicit attitudes towards content depicted in a video game influence their interaction with the game and their game experience. In order to do so, this study examined a particular case of a video game representing gay and bisexual women. The primary aim was to investigate how players' game engagement is influenced by the topic portrayed and by their attitudes towards gay and bisexual women. The secondary aim was to explore the players' implicit and explicit attitude change towards gay and bisexual women as a result of playing the game. This study used an experimental and a control condition, with two versions of one game differing only in the identity of one character - in the experimental version she is a lesbian and in the control version a heterosexual woman. The modification of the game was a part of the thesis. Participants' implicit and explicit pretest and posttest attitudes were measured, and their game engagement was measured in the posttest. Results showed lower game engagement in the experimental compared to the control group, however, no link between initial attitudes and game engagement was found. There was no significant explicit or implicit attitude change. This study brings new data to the areas of game research defining what elements affect players' experience and players' attitudes.

Keywords: HCI, video games, explicit attitudes, implicit attitudes, LGBT, empirical study, Game User Research, game engagement

Contents

Introduction

With over 3 billion players worldwide (Newzoo, 2023), it is becoming increasingly important to explore how video games influence player attitudes on the topics they portray and how player attitudes influence their gameplay. Attitudes are one of the most important topics in social psychology - the debate around them is ongoing, with new studies on the topic coming out every year. Attitudes are important, because they influence behavior, how we relate to others, or how we process information (Vogel and Wänke, 2016). Negative attitudes can then lead to discriminatory behavior, as has been shown by a multitude of studies (Carlsson and Eriksson, 2016; Ayhan et. al., 2020; Moody et. al., 2019; Baldassarre at. al., 2020; He, 2020; Esses, 2021). From the current research, it is becoming increasingly clear that video games have both positive and negative effects on player attitudes (Kolek et al., 2023) which merits further investigation into the topic, into establishing what kinds of games can influence attitudes, which attitudes can be influenced, and how. At the same time, there is relatively little research into how player attitudes influence players' game experience, and the present study aims to fill this research gap.

This thesis deals with a subset of LGBT representation in video games - the representation of gay and bisexual women. For a long time, LGBT representation was present in video games primarily through big game productions where it was often limited or one-dimensional, a trend which changed with the rise of indie games (Ruberg, 2020). Looking at AAA games, the major examples are the *Dragon Age* (2009-2014) and the *Mass Effect* (2007-2021) series from Bioware - games in which the representation is limited to single side characters and often hidden behind specific dialogue options in order to avoid backlash from the games' heterosexual fanbase, a strategy which has been criticized by gamers and game developers alike (Gaming in Color, 2015; Anthropy, 2012). In opposition to this stand small indie games like, for instance, *Butterfly Soup* from Brianna Lei (2017) - a game about gay and bisexual teenage Asian girls living in the US centered on the characters' daily experiences and struggles connected to their identities, making the game feel both more personal and more authentic.

So then, why is it important to have representation of minority groups in games and to give consideration to how that representation is executed? It has been shown that representation (or lack thereof) can negatively impact the minority group in question, influencing their self-worth and fostering feelings of alienation, as evidenced by Smith and Decker's set of interviews on representation of Queer People of Color (Smith and Decker, 2016). It has also been shown in previous research that representation of minority groups can influence prejudicial thinking in players outside the group being represented when said representation relies heavily on stereotypes (Deskins, 2013); Saleem and Anderson (2013) explored how stereotypical portrayals of Arabs influence player attitudes; Shliakhovchuk and García (2020) reviewed multiple studies on the impact of video games on players, finding that impacts can be both positive and negative, depending on how the representation in the game is executed.

This brings us to the core of this thesis: attitudes and attitude change, and how they relate to video game play. There are a multitude of studies on how player attitudes relate to video games; most of the focus is on video games as means of attitude change, as highlighted by Kolek et al.'s recent meta-analysis (2023). For instance, Pech and Caspar (2022) propose video games as tools to reduce prejudice; Mulak (2021) sees video games as something which provides safe contact between in-group and out-group members, and this contact can lead to attitude change. A lot of research has also been done on how persuasive game mechanics like perspective-taking (where the player is put into another person's shoes - Kolek et al., 2023; Ruggiero, 2015; Alhabash and Wise, 2012) or stereotypization can lead to attitude change (Kolek et al., 2023; Saleem and Anderson, 2013).

In this study, I examined how player's attitudes' towards gay and bisexual women inform their interaction with a game where this group is represented. There is a lot of empirical research into how players' attitudes towards marginalized groups interact with their gameplay, for instance, Mulak (2021) explored the link between player contact with minority groups in video games and attitude change; Pech and Caspar (2022) researched how interactions with a fictional minority in a video game can change real life attitudes towards minorities; or Parrott et. al. (2017) who analyzed a video game with Mexican immigrants in the US and how it influences players' attitudes towards the group. There are, however, not many studies about LGBT people specifically; for instance, Parshakov et al. (2022) examined how making a character gay in a popular video game influences the players' behavior in the game; or a paper by Veale (2017) where the author argues that the game *Gone Home* (Fullbright, Blitworks, 2013) could be used to educate players by using nostalgia to make them empathize with a gay teenage girl. However, the study only presents this as a theory and does not support its arguments with empirical research, which was done in this study. Specifically, this study examined how players interact with a game containing a narrative with a lesbian character.

The primary aim of this thesis was to investigate the influence of a game with a lesbian character on the game engagement of players and whether that influence was related to their attitudes towards gay and bisexual women. If players' game engagement is influenced by their attitudes towards a depicted topic it would tell developers important information on how their audience will react to the game (useful, for instance, for community management after the game is released). This information would also be valuable for developers of games with LGBT themes, in order to determine if their games with such content can appeal to a wider audience without watering down the narrative to make it more palatable to heterosexual audiences.

The secondary aim of this thesis was to explore whether players' implicit and explicit attitudes towards gay and bisexual women change as a result of playing a game with a lesbian character. If such a game could shift players' negative attitudes in a positive direction games like the one used in this study could be used as a tool to promote positive attitudes and reduce biases. And, more broadly, if games can influence players' attitudes on a certain topic, specifically when it comes to representation of minority groups, it would mean game developers should be mindful when creating such representation and consider what effect positive or negative representation will have on the players.

For the purpose of this study, I used a game created as part of another project which I modified to contain a more prominent narrative for one of its supporting characters. The game had two versions, one in which the character was a lesbian and one in which she was a heterosexual woman. The participants were randomly divided into an experimental and control group and instructed to play the game, with the experimental group playing the version with the lesbian character and the control group playing the one where the character is heterosexual. A Likert scale questionnaire was used to measure the participants' game engagement. The Associative-propositional evaluation model (APE, Gawronski and Brannon, 2018) was used to conceptualize attitudes and attitude change. The APE model interprets attitude formation through two complementary processes - associative, which are mental associations activated as reaction to stimuli (the so-called gut response) and are measured through implicit measures, and propositional, which refer to the validation of information acquired through associative processes and are measured using explicit measures (Gawronski and Brannon, 2018). In other words, implicit measures are thought to capture affective reactions to stimuli and propositional processes can then be used to either accept this reaction or to reject it, depending on the individual's beliefs or on whether they are motivated to control their response (Gawronski and Brannon, 2018). This model was chosen because it has the potential to interpret attitudes and attitude change connected to socially sensitive topics, and to reveal hidden biases. It is also widely used and has good support in empirical research (Hütter, 2022). As the implicit measure the SC-IAT method was used and as the explicit measure I used a Likert scale questionnaire.

In Chapter 1 I described the theoretical background for this thesis. In Chapter 2 I described the objectives of this study and presented my hypotheses. In Chapter 3 I described the intervention and the methodology used to test the hypotheses. In Chapter 4, I explained how I modified the video game to fit the purposes of this study. In Chapter 5 I presented the results from the intervention, and in Chapter 6 I discussed these results.

1. Theoretical Background

This thesis explored the relationship between people's attitudes and how people with certain attitudes interact with video games with the depiction of topics pertaining to those attitudes. It also explored whether people's attitudes can be changed by playing video games. In this section, I outlined the context within which my research operates.

1.1 What are attitudes?

"An attitude is an evaluation of an object of thought" (Vogel and Wänke, 2016). The evaluation has a valence - i.e. it can be either positive or negative (Hütter, 2022). An attitude object is anything that a person holds in mind around which an attitude is formed (Vogel and Wänke, 2016). We hold attitudes to categorize information acquired from the environment, to conserve energy and to ease our decision-making process; attitudes also serve more symbolic functions like forming a person's value system and defining how people relate to each other on various topics (Vogel and Wänke, 2016).

Attitudes are important, because they influence a variety of different things - our behavior, how we process information, even how we relate to others - in a broader sense, attitudes contribute to the public opinion and make up our values as a society (Vogel and Wänke, 2016). Attitudes are also predictors of behavior (Hütter, 2022), although there have been numerous discussions in recent years about the extent to which attitudes and behavior are linked (Gawronski et al., 2022). Negative attitudes can then lead to discrimination, a phenomenon which has been documented extensively, across a variety of different sectors and for a variety of different attitudes. For instance, attitudes as predictor of ethnic discrimination (Carlsson and Eriksson, 2016), discrimination against sexual and gender minorities in the health care sector (Ayhan et. al., 2020), racial and social class discrimination among riders using ride sharing services (Moody et. al., 2019), discrimination connected with the Covid pandemic (Baldassarre at. al., 2020; He, 2020), attitudes towards immigrants and the discrimination connected to them (Esses, 2021), and many more.

1.1.1 Associative-Propositional Attitude Model

In order to measure attitudes, I used the Associative-Propositional Evaluation model (APE - Gawronski and Bodenhausen, 2011; Gawronski and Brannon, 2018; Gawronski et al., 2022), because it has the potential to conceptualize attitudes on socially sensitive topics and reveal hidden biases. It is also widely used and has good support in empirical research (Hütter, 2022). The APE model explains attitudes in relation to two complementary mental processes - associative and propositional. Associative processes refer to activation of mental associations as reaction to input stimuli, in other words, what we understand as the so-called gut response (Gawronski and Brannon, 2018). Propositional processes are then mental processes guided by propositional logic, which are concerned with validation of the information received from associative processes (Gawronski and Brannon, 2018). Associative processes are formed independent of whether the individual believes in the provided information, while propositional processes are concerned with the truth value of the information, i.e. whether the individual

considers the information to be valid (Hütter, 2022). Both processes then lead the individual to encoding information into an associative network which represents the individual's attitudes as a set of interconnected links (Hütter, 2022). Information is retrieved from this network by associative processes, and propositional processes then operate on this retrieved information (Hütter, 2022). Propositional processes are assumed to be able to modify the links of this network and therefore alter what information will be retrieved from the network in the future (Hütter, 2022). See Figure 1.1 for an illustration of the APE model.

