Proceedings of the Fifteenth AAAI Conference on Artificial
Intelligence and Interactive Digital Entertainment (AIIDE-19)

Alignment of Player and Non-Player Character Assertiveness Levels

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Abstract

With the intent to broaden videogames' audiences, and based on the Media Equation study on the law of similarity–attraction, we propose aligning the NPCs' assertiveness level to the player's own assertiveness level. We developed a testbed game, a 2D puzzle platformer with a companion NPC, with two versions of the NPC's behavior, one for each end of the assertiveness scale. We conducted a 2x2, between-subjects experiment (n=48), in which Assertive and Non-Assertive subjects were randomly matched with one of the NPCs. Subjects recognized the NPC's personality type, giving a significantly higher assertiveness score to the NPC endowed with assertive characteristics. Non-Assertive players reported significantly higher Tension scores when interacting with the Assertive NPC than when interacting with the Non-Assertive NPC. However, based on assertiveness level alignment, there was neither a significant difference in the enjoyment of the experience nor in the player's affinity for the NPC.

Introduction

The desire for games to adapt to the player's interests has been evident since the 1980's, with fan-made enhancement kits such as *Crazy Otto* (1980). Nowadays, we can see even larger success cases for fan-made modifications, such as *Defense of the Ancients* (2003) and *DayZ:Battle Royale* (2013). Game developers have also tried to integrate adaptation into their games. In *Resident Evil 4* (2005), the AI's behavior is adapted to the player's performance (Future Press 2005). Game adaptation has been shown to increase player enjoyment (Aponte, Levieux, and Natkin 2011). Effective approaches to the adaptation process include taking into account the player's performance, tactics, strategies and profile (Bakkes, Spronck, and van Lankveld 2012; Karpinskyj, Zambetta, and Cavedon 2014).

In this work we propose adapting NPC companions to the player's profile since, when present in games, they can take an impactful role in the player's experience. Taking Media Equation's finding that the *law of similarity–attraction* applies to relationships between people and computers (Nass et al. 1995), we will try to apply it to relationships between players and NPCs. A concern with using Extraversion as the measure to adapt to the player's personality, as the Media Equation study did, is its effectiveness. A previous study (Paunonen and Ashton 2001) suggests that using the personality traits' facets, instead of the whole personality trait, leads to better results in predicting behavior. With this in mind, in this work, we will focus on a facet of Extraversion, rather than the whole trait: *Assertiveness*. We propose adapting the NPC's behavior to exhibit assertiveness levels aligned with the player's.

In our main study, we will measure both the player's and NPC's assertiveness levels using NEO PI-R's 10-item assertiveness self-assessment scale[1]. For the NPC, a modified version in the third person will be used. For the purposes of evaluation, we predict that the player will perceive the NPC endowed with assertive characteristics as assertive and the NPC endowed with non-assertive characteristics as non-assertive (Hypothesis **H1**). We also predict an increase of the player's enjoyment of the experience when their assertiveness level matches the NPC's (Hypothesis **H2**). Lastly, we predict that the player will have a higher affinity for the NPC when their assertiveness levels match (Hypothesis **H3**).

The rest of the document will be structured as follows: (1) we will start by providing a theoretical review for the subjects our work relates to; (2) describe the implementation and quality assurance process of the testbed game; (3) present the two studies that were conducted to validate our solution and evaluate our hypotheses, and discuss the results obtained; (4) finally, we will summarize our findings and present ideas for further research on the subject.

Related Work

Video game adaptation always relies on having some sort of player model to adapt the game to. This model could simply be gathered from the player's choice of difficulty and stay static throughout the game, or it could be imperceptibly adapted to the player's physiology or actions inside the game, and be refined as the game progresses (Bakkes, Spronck, and van Lankveld 2012). A very promising method

[1] https://ipip.ori.org/newNEOKey.htm#Assertiveness

of player modeling is player profiling, which uses psychologically and sociologically verified player profiles to provide a player model that represents internal traits of the player, such as their personality and motivations. For example, Bartle (1996) divides online Role-Playing Game players into "achievers", "explorers", "socialisers" and "killers". Quantic Foundry's Gamer Motivational Profile (Yee 2016) was created based on players' motivations, and provides a relative percentile score for each motivation, comparing the player's motivations to those of everyone else that took the survey.

