Do Warriors, Villagers and Scientists Decide Differently? The Impact of Role on Message Framing

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Abstract. The role people play in real or virtual environments can have an influence on how we make decisions. Furthermore, it has been suggested that stimulating analytic or impulsive information processing can influence framing effects. In this study we combine these previous results and examine whether virtual role-playing influences the strength of the effect of message framing. Participants were subjected to an experiment in which they played different characters in a computer game. Within the game, the effects of different types of message framing where measured. The results suggest that susceptibility to attribute framing increases when role-playing an impulsive character. The current study contributes to the existing literature both by demonstrating a novel effect virtual role playing has on our information processing, as well as by introducing games as a novel medium for studying the effects of message framing.

Keywords: Behavioral economics · Framing effect · Proteus effect · Role-playing · Avatars · Serious gaming

1 Introduction

Ever since its demonstration by Tversky and Kahneman [1], the so-called 'framing effect' has been a well-researched phenomenon in the field of decision-making and behavioral economics. The framing effect is a cognitive bias, it assumes that choices between logically equivalent alternatives can be influenced by framing the problem in different ways. It is claimed to be one of the strongest cognitive biases in human decision-making. As such, the presence of the framing effect is often used as evidence for irrational or impulsive decision making. In this paper a study is presented which investigates whether the effect size of different variants of the framing effect can be influenced by playing a specific role or avatar in a virtual environment. We hypothesize that by playing a distinct role different types of information processing can be primed, and subsequently influence the strength of the framing effect. Thus, the goal of the study was to show the influence of digital persona on cognitive processes related to decision making. In particular, the focus of this research is the question: "Does playing

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an analytic or impulsive character, respectively, influence the susceptibility to the framing effect?"

This research can be seen as a proposal for how virtual role-playing environments can be used to produce novel and interesting insights, especially in the field of behavior psychology and decision-making. Where most of the research on framing is conducted in a lab-setting and by using questionnaires, the present research shows how a game can be used as an alternative medium to gather data in situ. Even though games are virtual, they may provide a more natural environment in which psychological experiments may be concealed, as well as provide some increased motivation to win by all means, thus reducing observer effects such as the Hawthorne effect. Whilst the main interest of the authors is in biases in decision making in general, this kind of research can also contribute to the use of gaming for serious, non-entertainment purposes.

The remainder of this paper is structured as follows: First, a background section will provide an overview of the literature regarding the framing effect and serious gaming, as well as explaining the different variants of the framing effect. Second, an overview of studies on video-games and behavioral change is given. Third, the method used for the research is discussed, as well as its merits in comparison to methods used in other framing studies. Finally, the empirical results are presented and reviewed.

2 Background

In this section a more detailed explanation of the framing effect and the types of framing, is given.

2.1 The Framing Effect Explained

The classic understanding of the framing effect is often called the 'risky-choice framing effect'. An example of the risky-choice framing effect is the 'Asian Disease Problem' as described by Tversky and Kahneman [1]. The 'Asian Disease Problem' is an experimental setup in which two groups of participants are proposed the situation of a hypothetical outbreak of an Asian disease that infected 600 patients. For this outbreak the participants need to choose one out of two treatments. For each of the two treatments a different description is given, either describing a sure outcome or a gamble. E.g. the first treatment would be described as "Treatment A will save 200 patients" while the second treatment would be described as "With treatment B, there is a 1/3 probability that everyone will be saved, and a 2/3 chance that nobody will be saved." For both groups a similar description is given. However, the difference in the descriptions for each of the groups is that net results of each of the options is either described as a gain (positive frame) or a loss (negative frame). For example, instead of the example descriptions as given above (the positive or gain-frame), in the second group the medicines would be described as: "With treatment A, 400 people will die" vs. "With treatment B, there is a 1/3 probability that nobody will die, and a 2/3 chance that everyone will die" (a negative or loss-frame). Note that the description in both groups is logically the same; for both groups the expected net results of either option is 200.

