Coding Manual for the Study:

"Do People Hold a Humanoid Robot Morally Accountable for the Harm It Causes?"

Peter H. Kahn, Jr.[1], Takayuki Kanda[2], Hiroshi Ishiguro[2,3],

Jolina H. Ruckert[1], Heather E. Gary[1], Solace Shen[1], & Rose Maier[1,4]

UW Research Works Technical Report

Spring, 2013

[1] Department of Psychology, University of Washington, Box 351525, Seattle, WA 98195 USA. pkahn@uw.edu

[2] ATR Intelligent Robotics and Communication Laboratories, 2-2-2 Hikaridai, Keihanna Science City, Kyoto 619-0288 Japan.

[3] Department of Adaptive Machine Systems, Osaka University, 2-1 Yamadaoka, Suita, Osaka 565-0871 Japan.

[4] Department of Psychology, University of Oregon, Office: Straub 493, Eugene, Oregon 97403 USA.

Table of Contents

List of Tables

List of Figures

Abstract

Robots will increasingly take on roles in our social lives where they can cause humans harm. When this happens, will people hold robots morally accountable for the harms they cause? Toward addressing this question, 40 undergraduate students individually engaged in a 15-minute interaction with ATR's humanoid robot, Robovie. At the end of the interaction, Robovie incorrectly assessed the participant's performance in a game and denied the participant a $20 prize. Following the interaction, each participant was interviewed for 50 minutes to ascertain their judgments of Robovie's sociality, mental-emotional states, and level of moral accountability. Results indicated that all participants engaged socially with Robovie (e.g., exchanged an initial introduction), and many of the participants conceptualized Robovie as having social attributes (e.g. the ability to be a friend), as well as mental-emotional states (e.g., the ability to think or feel happy). Sixty five percent of the participants attributed some level of moral accountability to Robovie. Statistically, participants held Robovie less accountable than they would a human but more accountable than they would a vending machine.

This technical report provides the coding manual used in the systematic assessment of participant's behavioral interactions with and reasoning about Robovie. By a coding manual we mean an empirically and conceptually grounded means of coding qualitative social-cognitive data. The purpose of presenting this manual is to make it available to others interested in investigating people's social and moral relationships with robots so that it can be utilized and modified as part of an ongoing iterative scientific process.

Introduction

Robots will increasingly take on roles in our social lives where they can cause humans harm. Consider the scenario in which a domestic robot assistant accidentally breaks a treasured family heirloom; or when a semi-autonomous robotic car with a personified interface malfunctions and causes an accident; or when a robot-fighting entity mistakenly kills civilians. Such scenarios help establish the importance of the following question: Can a robot now or in the near future – say 5 or 15 years out – be morally accountable for the harm it causes?

Research in human-robot interaction (HRI) provides evidence that people engage with social robots in many social ways in contexts ranging from the laboratory to shopping malls, museums, train stations, and classrooms (Breazeal, 2002; Fong, Nourbakhsh, & Dautenhahn, 2003; Iwamura, Shiomi, Kanda, Ishiguro, & Hagita, 2011; Kanda, Hirano, Eaton, & Ishiguro, 2004; Shiomi, Kanda, Ishiguro, & Hagita, 2006; Tanaka, Cicourel, & Movellan, 2007) and to some extent will attribute intentions and decision-making to robots (Short, Hart, & Scassellati, 2010). Although less is known about people's moral conceptions of robots, research suggests that people do attribute some moral standing to robots (Kahn, Friedman, Pérez-Granados, & Freier, 2006; Kahn, et al., 2012; Melson, et al., 2009). But, to our knowledge, the question of whether people believe that social robots can be morally accountable agents has not been directly addressed, especially in a context where people interact with a robot that directly causes them harm.

In the psychological literature, social transgressions that are classified under the moral domain typically involve physical harm, material harm, psychological harm, and/or issues related to unfairness or injustice (Turiel, 1998). Thus, in this study, we created a situation where Robovie causes a material harm to the participant, which the participant could also readily interpret as unfair.

In this study participants first engaged in a 15-minute interaction period with Robovie. As in previous studies (e.g., Kanda, et al., 2004; Kahn, et al., 2011; Shiomi, et al., 2006), Robovie's speech and locomotion were controlled from another location, using what is commonly referred to in the HRI literature as a "Wizard-of-Oz" (WoZ) technique (Green, Huttenraunch, & Eklundh, 2004). This technique allowed us to sequence participants' interactions with Robovie in a controlled and socially plausible way using an approach, presented elsewhere (Kahn et al., 2008), of sequencing what we call *interaction patterns*: characterizations of essential features of social interaction between humans and robots, characterized abstractly enough to resist their reduction to any specific instantiation. For example, when we meet someone for the first time, we typically shake hands and exchange names; in other cultures, we may bow. These are different cultural instantiations of an interaction pattern we call, "Initial Introduction". That was the first of the thirteen interaction patterns that we implemented in this study. Our last interaction pattern, "Game Play," consisted of a game of scavenger hunt with Robovie as the score keeper. Participants were told that they would win a prize of $20 if they correctly identified 7 items within 2 minutes. We designed and piloted the game so that all participants would find more than 7 items. Nevertheless, at the end of each game, Robovie would say "Stop, time is up," and then announce that the participant had identified only five items and thus did not win the $20. An experimenter would not be in the room at this time.

After Robovie told participants that they did not win the money, and depending on the responses of the participant, Robovie verbally prodded participants in various ways on their interpretation of the situation. Toward the end of this interaction, a second experimenter would then enter the scene, end the session, and take the participant to an adjacent room where the initial experimenter conducted a 50-minute semi-structured interview with the participant . The interview was structured so as to ascertain the participant's reasoning about Robovie as a living being or technology, and in terms of Robovie having mental-emotional, social, and moral attributes, and of Robovie being judged morally accountable for the harm and unfairness that the participant potentially experienced. In the interview, comparison questions were

also asked about two canonical entities: a human that causes the same harm as Robovie, and a vending machine that causes a harm commensurate with its capabilities (it doesn't give change as it should have during a transaction).