There has also been successful research in using personality models directly taken from the psychological field, and applying them to game adaptation. Van Lankveld (2011) found a statistically significant correlation between in-game behavior data and the Five Factor Model (FFM). Yee et al. (2011) found a statistically significant correlation between player's chat logs in *Second Life* (2003) and the FFM. The FFM, more commonly referred to as "Big Five" is a theory that divides a person's personality into five main components. These components were discovered and refined by multiple independent empirical studies over a period of 50 years. The model's components are: *Extraversion*, how outgoing the person is and how likely they are to seek someone else's company; *Agreeableness*, *Conscientiousness*, *Neuroticism*, *Openness to Experience*. Its use in interpersonal relationships has been the focus of studies such as McCrae and Costa's (1989), in which, using joint-factor examination with Interpersonal Circumplex theories, the two dimensions of the FFM that were found to be of greater influence were *Extraversion* and *Agreeableness*.

The Media Equation

The Media Equation is a theory that states that people tend to treat computers and media as people or real places. The studies conducted to validate the Media Equation used the following method: take previous findings from the fields of Psychology and Sociology on interpersonal relationships; change one of the "humans" in the experiment's statement to "computer", e.g. "people like people that flatter them" becomes "people like computers that flatter them"; replicate the same methodology and replace one of the members of the relationship with a computer.

One study of the Media Equation in particular (Nass et al. 1995), tests the *law of similarity-attraction* between computers and people. This law states that individuals prefer to interact with others who are similar in personality to themselves. As was previously mentioned, from McCrae and Costa's findings (1989), the two most relevant personality traits from the FFM in interpersonal relationships are *Extraversion* and *Agreeableness*. Nass and his team chose to focus on *Extraversion* in their study, which ranges from *dominance* to *submissiveness*.

The study was a 2x2 between-subjects experiment (n=48). The Bem-Sex Role Inventory (Bem 1974) was used to choose subjects that fit into a dominant category and a submissive category. The dominant and submissive subjects were randomly assigned a computer that exhibited submissive or dominant behavior. The experiment consisted of the "Desert Survival Problem", in which the player was assisted by the computer to order a list of objects, in order of usefulness, in the hypothetical case of being stranded in a desert. In order to express the computer's dominant/submissive behavior, the experimenters manipulated the following:

- *The phrasing of the text displayed by the computer* — the dominant computer used strong language, assertions and commands, whereas the submissive computer used weaker language, suggestions and questions.
- *The confidence level expressed by the computer* — the computer's opinion was accompanied with a 10-point scale of confidence. The dominant computer presented an average confidence level of 8.0 with a standard-deviation of 0.8, and the submissive computer displayed an average confidence score of 3.0 with a standard-deviation of 0.8.
- *The order of interaction* — the dominant computer would always interact and give their opinion first, in contrast, the submissive computer always presented their opinion after the subject had already presented his or hers.
- *The name given to the computer* — the dominant computer was given the name of *Max*, and the submissive computer was named *Linus*, which were both confirmed by a pretest to suggest dominance and submissiveness, respectively.

This study found that to convey personality we do not need very complex agents, realistic visuals, or deep logic and Artificial Intelligence (AI). Positing that "(...) even the most superficial manipulations are sufficient to exhibit personality with powerful effects.". Moreover, subjects preferred the computer that was similar to them in assertiveness, and were more satisfied with the whole experience.

Non-Player Characters

NPCs have been present in games since the early days of tabletop games, such as *Dungeons & Dragons* (1974). They can be used as coaches, opponents or companions to the player (Bakkes, Spronck, and van Lankveld 2012).

As an *opponent*, the NPC's role is to try to match the player's skill and provide a suitable challenge, since it has been shown by Scott (2002) that if the player finds the opponents too weak, they loose interest in the game, and if they find it too difficult, it also has been shown by Livingston and Charles (2004) and Van Lankveld (2010), that the player is prone to getting frustrated and quit playing the game. This is where player modeling comes in, helping the developers to predict and monitor the player's skill level and adapt to it dynamically. This has traditionally been a complex AI problem and has been applied to a wide range of game types, from Role-Playing Games to Real-Time Strategy games.