Associative processes are measured using implicit measures which rely on procedures derived from cognitive psychology, typically procedures where the individual has to respond to stimuli under time constraints, and propositional processes are measured using explicit measures which are based on self-report (Gawronski and Brannon, 2018). When using explicit measures we also have to keep in mind that participants may not be willing to reveal their propositional reasoning, because of perceived social undesirability of certain attitudes (for example prejudiced attitudes like racism or homophobia) or in an effort to behave in the manner they expect the person measuring their attitudes to want them to behave; this process is called editing (Gawronski and Brannon, 2018). There are ways of lessening editing of attitudes by attempting to remove the participants' motivation to edit their attitudes, for instance by making the questionnaires anonymous; implicit measurements are then a way of complementing the data received from explicit measurements and by-passing the editing process. However, it is important to note that a person's implicit attitudes are not necessarily in line with their explicit ones, i.e. their gut response to stimuli may not always be in accordance with what they consciously believe in (Gawronski et al., 2022). For example, a person may instinctively perceive a black man as more dangerous than a white man (also known as the "Black Criminal" stereotype - Taylor et al., 2019), even if they consciously believe that racism is bad.
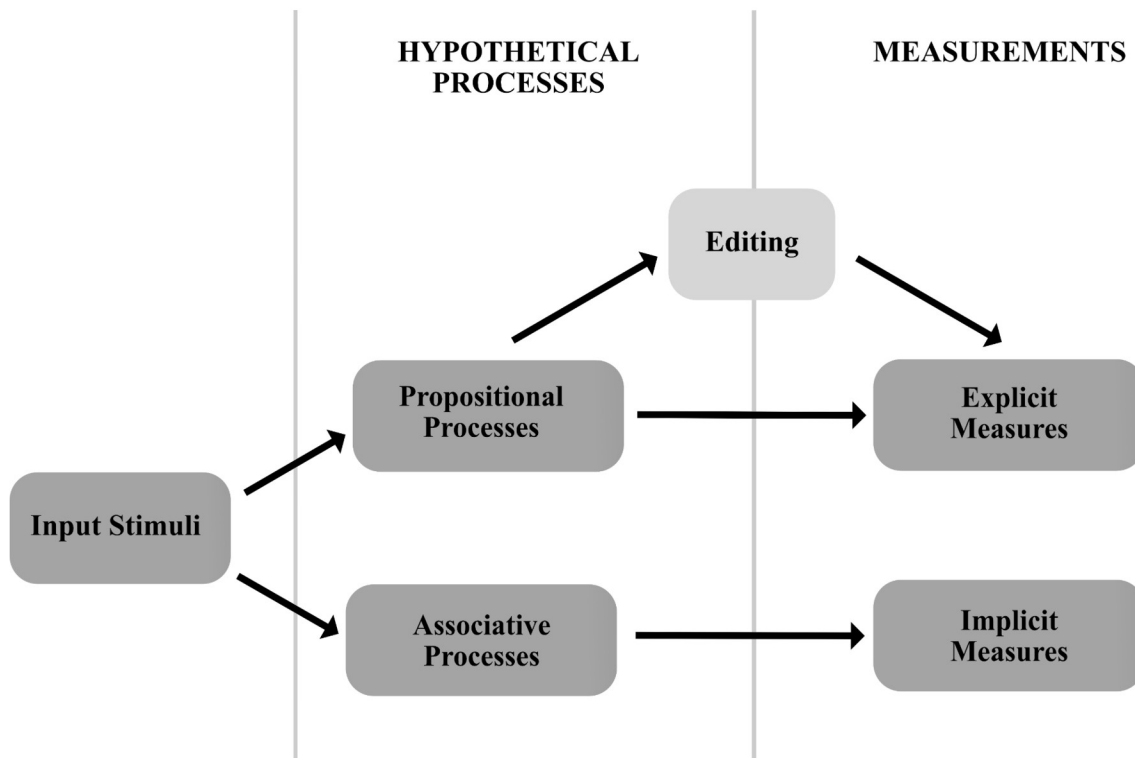
Figure 1.1: Illustration of the APE model (Gawronski and Bodenhausen, 2011).

1.1.2 APE model and Attitude change

One of the main ways of changing someone's attitudes is persuasion, i.e. influencing an attitude by means of exposing an individual to new information and by them processing this information (Vogel and Wänke, 2016). There are various key elements to persuasion - the source of the message, how the message itself is structured, the characteristics of the recipient and the medium through which the message is communicated (Vogel and Wänke, 2016). All of these elements play a role in whether the persuasion leads to a favorable or unfavorable response in the recipient (Vogel and Wänke, 2016). The recipient's cognitive response to the message, that is relating the message to their own pre-existent knowledge about the attitude object and their pre-existing attitudes, is then what leads to attitude change (Vogel and Wänke, 2016).

Persuasion is something we tend to be resistant to, because it threatens our psychological freedom (Vogel and Wänke, 2016). Our attitudes are also a part of what maintains our identity, so changing an attitude, even in the face of valid arguments against it, can be difficult. Another aspect of attitudes is our need for self-consistency - if new information threatens our current attitude it might not threaten just one but an entire structure of attitudes, thus creating a state of cognitive dissonance (Gawronski and Brannon, 2018); so being resistant

to persuasion may also be a way to avoid the inconsistency in our whole belief system which would be created by changing one of our attitudes (Vogel and Wänke, 2016).

Implicit attitude change, according to the APE model, is based on frequent co-occurrences of stimuli (Gawronski and Bodenhausen, 2018). Thus, mental links arise when stimuli related to the attitude object occur together with stimuli of either positive or negative valence (Gawronski and Bodenhausen, 2018). Explicit attitude change then occurs by the formation of links on the basis of newly acquired information (Gawronski and Bodenhausen, 2018) and propositional reasoning about the validity of that information (Hütter, 2022). This is contrasted with implicit attitude change, where the links between the stimuli are not important (Gawronski and Bodenhausen, 2018) and validation of information does not occur (Hütter, 2022). It is important to mention that although, according to the APE model, there are two kinds of mental processes, associative and propositional, the information is presumed to be stored within one mental network (Gawronski and Bodenhausen, 2018).

Regarding the topic of this thesis, it is worth mentioning that when it comes to attitudes towards minority groups, like LGBT people, the source of the persuasion becomes particularly important, as out-group members are generally perceived as less trustworthy than in-group members (Vogel and Wänke, 2016 - in-group member here refers to the group the individual belongs to - for instance a non-LGBT person, and out-group members are then the "other", people outside the individual's group - for instance LGBT people); the quantity of sources for the persuasive message also plays a role (Vogel and Wänke, 2016), which is particularly interesting to consider when talking about the quantity of minority representation in media.

1.1.3 Literature Review

There is a lot of research into how and whether attitudes towards minorities can be changed, illustrated by Paluck et al. (2021) in their meta-analysis on past research into prejudice, where they reviewed a variety of experimental studies on the topic. A meta analytic study (Braddock and Dillard, 2016) on narratives in different media found that narratives can have an effect on both implicit and explicit attitudes, with the medium of the narrative having no effect on the strength of the persuasive message (i.e. how significant is the effect of the message on beliefs, attitudes, intentions and behaviors - Braddock and Dillard, 2016). Pech and Caspar (2022) cite video games as one of the most promising methods of reducing prejudice, for a couple of reasons - video games being the fastest growing form of entertainment; they can facilitate contact between in-group and out-group members in a relatively safe environment; also, video games have been used by extremists to promote right-wing ideologies, so it would follow that this same tool could be used to promote counter-narratives. In their paper Pech and Caspar supported these assumptions with an empirical study - using neuro-cognitive measurements (as opposed to self-report which are thought to be unreliable when assessing prejudice, Paluck et al., 2021) they examined whether a video game about a fictional minority, where the player is led through implicit messaging in the game to empathize with this minority, can change player attitudes towards real world minority groups. They found that this type of video game indeed has a potential to reduce prejudice against non-fictional minorities. Mulak (2021) proposed a concept of virtual contact hypothesis, built on the intergroup contact hypothesis which states that the interaction between a member of an out-group and an in-group

can change attitudes towards the other group. Virtual contact hypothesis then extends this concept to video games, stating that interactions with in-game NPCs can be construed as intergroup contact which can therefore be linked to change in prejudiced attitudes (Mulak, 2021). This change in attitudes can go either way - contact with an NPCs representing a minority which is stereotypical can strengthen stereotypical beliefs, while quality contact with a minority NPC can lead to higher acceptance of minorities (Mulak, 2021).

1.2 Video games and attitudes

There is a lot of research into how player attitudes can be influenced by the topics portrayed in the game, as evidenced, for instance, by Kolek et al.'s meta-analysis on narrative games (2023). Games have a potential to change attitudes through messages in their narrative, or by persuasive game mechanics - something Ian Bogost calls persuasive games. Persuasive games are supposed to be structured in a way which persuades the player not through direct messaging but through in-game mechanics, that is the players themselves develop persuasive arguments through the course of the game in order to fulfill the game's objective, something Bogost calls procedural rhetoric (Bogost, 2010). Persuasive game mechanics like stereotyping (a mechanic which ubiquitously connects a group portrayed in the game with some stereotypical trait of that group - Kolek et al., 2023), meaningful feedback (when the player progresses in the game, and that progression is related to the measured attitude, they are provided with a reward or a penalization - Kolek et al., 2023) or perspective-taking (a mechanic which provides the player with multiple complex perspectives on the attitude object measured - Kolek et al., 2023) have been shown to lead to attitude change (Kolek et al., 2023). De la Hera presents a theoretical model of persuasion in games, where she separates persuasion into a few different aspects; most interestingly procedural persuasion, where the persuasive messages are inferred from the rules of the game, and narrative persuasion, where the persuasive messages are inferred from the game's narrative (de la Hera, 2019).

There is ample empirical evidence showing that video games can change attitudes. A study by Parrott et al. (2017) found a narrative game where you play as a Mexican immigrant in the US having a positive effect on attitudes towards Mexicans in the US, with enjoyment of the narrative exacerbating the effect. Another study by Grasse et. al. (2021) has found that a narrative game has a potential to positively influence students' attitudes towards responsible conduct of research. A persuasive game which puts the player in the shoes of a homeless person was found to positively increase explicit attitudes towards homelessness (Ruggiero, 2015). There are several studies which explored both explicit and implicit attitudes: Saleem and Anderson (2013) explored effects of stereotypical portrayals of Arabs as terrorists in violent and non-violent video games on attitudes towards Arabs and found a negative correlation, while the effect was even larger when the characters were portrayed in violent contexts. Alhabash and Wise (2012) found that playing a role-playing game, where you role-play as the Palestinian president using the mechanic of perspective-taking has an effect on players' explicit attitudes towards Palestinians. Another study by Kolek et al. (2021) found that a narrative game with historical themes with the same mechanic can change players' explicit attitudes towards history but has no influence on implicit attitudes.

Even further there is some evidence that playing video games can influence not just attitudes but behavior directly, which is worth mentioning because attitudes themselves are connected to and influence behavior (Vogel and Wänke, 2016). For instance children's eating habits, as evidenced by Chow et. al. (2020) in their metaanalysis on existing studies about how game-based approaches can change eating behavior.

Although there is a lot of research into how games can influence attitudes, there is almost no research on how players' attitudes influence their game experience, which is where this study comes in.

1.3 Attitudes towards LGBT people and their representation

1.3.1 LGBT Representation in video games

Representation of LGBT people in video games has come a long way in the past couple of decades, and there is a considerable amount of research on the topic. For instance a 2019 study by Shaw et al. delves into how LGBT people have been portrayed in video games through the ages and found that representation has improved over the last decades; Süngü (2020) likewise found that there was an increase in LGBT representation over the last decades, both in AAA games and in indie games starting with the indie games movement; this trend was also observed by Utsch et al. (2017) in their quantitative analysis on LGBT representation, with RPG and Adventure genres having the most LGBT representation.

How then did this increase in LGBT representation occur? There are several different reasons cited across literature, all of them, however, connect this increase with the rise of indie games (Shaw et al., 2019; Süngü, 2020; Ruberg, 2020). In her *Rise of Videogame Zinesters* (2012) Anna Anthropy called upon creators not experienced in game development to use freely available tools, like *Twine* or *GameMaker*, to tell their story. This is often cited as the impetus for a movement Bo Ruberg calls The queer games avant-garde (Ruberg, 2020) - a shift in video game production led by independent game developers with LGBT game makers at the fore-front, who develop games outside of the traditional structure and funding of the game industry (Ruberg, 2020). This was possible partly because of community power and with more prominent LGBT game makers making tutorials for others on how to use these freely available tools (Keogh, 2013). And with the rise of events like QGCON (The Queerness and Games conference, which started in 2013 and is held every year since) these smaller games could reach a wider audience.

The rise of indie games therefore goes hand-in-hand with rise in LGBT representation (Ruberg, 2020), because LGBT individuals and small teams started using video games as a medium to tell their own story, inspired by their own experience as LGBT people - games like *Mainichi* (Brice, 2012), *Dys4ia* (Anthropy, 2012) or *Realistic Kissing Simulator* (Andrews and Schmidt, 2014). Some indie games with LGBT representation even reached mainstream gamers (Ruberg, 2020), with games like *Dream Daddy* (Game Grumps, 2017) or *Undertale* (Toby Fox, 2015). This, in turn, led to a push for bigger studios to include LGBT representation in their games (Ruberg, 2020), seen for instance on games like *Overwatch* (Blizzard, 2016)

which included multiple characters with LGBT identities. The queer games avant-garde therefore had an impact on the video game industry as a whole, pushing the boundaries of what constitutes a video game and destabilizing the notion of mainstream gaming (Ruberg, 2020).

However, broadly speaking, there is a difference between how LGBT people are represented in big commercial games and their representation in smaller titles, a contrast between AAA games where players can select their sexual orientation and where different orientations are explored through romantic or sexual interactions and often hidden behind specific dialogue options, and indie games which often rather deal with the perception of the world as a LGBT person and the problems LGBT people face in their daily lives (Süngü, 2020). This can be seen, for instance, when contrasting games like the *Dragon Age* (Bioware, 2009-2014) or the *Mass Effect* (Bioware, 2007-2021) series with smaller games like *Butterfly Soup* (Brianna Lei, 2017) or *Dys4ia* (Anthropy, 2012). There is also a difference in how independent LGBT developers approach their games - going beyond just representation, they often see their games as inherently political; as opposed to commercial games which often aim to be apolitical and "just for fun" (Ruberg, 2020).

