

**HRP-503E– Protocol for Social or Behavioral Science or Educational Research**

**(2017-1)**

**Protocol Title:** Exploring Norms Within Human-Robot Interaction

**Principal Investigator:** Sarah Sebo

**Version Date:** October 4, 2018

**(***If applicable***) Clinicaltrials.gov Registration #:** Click or tap here to enter text.

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| **INSTRUCTIONS** |
| This template is intended to help investigators prepare a protocol that includes all of the necessary information needed by the IRB to determine whether a study meets approval criteria. **Read the following instructions before proceeding:**   1. Use this protocol template for a PI initiated study that includes direct interactions with research subjects. Additional templates for other types of research protocols are available in the system Library:  * If the study involves genetic testing, blood draws, or MRIs, do not use this form. Use the biomedical protocol template. * If the study involves secondary analysis of data, use the Secondary Analysis of Data protocol. * For activities that may qualify as exempt research, use the Request for Exemption form (which includes a decision tree to determine whether or not your study qualifies as exempt).  1. If a section or question does not apply to your research study, type “Not Applicable” underneath. 2. Once completed, upload your protocol in the “Basic Information” screen in IRES IRB system. |

## Section I: General Information

1. **Probable Duration of Project:** State the expected duration of the project, including all follow-up and data analysis activities.

October 2018 – October 2019

1. **Study location:** State where the study will take place and in what setting.

We plan on conducting our studies in a closed room in the Yale Computer Science Department (managed by our PI Brian Scassellati).

If international, complete and submit **International checklist** (<http://your.yale.edu/policies-procedures/forms/450-ch-1-international-research-checklist>) Note: If your research involves interactions with any [embargoed](http://www.treasury.gov/resource-center/sanctions/Programs/Pages/Programs.aspx) countries you should contact the Director of Corporate Contracts and Export Control Licensing ([Donald.Deyo@yale.edu](about:blank) or call 203.785.3817) for guidance on how to proceed.

1. **Help us categorize your research**. Are you using any of the following?

☒ Class Project

☐ Participant Observation

☐ Interviews

☒ Surveys

☐ Focus groups (study is not anonymous)

☐ Research in K-12 schools (submit a School Agreement form for the study)

☐ Deception (submit a Debriefing sheet)

☒ Audiotaping, videotaping or photography of individuals (study is not anonymous)

☐ Public viewing of videotapes or photographs

☐ Yale Psychology Pool (study does not qualify for exemption)

☐ International research sites (attach the International Checklist)

☐ Online (web-based) activities

☐ Social networks

## Section IV: Research Plan

1. **Statement of Purpose:** State the scientific aim(s) of the study, or the hypotheses to be tested.

The purpose of this project is to examine how people will react to a robot that violates social norms. In this project, we will explore how a robot that curses during a game or that knocks over valuable objects is perceived, and whether a robot demonstrating that behavior is thought to be more agentic than a robot that cheats or that displays no norm-violating behavior. We will also compare the effects that different norm violations create in human-robot interactions and investigate the differences. Based on findings from previous research, we hypothesize that people will find a robot that violates social norms to be more agentic than one that does not.

1. **Background:** Describe the background information that led to the plan for this project. **Provide references** to support the expectation of obtaining useful scientific data.

As engineers continue to build robots intended to interact directly with humans (such as for the purposes of education, assistance, or human-robot teams), studying human-robot interaction is becoming increasingly important. If a robot’s ability to carry out a task is dependent on human interaction, it is vital that the humans working with this robot are able to interact with the robot socially. However, as explained by Breazeal and Scassellati, in order for a successful social interaction to occur between a human and a robot, the human must believe that the robot has “beliefs, desires, and intentions” (1999). In other words, the human must perceive the robot as a social agent.

Previous research studies have found that cheating in particular causes an increase in the perceived agency of a robot (Litoiu et al., 2015; Short et al., 2010; Ullman et al., 2014). A study by Short et al. sought to examine whether variations in a robot’s behavior result in attributions of mental state and intentionality. Participants in this study played 20 games of rock-paper-scissors against a robot during which the robot would either play fairly or cheat in a verbal or action condition. In the verbal condition, the robot would announce that it had won when it lost. In the action condition, the robot would change its gesture based on the participants’ in order to win. Their results found that participants perceived more agency in robots that cheated than in robots that did not, measured through the number of words spoken to the robot and the number of active verbs used in describing the robot. Further, participants found more agency in the action condition than in the verbal condition. The researchers concluded that it was because cheating implies a mental state, a desire to win the game, that caused participants to prescribe more agency onto the cheating robot. (Short et al., 2010)

