

# Validity of a Virtual Negotiation Training

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**Abstract.** In this paper we present a rigorously setup VR negotiation training, including an intelligent virtual agent able to express emotion and to give explanations of its behavior. We discuss the measures we took to ensure the validity of the VR training. We also present a small scale experiment showing convergent validity of the VR training.

## 1 Introduction

Virtual training systems are reported to be an effective means to train people for complex, dynamic tasks like negotiation or crisis management. Intelligent virtual agents that express emotion and that give explanations about their behavior can be used in such training [4, 3, 10]. Here we focus on measures taken to ensure the validity of a VR negotiation training we developed and present preliminary experimental results on the convergent validity of the training.

## 2 Validity of the Virtual Reality Training System

The learning goals of the negotiation training are to help people understand the importance of issues (e.g. height of salary) versus interests (e.g. enough money to make a world trip), and to train people to ask about interests to find compatible issues to get to a win-win deal with the IVA. These goals are confirmed to be important by negotiation literature [5] as well as by 8 case studies we did as a requirement analysis for the VR training.

The training content was based on the issues and underlying interests that arose in the 8 case studies. The training involves a negotiation about terms of employment with a human playing the employer and a virtual agent playing the candidate employee. A win-win solution appears only when the trainee explored the agent's interests. No agreement is reached when the trainee did not do so.

The virtual agent communicates in natural speech, recorded by a professional voice actor. In negotiation support, emotions play an important role [1]. The virtual agent expresses three basic emotions as feedback to the trainee's selected response option. Happiness signals a - for the IVA - positive outcome of a chosen option, sadness signals a potentially bad outcome, anger signals an actual bad outcome. These expressions were uniquely identifiable [2], and their meaning is compatible with cognitive appraisal theory [9], and operant conditioning. To support users in their learning, the IVA is able to explain its own behavior.

Explanations aim to help trainees to better understand and learn from training sessions [8, 6]. Our explanation method is grounded in our previous work [7].

The virtual training and scenario were reviewed and approved by a professional negotiator not involved in the design and development of the VR training. All of these measures bolster the validity of the VR training.

We performed an experiment (n=18, 12m, 6f, avg age=27, sd=4.0) to test if self-reported negotiation skill relates to better training performance (convergent validity). Subjects rated (5-point scale) self-reported negotiation skill, negotiation liking, negotiation frequency, and negotiation perseverance. Then, all subjects played the scenario as well as possible. We counted how often the subject made the IVA happy, sad and angry, and recorded the outcome utility of the deal (u=[0,8]). We found a significant correlation between self-reported negotiation frequency and sad IVA reactions ( $r(18)=-0.5$ ,  $p=-0.036$ ), and correlations between frequency and utility ( $r(18)=0.44$ ,  $p=0.066$ ) and between frequency and happy reactions ( $r(18)=0.418$ ,  $p=0.085$ ) approached significance. These findings indicate convergent validity.

### 3 Conclusion

We have described the validity of a VR negotiation training. We plan to investigate the actual effect of the training combined with instruction, exploration, and reflection, and the specific effects of emotion expressions and explanations.

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