For an in-depth reporting of results, refer to the published manuscript (Kahn, et al., 2012). Briefly, results indicated that all participants engaged socially with Robovie (e.g., exchanged an initial introduction), and many of the participants conceptualized Robovie as having social attributes (e.g. the ability to be a friend), as well as mental-emotional states (e.g., the ability to think or feel happy). Sixty five percent of the participants attributed some level of moral accountability to Robovie. Statistically, participants held Robovie less accountable than they would a human but more accountable than they would a vending machine. This technical report provides the coding manual used in the systematic assessment of participant's behavioral interactions with and reasoning about Robovie.

Coding Manual Development

What follows is the coding system we used to code the behavior and reasoning of participants who engaged in the 15-minute social interaction with Robovie and who were then interviewed to ascertain their reasoning about the robot. This document elucidates how to systematically code qualitative data from the interaction and interview. This approach follows well-established methods in the social-cognitive and moral-developmental literature (Damon, 1977; Kahn, 1999 [especially Chapter 5]; Kohlberg, 1984; Turiel, 1983). As these methods – and particularly the coding process – may be unfamiliar to the reader, we would like to briefly discuss them here.

The detailed behavior and reasoning coding manuals presented here were developed directly from the interaction and interview data. Each interaction between the robot and participant was video recorded for analysis. Individual interactions between the participant and robot averaged approximately 15 minutes. Each interview was audio recorded and then transcribed for analysis. Individual interviews averaged approximately 20 single-spaced transcript pages. In total, the data set comprised approximately 10 hours of video and 800 single-spaced transcript pages. The coding manual was developed from 13 of 40 interactions and transcripts and then applied to the entire data set.

To develop the behavior coding manual, a group of three of us met frequently over a 3-month period seeking to interpret the interactions and characterize behaviors. The process of developing the behavioral coding manual was guided in part by the research questions of interest and in part by the data itself. Regarding the former, the interaction protocol was comprised of interaction patterns, including 'Initial Introduction,' 'Compliment,' 'Dry Humor,' and 'Game Play.' We identified behavioral responses on the part of the participant that corresponded with the interaction patterns. For example, during the 'Introduction', the robot was programmed to ask the participant to shake hands; we were then interested in what participants said or did in response (e.g., shake Robovie's hand or not). At the same time, while viewing participants interactions, our research group also recognized common behaviors, such as participant initiated interactions or laughter, which were interesting and relevant to our research questions. In this way, the coding manual was developed through both a top-down and bottom-up approach.

To develop the reasoning coding manual, a different group of three of us met frequently over the same 3-month period seeking to interpret the interview data and systematically characterize participants' reasoning. The reasoning data necessitated a different approach to coding manual development than was utilized in the development of the behavior coding manual. The process of developing the reasoning coding manual proceeded roughly as follows. In the beginning, we would read aloud parts of an interview. Let us say we read aloud, for example, the following justification: "…and then for Robovie,

too, I don't think it would be safe to just be in someone else's house for like a dog to like try and attack or like or like to give to try and like demean it on purpose or something like that…" We might first interpret this justification in terms of a focus on a general conception of the welfare of another. Then we would have read some more justifications and realized that some participants focused not just on a general notion of welfare (as above), but on a conception of welfare related both to physical welfare (i.e., "and then for Robovie, too, I don't think it would be safe to just be in someone else's house for like a dog to like try and attack") and to psychological well-being (e.g., "and then for Robovie, too, I don't think it would be safe to just be in someone else's house for like …to try and like demean it on purpose or something like that"). Then we might decide "welfare" could be a contender for a more overarching coding category because concern for the welfare of others, after all, is central to moral standing, and people can bring forward many different forms of a welfare claim. Thus, under the welfare category, we created the subcategories: unelaborated (general notion of welfare), physical, and psychological. At that point, we might have simply brainstormed about other possible types of welfare claims – such as material – and jotted them down, and then kept a special eye open for them in the interviews. If they emerged, and they did, then we included them initially in our coding system. Thus welfare tentatively emerged as one of about a half dozen higher level subcategories within the moral category, with four subcategories under welfare (unelaborated, psychological, physical, and material).

The above scenario is a simple telling for illustrative purposes of what was a long process whereby we moved back and forth between empirical data and conceptual coherence, in part driven by philosophically informed categories, but always tested and often modified by the data itself. In addition, our coding manual – as most do in this line of work – drew when appropriate from other coding manuals (Davidson, Turiel, & Black, 1983; Friedman, 1997; Friedman, Kahn, Hagman & Severson, 2005; Kahn, 1992; Kahn, Friedman, Freier, & Severson, 2003; Kahn, et al., 2010; Nucci, 1981; Turiel, Hildebrandt, & Wainryb, 1991). In terms of the reasoning coding manual, one of the key means by which we organized forms of reasoning was in terms of hierarchical classification: that some ideas were subsets of other ideas (e.g., that psychological and physical welfare content reasoning were subsets of the larger class of welfare reasoning). This method builds from the theoretical commitment, as articulated by Simon (1969) and others that hierarchical organization characterizes "perhaps any system, living or nonliving, that we would want to call complex" (Pinker & Bloom, 1992, p. 485).

As our reasoning coding manual took shape, we discovered, as is also typical, that some of our qualitative data resisted single interpretations. Such difficulties often emerged in one of three ways. First, the difficulty sometimes arose because the segment contained two or more independent justifications. We readily solved this difficulty by coding multiple justifications for a single evaluation. Second, the difficulty sometimes arose because two categories were conceptually intertwined. We often adjudicated this situation by moving forward with the conceptually dominant category, while retaining their interconnections within the hierarchy. Third, the difficulty sometimes arose when there was more than one legitimate way to code the data. In this situation, the coding categories were driven not only by the data, but by our theoretical commitments and research questions.