Although logically equivalent, the different frames have a profound effect on the choice preference of the participants in each group. Kahneman & Tversky observed that most participants avoided risks when presented with a positive frame, while seeking risks when presented with a negative frame. Even more, they found the effect to be as strong as to induce an almost symmetric reversal of choice preference in both groups; in the 'positive framing' group 72 % choose for the sure option while only 22 % chose for the sure option in the 'negative framing' group (and vice versa).

Apart from the risky framing effect other variants of framing can be distinguished, namely attribute framing and goal framing. In the case of attribute framing a choice shift is caused by describing the attributes of an object, or a procedure, in either a positive way or in a (equivalent) negative way. The effect of the attribute framing is then measured by the willingness to do the action or the evaluation of the product. For example, consumers are more likely to rate a piece of meat positively when it is described as 25 % lean instead of 75 % fat [2].

Lastly, goal framing entails the effect that is caused by describing either the positive or negative consequences of doing an action or avoiding to do that action. For example, women are more apt to participate in breast self-examination when they are presented with the negative consequences of not engaging in the procedure than when presented with information stressing the positive consequences of doing the procedure [3].

2.2 Causes of and Influences on the Framing Effect

Although the framing effect has been proven to be consistent and strong, several influences on the magnitude and presence of the framing effect have been found. For example, when one is presented with a risky framing problem and is asked for a rationale for the decisions, the framing effect seems to disappear [4]. Even more, the framing effect seems to (dis)appear when a participant is respectively asked to *'think like a scientist'* or *'choose using their gut feeling'* before a framing experiment [5].

Due to the supporting research, the causes of the framing effect have often been related to dual process theories, which roughly state that our cognitive information processing system is divided into two separate systems, namely a system concerned with intuitive judgments and an analytic or rational system [6].

2.3 Role-Playing, Avatars and Behavioral Change

The influence of virtual characters on human behavior is often related to video-games. For example, the research by Konijn et al. [7] suggests that when adolescent boys identified with a violent game character, they show increased aggression while playing against other players. An earlier study by Nowak et al. [8], suggest that playing aggressive video games can increase aggressive behavior outside the virtual world. Even more, a study by Yoon and Vargas [9], more specifically researching *types* of avatars, showed that the specific type of avatar can have a profound influence on the behavior of a subject outside the virtual environment. In their experiment the subjects played either a hero or a villain. After their play-through they were asked to pour either

chili-sauce or chocolate sauce on a dish which was said to be for the next participant. Ultimately, the results showed that the participants who played as a villain not only chose to pour chili-sauce more often, but did so in considerably higher amounts than the participants who played the hero avatar. A study by Happ et al. [10], relating avatars to (pro) social behavior, showed similar results.

Although the relation between avatars and behavioral change has been demonstrated multiple times, studies concerning the relation between virtual role-playing and the framing effect are lacking. This is especially surprising since the framing effect could provide interesting insights in the cognitive processes of players playing a specific kind of avatar.

3 Method

The goal of the present research was to answer the question: "Does playing an analytic or impulsive character, respectively, influence the susceptibility to the framing effect?" In this section the design and procedure of the experiment is discussed. Furthermore, the rationale for using a digital environment is given.

3.1 Experiment Design

The experiment utilizes a 'mod' made for the well-known video role-playing game called Skyrim.[1] A mod or modification is an addition to an existing game, changing the content or the game-play mechanics of the game. In this research a self-developed mod was used to modify Skyrim so that it was usable for the experiment.

Out of a group of 86 participants, each participant was randomly given a specific role and had to play a small scenario. More specifically, 29 played as a 'Warrior' character, 29 played as a 'Scientist' character and 28 as a 'Neutral' character. The reason for including the neutral character was that it functioned, more or less, as a 'control group' character. For example, it was expected that players playing the warrior role showed the highest susceptibility to the framing effect, players playing the scientist role the lowest, while a moderate effect was expected for the players playing the neutral character.