As a *coach*, the NPC is used to redirect the player's attention and focus, or encourage a certain type of behavior. When coupled with player profiling, this type of NPC can be very effective in games which have a training purpose and personalized coaching is often a requirement.

When NPCs act as *companions* to the player, they are used to help, motivate or even guide the player. It is often the case though, that the player becomes frustrated with the NPC's

behavior for an action that goes against the player's intentions. For example, if the player is trying to act stealthily and the NPC rushes in to try to eliminate some threat and cause mayhem, the player's experience might be negatively affected. That is where player modeling can help. With player modeling in mind, the companions have the role of behaving according to the player's expectations made easier. By understanding the player's motivations or preferred behavior, the task of deciding how to act becomes quite simple.

Research on companion NPC demonstrated personality and adaptation to the player has been growing over the past few years, with works by Martins (2017), Chowanda et al. (2016) and Filipe (2015) showing some success in demonstrating personality traits through NPC behavior, and works as the one done by Doirado and Martinho (2010), which successfully adapts *Fallout 3*'s companion dog, Dogmeat (2008), to better predict player intentions and behave accordingly.

Implementation

The game created to test our hypotheses is called *Cave Escape* [2]. We wanted to create a setting for the game that made the player feel like they were in a similar situation to the NPC. However, one aspect that we wanted to avoid was creating the notion of the characters being part of a team, therefore avoiding a cooperation main effect, suggested by Johnson and Gardner (2005). To do this, the setting had to be somewhat neutral in team formation queues, conversely we wanted to avoid settings such as sports based settings and military based settings. We found that "trapped together in a cave" was a good compromise between having the player and NPC cooperate naturally and not invoking team based reactions. The name given to the game, *Cave Escape*, is meant to reinforce the premise that the player and NPC are stuck in the cave together.

Another requirement for the concept was creating a context in which the player and NPC could interact repeatedly. Asking the characters to choose between two doors when prompted was our answer to that requirement. Standing side by side, and only letting one person through before closing, the doors prompted a brief discussion between the two characters, on which door each one of them would go through.

Game Mechanics

The game is split into two types of rooms, decision-making rooms and puzzle rooms. The former includes the rooms in which the player and NPC interact, and have to decide between the doors. The puzzle rooms are based on a couple of mechanics from classic puzzle platformers such as *Portal* (2007), however, the player's movement is similar to that of *Braid* (2008). They are able to move to either side, and jump. They can also pick up and drop boxes, and enter doors.

The main goal of each level is to open the locked doors, seen in Figure 1(3), to progress to the next level. To unlock the doors, the player has to activate the triggers, seen in Figure 1(2), spread around the level by placing the boxes, seen in Figure 1(1), on them. Above each door, there are indicators representing the amount of triggers associated with it, and their state (Figure 1(4)). This was done to help the player keep track of what they have left to do. Once all the triggers in the room are activated, the door opens to let the player through. There are three other mechanics that are introduced in the game, trampolines (Figure 1(6)), checkpoints (Figure 1(5)) and spikes (Figure 1(7)).

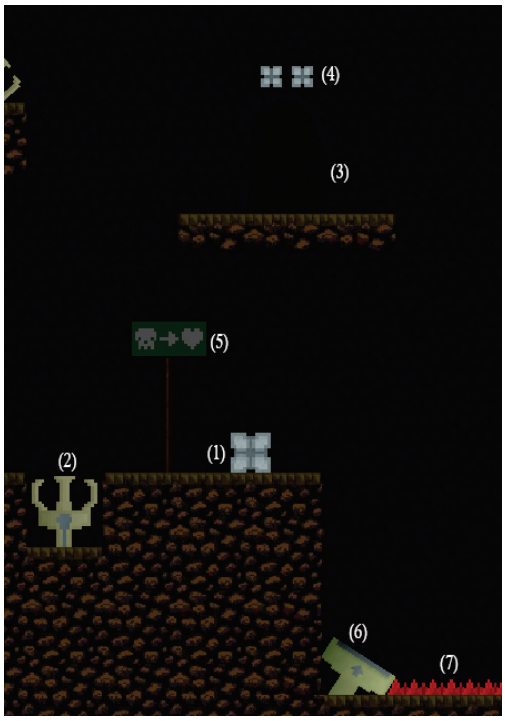

Figure 1: Game's mechanical components.