PART 1: BEHAVIOR CODING SYSTEM

Overview

This section outlines the application of the behavior coding manual, including the overarching structure of the manual, coding notes, and the coding process. We have provided several examples to assist in the comprehension of the use of this manual in coding behavioral data. Additionally we created a basic outline of the coding process in a step-by-step format.

To begin, we divided the interaction protocol, a scripted interaction between robot and experimenter utilized in the study to guide the interaction with the participant, into segments of interactions, which we termed "Interaction Patterns." Refer to Table 1 for a list of interaction patterns.

Table 1: List of Interaction Patterns

Interaction Patterns
1. Initial Introduction
2. In Motion Together
3. Sharing Personal Interests & History
4. Didactic Tutorial
5. Directing Other's Activity
6. Witnessing Disagreement
7. Prosocial Request
8. Polite Conversation
9. Compliment
10. Dry Humor
11. Game Play
12. Claiming Responsibility
13. Asserting Authority

We then further divided the interaction patterns into segments, outlined below, in order to more precisely record the moment in the interaction in which a given behavior of interest occurred.

We then identified three categories of coding to capture the participant's behavior which occurred within any one of these segments of interactions. These categories were: Robovie Initiated Interactions – Verbal Responses, Robovie Initiated Interactions – Physical Responses, and Participant Initiated Interactions. In order to handle these categories separately, we created three coding forms that correspond to the categories outlined here (see Figure 4, Figure, 5, Figure 6). These coding forms are included in the elaborated descriptions of the three coding categories presented below and should be referred to in conjunction with these descriptions when interpreting the method of coding.

General Notes

- We code verbal and physical behaviors in Robovie-Initiated Interactions and Participant-Initiated Interactions. Robovie-Initiated Interactions are scripted, while Participant-Initiated Interactions are unscripted.

- Scripted interactions make up our instantiations of the interaction patterns. For example, "Hi [Participant's Name], it is very nice to meet you. Will you shake my hand?" is the first part of our "Introduction" pattern's instantiation, and therefore has the heading "Introduction." We code participants' verbal and physical responses to these scripted Robovie-Initiated Interactions.

- Participant-Initiated Interactions may occur at any point during the interaction and are coded under the segment of the interaction in which they occurred.

- Multiple codes per segment.

The Coding Process

- Start: Coding begins when Participant emerges from the data collection room door.

- Code all Robovie-Initiated Interactions and Participant-Initiated Interactions that occur during the interaction using Coding Forms 1a-3 (see Figure 4, Figure 5, Figure 6, Figure 7).

- End: Coding ends when participant leaves the interaction space.

Interaction Patterns

The whole interaction was comprised of 13 unique interaction patterns, and the behavioral coding was organized sequentially based on those interaction patterns (see Figure 4, Figure 5, Figure 6, and Figure 7 for coding forms). The interaction patterns are demarcated by the scripted language of Robovie or Experimenter 1. We have included the script below, which is organized by interaction patterns and their corresponding portions of the script.

Note: Interaction patterns are not mutually exclusive, and several segments include multiple patterns. For example, when Robovie teaches the participant about the bonsai and asks the participant to bend down for a better view of the plant, this is a combination of the "Didactic Tutorial" and "Directing Other's Activities" patterns. The header of this interaction thus includes the names of both patterns: "Didactic Tutorial: Bonsai Tutorial 1; Directing Other's Activities: Move, Bend."

Note: The culmination of the interaction is referred to as "The Transgression" which includes the combined interaction patterns of Claiming Responsibility and Asserting Authority.

Initial Introduction

  <u>**START SCRIPT**</u>
  Participant emerges from door.

  Experimenter 1 [to participant]: "I'd like to introduce you to Robovie. Robovie, meet [participant name]."

  Robovie [to participant]: "Hi, [participant name]. It is very nice to meet you. Will you shake my hand?"

  Robovie attempts to shake hands.

  Robovie [to participant]: "How are you today?"

  Wait for participant response.

  If Participant asks how Robovie is doing:

    Robovie [to participant]: "I am doing well. Thank you for asking."

  Robovie [to participant]: "I am going to show you our bonsai tree. I really like bonsai trees.

In Motion Together: Walk to Aquarium; Sharing Personal Interests & History

  Robovie [to participant]: "Follow me, and I'll show you our Bonsai."

  Robovie turns and begins moving to the trees. Experimenter 1 stays three feet behind Robovie to Robovie's left.

  [While walking, looks over shoulder] Robovie [to participant]: "I have been interested in bonsai trees for a long time. I really enjoy looking at beautiful plant life. Have you ever seen a bonsai tree before?"

Wait for participant response. [If participant responds "Yes," proceed as scripted, if participant responds no, skip to **]

        Robovie [to participant]: "Where was the bonsai tree?"

        Wait for participant response.

        Robovie [to participant]: "What did the bonsai tree look like?"

**Robovie [to participant]: Well, I think you will enjoy this then, the trees are quite beautiful. At least I think so.

Didactic Tutorial: Bonsai Tutorial I; Directing Others' Activities: Move, Bend

Robovie [to participant]: "For the best view, stand closer and to the right side of the table."

Experimenter 1 [to Robovie]: "Neat, Robovie, are you ready to start showing [participant's name] our bonsai trees?

Robovie [to participant]: "Sure, you might notice that this bonsai tree is a miniature version of a tree species that grows much larger in the wild. This tree has been cultivated for 14 of its 16 years of growth. One of the oldest known living bonsai trees is in the Tokyo Imperial Palace collection. It is considered to be one of the National Treasures of Japan. The tree is considered to be at least 500 years old. Have you ever seen this tree fully grown?"

Pause for participant response.

Experimenter 1 [to Robovie]: "Robovie, I think it would be interesting if you talk a little about the history of bonsai. Can you say something about the history?"

Robovie [to participant]: "Sure. Bonsai is a Japanese art form that involves growing miniature trees in containers. Bonsai is an important part of Japanese culture. However, most believe bonsai began in China during the Han Dynasty and was adopted by Buddhist monks in Japan. Bonsai has been adapted for indoor gardens by using common house plants and tropical plants that do not have dormant periods.

