What Kind of Stories Should a Virtual Human Swap?

(Extended Abstract)

Setareh Nasihati Gilani
USC Institude for Creative
Technology
sngilani@ict.usc.edu

Kraig Sheetz
US Military Academy
kraig.sheetz2@usma.edu

Gale Lucas, David Traum
USC Institude for Creative
Technology
{lucas,traum}@ict.usc.edu

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1. INTRODUCTION

Stories are pervasive in conversation between people [5]. They are used to establish identity pass on cultural heritage, and build rapport. Often stories are swapped when one conversational participant will reply to a story with a story.

Stories are also told by virtual humans [1, 6, 2]. In creating or mining stories for a virtual human (VH) to tell, there are a number of considerations that come up about what kinds of stories should be told, and how the stories should be related to the virtual human's identity, such as whether the identity should be human or artificial, and whether the stories should be about the virtual human or about someone else.

We designed a set of virtual human characters who can engage in a simple form of story-swapping. Each of the characters can engage in simple interactions such as greetings and closings and can respond to a set of "ice-breaker" questions, that might be used on a first date or similar "get to know you" encounter. For these questions the character's answer includes a story. We created 4 character response sets, to have all combinations of identity (human or artificial) and perspective (first person stories about the narrator, or third person stories about someone else). We also designed an experiment to try to explore the collective impact of above principles on people who interact with the characters. Participants interact with two of the above characters in a "get to know you" scenario. We investigate the degree of reciprocity where people respond to the character with their own stories, and also compare rapport of participants with the characters as well as the impressions of the character's personality.

2. RELATED WORK

Several virtual agent systems have told, elicited or swapped stories. Many systems tell stories as part of an interaction

establishing information about the character. Stories have also been told as part of establishing a long-term relationship and influencing users to adopt behavioral change. Perhaps the first system that allowed a kind of story-swapping with a virtual agent was [6], in which a child character Sam would alternate telling and listening to stories with children.

[2] performed an experiment contrasting first vs third person stories in a health-care application, where an agent told inspiring stories about weight loss, either about the agent (first person) or about someone else (third person). They found that first-person participants reported greater enjoyment, but there was no significant difference in either looking forward to talking or feeling of dishonesty between the groups. However first-person subjects did have a greater probability of talking to the agent. We revisit the question of first vs third person stories, but in a more casual setting, where the agents also use speech input to trigger virtual agent responses, elicit user stories, and including an additional condition of artificial identity.

3. STORY-SWAPPING AGENTS

We created six versions of simple story-swapping agents, using the Virtual Human Toolkit [4]. All were designed to engage with users in a simple "get to know you" dialogue, including reciprocal question answering. Four different sets of character dialogue were created, each being able to answer 20 "ice-breaker" questions, such as "Do you play sports". We created two different characters: Arnold tells first-person stories, while Arron tells third person stories about an acquaintance.
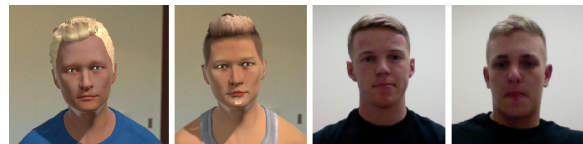

Figure 1: VH and Human Arron and Arnold

For each character, there are two versions of the stories, one in which the character is portrayed as human (Human), and having fully human experiences, and another (VH) in which the character has an artificial identity, and unable to do things like eat, but having experiences in a virtual world. For the human stories, we also have two means of display: virtual human (VH) and video recordings of people (Human). Figure 1 shows the four presentations of VH and Human Aaron and Arnold. We thus have six different

agents, considering perspective (Arnold-1st or Arron-3rd), identity (Human or VH) and embodiment (Human or VH).

4. EXPERIMENTAL DESIGN

In order to shed light on the best design choices for virtual human stories in story-swapping dialogue, we recruited experimental participants to engage in dialogue with the six agents described in the previous section. We examined independent variables of perspective (first vs 3rd person), identity (human or VH), and presentation (human video or virtual human). We used a partial within-subjects design, where each participant talked to multiple virtual humans. We decided to look at perspective (first vs third) within subjects, and to keep the identity and presentation variables the same for that subject. To control for order effects, half of the participants first talked to Arnold, while the other half first talked to Arron.

4.1 Metrics

The experiment consisted of a 3 (agent: VH-VH vs. VH-Human vs. Human-Human) $\times$ 2 (order: 1st then 3rd vs. 3rd then 1st) design. Our 60 participants (38 male, 22 female) were randomly assigned to one of these 6 cells (10 per cell). We measured the following dependent variables for each interaction: a 9-item rapport scale based on [3], a 6-item ancillary rapport scale, two items on subjective sharing of personal information, a set of 30 personality characteristics, length of participant responses and number of participant responses containing stories.

4.2 Protocol

After receiving a general explanation of the system and the procedure of the study, participants gave consent. Prior to starting the interaction with the agent, participants were given the set of questions that were supposed to be the topics of their conversation and 5 minutes to plan their answers. Each conversation consisted of a sequence of sub-dialogue episodes. After the greetings, each episode began with an ice breaking question like 'What was your favorite vacation?' from the participant followed by the agent's answer. The agent responded to the question and told stories according to its assigned perspective and identity. After his answer, the agent prompted the user to reciprocate, using phrases like "What about you?" or "Yourself?".

After going through all the questions, participants were asked to fill out a questionnaire with the subjective items about their experience with the agent. Then, participants went through the same procedure with the second character.

5. RESULTS

On each of the dependent variables, we conducted a 2 (perspective: 1st person vs. 3rd person) $\times$ 2 (order: 1st then 3rd vs. 3rd then 1st) $\times$ 3 (agent: human-human, VH-VH, vs. VH-human) mixed ANOVA with order and agent as between-subject factors, and perspective as a within-subjects factor. For the Rapport Scale, there was only a marginally significant main effect of perspective, F(1, 53) = 3.21, p = .08, such that users experienced greater rapport with the 1st person agent (M = 3.61, SE = 0.09) than with the 3rd person agent (M = 3.42, SE = 0.09).

For our ancillary rapport measure, we also found a main effect of perspective, $F(1, 53) = 4.44, p = .04$, again such

that users experienced greater rapport with the 1st person agent ($M = 3.41, SE = 0.12$) than with the 3rd person agent ($M = 3.10, SE = 0.12$). Participants shared significantly more personal information with the 1st person agent ($M = 3.92, SE = 0.12$) than with the 3rd person agent ($M = 3.65, SE = 0.14$) $F(1, 53) = 6.88, p = .01$. 1st person agents were also seen as significantly more cheerful and trustworthy and less aloof and (marginally) less rude.

In the VH-human condition, participants overall rated both agents as more "unsympathetic" when they interact first with the 3rd person agent. This was true also for ratings of "unintelligent", but the opposite held for VH-VH and Human-Human conditions. Furthermore, users spent more time speaking with the agents they came across second. We did not witness any other significant differences in the percentage of told stories among the six conditions.

6. CONCLUSIONS

In Summary, like [2], we see a general preference for 1st person over third person stories. On the other hand, we do not see differences in objective measures of user reactions to the stories in dialogue, so it may also be fine to tell third-person stories or have a non-human backstory identity, as long as the stories are interesting and approachable, and the identities are consistent.

There are many ways in which we would like to follow up this study. We can vary the within-subjects variables, look at effects of different genders of virtual humans, and other subject matter. We also want to look at different dialogue protocols, and a mixture of types of stories.

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