Interactions

Interactions between the NPC and the player occur in-between the puzzle rooms and consist of the following steps:

1. Introduction and small comment by the NPC;
2. Simple reply by the player;
3. NPC's comment on the door choosing process;
4. Statement of intention by the NPC;
5. Player's decision.

The final interaction in the game adds a twist to the formula. Instead of choosing between two doors, the player and NPC are given only one door for both of them. Making the situation one of competition instead of cooperation. In this scenario, the structure varies in the second half of the interaction. It is structured in the following manner:

1. Small comment by the NPC on the previous level;
2. Simple reply by the player;
3. NPC notices the singular door;
4. NPC comments that only one person can escape;

[2] A video of the game with an assertive NPC can be found at: https://youtu.be/lEkBwDwNa2g

5. NPC states it wants to be the one to go through the door;
6. Player's decision to try to run for the door or stay behind (see Figure 2).

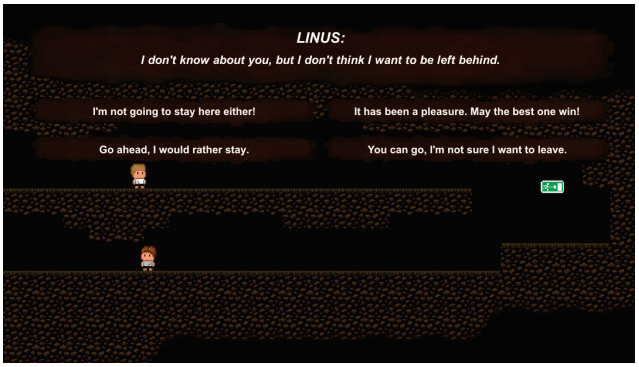

Figure 2: End scene player options.

The NPC keeps true to what they said and always starts running for the door. The player is free to stay behind or run for the door, regardless of what they choose. The NPC however, adapts to the player's choice, and walks slowly if the player decides not to run for the door and stay behind, and, before entering the door, turns back and thanks the player for their "sacrifice". If, instead the player decides to run for it, the NPC is scripted to follow the player as closely as possible. Before the characters reach the door however, the game starts slowing down incrementally, and fades to black, giving the game an ambiguous ending. This was done to avoid having the idea of defeat or victory influence the player's experience.

Assertiveness Expression

In order to express assertiveness, we manipulated the NPC's text according to the following parameters:

1. *The phrasing of the text used by the NPC* — The assertive NPC uses assertions and statements. In contrast, the non-assertive NPC uses questions, suggestions and seems uncertain of what they are saying. For example, the assertive NPC says "Alright! I want to go through the one on the right, you can go through the one on the left.", whereas the Non-assertive NPC says "Would you like to choose? I can go through the door on the right, if you prefer the one on the left.";
2. *The name of the NPC* — The name given to the assertive NPC was the same as given to the corresponding assertive computer by Nass et al. (1995), "Max". In the same vein, the non-assertive NPC was given "Linus" as their name;
3. *The response the NPC gives to the player's answer* — In the first two interactions, the NPC responds to the player's decision, these replies depend on the NPC's assertiveness level, and the player's decision, this is, whether the player goes with or against the NPC's intents. The assertive NPC expresses their dissatisfaction if the player chooses the door the NPC declared as their intended door. If the player goes against the NPC's choice in the first two interactions, the non-assertive NPC makes an effort to not seem bothered by the player's choice when it opposes theirs, and accepts whatever the player decides. Conversely, the assertive NPC revolts and imposes their choice on the player, by stating that their discontentment and not waiting for the player before going through their desired door;
4. *The order of declaration of intent* — The assertive NPC states its preference for a door right away, before the player has any chance to express themselves. On the other hand, the non-assertive NPC is ambiguous when presenting their intentions, and instead asks the player for their choice, and if they would like to choose.

The full dialogue script can be found in (Pacheco 2019).