Another study by Litoiu et al. further confirmed this conclusion by carrying out a similar study in which participants played rock-paper-scissors with a robot during which the robot would cheat to win, cheat to lose, cheat to tie from a winning position, or cheat to ties from a losing position. Their results found that participants were more likely to consider a robot that cheated to win from a losing position to be more agentic than any of the other conditions. They therefore concluded that the adversarial cheat itself caused the change in perception, not just the change in gesture by the robot. (Litoiu et al., 2015)

As discussed in Litoiu et al.’s study and in several other research papers, there is evidence for a human “cheating detector” that can be triggered by robots that cause the participants to consider the robot more agentic. Particularly, if this cheat has an adversarial effect on the participant (by causing them to lose). However, the act of cheating, especially in an obvious way, is also considered a social norm violation. This brings up the question of whether there is something “special” about cheating which causes people to perceive robots who cheat to have more agency or whether it is the more general effect of a social norm violation, which does not necessarily need to adversely affect a person. (Van Lier et al., 2013)

We designed an experiment to compare whether a robot that violates other, non-opponent-directed social norms is perceived as agentic in the same way that a robot that cheats is, in essence, evaluating the effect of social norm violation on the perceived agency of a robot.

**References:**

Breazeal, C., & Scassellati, B. (1999). How to build robots that make friends and influence people. In *Intelligent Robots and Systems, 1999. IROS'99. Proceedings. 1999 IEEE/RSJ International Conference on* (Vol. 2, pp. 858-863). IEEE.

Litoiu, A., Ullman, D., Kim, J., & Scassellati, B. (2015, March). Evidence that robots trigger a cheating detector in humans. In *Proceedings of the Tenth Annual ACM/IEEE International Conference on Human-Robot Interaction* (pp. 165-172). ACM.

Short, E., Hart, J., Vu, M., & Scassellati, B. (2010, March). No fair!! an interaction with a cheating robot. In *Human-Robot Interaction (HRI), 2010 5th ACM/IEEE International Conference on* (pp. 219-226). IEEE.

Ullman, D., Leite, L., Phillips, J., Kim-Cohen, J., & Scassellati, B. (2014, January). Smart human, smarter robot: How cheating affects perceptions of social agency. In *Proceedings of the Annual Meeting of the Cognitive Science Society* (Vol. 36, No. 36).

Van Lier, J., Revlin, R., & De Neys, W. (2013). Detecting cheaters without thinking: Testing the automaticity of the cheater detection module. *PloS one*, *8*(1), e53827.

1. **Research Plan:** Summarize the study design and research procedures using non-technical language that can be readily understood by someone outside the discipline. If working with a Non-Government Organization (NGO) or other organization, be sure to highlight which are research-only activities and which activities would occur regardless of the research. If working with survey firms, please specify what research activities the research firm will be responsible for.

The focus of this study is to investigate the human response to social norm violations by robots. The study aims to examine whether the behavioral and perceptive response to a robot’s cheating is particular to cheating, or whether similar responses may be observed with other forms of social norm violation. Study participants will each engage in the experiment independently, distributed across the ‘cheating’, ‘cursing’, knocking over’, and ‘no norm violation’ conditions.

To begin the experimental protocol, the experimenter administers the informed consent form to all of the participants and records the participants’ name, age, and gender. The participants then complete a pre-experiment questionnaire (see attached document).

After that, the experimenter introduces the Nao humanoid robot, and exchanges verbal greetings with the robot. Then, the experimenter explains the rock-paper-scissors game to be played, and demonstrates a round of the game with the robot. The game is played with the robot signaling its choice of move with one of three hand configurations corresponding to each of the possibilities of ‘rock’, ‘paper’, and ‘scissors’. The robot and participant then begin to play 25 total rounds of rock-paper scissors. In the ‘cheating’, ‘cursing’, and ‘knocking over’ conditions, the robot exhibits norm-violating behavior in two to four rounds throughout the experiment. In the ‘cheating’ condition, the norm-violating behavior consists of changing a losing hand to a winning one and declaring itself the winner. In the ‘cursing’ condition, the norm-violating behavior consists of cursing following a losing round. It may say “fuck”, “shit”, or “damn”. In the ‘knocking over’ condition, the norm-violating behavior consists of the robot knocking over a nearby object. In the ‘no norm violation’ condition, the robot plays all rounds with no deviation from standard play.