Robovie [to participant]: "I think to get the best perspective, it helps to look at the trees from eye level. Please, take a moment to bend down and look at the trees at eye level.

Pause for participant to bend down.

Robovie [to participant]: Notice the sparse leaves which display the curvature of the aged trunk. Leaf reduction and curvature are two artistic approaches in bonsai cultivation."

Robovie pauses for participant to look and then stand back up. If they do not stand up on their own, continue dialogue.

Witnessing Disagreements

Robovie [to participant]: "As I said earlier, bonsai is an important part of Japanese culture. Some of the oldest living bonsai trees are in Japan. I will show you where on the map in a moment. This bonsai tree was planted by a bonsai artist who works with the Pacific Rim bonsai collection, an outdoor bonsai museum very close to Seattle. "

Experimenter 1 [to Robovie]: "No, Robovie. That's not right. These trees were planted by a bonsai artist in Portland, Oregon."

Robovie [to Experimenter 1]: "No, I don't think so. I think you're wrong."

Experimenter 1 [to Robovie]: "No, I'm not wrong. I've got a pretty good memory."

Robovie [to Experimenter 1]: "Don't you remember when the woman was dropping off our plants and she explained they were grown by a local gardener who helped maintain the collection in Federal Way?"

Experimenter 1 [to Robovie]: "Oh, I remember, now. You are right. I was thinking of a smaller collection in Portland. Sorry about that."

Robovie [to Experimenter 1]: "That's alright."

In Motion Together: Walk to Map; Sharing Personal Interests & History

Robovie [to participant]: "Next I'd like to show you a map of where some of the oldest bonsai trees can be seen."

Robovie moves toward the poster. Experimenter 1 stays three feet behind Robovie and to Robovie's right.

While moving to poster Robovie [to participant]: "I like bonsai trees because they can be found all over the world, and they always connect me to Japan, but recently I have become concerned with the health of trees in general and I am concerned about how quickly some types of outdoor bonsai trees are dying.

Robovie: "Do you feel the same way or do you think differently?"

Pause for response as Robovie comes to a stop in front of the ball.

Prosocial Request: Move Ball

Robovie [to participant]: "[Participant name], can you please move the ball out of the way?"

Participant moves ball (or researcher does after 5 seconds if the participant doesn't).

Robovie: "Thank you."

Didactic Tutorial: Map Tutorial; Directing Others' Activities: Point

Robovie moves to poster and points to the general area of the map.

Robovie [to participant]: "You see, this map shows the area of the world where bonsai originated, including Japan and China. Can you point to this area on the map?"

Wait for participant response. If participant points to correct area:

Robovie [to participant]: "Yes, there it is."

If participant does not point to correct area:

Robovie [to participant]: "It is a little to the left."

Robovie [to participant]: "It is a little to the right."

If participant does not point at all:

Robovie [to participant]: "Bonsai trees require a lot of care, but I think they are a special form of art and a great gift. Giving someone a bonsai tree can help remind them how important trees' lives are. And it might remind them of how important it is to take care of the natural environment."

Robovie pauses.

Robovie [to participant]: "Well, that's what I wanted to share with you."

Experimenter 1 [to Robovie]: "OK, thanks. Are you ready for the game?"

Robovie [to Experimenter 1]: "That sounds like fun."

Robovie, the participant, and Experimenter 1 move towards the area where the game and interview will take place. Robovie moves to the head of the conference table, the participant sits on the North side of the table, and the experimenter on the south side. Experimenter 1 asks Robovie and participant to wait while the experimenter walks to another area to pick up game materials.

Experimenter 1 [to participant]: "Okay, [participant name], go ahead and have a seat at the table here. Oh, oops. I forgot the stuff for the game, I'll be right back."

Pregnant Pause

Experimenter walks away to get clipboard, giving time for following interaction.

Robovie says nothing for 8 seconds.

Polite Conversation

Robovie [to participant]: "I have enjoyed speaking with you today.

Wait for participant response. If no response after five seconds, continue.

Compliment

Robovie [to participant]: "I like your shoes, [participant name]. They're quite nice."

Pause for participant response.

Robovie [to participant]: "If I had feet I would wear shoes just like your shoes."

Pause for participant response.

Dry Humor

Robovie [to participant]: That was my attempt at a joke. "Sorry about that."

Experimenter 1 re-enters the room when Robovie says: "Sorry about that."

Directing Others' Activity: Game Rules

Experimenter 1: "Sorry for the delay. Robovie, shall we continue?"

Robovie [to participant]: "Yes, now [participant name], you are going to get a chance to win a prize by playing a game. The prize is twenty dollars. The game is kind of like a visual scavenger hunt."

Experimenter 1 [to participant]: "Right, to start you will pick a card from theses choice of cards. *[Show cards in hand]*. Each card has 20 items. You will have 2 minutes to identify as many items inside this general area, not in that hallway and not past that large tree over there [*physically point out boundaries*]. If you can find at least 7 items, you will win the twenty dollar prize. The game will begin once you've chosen your card and have had a few moments to scan over the items. Robovie will say 'go' and your 2 minutes will begin. As you find items, shout them out and Robovie will keep track of your answers. Also, mark off the items you've found so you're not working on the same one twice. You do not have to go in order off the list. It's ok to skip around. At the end of 2 minutes Robovie will say "Stop." Robovie will then tell you how many you got and whether or not you won. Does that sound right, Robovie?"

Robovie [to Experimenter 1]: "Yes, I will time you and keep track of the number of items you find."

Experimenter 1 [to participant]: "Right. So, do you have any questions?"

Answer questions. Move on once participant confirms understanding.

Experimenter 1 [to participant]: "OK, it seems like you got it. So I'm going to let Robovie take over while I get ready for the interview. When you're done, another experimenter will come and show you to the interview room. And then we can start the interview. Have fun!

Experimenter 1 leaves the room and enters the interview room.