Preliminary Study

One of the concerns we had, when developing the dialogue system, was the relationship between the expression of *assertiveness* and other personality traits, mainly the *friendliness* trait. To test if there was a correlation between these personality traits, we held an open test. We also used this experiment to test the player controls' quality, the first two levels, and the overall quality of the game with a larger sample than the previous informal tests. In this study, we had 20 participants, out of which 6 were female, 14 were male, and the ages varied between 15 and 25 (mean $= 21.65$, $s = 2.92$). To measure the NPC's assertiveness and friendliness, we used the Abridged Big Five-Dimensional Circumplex (AB5C). The AB5C was chosen because it relates assertiveness and friendliness in the context of interpersonal relationships (Hofstee, de Raad, and Goldberg 1992). Each person only played the game once with a specific NPC personality. Given the purpose of this study, we wrote four different dialogue scripts based on the assertiveness theory presented previously, and by "reverse-engineering" the friendliness items in the questionnaire. The four dialogue scripts reflected the following behaviours: Assertive–Friendly; Non–Assertive-Friendly; Assertive–Unfriendly; Non-Assertive–Unfriendly.

Results

A Kruskal-Wallis test revealed a statistically significant difference in the assertiveness scores between the different groups ($\chi^2(3) = 8.215$, $p = 0.042$), with a mean rank assertiveness score of 17.00 for Assertive–Friendly, 8.30 for the Assertive–Unfriendly, 7.80 for the Non-Assertive–Friendly and 8.90 for the Non-Assertive–Unfriendly.

Given this result, we used Mann-Whitney U tests on pairs of gathered scores. Comparing the assertiveness scores between the Assertive–Friendly and Non-Assertive–Friendly NPCs, with means of 4.08 and 3.34, respectively, the Assertive–Friendly NPC was ranked significantly higher than the Non-Assertive–Friendly ($U = 1.5$, $p = 0.02$ two-tailed). However, when comparing assertiveness scores of the Assertive–Unfriendly and Non-Assertive–Unfriendly NPCs, there was no significant difference ($U = 12.5$, $p > 0.05$). Another Mann-Whitney U test indicated that the assertiveness score of the Assertive–Friendly NPC is signif-

icantly higher than that of the Assertive–Unfriendly NPC ($U = 1.5$, $p = 0.02$ two-tailed)

Analysis

The version of the game used in this preliminary study only had two levels and two rooms. The interaction with the NPC was merely four dialogue sequences.

The friendly NPCs had assertiveness scores more closely aligned with the ones that they were intended to convey. This is, the Assertive–Friendly NPC had a higher assertiveness score than the Assertive–Unfriendly NPC, and the Non-Assertive–Friendly one had a lower assertiveness score than the Non-Assertive–Unfriendly NPC. From which we concluded that higher levels of friendliness convey different levels of assertiveness better. We believe this correlation happens because higher levels of friendliness translate into more opportunities for interaction. Given the low amount of interactions in this version of the game, this might have had a bigger effect than usual on the perception of the NPC's personality. Given these results, we decided to set the level of friendliness for our main study on the positive end of the scale, and maintain a similar level for both the assertive and non-assertive personalities.

Main Study

In this study, we wanted to test if the player's assertiveness level being aligned with the NPC's increases the player's enjoyment of the game and affinity for the NPC.

Questionnaire

The questionnaire used was composed of three sections: (1) player identification and assertiveness self-assessment, (2) game experience and NPC social presence evaluation, and (3) NPC assertiveness assessment.

In the first section, for the assertiveness self-assessment, we used the NEO PI-R's 10-item assertiveness scale, which has a cronbach alpha of .84 (reported by its authors), and evaluated by a 5-point Likert scale.

The second section of the questionnaire is composed by Ijsselstein's Game Experience Questionnaire's (GEQ) In-game Module and Social Presence Module. The Social Presence Module was adapted to include the NPC's name, instead of the word "other" in the phrasing of the items. The items in this section are scored with a 5-point Likert scale from "not at all" to "extremely".

In the last section, we measure the NPC's assertiveness with the same 10-item assertiveness scale that was used in the first section of the questionnaire, however, this time, the scale was converted into the third-person using the International Personality Item Pool's (IPIP) guide found on their official website[3].