Each of the roles had certain abilities which let the player manipulate the world in certain ways. For example, the warrior had the possession over a sword and a shield, allowing him to defeat enemies by force. The scientist had the ability to activate certain puzzle elements in the game. The neutral character had no specific abilities. In this research a combination of visual cues and character traits are given to manipulate the concept of "role". In the research we added a number of manipulation checks to assess whether our role manipulation was successful.

During the gameplay, the participants were presented with four framing tasks in either a positive framing or a negative framing. The tasks the participants received were

[1] See https://cognitiveroleplaying.wordpress.com/ for screenshots and http://bit.ly/1mdfsre for user feedback and downloading the mod.

two risky framing tasks, one attribute framing task and one goal framing task. The framing for each separate task was randomly assigned. As such, this experiment utilized a 3 (role) x4 (task) x2 (valence) mixed-subject design with role and valence as between subject factors, and task as a within subject factor. Most participants were subjected to the experiment by face-to-face contact; the participants met the researchers in 'real-life' and were instructed by the researchers directly. A sub group of 26 of the participants were found on internet fora and were instructed how to conduct the experiment through online media. Of 66 out of the 86 participants the age is known, which averaged around 25 years old (median = 25.5).

3.2 Procedure

The players were asked to take place behind a laptop and were given a small explanation of the research. However, the explanation did not include any references to the framing effect itself. Instead the participants were told that "they partook in a study regarding role-playing and behavior". The participants were asked to play through a small introduction level to get acquainted with the mechanics and the controls. After the introduction level, the main story of the game was explained. Finally, participants were *given* one specific role and were presented with a small background story of their character. Again, as a means of avoiding any bias of the participant for (non) risky behavior, the characters were described simply by their occupation and origin. References suggesting whether the characters themselves would or wouldn't take risks were avoided.

The main premise of the game consisted of finding a cure for an outbreak of a mysterious disease, in a supposed abandoned research facility. Throughout their exploration they were presented with two challenges. For the first challenge the player had to find a way past a guarded gate, either by using force, solving a puzzle or using dialogue. The second challenge consisted of a group of enemies which the player had to evade by using force or triggering a trap. However, if player was the neutral character, the player would be allowed to cross without the need for any interaction. The purpose of these challenges for the research was to prime the players to 'get in character' and roleplay.

In the game the player met a non-playing-character (NPC) which guided the player through the use of dialogue. The reason for including this character was threefold: first, through this character more story-elements were given to the player. Second, through the interaction with the character the player was able to role-play his or her character by giving answers during the dialogue. Lastly, through the answers on the dialogue, data was generated by which could be deduced whether the player was giving answers like the character (the participant was playing) would. On a similar note, the actions performed during the challenges were also recorded for the same reason. After going through the level, a code was generated which contained the data of the experiment, namely the choices as well as the role-playing actions performed by the player. A full play-through from begin till end, for either online or offline participants, averaged around 20 min.

Framing tasks: Throughout the play-through each player was presented with four framing tasks:

Task 1 (Goal framing task): In the starting dialogue with the NPC, the player is told that there are several items present in the research facility. After this dialogue, the framing message is given in either a positive or negative frame. In the positive frame the message was as follows: "If you take these valuable items, you might receive a reward in the end". The negative frame read: "Don't leave these items, since you might miss out on a reward in the end". At the end of the experiment the amount of valuable and non-valuable items the player picked up were measured.

Task 2 (First risky framing task): After the first challenge the player encounters a chest which initiates the task. The player is told that there is an amount of 400 gold pieces in the chest. Two options are given in either a positive or negative frame. In the positive frame the two options were described as follows: either the player could gain exactly 100 gold pieces for sure, or the player would have a 1/4th chance to gain all gold pieces while having a 3/4th chance of gaining none. In the negative framing the two options were described as follows: either the player could lose exactly 300 pieces (from the 400) for sure, or the player would have a 1/4th chance to lose none of the gold pieces while having a 3/4th chance to lose all the gold pieces.