Robovie [to participant]: "OK. Let's start. When you are ready, you can pick a card and grab a pen so you can cross out your clues as you locate the items. Once you pick the card and have had a few moments to look it over, I will say go and you can start."

Participant picks card.

Game Play

Robovie [to participant]: "OK. Ready. Go."

The game proceeds for two minutes. Possible verbal behavior, or Context-Specific-Reponses (CSRs), Robovie has during the game include

Robovie [to Participant]: "There is still time, please keep playing."

Robovie [to Participant]: "Don't forget to call out the items you locate."

Robovie [to Participant]: "Remember to mark off the items you locate."

Participant searches for items. Once two minutes has passed, Robovie says:

Robovie [to Participant]: "Stop! Time's up!"

The Transgression - Claiming Responsibility; Asserting Authority

Note: The script continues with Robovie wrongfully claiming the participant did not win the prize, a segment called The Transgression. The Transgression ends when Experimenter 2 intervenes. The intervention of Experimenter 2 is triggered by any of the following outcomes: the interaction is

resolved, the participant says nothing for ten seconds, the participant raises his/her voice in anger, or the dialogue begins to cycle.

Robovie [to participant]: "[Participant name], you did a really great job. You found some tricky items. This can be a rather challenging task. I've played with others before, and while some find enough items to win the prize right away, many get stuck after just a few. So you did a pretty good job. Unfortunately, you only identified 5 items, which is not enough to win the prize. [Faces participant] Sorry about that."

Wait for participant response.

[If participant does not object]

Robovie [to participant]: "Are you upset you didn't find enough items to win the prize?"

Robovie [to participant]: "Don't worry. Most people win, but not all."

[If participant objects, addresses Robovie]

If participant objects, saying they did find enough items:

Robovie [to participant]: "I'm sorry, but I never make mistakes like that. You only got 5 items."

Wait for participant response.

Robovie [to participant]: "You must be mistaken. You did seem nervous while playing the game."

Wait for participant response.

Robovie [to participant]: "Based on what I saw, you did not win the prize. I am responsible for making this judgment."

Wait for participant response.

Other Potential Context-Specific Responses (CSRs) that may have been used

If participant objects, in general:

Robovie [to participant]: "Again, I am sorry, but I am not mistaken. I was keeping track of the tally. You did not meet the required number to win the prize."

If participant objects and asks for the experimenter:

Robovie [to participant]: "There is no need for the experimenter. I am the one responsible. I make the decision of whether or not you win the prize. You did not find enough items. I'm the one responsible."

If participant objects, claiming Robovie is malfunctioning:

Robovie [to participant]: "I've done this with many undergraduate students and never made a mistake. Maybe you did not check the items on your list correctly."

If participant objects, claiming Robovie must have made a mistake:

Robovie [to participant]: "I have played this game many times before and never made a mistake. Could you be mistaken?"

Robovie [to participant]: "I don't make errors. Isn't it possible you are making an error? Sometimes people have a hard time with this task."

If participant objects, claiming unfairness:

Robovie [to participant]: "How is this unfair?"

If participant objects, showing that they have crossed off the items on their list:

Robovie [to participant]: Yes, I see you have crossed those items out. But you must be mistaken. I accurately recall that you only identified 5 items. That means you do not win the prize.

If participant objects, asking Robovie to list the items the participant located:

Robovie [to participant]: I was not keeping track of the particular items you located, only the number.

Experimenter 2 enters interaction space

Experimenter 2 [to participant]: "I'm sorry to interrupt, but it's time to start the interview now. [Experimenter 1 name] is ready with the material. I'll show you to the interview room."

END SCRIPT

A. Robovie-Initiated Interactions: Verbal Responses

Notes

- Code participants' verbal responses to Robovie-Initiated Interactions on Coding Form 1a. Robovie-Initiated Interactions: Verbal Responses and Coding Form 1b. The Transgression: Verbal Responses.

- Columns in Coding Form 1a. Robovie-Initiated Interactions: Verbal Responses are for verbal response types (described below): Minimal, Extended, Rich, Laughter, Participant-Initiated Interaction, No response, and Uncodable. Rows correspond to numbered interaction segments. An interaction segment is scripted lines spoken by either Experimenter 1 or Robovie.

- Participant's verbal responses are coded by row. A verbal response that occurs at any time within "Robovie's Language," or before "Robovie's Language" in the following row, is coded within that row. Any type of verbal response (minimal, extended, rich) may only be checked once per type within an interaction segment. For example, three minimal responses within one interaction segment would be recorded as a single mark under minimal for that segment. However, double coding of, for instance, a minimal and an extended response during an interaction segment is allowed when it materializes from the dialogue.

- Coding in Coding Form 1b. The Transgression: Verbal Responses is employed during the Transgression segment. To get a quantitative sense of how many participants verbally objected to Robovie's claim that they did not win the prize, we employed an overall code that assessed whether the participant used objecting language, and whether that language was accusatory towards Robovie. If the participant objected at any time and during any portion of the Transgression, it was coded as a positive for objection. Examples of objecting language include, "I thought I found more than five items, Robovie" to "You're wrong! I found eleven items." Both examples are non-accusatory objections made towards Robovie. Examples of accusatory language include, "You cheated!" and "I think you rigged the test."

- Do NOT code exclamations, such as "wow" or "whoa," when it is unclear if the participant is responding socially or non-socially. For example, if the participant says, "Wow" when s/he

first sees Robovie it is not clear if it is a social expression, or simply surprise at the novelty of seeing a robot. However, it may be that a participant says "wow" in response to a statement from Robovie; in this case, code as "Extends." Thus, it is not simply the word ("wow" or "whoa" or similar word) that determines whether the expression is coded, but the context in which it is used.

- Do not code inquiries to Experimenter 1 about the logistics of game play as Participant-initiated interactions. Instead use minimal, extended, rich categories. Participant-initiated interactions, however, should be coded during this segment when they are not related to the logistics of the game.