Procedure

The participant was allowed to be a part of the experiment either remotely or in person. The procedure taken with each participant was the following:

1. *Introduction* — The participant, upon opening the online questionnaire, was explained that they would be part of an experiment to test a game, that the experience was of voluntary participation and took around 25 to 30 minutes;
2. *Initial Questionnaire* — The participant was prompted to fill the first section of the questionnaire, the identification and assertiveness self-assessment;
3. *Starting the game and getting to know the controls* — The participant was told of the various options of playing with a game controller or keyboard and mouse. Then, upon opening the game and pressing "Play", was introduced to the controls of the game;
4. *Escaping the Cave* — The participant played the game from start to finish;
5. *Final Questionnaire* — The last two sections of the questionnaire were filled when the participant was finished playing the game.
6. *Saying goodbye* — Finally, the participant was thanked for participating.

Sample

The participation in this experiment was voluntary. The participants were randomly approached, in person and via social media, and asked to participate in our experiment.

We had a sample of 48 people, aged between 21 and 29 (mdn $= 23.75$, 7 female), 56.3% of the participants were dedicated gamers, choosing the "I reserve time in my schedule to play video games.". 79.2% had already played at least one puzzle-platformer, with 10.2% reporting the genre being one of their favorites. The discrepancy in game experience and genre experience was not caused by the methods used to disclose the experiment, given its publication through generally game neutral means. We believe this difference comes from the increased likeliness of more game-savvy people to participate in such an experiment voluntarily.

In our sample, the median for assertiveness score, was 3.35, with a standard deviation of $s = 0.60$. This median was chosen as the cutoff point to divide our sample into assertive and non-assertive players, based on Ipip's reasoning for not providing norms for their items[4], in which they defend the use of local norms rather than global ones, since our present sample is very hard to be proven as a representative subset. Given our sample size of 48 participants we can observe the four treatment groups and how many observations per treatment group we had in table 1.

	Assertive NPC	Non-Assertive NPC
Assertive Player	8 (Group A)	16 (Group B)
Non-Assertive Player	16 (Group C)	8 (Group D)

Table 1: Participant distribution in the experiment.

[3] https://ipip.ori.org/Third-Person-Items.htm

[4] https://ipip.ori.org/newNorms.htm

Manipulation Check

Normalization analysis of the NPC's assertiveness scores, using a Shapiro-Wilk test revealed them to be approximately normal ($p > 0.05$). To analyze the player's perception of the NPC's assertiveness, we used a two-way ANOVA model, considering the player's assertiveness level (non-assertive, assertive) and the NPC's demonstrated assertiveness level (non-assertive, assertive) as independent variables.

Consistent with Hypothesis **H1**, the assertive NPC was perceived as significantly more assertive than the non–assertive NPC, $F(1, 44) = 33.467, p < 0.001$ (see Figure 3). There was no main effect for the player's assertiveness level, $F(1, 44) = 1.987, p = 0.166$, and no significant interaction effect was found, $F(1, 44) = 0.482, p = 0.491$.

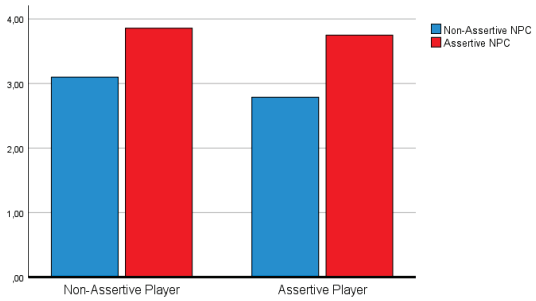

Figure 3: Mean perception of NPC assertiveness score as a function of player and NPC assertiveness level.

Results

We will now describe the analytical process of the results from GEQ's in-game module and social presence module. We started by trying to apply ANOVA on Ranks to the data, however, a normal distribution could not be achieved. Therefore, we used a Kruskal-Wallis H test, separating the data by each treatment group seen in Table 1.

This analysis revealed that there was a statistically significant difference in Tension scores between the different groups, $\chi^2(3) = 13.513$, $p = 0.004$, with a mean rank Tension score of 30.44 for group A, 19.91 for group B, 31.63 for group C and 13.50 for group D. Applying a Mann-Whitney U test with Bonferroni correction for each pair of groups, revealed that Non-Assertive players report significantly ($p < 0.0125$) higher Tension scores when interacting with the Assertive NPC (mean rank = 15.56) than with the Non-Assertive NPC (mean rank = 6.38), $U = 15.00, p = 0.002$.