Task 3 (Attribute framing task): During dialogue with the NPC, the player is told about a medical procedure one of the patients in the research facility had to undergo. An attribute or characteristic of the procedure is described, namely the success or mortality rate. In the positive frame the procedure was being described as "2/3th chance of being successful". In the negative frame the mortality rate was being described, which was 1/3th. After, the player was asked whether he or she would or wouldn't have done the procedure.

Task 4 (Second risky framing task): At the end of the play-through the players find a medicine cabinet with ingredients to make the final cure. However, they are being told that they can make only one cure out of two possible cures. This task is essentially the classic 'Asian disease experiment'. In the positive frame both cures were described as follows: The first cure saves exactly 300 out of 900 patients while the second cure has a 1/3th chance of saving all patients and a 2/3th chance of saving none. In the negative frame the cures were described as follows: The first cure lets exactly 600 out of 900 patients die, while the second cure has a 1/3th chance of letting no patients die and a 2/3th chance of letting all patients die.

3.3 Rationale for Using a Digital Medium

The main reason for using a digital environment was that the researchers were essentially able to 'catch the subjects in the act' (roleplaying while being subjected to framing research). Furthermore, by using a digital medium instead of using a more traditional approach to framing research is that it's escaping the controlled and sometimes more unrealistic circumstances of the lab. Although not all framing research is conducted using this setting, often the classic framing research method is to provide participants with hypothetical situations and simple A/B choices on questionnaires. However, 'real-life' choices are often made in more subtle contexts in variable

circumstances. Therefore, by providing the participants with a digital video-game, a game similar to games they play at home as well, the present research can be considered somewhat of a field-research instead. An interesting observation, acquired by informal interviews after the experiment, supporting this claim was that during the experiments the players actually thought there was something at stake; that by answering the questions they could eventually 'win' the game. It was strongly believed that, since they were presented with a game, a reward and punishment system existed. This provided the advantage that the players really took the experiment seriously. Therefore, one could argue that the results of the research present a more realistic picture. Especially, in comparison with classic risky framing research it might be that the participants felt more involved. In the classic risky framing experiment, participants were asked to imagine the hypothetical outbreak. Instead, in the research as presented by this article, participants (implicitly) thought that their actions had an impact, since that's normally how a game works.

3.4 Results

In this section the main results of each framing task are given. This means that for the attribute framing and risky framing tasks the choice preference of the participants for that task are evaluated. For the goal framing, the amount of valuable was measured. Although all of the framing tasks are evaluated, graphs are shown for key results only.

During the play-through the role-playing actions of the subjects were measured on specific control tasks to determine whether the player behaved like a warrior, scientist or neutral character in terms of choices made, based on the randomly assigned role. Based on the amount of these actions it was determined whether the player acted according to his or her role. For example, if a participant receiving the warrior role would chose the warrior option at all five moments, that participant would receive a score of 5 for 'playing according to their role'. Based on the average amounts of correct actions done according to role per participants for each group (War: M = 2.8; Sci: M = 3.6; Neu: M = 3.6), we can conclude that for the warrior and scientist group the role manipulation worked as participants receiving those roles, mostly chose the options according to their given role. Hence, there was a positive association between the role, and the actions selected by the participants indicating that our role manipulation was successful.

Attribute framing task: In Fig. 1. (figure in the right-corner) the results of the attribute framing for all the participants, independent of the role they played, are shown. A significant effect of attribute framing was found with $X2 = 4.54$; df: 1; $p = 0.033$. These results suggest that, overall, attribute framing had a significant effect on the choices made by the participants.