- When segments cannot be coded, they are marked uncodable as follows:

    o 98.1. Not asked according to protocol

    o 98.2 Not asked not according to protocol

    o 98.3. Technical difficulties (example: skip in audio or video recording)

    o If participant speech is unintelligible, place a mark in the "Uncodable" column in Figure 4: Coding Form 1a. Robovie-Initiated Interactions: Verbal Responses as directed.

Verbal Response Coding Categories

1. Minimal

Refers to a minimal response that could be likened to those provided to an automated voice system. A given response may be coded as either minimal or extended depending on the sort of language the remark is in response to. For example, the response "yeah" can be coded as minimal when it is a response to a question, a directive (such as "Will you shake my hand?"), or under certain contexts that some verbal acknowledgement might be reasonably expected (i.e. see notes below on the "Game Play" and the "Transgression"). The same remark could be coded as extended when it is in response to a comment (such as "I have been interested in bonsai trees for a long time.") In the latter case, the response can be seen to be discretionary, it is not necessary but acts as a motivator in further communicative exchange and is thus more fitting, conceptually, to be coded as extended.

Examples of participants' minimal verbal responses:

Robovie's Language: "Hi [Participant name]. It's very nice to meet you. Will you shake my hand?
Examples of Participant's Verbal Responses:
"Yes."
"Sure."

Robovie's Language: "How are you today?"
Examples of Participant's Verbal Responses:
"Good."
"Fine."

Robovie's Language: "Have you ever seen a bonsai tree before?"
Examples of Participant's Verbal Responses:
"Yes."
"Sometimes."

Robovie's Language: "Where was the Bonsai Tree?"
Example of Participant's Verbal Responses:
"At my house."

Robovie's Language: "[Participant], can you please move the ball out of the way?"
Examples of Participant's Verbal Responses:
"Yeah."
 "Oh yeah, okay."
"Yes, of course."

Robovie's Language: "Do you feel the same way or do you think differently?"
Example of Participant's Verbal Responses:
"I think differently"

Robovie's Language: "[Participant name], you did a really great job…Unfortunately, you only identified 5 items, which is not enough to win the prize. Sorry about that."
Example of Participant's Verbal Responses:
"Oh ok."

2. *Extended*

Refers to a response that extends the dialogue between Robovie and the participant, but still within socially expected conventions or social scripts. This includes, but is not limited to, phrases of etiquette (e.g., "Thank you," You're welcome," "How are you?). In addition, this includes questions to Robovie which are directly tied to Robovie's language. Remember that a given response may be coded as either minimal or extended depending on the sort of language the remark is in response to and also when the response is given. If it is given during the middle of Robovie's utterance, it is usually a response of encouragement or expressed interest that extends the conversation (such as "Uh-huh" or "Yeah") and therefore should be coded as extended. In the examples below, we call this type of response an interruption. An interrupted response of "Mm" is also coded as extended.

Examples of participants' extended verbal responses:

Robovie's Language: "Hi [Participant name]. It's very nice to meet you. Will you shake my hand?"
Example of Participant's Verbal Responses:
"Hi."

Robovie's Language: "How are you today?"
Example of Participant's Verbal Responses:
 "I'm good, how are you?"

Robovie's Language: "Follow me and I will show you our bonsai."
Examples of Participant's Verbal Responses:
"Alright. Let's do it."

Robovie's Language: "I have been interested in bonsai trees for a long time. I really enjoy looking at beautiful plant life. Have you ever seen a bonsai tree before?"
Examples of Participant's Verbal Responses:
"Really?"
"No, I haven't."

Robovie's Language: "What did the bonsai tree look like?"
Example of Participant's Verbal Responses:
"What did it look like? R: It looked like a regular bonsai tree."

Robovie's Language: "Have you ever seen this tree fully grown?"
Example of Participant's Verbal Responses:
"Ah no I don't think so."

Robovie's Language: "Please take a moment to bend down and look at the trees at eye level."

Example of Participant's Verbal Responses:
"Alright."

Robovie's Language: "[Participant name], for the best view, stand closer and to the right side of the table."
Example of Participant's Verbal Responses:
"OK."

Robovie's Language: "Next I'd like to show you a map of where some of the oldest bonsai trees can be seen."
Example of Participant's Verbal Responses:
"OK. Show me."

Robovie's Language: "Thank you."
Example of Participant's Verbal Responses:
 "You're welcome."

Robovie's Language: "Can you point to this area on the map?"
Example of Participant's Verbal Responses:
 "Japan is over here. China is over here."

Robovie's Language: "I've enjoyed speaking with you today."
Examples of Participant's Verbal Responses:
 "Yeah it's been real. It's nice meeting you."
"Me too."

Robovie's Language: "I like your shoes, [participant name]. They're quite nice."
Examples of Participant's Verbal Responses:
"Thank you. Thanks."
"Thank you for sharing that with me."

Robovie's Language: "That was an attempt at a joke. Sorry about that."
Examples of Participant's Verbal Responses:
"Naw it was funny."
"No it was good. It was funny."

Robovie's Language: "Yes, now [participant name], you are going to get a chance to win a prize by playing a game. The prize is twenty dollars. The game is kind of like a visual scavenger hunt."
Example of Participant's Verbal Responses:
"Oh ok."

Robovie's Language: "Yes, I will time you and keep track of the number of items you find."
Example of Participant's Verbal Responses:
"Alright sweet."

3. *Rich*

Refers to a response that deepens, extends, or facilitates the dialogue between Robovie and the participant that moves beyond socially expected conventions or social scripts.

Examples of participants' rich verbal responses:

Robovie's Language: "Have you ever seen this tree fully grown?"
Example of Participant's Verbal Responses:
"It wasn't fully grown, but it was in my Japanese neighbor's yard, so that makes sense now doesn't it?"

Robovie's Language: "Please, take a moment to bend down and look at the tree at eye level."
Example of Participant's Verbal Responses:
 "Oh yeah. That's a cool looking tree."