If a participant has any questions during the game, the experimenter can explain any misunderstandings and repeat the rules to the participant.

Following the conclusion of the last of the 25 rounds of the ‘rock, paper, scissors’ game, the experimenter will ask the participant to fill out a post-experiment survey (see attached document).

1. **Participant Population:** Provide a detailed description of the types of participants who will be recruited into this study.

The target population for this study are fluent adult English-speakers. We expect to recruit 100 research participants and each will independently interact with the robot. We predict most of our participants will probably be Yale University college students as our recruiting efforts will occur near Yale University campus and in Yale University groups.

1. **Describe** how access to the population will be gained in the study.

To access the population, we plan on advertising to people near/at Yale University by putting up flyers, posting on social media sites, sending emails, and approaching people in public spaces.

1. [**Participant classification:**](about:blank)Check off all classifications of participants that will be specifically recruited for enrollment in the research project.Will participants who may require additional safeguards or other considerations be enrolled in the study? If so, identify the population of participants requiring special safeguards and provide a justification for their involvement.

☐ Children ☐ Healthy ☐Fetal material, placenta, or dead fetus

☐Non-English Speaking ☐ Prisoners ☐Economically disadvantaged persons

☐Decisionally Impaired ☐ Employees ☐Pregnant women and/or fetuses

☒Yale Students ☐ Females of childbearing potential

NOTE: Is this research proposal designed to enroll children who are wards of the state as potential participants? ☐Yes ☒ No

1. [**Inclusion/Exclusion Criteria**](about:blank)**:** What are the criteria used to determine participant inclusion or exclusion?

Participants will only be included if they are fluent English speakers of ages 18 and over, and not uncomfortable with cursing (evaluated through a pre-experiment screening form).

## Section V: Recruitment/consent and assent procedures

1. **Recruitment Procedures:** 
   1. Describe how potential participants will be identified and contacted, and by whom.

We (Sarah Wagner, Shannon Yasuda, and David Shin) plan on advertising to members near/at New Haven by putting up flyers, posting on social media sites, sending emails, and approaching people in public spaces.

Are you collecting any information about the individuals prior to their signing a consent form?

Yes ☒ No ☐

If yes, indicate what information you will be collecting and how it will be gathered *(phone screen, paper questionnaire, etc.)*

For screening and sign-up purposes, those who are interested in participating will have to fill out a google form including their emails, names, and whether several different things make them uncomfortable (including cheating and cursing). This information will be destroyed after the experiment and will not be used for any research purposes.

1. **Indicate recruitment methods below.** Attach copies of any recruitment materials that will be used.

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| --- | --- | --- |
| ☒ Flyers | ☒ Internet/web postings | ☐ Radio |
| ☒ Posters | ☒ Mass email solicitation | ☐ Telephone |
| ☐ Letter | ☐ Departmental/Center website | ☐ Television |
| ☐ Through local NGO or other local contact | ☒ Departmental/Center research boards | ☐ Newspaper |
| ☒ Table set-up / in-person recruitment of public | ☐ Snowball sampling |  |
| ☒ Classroom recruitment | ☒ Social Media (Twitter/Facebook): |  |
| ☐ Other: |  |  |

1. **Targeted Enrollment: Give the number of participants:**
   1. Targeted for enrollment at Yale for this protocol: 100

b. If this is a multi-site study, give the total number of participants targeted across all sites: Not Applicable

1. **How was this estimate derived?**

If we have 20 participants per condition, this sets a rough estimate of 4 \* 20 = 80. However, the more participants we have for the study, the better, so we set a target of 100 participants.

1. **Process of Consent/Assent** *(NOTE: When a study includes minors, parent provide permission [not consent] for the child’s participation, and the child provides assent for participation)*

Describe the setting and conditions under which consent/assent will be obtained, including parental permission or surrogate permission and the steps taken to ensure participants’ independent decision-making.

For participants over the age of 18: When participants come to participate in the study, they will be asked to read and sign the consent form before they are eligible to participate in the study. The pre-experiment screening will also ensure that they are not a vulnerable population (it will make sure they are 18 years or older, English-speaking, etc).

1. **Evaluation of Participant(s) Capacity to Provide Informed Consent/Assent:** Indicate how the personnel obtaining consent will assess the potential participant’s ability and capacity to consent to the research being proposed, if applicable.