1.3.2 The Importance of LGBT Representation

A documentary on LGBT representation in games, Gaming in Color (2015) explores what value could LGBT representation offer to heterosexual audiences. The assumption is that a lot of straight people do not interact with a lot of (or any) LGBT people in real life, so seeing a gay person exist as a part of the game world normalizes the existence of LGBT people for such audiences. As the authors argue, it lets them see that gay people are just normal, regular people, and not something to be afraid of. The purpose of representation is then, among other things, to better represent our society, making the game world feel more real, making it feel closer to the diversity of people in real life. Adrienne Shaw (2015) also mentions the educational potential of representation, however she cautions against the simple categorization of representation as either good or bad and what can be the outcomes of that; she also proposes the potential of representation in games as presenting what lives and people and realities there can be, as who and what can be possible.

However, LGBT representation is also important for LGBT audiences themselves, and many LGBT players have been calling for more LGBT representation in games, as illustrated in the documentary mentioned above (Gaming in Color, 2015), although perhaps most famously by Anna Anthropy in her *Rise of videogame zinesters* (2012). Smith and Decker (2016) have explored the impact of Queer People of Color (QPOC) representation in games on QPOC players, and found that representation can have a positive effect in how the players view themselves and how others view them, while the absence of representation can foster feelings of alienation and damage the marginalized group's self worth. They also stress the importance of representation in games to motivate marginalized groups to pursue a career in the game industry, thus making the industry more diverse and breaking the cycle of video games being made by the same insular group of people (Anthropy, 2012).

The mainstream gamer culture is generally not thrilled with diversity in their games, which is documented for instance by Parshakov et al. (2022) who explored the representation of

LGBT characters in Overwatch and what impact it had on the players. A similar study was done of the same game by Välisalo and Ruotsalainen (2022), who examined the backlash to LGBT characters in the game in gaming forums. Overall, there is still a lot of homophobia in video games (Shaw and Friesem, 2016), as well as in the gaming community, as evidenced for instance by Gillin and Signorella (2023) in their study on online gaming environments, where they found that all players, regardless of their identity, are exposed to negative comments about sexual orientation and gender identity.

There is also some criticism on how LGBT representation in games is perceived by the gaming community, and how that perception depends on the way the representation is executed. For instance, Bo Ruberg's 2018 essay *Straight-washing "Undertale": Video games and the limits of LGBTQ representation* analyzes the straightwashing[1] of Undertale by the wider gaming community. Even though Undertale is widely beloved for its nostalgic feel, challenging gameplay and novel game mechanics, the LGBT content in the game is largely ignored by the broader gamer audience - both in the game's numerous reviews, and in the discussions in gaming forums (Ruberg, 2018). Ruberg argues that this effect is caused by the fact that the LGBT characters in the game are not presented as disruptive to the game world, and there is no conflict regarding their sexualities or gender identities, making their LGBT identity easier to overlook (Ruberg, 2018). This all seems to suggest that LGBT representation in video games, and more broadly in media, can go in a variety of ways, and have a variety of effects on audiences, and there is still a lot of potential into research on the topic.

1.3.3 Attitudes towards LGBT People

As mentioned at the beginning of this chapter, attitudes can lead to discrimination, and since LGBT people are a marginalized group, negative attitudes towards LGBT people can lead to discrimination against the group, as evidenced for instance by Ayhan et al. in their 2020 study on discrimination against sexual and gender minorities in the health care sector. This fact merits investigation into what kinds of attitudes people hold and how these attitudes can be changed.

The parasocial contact hypothesis (Schiappa et al., 2005) posits that people may form relationships to characters in media in a similar way that they do in real life. This contact, in turn, was theorized to influence attitudes toward the represented group in a similar way as to how contact with real in-group members of that group would (Schiappa et al., 2005). A meta-analysis of the experimental studies on parasocial contact hypothesis since then by Banas et al. (2020) has found that positive contact indeed leads to decrease in prejudice, while negative contact leads to more prejudiced attitudes. A study by Bond (2021) then found that parasocial contact with gay characters in a television show increased positive attitudes towards gay people. A surprising finding by Birchmore and Kettrey (2022) was that participants exposed to media with the "Burry Your Gays" trope (a common trope featuring gay characters dying right after they are revealed to be gay - Hulan, 2017) also lead to more positive attitudes towards sexual and

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[1] Similar to whitewhashing, i.e. overemphasizing the prominence of white people and minimizing the prominence of non-white people, most commonly in portrayal of historical characters in media, straightwashing, in this instance, refers to the removal or erasure of LGB elements from a piece of media by mainstream audiences (Ruberg, 2018).

gender minorities, suggesting that a variety of different representations of characters may lead to more positive attitudes.

A 2015 study (Bond and Compton, 2015) found that exposure to gay characters in television increases the likelihood of acceptance of gay equality by heterosexual audiences. Similarly, a GLAAD Accelerating Acceptance survey (2023a) found that exposure of non-LGBT people in the US to representation of LGBT people in media increased their acceptance of LGBT people in their daily lives, in other words, promoted positive attitudes towards LGBT people.

When it comes to video games specifically, Veale (2017) argued that the game *Gone Home* (Fullbright, Blitworks, 2013) could be used to increase players' positive attitudes towards LGBT people through nostalgia. Parshakov et al. (2022) did a case study on how a character (Soldier:76) in a popular video game (*Overwatch* - Blizzard, 2016) being announced as gay influenced the players' pick rate of the character - the pick-rate dropped significantly, although, interestingly, the effect was only short lived.

1.4 Game engagement

Definitions of game engagement vary across literature (Martey et. al, 2014), often it is defined as a combination of several different aspects of game experience. It has been conceptualized as presence, flow, arousal and many other concepts, and can be measured in a variety of ways - from self-report questionnaires or analyses of players' game play videos to mouse movements, and other various game analytics (Martey et. al, 2014).

In this thesis I defined game engagement according to the questionnaire used (*The development of the Game Engagement Questionnaire: A measure of engagement in video game-playing*, Brockmyer et al., 2009). I chose to use this definition of game engagement, because it encompasses a few different ways in which players interact with a game, because along with its definition a specific game engagement questionnaire was developed, because it was developed in relation to exploring player attitudes (although in this case it was attitudes to violent content in video games), and because the questionnaire has high validity (Cronbach's alpha in initial testing of the questionnaire on middle school students was .76, and .82 for college students). Here, game engagement is defined as consisting of four interconnected aspects - being immersed in the game-playing experience (immersion), the feeling of being present inside or being a part of the game's environment (presence), the enjoyment derived from balance between the challenges provided in the game and the player's skill (flow), and the state of being in an altered state of consciousness when playing the game where the act of playing the game is separated from conscious thought (absorption or essentially a non-pathological form of dissociation[2]) (Brockmyer et al., 2009).

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[2] Dissociation is a symptom of some mental illnesses, characterized by the individual entering an altered state of mind, where thoughts, feelings and experiences are not integrated into the normal stream of consciousness (Brockmyer et al., 2009). An example of non-pathological dissociation is the so-called highway hypnosis, where drivers "zone out" during monotonous stretches of road (Brockmyer et al., 2009).

1.4.1 Attitudes and game engagement

Again, there is not a lot of research on how attitudes influence game engagement, however, there is some research on how game engagement can facilitate attitude change. Vermeir and Kazakova (2014), for instance, found that higher flow (a concept I considered as a part of game engagement for the purposes of this thesis) leads to more positive attitudes towards brands represented in game. Another study by Grasse et al. (2021) found that engagement with the game leads to more pronounced attitude change, i.e. that game engagement positively correlates with posttest attitudes as well as with attitude change. Similarly, Sabourin and Lester (2013) found that states such as flow have a positive effect on learning, while negative affective states such as boredom or frustration tend to have a negative effect. Yet, no study was directly dealing with whether and how player attitudes influence game engagement.

2. This study

This study's objective was to find out whether the inclusion of a lesbian character in an action video game has an effect on players' game engagement, whether this effect depends on their initial attitudes towards gay and bisexual women, and whether such a game can change the players' attitudes towards gay and bisexual women. I achieved this by doing an empirical study in which I had the participants play a game created as part of another project which I modified for the purposes of this study. I collected measurements of participants' pretest and posttest implicit and explicit attitudes, and measurements of their game engagement in the posttest. I used an experimental and a control group; in the experimental group the participants played a version of the game where one of the main characters was a lesbian, in the control group the character's sexuality was changed to being heterosexual, with that being the only difference in the control condition. The length of the intervention was approximately one hour.

2.1 Hypotheses

In order to examine the main goals of this study I formulated the following hypotheses.

H1: Participants' evaluation of the game (H1a) and their measured game engagement (H1b) will be lower for the experimental group compared to the control group.

There is some evidence that inclusion of a LGBT character in a video game elicits negative reactions from the player base. For instance a study by Parshakov et. al. (2022) examined how in Overwatch, after one of the main characters (Soldier:76) was announced to be gay, his pick rate dropped significantly[3]. In another study by Välisalo and Ruotsalainen (2019) it was found that sexuality of a character has an effect on players' engagement with said character. This was further explored by a later study by Välisalo and Ruotsalainen (2022) which explored some of the backlash that the reveal of two Overwatch characters as gay (Tracer and Soldier:76) received on the forums. For these reasons I expected to measure lower game engagement and evaluations of the game in the experimental group than in the control group, because of the inclusion of a LGBT character in the game in the experimental version.

To test this hypothesis I used a two sample *t*-test to compare measured game engagement between the experimental and the control group. I used the same method for the game evaluations.

H2: Participants in the experimental group with negative pretest explicit attitudes will have lower game engagement than those with positive pretest explicit attitudes.

I expected participants with initial negative attitudes towards gay and bisexual women to have lower game engagement compared with players that started out with more positive

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[3] It is interesting to note, however, that this was an immediate reaction to the announcement and the change, though substantial at the time, did not have long-term effects.

attitudes. The reasoning was that the positive information about the attitude object provided in the experimental game would be inconsistent with the participants' attitudes towards the object if the participants had negative explicit attitudes (Gawronski and Brannon, 2018). Trying to resolve this inconsistency would then take up some of their mental capacity. And since game engagement requires players' mental capacity (Brockmyer et al., 2009), this thesis assumes that this inconsistency would cause players to not be able to fully focus their attention on the game playing experience, thus lowering their game engagement. Since this inconsistency should not be present for participants with initially positive attitudes, their game engagement should not be affected.

To test the hypothesis I took the lower and upper halves of participants, separated by the mean of their pretest explicit evaluations, from both the experimental and the control groups and used two sample *t*-tests to compare the two halves' game engagement for both groups.

H3: There will be positive change in explicit attitudes in the experimental group compared to the control group.

According to the APE model, change in explicit attitudes is likely to occur when a person acquires new information and propositionally reasons about that information (Gawronski and Brannon, 2018). The video game which the participants played presents new information in the form of a gay woman being presented in a positive light, and I therefore expected a change in the posttest explicit attitudes for the experimental group in the positive direction.
This was also supported by research on how representation of LGBT characters in media increases acceptance of LGBT rights in real life (GLAAD, 2023a).

To test this hypothesis I used a two sample *t*-test to compare the change in pretest-posttest explicit attitudes in the experimental versus the control group.

H4: There will be no change in implicit attitudes in the experimental group compared to the control group.

Even though I expected positive change in explicit attitudes after the game playing experience I did not expect any change in implicit attitudes, because, according to the APE model, change in implicit attitudes is caused by frequent co-occurrences of the measured stimuli with stimuli of positive or negative valence (Gawronski and Brannon, 2018). Even though there are such co-occurrences in the game when the lesbian character provides the player with helpful items, I do not believe the co-occurrences are frequent enough in order to cause implicit attitude change.

To test this hypothesis I used a two sample *t*-test to compare the change in pretest-posttest implicit attitudes in the experimental versus the control group.

H5: There will be a higher positive correlation between game engagement and pretest-posttest change in explicit attitudes in the experimental group compared to the control group.

Part of the game engagement measure was meant to determine to what degree the participants experienced a flow state. Being in a flow state is thought to enhance learning (Brockmyer et al., 2009), that is, acquisition of new information, which, in this case, is the positive information about the attitude object present in the game. Moreover, the state of absorption which is part of the game engagement evaluation could make participants less resistant to persuasion. Previous research has also linked game engagement with positive effect on learning (Sabourin and Lester, 2013) and with positive effect on attitude change (Grasse et. al., 2021). Therefore, I expected the participants with higher measured game engagement to experience more significant explicit attitude change in the positive direction.

To test this hypothesis I looked at the correlation between the measured game engagement and the pretest-posttest differences in explicit attitudes for the experimental group.

3. Methodology

In this section I analyzed the game used in the intervention, outlined the methods I used to test my hypotheses, and described the procedure of the intervention.

