

# Studying Gender Bias and Social Backlash via Simulated Negotiations with Virtual Agents

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**Abstract.** This research investigates whether (female and male) virtual negotiators experience a social backlash during negotiations with an economical outcome when they are using a negotiation style that is congruent with the opposite gender. An interactive turn-based negotiation using a virtual agent as employee is used in an experiment with 93 participants. Results show that the effect of gender on negotiation outcome and social backlash was less pronounced in this experiment than expected based on existing literature. Nevertheless, the results found provide several interesting pointers for follow-up research.

**Keywords:** virtual agents, salary negotiations, social backlash, gender bias, gender pay gap.

## 1 Introduction

The gender pay gap refers to the phenomenon that women on average have lower salaries than men for the same type of job, even when adjusting for external factors like working time. One of the possible explanations of this phenomenon is the fact that men often achieve better negotiation outcomes than women [4], which may be caused by the fact that behaviors that are congruent with the female gender role are typically not seen as efficient for negotiations [1]. Women overall demonstrate a slightly less competitive negotiation style, compared to men [8]. The female negotiation style can be seen as a more cooperative or altruistic style [2], it is also described as an accommodating style, which leads to lower outcomes than the competitive negotiation style of men [8]. Female negotiators ask for less and make more generous offers compared to male negotiators [2]. Moreover, male negotiators often start with a high demand, which is shown to result in higher outcomes [6]. Female negotiators are more likely to agree on an offer earlier compared to males, which is an ineffective strategy [2].

Unfortunately, adjusting the negotiation style in such a way that it is no longer congruent with the gender role can lead to a social backlash (e.g., being perceived as less friendly) [1]. Female negotiators suffer more from social backlash than male negotiators [3], both regarding the economic outcome of the negotiation and the evaluation of the negotiator [7].

This research investigates whether this effect of gender on negotiation outcome and social backlash is also present when people negotiate with virtual

agents. By using a virtual agent in the role of either a male or female employee, and a human participant in the role of manager, it is possible to manipulate only the variables of interest and keep other variables constant among different conditions. Research has shown that the effects of emotions on the outcomes of human-machine negotiations are comparable to human-human negotiations [5]. Therefore for this research it is expected that the negotiation outcomes in the experiment are comparable to human-human negotiation outcomes. If this is the case, virtual agents may be used in the future to develop interventions to make people aware of their gender bias during negotiations.

Two negotiation styles, one congruent with the male gender role and one congruent with the female gender role, have been implemented in a female and male virtual agent in the role of employee. It is investigated whether females and males negotiating with a negotiation style opposite to the style of their gender role are punished for this, meaning their outcome benefits less from the other negotiation style compared to the opposite gender.

## 2 Research Method

Our main research goal is to study how the gender of a virtual agent influence its negotiation outcome and social backlash during salary negotiations with a human negotiation partner. In particular, the following hypothesis is tested: *Both female and male virtual agents experience a social backlash when negotiating using a negotiation style that is not congruent with their gender role.*

A total of 93 people (55 male, 38 female) participated in this study. All participants were at least 18 years old and had an adequate level of English to understand the negotiation. Only 15% of the participants had professional negotiation experience. None of the participants knew the goal of the research.

Within the experiment four conditions are used, corresponding to four virtual negotiation partners: a female employee with an assertive negotiation style (21 participants; 38% female), a female employee with a non-assertive negotiation style (25 participants; 44% female), a male employee with an assertive negotiation style (24 participants; 42% female), and a male employee with a non-assertive negotiation style (23 participants; 39% female).

For the experiment a between-subjects design was chosen, to prevent results from being affected by negotiations conducted earlier. Each participant was randomly assigned to one of the conditions. The type of virtual employee and the gender of the participant were independent variables, whereas (monetary) negotiation outcome and social backlash were dependent variables.