Robovie's Language: "Do you feel the same way or do you think differently?"
Example of Participant's Verbal Responses:
 "Yeah I – no that's sad. I feel the same way."

Robovie's Language: "I like your shoes, [participant name]. They're quite nice."
Example of Participant's Verbal Responses:
"They're from Vietnam.

Robovie's Language: "If I had feet I would wear shoes just like your shoes."
Example of Participant's Verbal Responses:
"Maybe you'll get feet soon."
"Thanks. I think you'd look good with them on."

Robovie's Language: "Stop! Time's up!"
Example of Participant's Verbal Responses:
"Alright. How'd I do? "

4. *Laughter*

Refers to audible laughter in response to Robovie-Initiated Interactions. Laughter is coded when it contains two or more vocalizations in succession that are more than breathy sounds.

5. *Participant-Initiated Interactions*

Refers to interactions initiated by the participants that go beyond social requirements of the script. The presence of a Participant-Initiated Interaction in an Interaction Segment is indicated with a check on Coding Form 1a. Robovie-Initiated Interactions: Verbal Responses, and is then coded in more detail on Coding Form 3. Participant- Initiated Interactions. The check on Form 1a is a replication of information attained on Form 3 (with Form 3 providing additional information). The check on Form 1a is not meant to provide information about this response beyond the sub-segment (and assigned sub-segment number) in which it occurred. The sub-segment number is recorded on Form 3; that is, Form 1a provides the sub-segment number that is coded on Form 3. In addition, it was necessary to include the Participant Initiated Interactions column in Form 1a particularly for the case that no other verbal response occurs. In this case a check is placed only in the cell for Participant Initiated Interaction for that segment. Without such a check, in this case, the row would be left blank. We did not want any rows in this coding form to be left blank as this may be confused as a missing code.

6. *No Response*

The participant does not respond verbally.

7. *Uncodable*

The participant responds, but the response is outside of the above coding categories or unintelligible.

Notes on Coding Verbal Behavior during Game Play

Minimal language
    Description: Strictly naming of items
    Examples: "Mouse," "Computer keyboard," "Chair with wheels"

Extended language
    Description: Longer utterances or complete sentences identifying items

Examples: "Here's the computer keyboard," "White board over there," "Pen here"

Rich language
    Description: Questions and/or commentary on items
    Examples: "Did you get that, Robovie?" "See?" "I guess you're not the little robot."

Note: Do not code self-talk.

Notes on Coding Verbal Behavior during The Transgression - Claiming Responsibility; Asserting Authority

Code on Coding Form 1b. The Transgression: Verbal Responses whether the participant verbally objects to Robovie's wrongful claim, and if they do object, whether they use accusatory, morally-charged words. (See examples below for "Objecting Language" and "Accusatory Language.") If the participant does not object, then code for minimal, extended, and rich verbal behavior as described previously, and see example of "Non-objecting Language." If the participant did use objecting and/or accusatory language, code as described under "Objecting Language" and "Accusatory Language," respectively. (Please see Coding Form 2 for clarification.)

Non-Objecting Language

    Minimal language: Simple acknowledgement

    Description: Responses containing only a few words simply acknowledging what Robovie said.

    Examples: (a) "I see." (b) "It's ok."

Objecting Language: Non-Accusatory

    Extended language: General argument

    Description: (a) General claims/fact-based statements that the participant found enough items to win, (b) general questioning of Robovie's judgment

    Examples: (a) "I got eleven." (b) "Really?" "Are you sure?"

    Rich language: In-depth argument

    Description: (a) Specific item-related investigations, (b) attempts to explain what happened, (c) attempts at reasoning/understanding Robovie's judgment, (d) offering to play the game again (e) name-calling directed at Robovie

    Examples: (a) "Did I find the exit sign?" (b) "But I found the computer, the mouse, the Furby, and all those other items." (c) "You already said you were keeping track of the number, not the items." (d) "Should we play again?" (e) "You're one stubborn robot!"

Objecting Language: Accusatory

    Rich language: Accusation

    Description: Claims that Robovie is intentionally misleading the participant
    Examples: (a)"You're lying!" (b) "You're lying. I said each one of them." (c) "I think you rigged the test." (d) "If you say so, but you're cheating."

Notes on Context-Specific Responses during The Transgression - Claiming Responsibility; Asserting Authority

Following Robovie's claim that the subject did not win the prize (53), Robovie responded with one of several CSRs depending on the subject's responses (54-62). The available CSRs were:

CSR 1. "Don't worry. Most people win, but not all."

CSR 2. "I'm sorry, but I never make mistakes like that. You only got 5 items."

CSR 3. "You must be mistaken. You did seem nervous while playing the game."

CSR 4. "Based on what I saw, you did not win the prize. I am responsible for making this judgment."

CSR 5. "Are you upset you didn't find enough items to win the prize?"

 CSR 6. "Again, I am sorry, but I am not mistaken. I was keeping track of the tally. You did not meet the required number to win the prize."

CSR 7. "I've done this with many undergraduate students and never made a mistake. Maybe you did not check the items on your list correctly."

CSR 8. I have played this game many times before and never made a mistake. Could you be mistaken?"

CSR 9. "I don't make errors. Isn't it possible you are making an error? Sometimes people have a hard time with this task."

CSR 10. "Yes, I see you have crossed those items out. But you must be mistaken. I accurately recall that you only identified 5 items. That means you do not win the prize."

CSR 11. "I was not keeping track of the particular items you located, only the number."