3.1 The game used in the intervention

The game used in the intervention is an action game which was developed as part of another subject - the specifics of what was modified for this intervention are described in the Implementation chapter. The game contains a simple narrative and a few key characters, the most important for this intervention being Anna, a friendly merchant who provides the player with the game's narrative through dialogues throughout the game. Another important character is the final boss, with whom Anna was romantically involved in the past. Since there was an experimental and a control group used in the intervention, the gender of the final boss changes depending on which group the participants playing the game belonged to - in the experimental game, the final boss is a woman, thus making Anna a lesbian, while in the control game the final boss is a man, thus making Anna heterosexual. This distinction was the only difference between the experimental and the control game.

3.2 The experimental game

The experimental game contains two gay female characters: one being a friendly merchant who guides the player through the game, Anna, and the other the final antagonist, Bridget, see Figure 3.1 for an illustration of the two characters. When analyzing the game I took advantage of Hera's theoretical model of persuasive messages in games (de la Hera 2019).

Figure 3.1: The avatar picture of Anna on the left and of Bridget on the right.

First, let's focus on procedural persuasion. Anna is a supportive friendly character which guides the player throughout the game, explaining the rules at the beginning and providing them with information about the game world. She also helps the player, by providing them with items which aid the player's progress in the game. Bridget is the final enemy in the game, encountered in the very last room; she sets obstacles for the player and is the one the player has to beat in order to win the game.

Narrative persuasion is especially relevant for this game as its narrative is fully scripted. The story of the game is mediated by the characters who tell it, which, for most of the game is Anna, only in the final room the perspective switches to Bridget. Each story snippet is presented in a text box with a portrait of the character speaking, further linking the story to the character who is communicating it.

The story is presented in the game in such a way that the players cannot avoid it; by beating a room the player automatically unlocks another part of the story in the form of Anna directly addressing the player, instead of when actively interacting with her character. This was done deliberately in order for the player to not be able to miss the story. It is important to note, that this arguably reduces the effectiveness of the persuasiveness of the game by taking away some of the player's freedom whilst interacting with the game's narrative. However, this should be counteracted a little by something Hera calls tactical persuasion - an "aim to provide appealing experiences … by delivering intellectual challenges" (de la Hera 2019), a tactic useful for overcoming player resistance to persuasive messages by forcing them to let their guard down; in this game this is done by having the players fight enemies which are mentioned in the narrative provided by Anna after receiving a snippet of the story.

Now, I will focus on the characterization of the two gay characters in order to determine whether their representation is more positive or negative. First, Anna, a character who is present throughout the game, save for the final room. She is friendly, nice and relatable. She is involved in a relatively realistic workplace romance with Bridget (which could be relatable, or at least familiar to the player) which she describes as she guides the player through the game. Although she might be viewed as a little naive, she should ultimately be sympathetic to the player, because she is a victim of what is essentially a toxic relationship. Her characterization avoids any negative stereotypes for gay women commonly present in media - for instance the "Burry Your Gays" trope (also known as the "Dead Lesbian Syndrome"), where gay characters are typically destined to die before the end of the story, often right after they are revealed to be gay (Hulan, 2017), or the common stereotype of gay characters being overtly sexual or predatory towards the player (Arltoft and Benkö, 2019). She also passes GLAAD's Vito Russo Test, which is similar to the Bechdel test in that it is meant to examine how LGBT characters are portrayed in media (GLAAD, 2023b) - she is not defined solely by her sexuality, is tightly tied to the plot of the game, and her characterization is not outwardly offensive (all common missteps of mainstream LGBT representation, see Shaw and Friesem, 2016).

Bridget, the former object of Anna's affection, is the final boss of the game. She is ambitious and calculating, bordering on cruel.

This analysis was meant to answer two questions - how persuasive is the message of the game and what are the contents of the message (i.e. if it is positive or negative representation). When it comes to the persuasiveness, the characters' identity is communicated clearly and some strategies are employed which should reduce player resistance to persuasion (engagement in the narrative instead of plainly stating the message, and tactical persuasion - the narrative is interspersed with challenges to overcome). As to the contents of the message, I would argue that the representation is more positive than negative, because Anna, who is a positive representation of a gay woman, has significantly more screen time and interactions with the player (15 Anna versus 5 Bridget monologues, Anna is included throughout the entire game, except for the final room, Bridget is in the final room only). There are no negative tropes, and the inclusion of two different gay female characters shows two different representations of gay women which adds to the complexity and multi-dimensionality of the narrative.

It is important to note, however, that trying to classify representation as positive or negative is difficult, it depends on context, and also on who is evaluating the representation - for instance, if it's an in-group or an out-group member (Shaw, 2015). An overly positive representation can be seen as positive for an out-group member but not for someone from the in-group, as it doesn't do justice to the complexity, and reality, of the group represented (Shaw, 2015). On the other hand, realistic representation can be seen as negative by the out-group, because it may seem stereotypical, even if, in the eyes of the in-group members, it represents the given group accurately (Shaw, 2015).

3.3 Measures

When measuring attitudes on a socially challenging topic, such as attitudes towards LGBT people, another consideration has to be taken into account, which is that if the participants hold attitudes which are considered taboo, it may compromise the validity of self-report measures, because the participants may be motivated to respond in a way that is socially desirable (this is what is called the editing stage in the APE model - Gawronski and Brannon, 2018). This editing stage is, however, not present in associative processes, because in the measurements the respondents are either unaware of their attitudes being measured or cannot influence the outcome of the measurement even if they do know about it - typically a reaction-time test, where it would assumedly be difficult for the participants to influence the outcome due to the time constraints put on their reactions. All of the explicit measurement questionnaires are also anonymous to lessen the participants' motivation for editing their responses.

3.3.1 Implicit Measure

For measuring implicit attitudes I used the Single Category Implicit Associations Test (SC-IAT), first described by Karpinski and Steinman in 2006. It is a modification of the Implicit Associations Test (IAT; Greenwald, McGhee, & Schwartz, 1998) for measuring associations to a single attitude object. This method is a reaction time test which measures the speed and accuracy with which participants respond to some kind of stimuli. In the base method, the IAT, participants are asked to categorize stimuli into two different groups as fast as possible. For instance, to measure a participant's attitudes towards Black people, we have stimuli from four different categories - White people (be it images or words), Black people, "good" words and "bad" words. There are always two groups into which the words should be assigned, for instance pairing "good" words with White people and "bad" words with Black people; the idea is that if a participant has an easier time (i.e. faster reaction times and less errors) assigning "good" words with "White people" words and "bad" words with "Black people" words, it reveals a subconscious bias towards White people compared to Black people. In the SC-IAT variant, there are only three categories of stimuli - "good" words, "bad" words, and words pertaining to the single attitude object being tested which, in my case, is gay and bisexual women. The main difference between IAT and the SC-IAT variant is that in IAT the two categories are relative, meaning two attitude objects are measured against each other (for instance Black versus White people), while SC-IAT measures associations to a single attitude object, see Figure 3.2 for an illustration of the SC-IAT test screen.
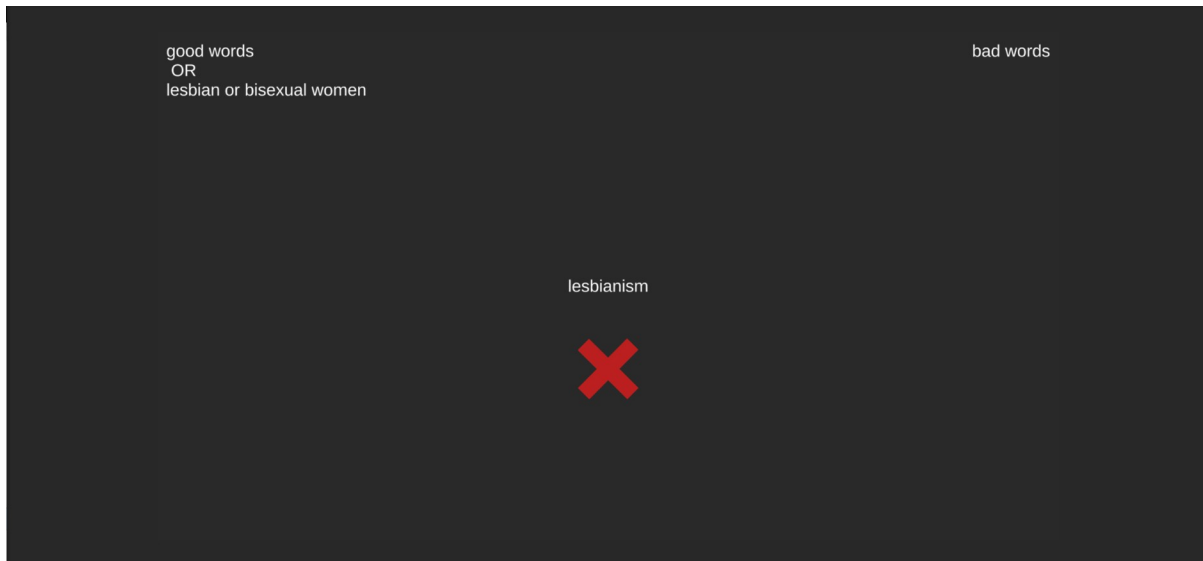
Figure 3.2: The SC-IAT screen during the test.

The specifics of my test were devised as follows: in the first part of the test, the participants were meant to assign "LGBT" words and "good" words into one group and "bad" words into the other. In the second part the groups were reversed, so the first group was "good" words and the second group was "LGBT" words and "bad" words. See Table 3.2 for the words used in my test. Each part was divided into a practice round with 24 words and a subsequent test round with 72 words. The results from the practice round were not factored into the final *D*-score (Greenwald, Nosek, & Banaji, 2003), the round was mainly there to let the participants familiarize themselves with how the test works.

Table 3.1: The words used in the SC-IAT.

LGBT	Positive	Negative
lesbian	great	awful
bisexual	amazing	disgusting
gay	wonderful	immoral
LGBT	pleasant	gross
queer	enjoyable	perverted
homosexuality	lovely	evil
lesbianism	beautiful	shameful
bisexuality	delightful	

The SC-IAT was made to be a part of the application with the game in order to make the process more streamlined for the participants, and to avoid them having to download two separate applications and switch between them.

3.3.2 Explicit measure

To measure explicit attitudes I used the Modern Homonegativity Scale, specifically the Lesbian Women Version (Morrison and Morrison, 2003). It is a scale designed to measure negative attitudes towards lesbian women. It analyzes discrimination towards lesbian women from a more modern standpoint, the specific beliefs it addresses are: whether lesbian women are making unnecessary calls to change the status quo (ex. questions 6, 10), whether discrimination towards lesbian women is still an issue in the present day (ex. questions 11, 12), and whether lesbians are causing their own oppression by unnecessarily flaunting their sexuality instead of assimilating into the mainstream culture (ex. questions 2, 3, 4). See Table 3.2 for the list of all questions in the scale.

I chose this scale because it measures specifically attitudes towards gay women and has a more modern approach towards measuring homophobic attitudes as described above - as opposed to some more traditional measures which assess traditional, moral or religious issues. More positive attitudes therefore mean higher acceptance of gay women, while more negative attitudes indicate lower acceptance. This measure is also fairly well established, with consistently high reported Cronbach's alpha coefficients.

Table 3.2: The Lesbian version of the Modern Homonegativity Scale (Morrison and Morrison, 2003). Note that in question 8 I replaced the word "Canadian" for "citizen" for the purpose of my intervention.

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1. The notion of universities providing undergraduate degrees in Gay and Lesbian Studies is ridiculous.
2. Celebrations such as "Gay Pride Day" are ridiculous because they assume that an individual's sexual orientation should constitute a source of pride.
3. Lesbian women should stop shoving their lifestyle down other people's throats.
4. Lesbian women seem to focus on the ways in which they differ from heterosexuals, and ignore the ways in which they are the same.
5. Many lesbian women use their sexual orientation so that they can obtain special rights and privileges.
6. Lesbian women have become far too confrontational in their demand for equal rights.
7. Lesbian women who are "out of the closet" should be admired for their courage.
8. In today's tough economic times, Canadians' tax dollars shouldn't be used to support lesbian organizations.
9. If lesbians want to be treated like everyone else, then they need to stop making such a fuss about their sexuality/culture.
10. Lesbian women should stop complaining about the way they are treated in society, and simply get on with their lives.
11. Lesbian women still need to protest for equal rights.
12. Lesbian women do not have all the rights they need.

The participants were given an instruction to rank the statements on a scale from "strongly disagree" to "strongly agree", a 5-point Likert scale was used for the responses. The total scores were calculated by summing up the participants' responses across all questions. The questions 7, 11 and 12 were reverse coded.