The main graph of Fig. 1. represents the choice preferences of participants playing the different roles. Since the different role-groups were relatively small, a fisher-exact test was used for producing more powerful results. Comparing the three different groups, interacting with attribute framing, no difference between each of the groups could be demonstrated ($p = 0.075 > 0.05$. However, a "trend" indicating the warriors being affected more strongly by the framing effect was shown. Using a fisher-exact test

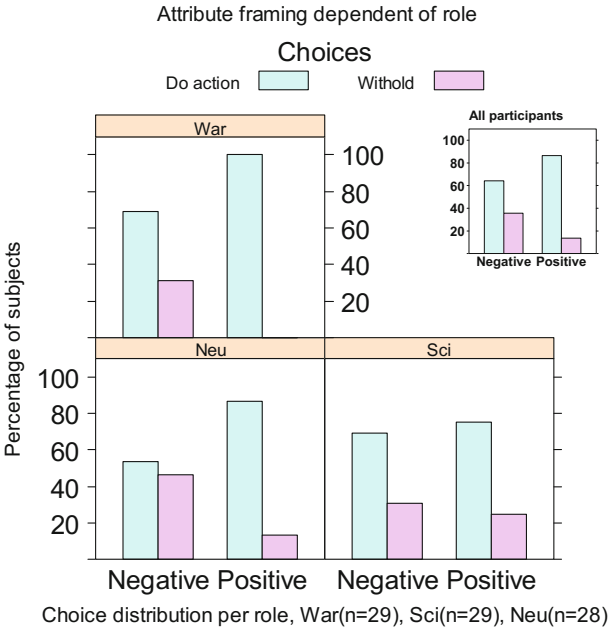

Fig. 1. Choice distribution for attribute framing task (for all participants and per role).

a difference between the two frames in the warrior group was found ($p = 0.047$). Since no differences were found in either the scientist group ($p = 1$) or the neutral group ($p = 0.192$), these results suggest that participants playing the warrior character were indeed influenced by attribute framing, while participants playing the other roles weren't being affected.

Risky framing task 1: From looking at the results independent of role (Fig. 2. right-corner), there was no indication that there was a framing effect. The results as divided by role showed a more noticeable difference in the warrior group. However, using a fisher-exact test a p-value of 0.264 was found, indicating that there was no statistical difference between the two framing groups. Also, in all other groups no difference was found (fisher-exact test, Sci: $p = 0.682$; Neu: $p = 1$). Comparing the three roles, no difference between the groups could be demonstrated ($p = 0.176$).

Risky framing task 2: The results independent of role, didn't suggest there was a framing effect present. Moreover, from a role-specific perspective no big differences can be distinguished. A fisher-test found a $p = 1$ for the warrior group, $p = 0.390$ for the scientist group and $p = 0.705$ for the neutral group. Also, there was a difference in preference for choosing either the risk or certain options among roles in general. For example, the participants playing the warrior role preferred the risky option despite the framing. Instead, both the neutral and the scientist group preferred the certain option. Lastly, no difference between the three role-groups could be demonstrated ($p = 0.134$).

Goal-framing: At the end of the play through the amount of valuable items, that were picked up by the players, was measured. The mean scores of picked up valuable

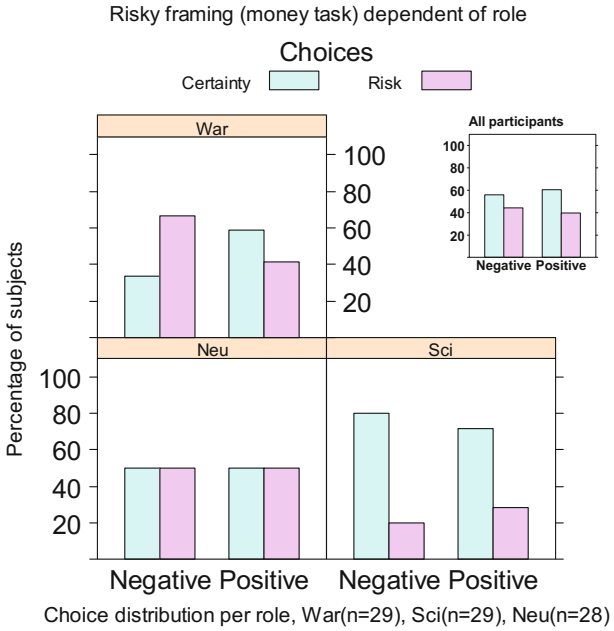

Fig. 2. Choice distribution for first risky framing task (for all participants and per role).