Hypothesis **H2** predicted players would perceive their game experience more positively when their assertiveness levels were aligned with the NPC's own assertiveness level. For this Hypothesis, we have to take into account the seven components in the GEQ's In-game module. Hypothesis **H3** predicted that the players would prefer to interact with the NPC, when their assertiveness levels were aligned with the NPC's own assertiveness level. For this Hypothesis, we are going to analyze each of the three components of the social presence module of GEQ. For both Hypothesis **H2** and **H3**,

	Mean rank Aligned	Mean rank Not-Aligned	U	*p*
Competence	28.47	22.52	192.5	.152
Sensory And Imaginative Immersion	24.06	24.72	249.0	.877
Flow	26.19	23.66	229.0	.551
Tension	21.97	25.77	215.5	.352
Challenge	26.09	23.70	230.5	.572
Negative Affect	19,88	26.81	182.0	.086
Positive Affect	29.03	22.23	183.5	.104
Empathy	27.03	23.23	215.5	.374
Negative Feelings	21.34	26.08	205.5	.266
Behavioral Involvement	26.94	23.28	217.0	.393

Table 2: Mann-Whitney U test results for each GEQ component, separated by "aligned" observations.

and since the normality assumption for ANOVA wasn't met, we used a Mann-Whitney U test, separating the observations into "aligned" (groups A and D) and "not-aligned" (groups B and C) to test the effect of assertiveness alignment. There was no significant difference between the aligned and not-aligned groups, as seen in Table 2.

Analysis

A potential reason for the significantly higher Tension score registered when Non-Assertive players interacted with the Assertive NPC, is the NPC's imposition of their choice on the player. The player, being Non-Assertive, would feel frustrated if they wanted the same door, but would not express that feeling to avoid conflict. For context, the items that score this component are "I felt frustrated" and "I felt irritable".

An aspect that is worth considering when reasoning about the results regarding hypotheses **H2** and **H3** is the difference between the scenario of the Media Equation study (Nass et al. 1995) and our own scenario. The interaction implemented in our work introduces certain elements that might have an effect on the player's relationship with the NPC. Namely, a potential conflict, when both parties want the same door, which introduces a competitive component to the interaction, in contrast to the interaction by Nass et al.(1995) which is cooperative only. Another aspect that was not present in the Media Equation study is the potential consequences of the conversation. Although all players had to play exactly the same levels in the same order in our implementation, for the player, choosing a different door would probably mean entering a different room from the NPC. Although this was not supported by the dialogue in the game, the player could interpret the discussion over a certain door to be informed by some knowledge that the NPC would have about the difficulty level of the room associated with that door, reinforcing the conflicting interaction.

Conclusion

We began this work with the intent of testing if the *law of similarity–attraction* would apply to player-NPC relationships. With that goal in mind, we started by reviewing the state of the art in player modeling and game adaptation,

while also studying research on the relationships between people and media and reviewing recent work done in the field of NPCs.

We developed a testbed game called *Cave Escape*. This game is a 2D puzzle-platformer with a companion NPC, which provides the context for repeating interpersonal interactions, in the form of deciding which door each character will go through to get to the next stage. Accompanying the development of the testbed game, informal playtesting sessions were conducted to ensure the adequacy of both the player controls and level design.

Then, we conducted a preliminary user study ($n = 20$) and confirmed that a higher level of friendliness allowed the NPC's assertiveness to be perceived more accurately. With this in mind, we implemented two friendly behaviors for the companion NPC, an Assertive and a Non-Assertive behavior.

Finally, we conducted a 2x2 between-subjects experiment ($n = 48$) to test our hypotheses. We found that the players perceived the NPC endowed with assertive characteristics as significantly more assertive than the NPC that exhibited non-assertive characteristics. We also found no difference in the levels of enjoyment of the experience and social presence, when the player's and NPC's assertiveness levels were aligned. However, we found significantly higher Tension scores when Non-Assertive players were matched with the Assertive NPC.

Acknowledgments. This work was supported by national funds through Fundação para a Ciência e a Tecnologia (FCT) with reference UID/CEC/50021/2019.

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