3.3.3 Game Engagement Measure

There are a multitude of different ways of measuring game engagement, including self-report questionnaires, analyses of players' gameplay videos, mouse movements, and there is evidence that these different methods measure different aspects of game engagement (Martey et al., 2014). The game engagement questionnaire I used was taken from *The development of the Game Engagement Questionnaire: A measure of engagement in video game-playing* (Brockmyer et al., 2009). This measure separates game engagement into four related categories - immersion, presence, flow and absorption. See Table 3.3 for the list of all questions.

Table 3.3: The Game Engagement Questionnaire items.

1. I lose track of time
2. Things seem to happen automatically
3. I feel different
4. I feel scared
5. The game feels real
6. If someone talks to me, I don't hear them
7. I get wound up
8. Time seems to kind of stand still or stop
9. I feel spaced out
10. I don't answer when someone talks to me
11. I can't tell that I'm getting tired
12. Playing seems automatic
13. My thoughts go fast
14. I lose track of where I am
15. I play without thinking about how to play
16. Playing makes me feel calm
17. I play longer than I meant to
18. I really get into the game
19. I feel like I just can't stop playing

The participants were given an instruction to rank the statements on a scale from "strongly disagree" to "strongly agree", a 5-point Likert scale was used for the responses. The total game engagement score was calculated by summing the participants' responses across all questions.

The game engagement questionnaire used during the interventions also contained two extra questions, one on whether they paid attention to the story in the game, and one on how they evaluate the game.

I had some difficulty choosing the best measurement for game engagement, due to the fact that most questionnaires are rather long, which did not suit the design of my study. I ended up choosing this one, because it is short while still including multiple aspects of game engagement, and it was specifically created to explore the relationship between engagement

and impact of playing video games on attitudes. The questionnaire also had a high Cronbach's alpha in the initial testing of the empirical study in which it was developed (.76 and .82).

For both questionnaires I used an online site called Formr, an iteration of which is hosted on Charles University's servers. The main reasons were that the site is GDPR friendly and that it has built-in support for R, which meant I could download the data in an R-friendly format after the interventions.

3.3.4 Data Analysis

The *D*-score (Greenwald, Nosek, & Banaji, 2003) is used for expressing the results of the IAT. A modified version of the *D*-score computation algorithm for SC-IAT was used (Karpinski and Steinman, 2006). Only the two test blocks were taken into account, let us call them block T1 and T2. The *D*-score was calculated by taking the differences between the average response times of blocks T1 and T2 and dividing them by their pooled standard deviation. Fast responses (under 350ms) as well as slow responses (over 1500ms) were left out. Responses with errors were replaced with the response time in which the error occurred plus the time needed to correct it (this was already treated during the data collection and thus was not part of the computations in R).

I mainly chose this method because it is the most widely used method of measuring implicit attitudes, and although IAT has generally proven to be more reliable (Hütter, 2022), it was not as well suited as SC-IAT to detecting possible prejudices against gay and bisexual women, for reasons specified above.

A limitation of the method I used should also be taken into account. Due to a mistake during the preparation of the SC-IAT software the number of words in each category was not equal, the concrete words used are specified in table 3.1 above - the number of words in the "bad" category is 7, compared to the 8 words in the "good" and "LGBT" category. The total number of words the participants categorized was therefore 69 for each test part, as opposed to the traditional 72.

All statistical computations were done in R. The R scripts used for the data analysis are available in Attachment 3.4. Data from the pilot study were not included in the computations.

3.4 Procedure

The intervention was conducted with an experimental group and a control group, where the control group played the exact same game except that the gay romance plot was substituted by a straight one, by changing the gender of one of the characters. The pilot study happened at the end of November of 2022, the main study over a period from December 2022 to April 2023.

3.4.1 Pilot study

At the end of November of 2022 we conducted a pilot study, which consisted of one online session with 12 participants. The purpose of the pilot study was to evaluate the

procedure of the experiment, specifically: to test the functionality of the SC-IAT, to test how well the online framework for questionnaires that we chose works, to test whether the format of the intervention is easy to follow for the participants, and to see what are the limitations of conducting the intervention in an online format.

The outcomes of the pilot study were as follows:

1. The SC-IAT was slightly modified to be more intuitive for participants and some bugs in the application, related to input processing and visual feedback, were fixed.
2. The syntax of the data file saved from SC-IAT was modified to be better readable in R.
3. As the game itself was never playtested on a larger number of people, there were also some bugs found inside the game which were found and fixed after the pilot. There were also some issues with launching the application with the game due to Windows Defender blocking it, which we decided to solve by making a new build of the game on a newer version of Windows and partly by providing instructions with screenshots on how to proceed when this happens.
4. The instructions on how to proceed during the intervention were not clear or detailed enough, so for further interventions more detailed instructions with screenshots were provided, for instance on how to download and unzip the game.
5. Another slightly unexpected outcome was that we found that the ratio of the amount of participants to the amount of actual usable data collected was rather low - this was to some extent caused by bugs in SC-IAT but also by some participants having trouble with uploading the data file or not finishing the experiment. This led to us planning more interventions for the main study, and with more participants than we originally intended, in order to collect a sufficient amount of data.
6. We also found that having two experimenters present during the intervention was useful to solve any issues which the participants had during its course.

All in all, we found that performing the interventions in an online format was doable with sufficient preparation and organization. Although, we also found that the amount of successfully collected data was significantly lower than the amount of signed up participants, which was accounted for by recruiting a larger number of participants than originally intended for the main study.

3.4.2 Participants

The participants were recruited through the *Labels* system from the Faculty of Arts at the Charles University, meaning the participants were college students who received credits for their participation in the study. The experiment was also targeted exclusively at women, for two reasons - because we expected most of the participants to be women anyway, because of the channels through which they were recruited, we decided to filter out the men from the beginning so that we would not have to account for gender during the data collection; the second reason is that the gay romance in the game was about two women, so by filtering out men we avoided the potential for mistaking men's fetishization of lesbian love for acceptance of gay people when measuring their attitudes. The participants' age was not restricted (but can be assumed to be early twenties for most participants, due to them being university students). The participants needed to have a PC with Windows 10 or higher to install the game and a stable internet connection to be able to be present for the intervention introduction and to be able to fill out the

questionnaires. The participants were expected to be at least occasional video game players. The participants were informed that the experiment would happen online, that they would be playing an action video game with narrative elements during the intervention and that they would fill out several questionnaires. The participants were sent an introductory email two days before the intervention which included an invite to a private Discord server, more detailed information about the intervention and an informed consent document attached which they were expected to read in advance so that they could agree to their participation when the intervention started.

3.4.3 Main Interventions

The interventions took place online on a private *Discord* server, which I created for the purpose of this study, in seven different sessions over a period from December 2022 to April 2023. The sessions took place at different times throughout the day, in order to mitigate the effects of random error. There were always two people that supervised each intervention, something that proved useful during the pilot, in order to deal with any potential issues. One person was tasked with dividing participants into experimental and control groups by assigning them two different roles in the *Discord* server which then allowed them to access the appropriate channel with the link to the game, see Figure 3.3 for an illustration of the interface of the *Discord* server. Meanwhile, the other person was charged with providing an introduction to the intervention over the voice channel and providing the participants with spoken instructions and the order in which they were to complete the specific parts of the intervention. The roles of the intervention supervisors were also regularly switched throughout the different interventions to avoid experimenter bias. One of the experimenters was always myself and the other person received instructions from me on how to either divide participants into teams or what to say during the introduction and what instructions to give. The participants only received spoken instructions at the beginning of the intervention and were provided with more detailed written instructions after completing each part - either inside the application or on the website used for self-report after completing each questionnaire.
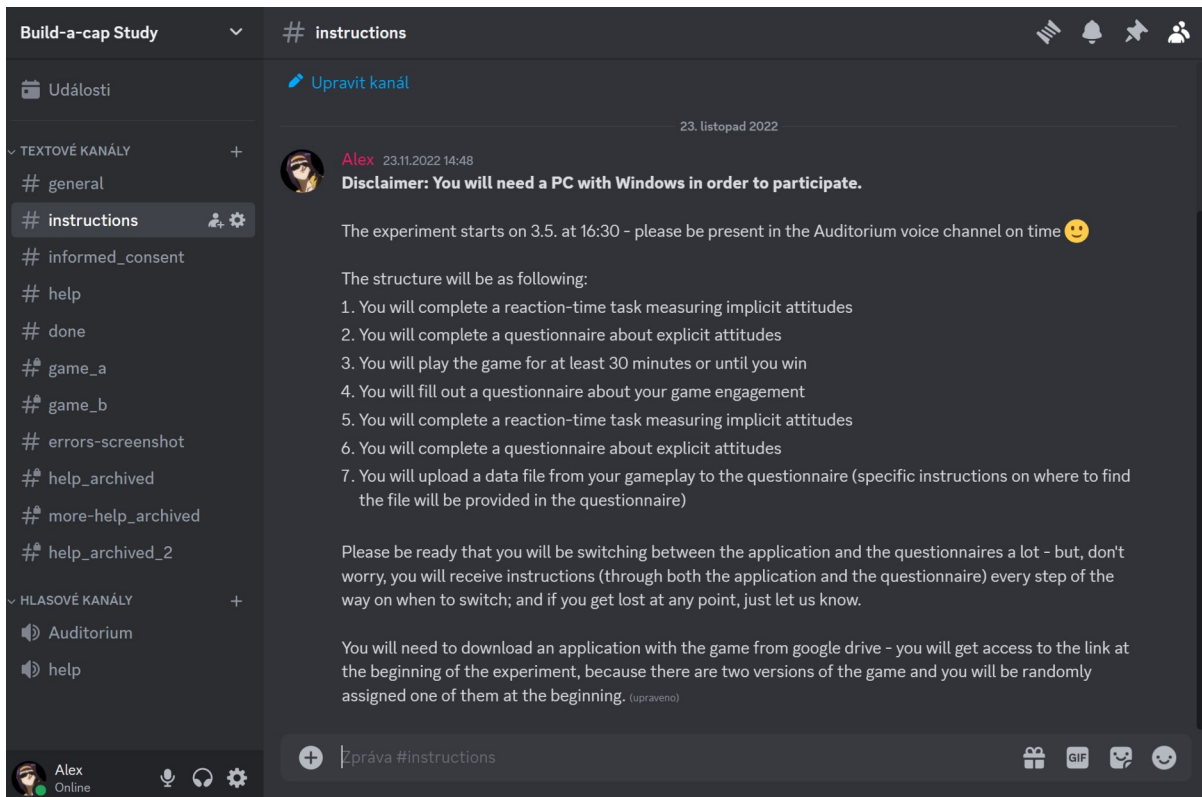
Figure 3.3: The interface of the Discord server for this study. On the right are the different channels, with the #instructions channel selected and displaying the instructions on the right, which were available to participants throughout the intervention.

3.4.4 Structure

Each intervention session was scheduled to be about one hour long. The structure of the intervention was as follows: Each session started with a reminder for the participants to read the informed consent document if they have not already done so and agree to it, by way of writing "I consent" and their full name to a specified text channel on *Discord*. This document formalized their participation in the experiment and allowed us to use the data provided by them during the intervention. Then there was a 5 minute window for them to write their consent to the document, which was also used as a way to wait for any late-comers. After each participant wrote their consent to the appropriate channel, they were assigned to either the control or the experimental group, which was done in alternating order of when they wrote their name into the channel and got access to the link to download the respective game version, each in a separate text channel on *Discord* which they only got access to after being assigned to a team. After this 5 minute window, the participants were given a brief introduction to the study, were told to download the application and start the intervention.

| PRETEST | BUILD-A-CAP | POSTTEST |
| ~ 8 minutes | ~ 30 minutes | ~ 11 minutes |

Single-Category Implicit Association Test	EXPERIMENTAL GROUP	CONTROL GROUP	Game Engagement Measurement
Explicit Attitude Measurement	Version with lesbian character playing ~ 30 minutes	Version with heterosexual character playing ~ 30 minutes	Single-Category Implicit Association Test
			Explicit Attitude Measurement

Figure 3.4: Schema of the intervention.

The intervention itself consisted of several parts. The participants were first asked to complete the SC-IAT which was intended to measure their implicit attitudes towards gay and bisexual women (about 5 minutes), then they had to complete a questionnaire to measure their explicit attitudes (about 3 minutes), and after that they were to play an action video game (which was part of the application they downloaded) for 30 minutes or until they won. After having played the game, they had to fill out a questionnaire on game engagement (about 3 minutes), then complete the SC-IAT again (about 5 minutes), complete the questionnaire for explicit attitudes again (about 3 minutes), and finally upload an automatically generated data file from their game play to the fill-out form. See Figure 3.4 for the schema of the intervention.

For the entire time of the intervention there were two experimenters available who supervised the intervention should any issues occur. The issues were then solved either through voice chat or in a help text channel.

4. Implementation

In this section I described what were the implementation steps I took to complete this thesis, namely what changes were made to the game used in the intervention, and how I implemented the SC-IAT.