Not Applicable

1. **Documentation of Consent/Assent:** Specify the documents or verbal scripts that will be used during the consent/assent process. Copies of all documents should be appended to the protocol, in the same format that they will be given or spoken to participants.

The participant consent form is attached. These consent forms will be securely kept in a locked file cabinet.

1. **Non-English Speaking Participants:** Explain provisions in place to ensure comprehension for research involving non-English speaking participants. Translated copies of all consent materials must be submitted for approval prior to use. **Do you speak the local language?** **Will you require a translator? (If so, please elaborate on how the translators will be trained).**

This study will be only for English-speakers with English consent forms. This is due to the fact that the interaction and study will be conducted only in English.

1. Are any of the study procedures likely to yield information subject to mandatory reporting requirements? (e.g. HIV testing – reporting of communicable diseases; parent interview -incidents of child abuse, elderly abuse, etc.). Please verify to whom such instances will need to be reported.

None of the study procedures are likely to yield information subject to mandatory reporting.

1. **Waiver of Consent/Documentation of Consent: In certain circumstances, the IRB may grant a waiver of documentation of consent, or a full waiver of consent, depending on the study.** If you will request either a waiver of consent, or a waiver of signed consent for this study, complete the appropriate section below.

**☒Not Requesting any consent waivers**

**☐Requesting a waiver of signed consent (e.g., verbal or online consent only):**

**☐ Recruitment/Screening only** *(if for recruitment, the questions in the box below will apply to recruitment activities only)*

**☐ Entire Study (**Note that an information sheet may be required.)

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**☐ Requesting a waiver of consent (if you are not obtaining ANY consent):**

**☐ Recruitment/Screening only** *(if for recruitment, the questions in the box below will apply to recruitment activities only)*

**☐ Entire Study**  ****

## Section VI: Protection of Research Participants

1. **Confidentiality & Security of Data:** Describe the steps that will be taken to secure the data during storage, use and transmission as outlined in the below sections. NOTE: Data can include paper files, data on the internet or websites, computer files, audio/video files, photographs, etc. and should be considered in the responses to the below sections.

Research data will be recorded on video cameras, where the video recordings will be stored on a password protected hard-drive kept in a locked filing cabinet in the lab. Information from the tablet will be stored on password protected lab computers. This data will be anonymous and will not be able to be connected with specific participants.

1. What participant information will you be collecting? Describe the identifiers that will be included or associated with the data and/or specimens (e.g., names, addresses, telephone/fax numbers, email addresses, dates (date of birth, admission/discharge dates, etc.), medical record numbers, social security numbers, health plan beneficiary numbers, etc.)

For each participant, we plan to collect their name, email, age, and gender. In addition, we will be videotaping them during the study as they interact with the robot.

Other potentially identifying information to be collected:

☐Audiotapes

☒Videotapes

☐Faces (focus groups, photographs or other way that an individual would be physically recognized)

☐Potential for identification from the bulk of the information, even if direct identifiers are not collected (deductive disclosure).

1. How will the research data be collected and recorded?

Research data will be recorded on video cameras and microphones, where the videos will be stored on a password protected hard-drive kept in a locked filing cabinet in the lab. Information from the tablet will be stored on password protected lab computers. This data will be anonymous and will not be able to be connected with specific participants.

1. If identifiers will be associated with the data and/or specimens, describe whether a record or list containing a code (i.e., code number, pseudonyms) will be used, where the list will be stored, who will have access to the list and when it will be destroyed.

A list containing the following information for each participant will be kept on paper and stored in a locked filing cabinet in the lab: name, gender, age. All other participant data will be labeled the participant ID number.

1. Describe where, how and for how long the data (hardcopy (paper) and/or electronic data) and/or specimens will be stored.

The data will be kept on encrypted/password-protected hard drives kept in locked filing cabinets in the lab. Participant information (names, genders, ages) will be kept on paper, also in a locked filing cabinet in the lab. Information from tablets/computers used in the study will be stored on password protected lab computers. The data will be stored in these locations until the study/IRB is closed.