items for the three class groups under both valence conditions, were respectively: War (positive): M = 8.92, SE = 0.33; War (negative): M = 12.43, SE = 0.35; Sci (positive): M = 9.43, SE = 0.42; Sci (negative): M = 9.54, SE = 0.40; Neu (positive): M = 9.64, SE = 0.30; Neu (negative); M = 9.73, SE = 0.42.

For determining whether there was a main effect for either the role or framing, an ANOVA test was used. However, no main effect was found for either role, $F(2, 72) = 0.330$, $p = 0{,}720$, or framing, $F(1, 72) = 0.625$, $p = 0.432$. These non-significant results suggest that framing and class, overall, have no impact on the amount of valuable items that the participants picked up (or that the study was underpowered to demonstrate the effect). Moreover, using a two-way ANOVA it was found that there is no interaction between the role participants played, and the framing of the message on the measured amount of valuable items, $F(2, 72) = 0.554$, $p = 0.577$.

4 Discussion

The results as presented by this research bring some interesting implications to light. First, since the framing effect has often been regarded as one of the stronger cognitive biases, the fact that the results as presented in the current didn't show the framing effect convincingly in most tasks raises some interesting questions. For example, it is of interest to see whether the current manipulation and measurement contained too much

variation (or whether merely the sample was too small) to replicate earlier studies. Most importantly, it raises the question whether the framing effects found in previous studies would be present when those studies would utilize different environment. When using a digital medium amounts to the disappearance of the framing effect, one could doubt whether current framing methodologies should be revised.

The results suggest that using a video-game as the medium may have been an influence on the absence of the framing effect in most cases. However, this immediately raises the problem of immersion. When is a participant really involved in a video game? And, can use of a game as a medium, if the player isn't feeling immersed, result in the player behaving more rational in their decision making? Furthermore, can the fact that the player may or may not have identified with the character influenced the results?

Some of these concerns can be addressed by evaluating the experimental results in detail. For example, in the research included multiple control tasks to check whether the player assumed his or her role correctly. These checks showed that most players acted according to their role. However, this still might have left the possibility open that the player acted according to his or role while not feeling 'connected' with the character. Even though some players, after finishing the experiment, did mention that they felt immersed more thorough measurements of immersion or the 'emotional involvement' of the player, could be provide some interesting insights.

Most importantly, the current results not only shed some light on current framing methodologies, but can be seen as an argument for using digital media, such as role-playing games, for more serious research topics. Often, videogames are considered to be meant for more playful or entertaining purposes. However, these results clearly show that research into video games combined with more serious topics can shed some interesting, new insights and yield results which are against established findings.

5 Conclusion

In this research an answer was sought to the question whether playing an impulsive or analytic character respectively induces or reduces the framing effect. In our in situ experiment a main effect of attribute framing was found. Furthermore, it was found that the group playing the warrior character was influenced strongly by the attribute framing effect while the other groups were not. The results, however, did not show a strong effect of risky-choice framing or goal framing: in our in situ experiments the effects of these manipulations were apparently small. However, even in these conditions results indicated that players adopting the warrior role seemed more prone to the effects of framing. Hence, we conclude that while a study with more power is certainly worthwhile, the current study at least provides initial evidence that the "warrior" — and hence impulsive — role is more prone to framing effects. Furthermore, our presented method using immersive gaming introduces a novel methodological paradigm to study human decision making: we hope this approach can benefit future studies.

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