To start the experiment, participants could download a compressed folder via a website which randomly assigned the participant to a condition. The compressed folder contains an application that can be run without installation, to

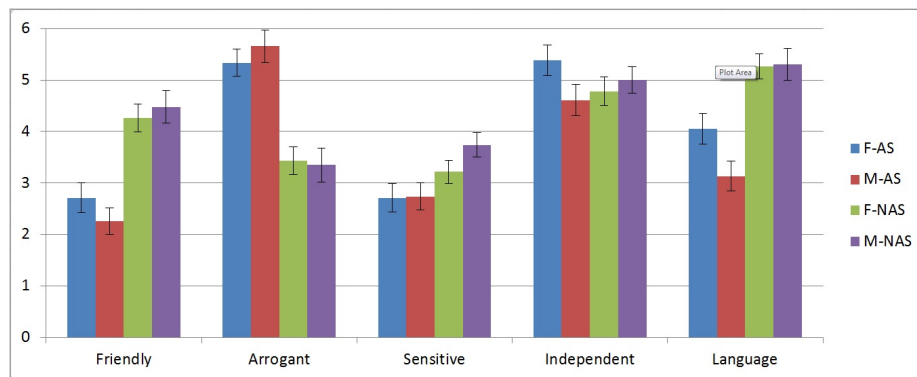
conduct the virtual negotiation followed by an online questionnaire<sup>1</sup>. The virtual negotiation consists of a background sketch<sup>2</sup> and a turn-based dialogue<sup>3</sup>.

### 3 Results

The hypothesis focuses at the social backlash experienced by both genders, measured in terms of subjective evaluation. The main results are shown in Figure 1. This figure contains five characteristics: two of these (friendly and sensitive) are assumed to be typically female properties, whereas two others (arrogant and independent) are typically male properties [1]. The fifth characteristic concerns whether the employee used appropriate language.

As shown in the figure, the differences between the male and female negotiators are small. For each characteristic, we tested, both for the female and for the male employees, whether there was a significant difference between the rating of the assertive and the non-assertive employee. This was done using independent t-tests with a Bonferroni correction to reduce the chance of a Type-I error.

For the female employees, significant differences were found for the characteristics Friendly ( $p < 0.001$ ), Arrogant ( $p < 0.001$ ), and Language ( $p < 0.005$ ). For the male employees, significant differences were found for the characteristics Friendly ( $p < 0.001$ ), Arrogant ( $p < 0.001$ ), Language ( $p < 0.001$ ), and, interestingly, Sensitive ( $p < 0.005$ ). Furthermore, also the difference in appropriate language between assertive males and assertive females was significant ( $p < 0.05$ ).



**Fig. 1.** Subjective evaluations

These results partly confirm our hypothesis that both genders would experience a social backlash when using a negotiation style that is not congruent with their gender role. Since the stereotypical female style is non-assertive, we can

<sup>1</sup> The questions of the questionnaire can be found at <https://goo.gl/i2PWKb>

<sup>2</sup> The used background sketch can be found at <https://goo.gl/Fbybyo>

<sup>3</sup> The dialogue can be found at <https://goo.gl/CPwums>

conclude that our female agents suffered from a backlash on some points: when adopting an assertive style, they were considered less friendly, more arrogant, and using less appropriate language. Instead, such negative effects cannot be observed when male agents switch from their stereotypical style (i.e., assertive) to a non-assertive style. On the contrary, in this case they are considered more friendly and sensitive, less arrogant and using more appropriate language.

Moreover, interesting differences between the genders were found for sensitivity (non-assertive male agents were considered more sensitive than non-assertive female agents) and for appropriate language (assertive female agents were considered to use more appropriate language than assertive male agents).

Besides the subjective measures also the monetary outcomes of the negotiation were analyzed. For the non-assertive employees, the salary raises that were reached by women and men are very similar. Testing whether there were significant differences in the outcomes reached by both genders, again using a t-test with Bonferroni correction, pointed out that there were no significant differences.

When considering the assertive employees only, the female employees on average achieved slightly higher raises than the male employees. This difference was not found to be significant. However, when leaving out the negotiations in which no deal was reached, the difference actually is significant ( $p < 0.05$ ). This is a surprising insight because most of the existing literature claims that it does not pay off for women to negotiate using an assertive style.

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