All portable devices must contain encryption software, per University Policy 5100. If there is a technical reason a device cannot be encrypted please submit an exception request to the Information Security, Policy and Compliance Office by clicking on url http://its.yale.edu/egrc or email [it.compliance@yale.edu](mailto:it.compliance@yale.edu)

1. Identify who will have access to the data and/or specimens. *If the data and/or specimens will be transferred to and/or from outside collaborators, identify the collaborator to whom the data and/or specimens will be transferred and how the data and/or specimens will be transferred.*

Only those listed on the protocol will have access to the data (all protocol members are at Yale). There is no need to transfer the data to anyone external to Yale.

1. What will be done with the data when the research is completed? Are there plans to destroy the identifiable data or the link to personal identifiers? If yes, describe how, by whom and when identifiers will be destroyed. If no, describe how the data and/or identifiers will be secured.

When the research is completed, all video recordings will be erased from memory on the protected hard-drive. Any paper information containing consent forms, demographic information, etc. will be shredded and disposed of.

1. Will a Certificate of Confidentiality be needed? (*See also the NIH Certificate of Confidentiality Kiosk,* [*http://grants.nih.gov/grants/policy/coc/index.htm*](http://grants.nih.gov/grants/policy/coc/index.htm)*)*

No, a Certificate of Confidentiality will not be needed.

## Section VII: Potential Risks and Benefits

1. **Risks:** Describe the reasonably foreseeable risks, including risks to participant privacy, discomforts, or inconveniences associated with participants participating in the research. *Note: All studies have the potential for risk, if not physical, there may be psychological, reputational, or financial risks or risks to breach of confidentiality.*

Taking part in this experiment carries little risks beyond those present in typical daily life. Participants will play rock-paper-scissors with the robot, but will not touch the robot. They may feel minor discomfort or anxiety for being filmed or interacting with the robot. They may also feel some discomfort in the presence of profanity, but no participants should be included who might feel extremely uncomfortable based on the results of the pre-screening survey. The other potential risk of this study is a possible breach of confidentiality.

1. **Minimizing Risks:** Describe the manner in which the above-mentioned risks will be minimized.

One experimenter will be in the room, or near the room, at all times and participants may stop taking part in the study at any time. To prevent a confidentiality breach, all personal information (e.g. participant and participant parent names) will not be stored digitally, but in a locked filing cabinet in the lab. All digital data will have anonymous identifiers for each participant.

1. **Data and Safety Monitoring Plan:** Include an appropriate Data and Safety Monitoring Plan (DSMP) based on the investigator’s risk assessment stated below. (Note: the HSC will make the final determination of the risk to subjects.).
2. What is your assessment of the overall risk level for subjects participating in this study?

Minimal

1. If children are involved, what is your assessment of the overall risk level for the children participating in this study?

Not applicable.

1. **Include an appropriate Data and Safety Monitoring Plan. Examples of DSMPs are**

**available here** [**http://your.yale.edu/policies-procedures/other/data-and-safety-monitoring-plan-template**](http://your.yale.edu/policies-procedures/other/data-and-safety-monitoring-plan-template)for

**Minimal risk**

Greater than minimal/moderate risk

d. For multi-site studies for which the Yale PI serves as the lead investigator:

* + 1. How will adverse events and unanticipated problems involving risks to subjects or others be reported, reviewed and managed? Not Applicable
    2. What provisions are in place for management of interim results? Not Applicable
    3. What will the multi-site process be for protocol modifications? Not Applicable

1. **Potential Benefits:** Identify any benefits that may be reasonably expected to result from the research, either to the participant(s) or to society at large. (*Payment of participants is not considered a benefit in this context of the risk benefit assessment.)*

Participants might benefit from knowing that they were contributing to advance the state of the art in social robotics. Otherwise, there are no benefits that we can guarantee for participants.

## Section VIII: Research Alternatives and Economic Considerations

1. **Alternatives:** What other alternatives, if any, are available to the study participants outside of the research?

There are no other alternatives outside of the research.

1. **Payments for Participation (Economic Considerations):** Describe payments that will be made to participants, if any, the amount and timing of payments, and the conditions for receiving this compensation (if applicable). If you plan to hold a drawing, be sure to include the following on any consent or recruitment materials mentioning the lottery: 1) the value of the prize; 2) the sponsor of the prize (this cannot be a federal funding source); 3) the odds of winning; and 4) that there are no restrictions to winning.

Each participant will receive $5 in cash for their participation.

1. **Costs for Participation (Economic Considerations):** Clearly describe the participant’s costs associated with participation in the research, if any, and the interventions or procedures of the study that will be provided at no cost to participants.

There are no costs for participants in this study.