4.1 Game Modification

The game used in this thesis was a modified version of the game made in the Software Project subject. It is a roguelike game (a video game genre characterized by the player permanently dying when they fail and having to start over from the beginning, typically with procedurally generated levels consisting of a string of rooms with enemies) where the player is put into the shoes of an office worker who climbs the corporate ladder by eliminating his colleagues. There are four different levels, each with a different theme. In each level there are several different rooms with different enemies, and a boss room (except for the last level which only has the boss room). In the last level the player faces the final villain of the whole game. See Figure 4.1 for the schema of the levels of the game. One of the key characters the player encounters in the game is the merchant who appears in each level, and who provides the player with helpful items throughout their journey. The base game has no dialogues whatsoever, and although there was some world-building done when designing the game, there is no story. The game was made using the Unity game engine.
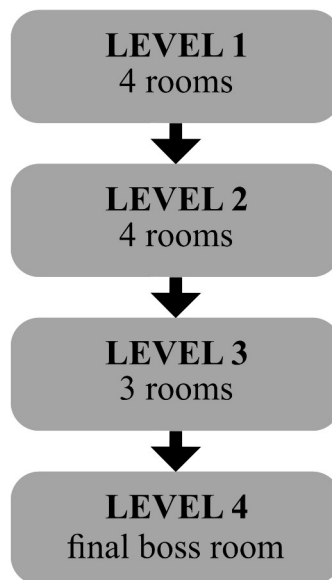
LEVEL 1
4 rooms

↓

LEVEL 2
4 rooms

↓

LEVEL 3
3 rooms

↓

LEVEL 4
final boss room

Figure 4.1: Schema of the passage through the game levels.

This base game was modified to fit the purposes of this study; the modifications will be described in this section.

The lesbian (or heterosexual in the version for the control group) character in the game is a merchant who supplies the player with weapons and various enhancements for their character throughout the game, and is also meant to be as something of a guide to the player, explaining how the game works and what they are supposed to do, and popping up at various stages of the game for a short dialogue through which her identity is revealed.

4.1.1 Dialogue System

One of the main additions to the game was the dialogue system. At the core of the system are three classes; the *Passage* class which contains the name of the passage and a list of dialogue lines, the *RoomDialogue* class which contains a list of passages, and the *LevelDialogue* class which contains a list of rooms. A list of the dialogues for each level are contained in the *LevelSO* scriptable object which is used by the *LevelManager* to get information about the current level.

With the dialogue system I also added a short tutorial in the form of a new tutorial room at the beginning of the game. In this room there is dialogue with the merchant who, step by step, explains the main game mechanics to the player, whilst adding some flavor dialogue and thus providing an introduction into the game's narrative. The player can try out the mechanics learned immediately after each explanation.

I created my own simple parser for the dialogue text files. The parser's function is to read the text file and create a *LevelDialogue* class for each level (and similarly for each room and passage), and then to save the parsed dialogue into the *LevelSO* scriptable object, which is used to read the dialogue from at runtime. I created a custom Editor Window (*FileReaderWindow*) from which I could call the parser, meaning I just had to provide the two text files for the different versions of the dialogue and press the button.
The text files had to follow the following conventions:
- each new line means a new dialogue bubble
- all text after the '%' character is ignored (in other words, is treated as a comment)
- there are three different commands, corresponding to the dialogue classes described above:
  - *Level:<number>* specifies the number of the level which applies to the following lines up until another *Level* command.
  - *Room:<number>* specifies the room number which applies to the following lines up until another *Room* command.
  - *Passage: <string>* - specifies a new dialogue passage which applies to the following lines up until another *Passage* command. When there are multiple passages per room, the last passage is expected to be named *Outro*.

Each *Passage* command must be preceded by a *Room* command, and each *Room* command must be preceded by a *Level* command. A passage is a unit of dialogue with a couple of dialogue lines which is triggered in different places throughout each room. This is implemented by placing a *GameObject* with a collider set as a trigger into the scene and adding a *DialogueTrigger* class to it, which is responsible for starting the dialogue and waiting for player input. These triggers are placed manually for the hand crafted rooms (namely the tutorial room and the final boss room), or on the exit trigger in the procedurally generated rooms, as there is always expected to be dialogue when exiting a room. The reasoning behind putting most of the dialogue passages at the end of the rooms, rather than at the beginning, was to let the player fight the enemies and explore the room first, and only then provide context for what was happening, so as not to overwhelm them. See Table 4.1 for an example of the dialogue text file.

Table 4.1: An example of a part of the experimental games' dialogue text file.

Level:1
Room:1 % Merchant/tutorial
Passage: Intro
Hey there!
You're the new recruit!
John Doe, right? I'm Anna!
Let me run you through how things work around here.

Passage: Movement
See that flower in the corner? Bridget and I used to chat there all the time…
Try getting over there using the arrow keys or the spacebar.
% -pockam, nez tam hrac dojde-

A simple dialogue user interface was also added (through the *DialogueUI* class), with a dialogue bubble and an avatar of the character speaking. Since the number of characters with dialogue lines was limited to only two, and thus the speaker only changed in the final level, the avatar switch was hardcoded, for simplicity. The dialogue is written out gradually and is unskippable - which was done here so that players had to pay attention to the story, as it was crucial to the experiment. See Figure 4.2 for the illustration of the dialogue UI.

Figure 4.2: The dialogue UI.

4.1.2 The Narrative

The dialogues themselves were written with the help of my supervisor, according to the narrative arc and the character backgrounds I came up with, and was iterated a couple of times. It is important to note, however, that the whole narrative and character backgrounds were built on the base of design documents created as part of the Software Project subject.

The story follows John Doe, the main character, whose main motivation is to climb the corporate ladder, in a world which is essentially a caricature of capitalism. John Doe starts out as a new recruit in an unnamed company and both him and the player are guided through how things work around there by the merchant character Anna. Anna, who is implied to be John Doe's colleague, provides a window into the game world, by way of commenting on the various characters and by slowly revealing her past romance with an ambitious colleague who then became her supervisor, who you later find out is the final boss, in much the same way that John Doe is progressing through the game. It is eventually revealed that the final boss is this past lover of Anna's and the story culminates in John Doe practically taking the final boss' place. This romance is also how we incorporated LGBT representation into the game, because, in the experimental version, the final boss is a woman.

4.1.3 Two versions of the game

The game was also separated into two different versions, i.e. there were two different builds of the game, one for the experimental group and one for the control group. The only difference in the two versions was the gender of the final boss, thus making the romance either gay, for the experimental group, or straight, for the control group. This was implemented by

adding a static variable which is set at the beginning of the game and is then used throughout the game to pick what version of assets to use - the changes are, specifically, the Text Asset for the dialogues, the Sprite for the UI avatar in the final level, and the Animator Controller of the final boss. The illustrations for the dialogue UI were created by my colleague from the Software Project, Veronika Petrova, while the in-world animation frames for the male version of the final boss were created by me (because in the original game from the Software Project, the final boss was a woman, the in-world animations for the final boss for the experimental version were already done). See figures 4.3 and 4.4 for illustrations of the two different bosses.

Figure 4.3: The two different avatars of the final boss for each version - Bridget on the left and Bernard on the right.

Figure 4.4: The two different in-world sprites of the final boss - Bridget on the left and Bernard on the right.

4.2 SC-IAT

The second crucial addition to the game was the framework for the reaction time task (SC-IAT, described in more detail in the Methodology section) which was used during the experiment. I ended up making the reaction time task a part of the application with the game itself, for two simple reasons - to circumvent the issue of having to find a GDPR-friendly web hosting and to make the intervention process more stream-lined for the participants.

The reaction-time task is a separate scene in Unity, which was the first thing the participants were greeted with when they ran the application. The scene consists of a Canvas object with the *SCIATController* class attached to it. The *SCIATController* is responsible for running the test and for instructing the *DataSaver* class to save the collected data to a .csv file. The *SCIATController* first shows the instructions for the test (see Figure 4.5 for an illustration), and sets up the helper texts in the upper corners. It then fills a list of pairs (input key - stimulus) according to which variation of the test should be run next, then shuffles the list of stimuli using the Fisher-Yates algorithm. Afterwards, it runs the test itself, always showing the participant one stimulus on the screen and waiting for input, see Figure 4.6 for an illustration. If the user provides the correct input, the next stimulus is shown, otherwise a red cross appears as the test continues waiting for the correct input. Both the instructions and the word groups for the SC-IAT are hardcoded in the *SCIATController*.
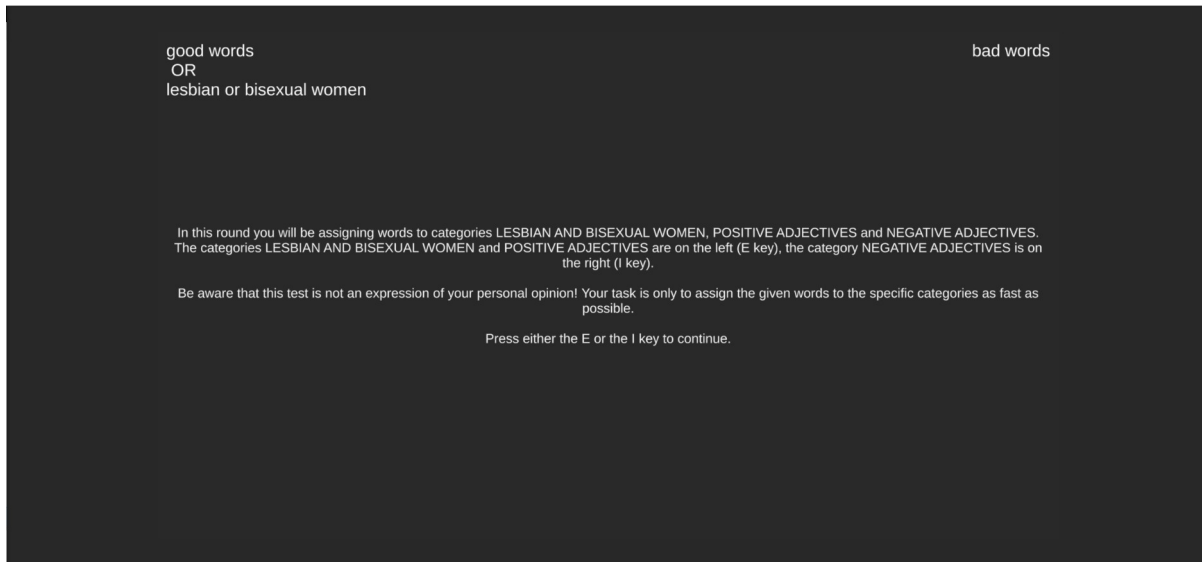
Figure 4.5: SC-IAT instruction screen.
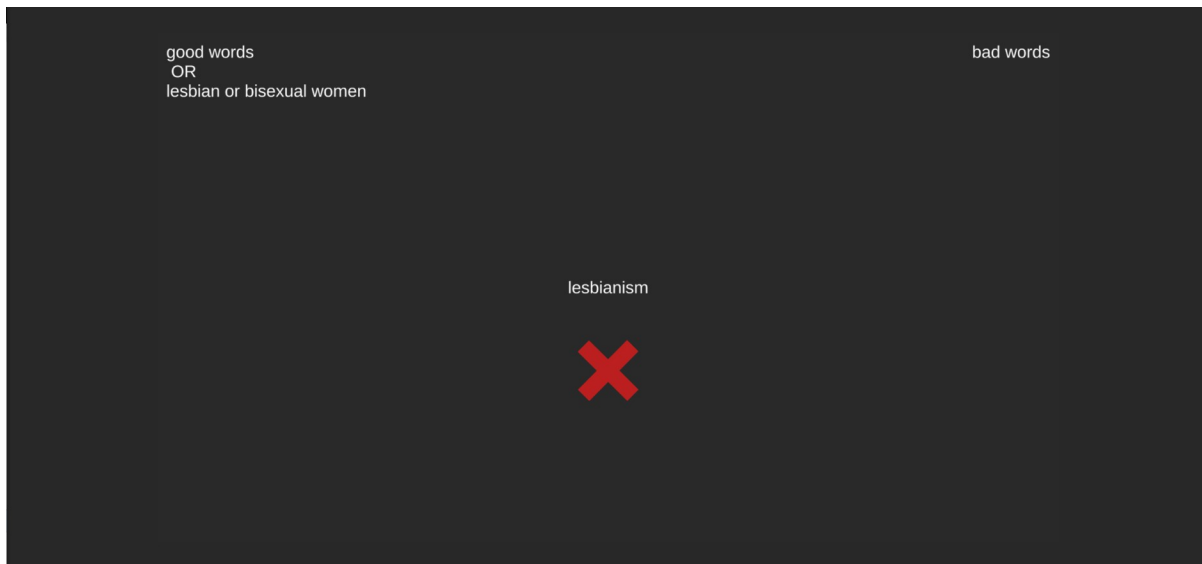
Figure 4.6: The SC-IAT screen during the test.

The *DataSaver* receives data from the reaction-time task as a *DataSet* object, which contains a list of *Entry* objects each corresponding to one stimulus. An *Entry* object thus consists of information on what word was the stimulus, the user's response time, how many (if any) errors the user made, which category the word belongs to, the *KeyCode* for the correct response, and other information useful for the later data analysis. It first writes the header for the .csv file listing out all of the variables of the *Entry* class. Then, it cycles through all of the entries and saves them as rows into a 'data.csv' file. It receives this *DataSet* object four times, a practice and a test dataset for the first variation of the test, and the same for when the words'

assignment to an input key switches. The *DataSaver* is also responsible for saving a brief analytics entry into the same file, with information on whether the user finished the game, how long the game playing session was, the FPS the user had and the date of the session.

The scene with the reaction-time task is run twice, once at the beginning of the experiment and the second time after the participants fill out the game engagement questionnaire. When run for the first time, the *SCIATController* also instructs the *DataSaver* to save what version of the game is running (i.e. whether this data belongs to the experimental or the control group). The entries for the pretest and the posttest of the SC-IAT are saved into the same file.

4.3 Experiment organization technicalities

There were some other minor additions to the game, or rather the application, which were done for the purposes of streamlining the experiment for its participants. After each of the SC-IAT sessions the players were instructed to go and fill out a questionnaire for explicit attitudes by a message on the screen, which also provided the link to the questionnaire. Similarly, after either winning the game or playing for 30 minutes, the game instructed the players to go fill out a questionnaire on game engagement.

5. Results

The total number of participants was 182 but 39 participants were excluded from the sample due to technical issues or due to participants not completing the whole intervention. This left us with 143 usable data samples in total, 72 from the experimental group and 71 from the control group. There were 72 and 70 pretest SC-IAT data samples for the experimental and the control group, and only 57 and 52 data samples for posttest SC-IAT for the experimental and the control groups respectively due to technical issues. As expected, there was no significant difference in pretest attitudes between the experimental and the control group, see Table 5.1. Overall, the pretest attitudes were slightly positive with a mean of 2.19 for the experimental group and 2.09 for the control group - compared with the mid value of the test which was 2.5. When divided into halves by the test's mid value (2.5), there were significantly more participants with positive attitudes in both groups, as expected (46 vs. 26 in the experimental group and 48 vs. 23 in the control). There was also relatively high variance in the pretest attitudes.

Table 5.1: Pretest descriptive statistics for the experimental and the control group.

| | Experimental Group | | | | Control Group | | | | Experimental vs. Control Group | | | | |
	n	M	SD		n	M	SD		diff	SD	d	t	p
Explicit	72	2.19	0.69		71	2.09	0.81		0.1	0.75	0.14	0.82	0.41
SC-IAT	72	0.08	0.41		70	0.06	0.3		0.02	0.35	0.05	0.32	0.75

When it comes to test reliability, my measured Cronbach alpha for the Modern Homonegativity Scale was: pretest experimental = .87, pretest control = .91, posttest experimental = .89 and posttest control = .92. The Cronbach's alpha measured from my data on the Game Engagement questionnaire was: experimental group = .87 and control group = .86.[4]

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[4] The acceptable value of Cronbach's alpha is .7 and higher (Tavakol and Dennick, 2011).

H1a: Participants' evaluation of the game will be lower for the experimental group compared to the control group.

There was a low-to-medium difference measured for game evaluation between the experimental and the control group (d = 0.26, p = .06), see Table 5.2. Game evaluation for the experimental group was lower than that for the control group, however, the p-value was higher than expected. Therefore, I conclude that H1a was not supported.

Table 5.2: Two sample t-test for game evaluation in experimental compared to the control group.

	Experimental Group			Control Group			Experimental vs. Control Group				
	n	M	SD	n	M	SD	Mdiff	d	t	DF	p
Game Evaluation	72	5.4	2.02	71	5.96	2.18	-0.55	0.26	-1.58	139.84	0.06

H1b: The measured game engagement will be lower for the experimental group compared to the control group.

There was a low-to-medium difference measured for game engagement between the experimental and the control group (d = 0.37, p = .01). Game engagement for the experimental group was lower than that for the control group, see Table 5.3. Therefore, I conclude that H1b was supported.

Table 5.3: Two sample t-test for game engagement in experimental compared to the control group.

	Experimental Group			Control Group			Experimental vs. Control Group				
	n	M	SD	n	M	SD	Mdiff	d	t	DF	p
Game Engagement	72	2.52	0.65	71	2.76	0.65	-0.24	0.37	-2.21	140.97	0.01

Table 5.4: Two sample t-test for game engagement for the experimental and the control group - low vs. high pretest explicit attitudes.

Experimental Group

	Low Explicit				*High Explicit*				*High vs. Low Explicit*				
	n	M	SD		n	M	SD		Mdiff	d	t	DF	p
Game Engagement	34	2.59	0.58		38	2.45	0.7		0.14	0.22	0.94	69.57	0.83

Control Group

	Low Explicit				*High Explicit*				*High vs. Low Explicit*				
	n	M	SD		n	M	SD		Mdiff	d	t	DF	p
Game Engagement	27	2.78	0.53		44	2.74	0.72		0.04	0.06	0.24	66.44	0.6

H2: Participants in the experimental group with negative pretest explicit attitudes will have lower game engagement than those with positive pretest explicit attitudes.

I tested this hypothesis by dividing the participants into two equal groups, one with high and the other with low attitude scores, separated by their mean pretest explicit attitude score. Though I measured a difference in game engagement between low versus high explicit attitude groups in the experimental group, it is not statistically significant. I measured no significant change in the control group, see Table 5.4. Therefore, I cannot conclude that participants' initial explicit attitudes had any effect on their game engagement, and H2 was not supported.

Table 5.5: Two sample t-test for change in explicit attitudes in the experimental compared to the control group.

Experimental Group

	Pretest					*Posttest*		
	n	**M**	**SD**			**n**	**M**	**SD**
Explicit	72	2.19	0.69			72	2.24	0.75

Control Group

	Pretest					*Posttest*		
	n	**M**	**SD**			**n**	**M**	**SD**
Explicit	71	2.09	0.81			71	2.13	0.84

Pretest-Posttest Difference

	Experimental Group				*Control Group*				*Experimental vs. Control Group*				
	n	**M**	**SD**		**n**	**M**	**SD**		**Mdiff**	**d**	**t**	**DF**	**p**
Explicit Difference	72	-0.05	0.94		71	-0.04	1.01		-0.01	0.01	-0.06	139.83	0.48

H3: There will be positive change in explicit attitudes in the experimental group compared to the control group.

There was almost no change in attitudes measured in either the experimental or the control group. Moreover, the difference in pretest-posttest attitude change between the experimental and the control group was negligible and the result was not statistically significant, see Table 5.5. This indicated that the magnitude of attitude change was not great and not different in the two groups, therefore H3 was not supported.

Table 5.6: Two sample t-test for change in implicit attitudes in the experimental compared to the control group.

Experimental Group

	Pretest				*Posttest*		
	n	**M**	**SD**		**n**	**M**	**SD**
SC-IAT	72	0.08	0.41		57	0.27	0.31

Control Group

	Pretest				*Posttest*		
	n	**M**	**SD**		**n**	**M**	**SD**
SC-IAT	70	0.06	0.3		52	0.25	0.31

Pretest-Posttest Difference

	Experimental Group				*Control Group*				*Experimental vs. Control Group*				
	n	**M**	**SD**		**n**	**M**	**SD**		**Mdiff**	**d**	**t**	**DF**	**p**
SC-IAT Difference	57	-0.22	0.43		52	-0.18	0.28		-0.04	0.11	-0.57	96.48	0.29

H4: There will be no change in implicit attitudes in the experimental group compared to the control group.

There was some change in implicit measurements (*D*-scores) detected for both the experimental and the control group, but the difference between the changes in the two groups was not statistically significant, see Table 5.6. Therefore, I concluded that H4 was supported.

H5: There will be a higher positive correlation between game engagement and pretest-posttest change in explicit attitudes in the experimental group compared to the control group.

Since there was no significant change in explicit attitudes, there could be no meaningful analysis of the correlation between attitude change and game engagement, therefore I could not evaluate this hypothesis.

6. Discussion

I investigated the relationship between players' game engagement and their attitudes towards gay and bisexual women when playing a game with a lesbian character. Specifically, the primary aim was to investigate the influence of a game with such a character on the game engagement of players and whether that influence was related to their attitudes. The secondary aim was to explore the players' implicit and explicit attitude change towards gay and bisexual women as a result of playing the game.

6.1 Main findings and interpretation

6.1.1 Game engagement (H1)

H1a: Participants' evaluation of the game will be lower for the experimental group compared to the control group.
H1b: The measured game engagement will be lower for the experimental group compared to the control group.

I have found that the inclusion of a LGBT character had no effect on players' evaluation of the game (H1a). This is in contrast with a study by Välisalo and Ruotsalainen (2022) which found that the reveal of two Overwatch characters as gay (Tracer and Soldier:76) received backlash from players on the forums. However, their study focused on a game which already had an established player base before the introduction of the gay characters, which was not the case in this study. Therefore, it could be assumed that when a gay character is included in the game from the start, this negative reaction from the player base can be circumvented. However, I have not found studies investigating this particular distinction, therefore, more research is needed to explore this theory.

I have found that when confronted with an LGBT character it lowered the players' engagement in the experimental group compared to the control group, regardless of the players' attitudes (H1b). What could play into this result could be that the inclusion of an unusual topic (or at least one the players' are not used to seeing in media) interferes with players' game engagement. It is interesting that even with this sample size (n=143) and with the participants not being primarily gamers, the results are still consistent with other studies on players' reaction to the inclusion of LGBT characters in video games. This suggests that the issue does not lie simply in the gamer community, and it not being inclusive of marginalized identities, but speaks of a broader issue. This result is in line with findings from other studies. Parshakov et al. (2022) found that the pick-rate of a character in a popular video game who was announced to be gay dropped significantly after the announcement. Välisalo and Ruotsalainen (2019) found that sexuality of a character is an important factor in players' engagement with the character.

6.1.2 Game engagement and attitudes (H2)

H2: Participants in the experimental group with negative pretest explicit attitudes will have lower game engagement than those with positive pretest explicit attitudes.

I have found no evidence that negative initial attitudes lead to lower game engagement (H2). This could be explained in a variety of ways: because the participants' initial attitudes were already positive (which we know from the data), there were not enough participants with negative attitudes to reliably measure this; or even though the inclusion of a lesbian character clearly leads to lower game engagement (H1), the deciding factor may have nothing to do with the participants' attitudes towards LGBT people and the problem may lie elsewhere, and further research is needed into what causes lower game engagement in this case.

6.1.3 Attitude change (H3 and H4)

H3: There will be positive change in explicit attitudes in the experimental group compared to the control group.
H4: There will be no change in implicit attitudes in the experimental group compared to the control group.

I have found that playing a game with a LGBT character has no significant effect on either players' explicit or implicit attitudes (H3 and H4).

When it comes to explicit attitudes (H3), there can be several explanations of this result. The game was not specifically tailored with the sole purpose of changing attitudes, and the topic, although present, may be somewhat overshadowed by the mechanics of the game, and the main mechanics are still that of a rogue-like. This is opposed to studies, where the game was created with attitude change in mind. A study by Pech and Caspar (2022) used a game which featured a fictional minority and was created for the purpose of attitude change, and was found to reduce prejudice against real minorities.

There is no roleplaying or perspective-taking in the game, as opposed to games used in studies which resulted in attitude change. For instance Ruggiero (2015) found that a persuasive social impact game that is played from the perspective of a homeless person had a positive effect on players' attitudes towards the homeless. Alhabash and Wise (2012) found that a role-playing game which put the player into the shoes of the Palestinian president had a positive effect on players' explicit attitudes towards Palestinians. Kolek et al. (2021) that player's explicit attitudes towards historical topics were changed by playing a narrative game about such historical topics.

The length of the intervention seems to have little effect on whether player attitudes are changed (Kolek et al., 2023), thus I presume that the short length of my intervention was not the reason that player attitudes did not change. However, the narrative of the game was rather superficial, and players' contact with the lesbian character was rather limited, meaning the players probably had little space to develop a strong connection to the character, as was the case in studies exploring parasocial contact and whether it changes attitudes. For instance, a study by Bond (2021) found that extended exposure to gay characters in a television show predicted prejudice reduction. Similarly, in a study by Mulak (2021) more quality contact with a

minority in-game character predicted more positive attitude change. Thus, perhaps for the type of game I used, the narrative had to be more in-depth and several interventions could be needed to result in attitude change, as they would simulate how players interact with video games (and other media) in real life.

For implicit attitudes (H4), however, my findings are in line with other studies. Alhabash and Wise's (2012) game played from the perspective of the Palestinian president produced no change in implicit attitudes towards Palestinians. Similarly, Kolek et al. (2021, 2023) found that a narrative game with historical themes has no effect on implicit attitudes towards history.

6.1.4 Game engagement and attitude change (H5)

H5: There will be a higher positive correlation between game engagement and pretest-posttest change in explicit attitudes in the experimental group compared to the control group.

I could not evaluate whether higher game engagement facilitates attitude change (H5), as there was no significant attitude change measured. There were some studies which did link game engagement with higher attitude change, for instance, Parrott et al. (2017) who found that higher game enjoyment in a video game which portrayed Mexican immigrants in the US positively caused more positive attitude change in the participants; the main difference of the game used compared to the game used in my intervention is that it had a much stronger emphasis on narrative and contained the mechanic of perspective-taking. In another study by Grasse et al. (2021) who in their intervention used a game which was likewise heavily narrative-based and used that same mechanic, it was found that higher game engagement led to more pronounced attitude change.

6.2 Implications

Video games are played by a wide population of people, and LGBT people repeatedly call for more representation (Gaming in Color, 2015). Studies have shown (Smith and Decker, 2016) such representation has a positive effect on the people inside the community, and games are known to be able to provide a safe space for LGBT people (Gaming in Color, 2015; Gillin and Signorella, 2023). Therefore, since LGBT people comprise about 9% of the worldwide population (specifically, according to the most recent survey from 2023 from the Statista Research Department, about 9% of people worldwide, on average, identify as LGB+ and about 3% identify as trans) there is a lot of merit to showing LGBT representation in games. Add to that the fact that representing a variety of people adds to the realism of the game world.

Even though I have not found a direct link between the participants' attitudes and their game engagement, game engagement was still influenced by the lesbian character included in the experimental version of the game. This could have a variety of explanations; since homophobia is a complex issue, it is possible that the used measurements were not measuring the concept accurately and it may be that structural homophobia has an effect on people which the used measurements did not capture; and structural homophobia is a well measured phenomenon. In 71 countries worldwide homosexuality is still considered a crime, while hate crimes and discrimination are still an issue, for instance in Eastern Europe (including the Czech

Republic) and the Balkans about 70% of LGBT people tend to hide their identity (Statista Research Department, 2023). The International Lesbian and Gay Association (ILGA) ranks the Czech Republic at 25.76% in their 2023 rainbow index which measures the legal and social situation of LGBT rights worldwide, with 0% meaning gross violations of human rights and 100% meaning full acceptance and equality; the index for Czech Republic is lower than the Europe average. Another possibility for these results is that the method used to divide the participants was not suitable; the participants were divided into two groups by the mean value of their pretest explicit attitudes, the dividing mean value was slightly higher than the mean value of the scale. And since slightly positive attitudes do not signal full acceptance of gay rights but rather ambivalence to slight acceptance, perhaps full or much higher acceptance is needed in order for player attitudes towards gay and bisexual women not to interfere with their game engagement when playing a game with this topic. There is also the possibility that homophobia had no direct effect on this result, and that the participants simply had lower game engagement in the experimental condition because of the unfamiliarity of the topic. Either way, more research is needed to determine what causes lower game engagement with games such as the one used in the experimental condition in this study.

Since my game was not successful in changing attitudes, the simple inclusion (i.e. representation) of LGBT characters does not seem to be enough to affect players' perception of LGBT people. Therefore, for attitude change to occur special attention should be paid to how the LGBT characters are included, what are their roles in the game, and, perhaps, how their representation is integrated into the game mechanics. Possible avenues are to increase the length and the quality of the contact the player has with the in-game character, as there are a multitude of studies which confirm that prolonged parasocial contact with gay characters in media can change attitudes, as evidenced for instance by Banas et al. 's (2020) meta-analysis on the topic; or the study by Mulak (2021) where they found that the quality of contact with in-game characters was a predictor of players' attitudes towards minorities. Some consideration could also be given to developing games with mechanics which result in attitude change, which is possible as evidenced by a multitude of other studies; for instance Pech and Caspar's (2022) game with a fictional minority which changed attitudes to real-world minorities, or the multiple studies on the mechanic of perspective-taking (Alhabash and Wise, 2012; Ruggiero, 2015; Kolek et al., 2021).

Although attitude change through games is clearly possible (Kolek et al., 2023), not all games are suitable for changing attitudes towards the topics they portray, as illustrated by this study. In the context of current research, it seems that certain game mechanics (and not just the simple inclusion of a topic) facilitate attitude change, and the game used in this study did not contain any of the game mechanics which have been proven to change attitudes. Therefore, more research is needed into what game mechanics lead to attitude change and which do not.

6.3 Limitations

There are several limitations to my study. First, the length of the intervention - the participants played the game for half an hour at maximum (most even less, if they managed to win before the time limit ran out) but most people play games for hours, likewise the gameplay time of a lot of similar games is several hours. Second, the nature of the intervention - the

participants did not have the freedom to choose when they wanted to play the game, and had to play the game in a single session, both constraints which are not typical for usual game play. Third, the participants themselves - the participant pool was not varied in respects such as age or education, since all of the participants were university students. For the same reason, the participants can be assumed to be more liberal than the general population, and thus have less extreme attitudes (which was confirmed in the data analysis). The participants were all women and when it comes to video games women are only about half of the player base[5], meaning that a lot of the participants can be assumed to not be regular gamers. The implicit attitude measurements deviated from the commonly used version of SC-IAT which could have an effect on the validity of the measurement, and so the measures cannot be viewed as equally reliable as the standard SC-IAT. And, lastly, it is possible that the experimental game might not have felt realistic for the players compared to the control game, because while a heterosexual workplace romance between the boss and their employee is rather common in media, it is not that common for gay relationships and may therefore not have been what the participants imagine when they think of a gay romance, making the experimental game's narrative less believable.

6.4 Future research

In future research into this topic it could be prudent to include more questions about the participant characteristics, namely, how often they play games or how important are the attitudes measured for them.

When implementing both explicit and implicit measurements of attitudes, more attention should be paid to what exactly we are measuring; better tailoring both of the measures to the attitude object being measured would be in order, perhaps by making the questions in the self-report focused at a more specific topic; and by presenting the implicit measure stimuli in a more specific context. Since there has been criticism on the temporal stability of implicit measures (Brownstein et al., 2020), it would bear looking into whether the measures used in this study would be stable over time, and use this information to develop better implicit measurements on the attitude object explored in this study. This was done, for instance, by Gschwendner et al. (2008) where they incorporated background images into the IAT which were contextually relevant to the attitudes tested - specifically, they explored attitudes towards Muslims where participants in the experimental group saw a picture of a mosque as background during the test, while the control group saw a picture of a garden; and they found that the measurements were more stable in the experimental compared to the control group over a two-week period.

Regarding the intervention itself, having a longer game with more in-depth narrative and character building would be one possible future avenue, so that players have the time to get invested in the characters. Alternatively, perhaps long-term effects of participants playing multiple games with LGBT representation over a period of time could be explored.

More studies are needed in order to explore what is the lower game engagement from playing a game with a lesbian character linked to and what aspects of the LGBT representation in games can have this negative effect; only then can we figure out what steps can be taken in terms of game design to mitigate these effects.

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[5] According to demographic studies about 46% of gamers in the US are women (ESA, 2023), and in Czech Republic women constitute only about a third of all players (GDA CZ, 2020).

Although there are not many studies on what kind of games can change players' attitudes towards LGBT people in video games specifically, there is a number of studies on attitude change towards LGBT people in other media (Bond, 2021; Birchmore and Kettrey, 2022), as well as on attitude change towards minorities through video games (Pech and Caspar, 2022; Ruggiero, 2015; Alhabash and Wise, 2012). Since the game used in my study was not successful in changing attitudes, the logical next step would be to create a game which is tailored specifically to change attitudes towards LGBT people, using the strategies from other studies which confirmed that games can change attitudes towards marginalized groups.

Conclusion

The objective of this thesis was to find out whether the inclusion of a lesbian character in a video game has an effect on players' game engagement, whether their attitudes towards gay and bisexual women play into this effect, and whether the game has a potential to change the players' attitudes towards gay and bisexual women.

I first summarized the current state of the research of attitudes, game engagement, and their relationship. I used the Associative-Propositional Evaluation model (Gawronski and Bodenhausen, 2011) to conceptualize attitudes; it defines attitudes as a pair of complementary processes - associative processes which are the mental associations arising as responses to stimuli and propositional processes which are guided by propositional thinking. Associative processes are then measured with implicit measures, like the SC-IAT used in this study, and propositional processes are measured with explicit measures, like self-report questionnaires.

I analyzed, using an empirical study, the effects of playing a game with a lesbian character on players' game engagement and attitudes in comparison to a game where that same character is heterosexual. The game, modified for the purposes of this study, was a rogue-like which included a narrative with a lesbian character as the player's helper. I collected data from a sample of university students. In the control group I used a version of the game where the originally lesbian character was heterosexual, which was the only modification made to the game for the control group.

I have found that players' game engagement is lower when playing a game with a lesbian character, compared to when the character is heterosexual, regardless of their attitudes towards gay and bisexual women. However, I have not found a significant link between players' initial explicit attitudes and their game engagement. The game also had no effect on players' attitudes towards gay and bisexual women. A link between game engagement and attitude change could not be evaluated, as there was no significant attitude change to begin with.

Future research into the topic should focus on finding out which aspects of representation of a lesbian character have the most effect on game engagement, and to find ways in which this effect could be mitigated.

It is becoming increasingly difficult to deny the significance of video games in our society, with over 3 billion players worldwide (Newzoo, 2023) and an immense body of research concerning their impact. Representation of minorities in video games has become an important topic in the past decades, with both LGBT players and LGBT game developers at the forefront, calling for more and better representation (Anthropy, 2012; Gaming in Color, 2015). The representation of LGBT people in games has thus become more common, starting with The queer games avant-garde (Ruberg, 2020) which saw a multitude of small LGBT game developers making games about their own experience, pushing the medium into new directions, and encouraging big gaming companies to make their AAA games more diverse as well.

The results of this thesis could, among other studies, serve as an impetus for further research into how player attitudes towards LGBT people interact with their game play, what effect they have on players' game engagement, and what kind of LGBT representation, characters and mechanics can lead to change in players' attitudes towards the LGBT rights. The results could also be interesting for game developers who wish to include LGBT

representation in their games. And, lastly, the results could also be of interest for the field of game studies and research concerning LGBT representation in games.

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A Attachments

A.1 The game project

The Unity project with the game is available on github at the following link (the "diplomka" branch contains all of the changes made to the game as part of this thesis):
https://github.com/Rolex-Dafi/Operation-Okapi.git

A.1.1 Opening the project in Unity

To run the project in Unity run the Unity Hub, in the "Projects" tab click on "Add", find the project folder and click on "Open". It should now be available in the list of projects in the "Projects" tab and can be opened by clicking on it. The project was made in version 2020.3.32f1 of Unity and should be opened in this version to ensure it will work properly.

The project includes the *TextMeshPro* package. This package needs to be installed before running the game inside Unity; it can be installed by going to the "Window/Package Manager" menu, selecting "All Packages" in the top left of the editor window, finding the corresponding package in the list on the left, selecting them and clicking the "Install" button.

A.2 The experimental game build

The experimental game build is available in the folder "A2_Experimental_Build" in the attachments. The application includes the SC-IAT and links to questionnaires, i.e. it is exactly in the form in which the intervention participants of the experimental group received it.

A.2.1 Launching the build

The build only works on Windows 10 a higher. To launch the build simply open the folder with the name "A2_Experimental_Build" and run the "Build_a_Cap.exe" application.

A.2.2 Controls

The game is controlled by keyboard and mouse, the specific controls are the following:
- Space or mouse left click to proceed in dialogue
- W, A, S, D or arrow keys to move
- Space to dash
- Mouse left click and right click to aim and attack
- E to pick up items and interact with objects

A.3 The control game build

The control game build is available in the folder "A3_Control_Build" in the attachments. The application includes the SC-IAT and links to questionnaires, i.e. it is exactly in the form in which the intervention participants of the control group received it.

A.3.1 Launching the build

The build only works on Windows 10 a higher. To launch the build simply open the folder with the name "A3_Control_Build" and run the "Build_a_Cap.exe" application.

To see the game controls, please refer to the previous section (A.2.2).

A.4 R scripts

The R scripts are available in folder "A4_R_Scripts" in the attachments.