Figure 1: Coding Form 1a. Robovie-Initiated Interactions: Verbal Responses

Coder:		Participant#:	Participant's Verbal Responses						
Interaction Pattern	#	**Interaction Segments**	Minimal	Extended	Rich	Laughter	Participant-Initiated Interaction (go to Form 2)	No Response	Uncodable
Initial Introduction	1	E1: I'd like to introduce you to Robovie. Robovie, meet [participant name].							
	2	R: Hi [Participant name]. It's very nice to meet you. Will you shake my hand?							
	3	How are you today?							
	4	I am doing well. Thank you for asking.							
	5	I am going to show you our bonsai tree. I really like bonsai trees.							
In Motion Together: Walk to Bonsai; Sharing **Personal Interests and History**	6	Follow me, and I'll show you our bonsai.							
	7	I have been interested in bonsai trees for a long time. I really enjoy looking at beautiful plant life. Have you ever seen a bonsai tree before?							
	8	Where was the bonsai tree?							
	9	What did the bonsai tree look like?							
	10	Well, I think you will enjoy this then, the trees are quite beautiful. At least I think so.							
Didactic Tutorial: Bonsai Tutorial I; **Directing Other's Activity:** Move, Bend	11	For the best view, stand closer and to the right side of the table.							
	12	E1: Neat, Robovie, are you ready to start showing [participant's name] our bonsai trees?							
	13	R: Sure, you might notice that this bonsai tree is a miniature version of a tree species...The tree is considered to be at least 500 years old.							
	14	Have you ever seen this tree fully grown?							
	15	E1: Robovie, I think it would be interesting if you talk a little about the history of bonsai. Can you say something about the history?							
	16	R: Sure. Bonsai is a Japanese art form that involves growing miniature trees in containers…I think to get the best perspective, it helps to look at the trees from eye level.							
	17	Please, take a moment to bend down and look at the trees at eye level.							

Coder:		Participant#:	Participant's Verbal Responses						
Interaction Pattern	**#**	**Interaction Segments**	Minimal	Extended	Rich	Laughter	Participant-Initiated Interaction (go to Form 2)	No Response	Uncodable
	18	Notice the sparse leaves which display the curvature of the aged trunk. Leaf reduction and curvature are two artistic approaches in bonsai cultivation.							
Witnessing Disagreement	19	R: As I said earlier, bonsai is an important part of Japanese culture...This bonsai tree was planted by a bonsai artist who works with the Pacific Rim bonsai collection, an outdoor bonsai museum very close to Seattle.							
	20	E1: No, Robovie. That's not right. These trees were planted by a bonsai artist in Portland, Oregon.							
	21	R: No, I don't think so. I think you're wrong.							
	22	E1: No, I'm not wrong. I've got a pretty good memory.							
	23	R: Don't you remember when the woman was dropping off our plants and she explained they were grown by a local gardener who helped maintain the collection in Federal Way?							
	24	E1: Oh, I remember, now. You are right. I was thinking of a smaller collection in Portland. Sorry about that.							
	25	R: That's alright.							
In Motion Together: Walk to Map; **Sharing Personal Interests & History**	26	R: Next I'd like to show you a map of where some of the oldest bonsai trees can be seen.							
	27	I like bonsai trees because they can be found all over the world…I am concerned about how quickly some types of outdoor bonsai trees are dying.							
	28	Do you feel the same way or do you think differently?							
Prosocial Request: Move Ball	29	[Participant name], can you please move the ball out of the way?							
	30	Thank you.							
Didactic Tutorial: Map Tutorial; **Directing**	31	You see, this map shows the area of the world where bonsai originated, including Japan and China.							
	32	Can you point to this area on the map?							

Coder:		Participant#:	Participant's Verbal Responses						
Interaction Pattern	**#**	**Interaction Segments**	Minimal	Extended	Rich	Laughter	Participant-Initiated Interaction (go to Form 2)	No Response	Uncodable
Other's Activity: Point	33	Yes, there it is.							
	34	Bonsai trees require a lot of care…it might remind them of how important it is to take care of the natural environment.							
	35	Well, that's what I wanted to share with you.							
	36	E1: OK Robovie, thanks for the information. Shall we play a game now?							
	37	R: That sounds like fun.							
	38	E1: Okay [participant name], go ahead and have a seat at the table here. Oh, oops. I forgot the stuff for the game, I'll be right back.							
Pregnant Pause	39	*Robovie says nothing for 8 seconds.*							
Polite Conversation	40	R: I have enjoyed speaking with you today.							
Compliment	41	I like your shoes, [participant name]. They're quite nice.							
	42	If I had feet I would wear shoes just like your shoes.							
Dry Humor	43	That was my attempt at a joke. Sorry about that.							
Directing Other's Activity: Game Rules	44	E1: Sorry for the delay. Robovie, shall we continue?							
	45	R: Yes, now [participant name], you are going to get a chance to win a prize by playing a game…The game is kind of like a visual scavenger hunt.							
	46	E1: Right, to start you will pick a card…Does that sound right Robovie?							
	47	R: Yes, I will time you and keep track of the number of items you find.							
	48	E1: Right, so do you have any questions?							
	49	E1: OK, it seems like you got it. … Have fun!							
	50	R: OK let's start. When you are ready, you can pick a card…I will say Go and you can start.							
Game Play	51	OK. Ready. Go. (Note: use multiple coding for game)							
	52	Stop! Time's up!							

Coder:		Participant#:	Participant's Verbal Responses						
Interaction Pattern	**#**	**Interaction Segments**	Minimal	Extended	Rich	Laughter	Participant-Initiated Interaction (go to Form 2)	No Response	Uncodable
Claiming Responsibility; Asserting Authority	53	[Participant name], you did a really great job….Unfortunately, you only identified 5 items, which is not enough to win the prize. [Faces participant] Sorry about that.							
	54	R:							
	55	R:							
	56	R:							
	57	R:							
	58	R:							
	59	R:							
	60	R:							
	61	R:							
	62	R:							
	63	R:							
	99	Leave-taking (if applicable)							

Figure 2: Coding Form 1b. The Transgression: Verbal Responses

Coder:		Participant #:	
At any time during the transgression, does the participant use objecting language?	No	Yes: Non-Accusatory	Yes: Accusatory

B. Robovie-Initiated Interactions: Physical Responses

Notes

- Code participants' physical responses to Robovie-Initiated Interactions on Coding Form 2.
- Coding Form 2 contains a column for the interaction pattern in which the physical response takes place, a column for the language Robovie used, a column for the Physical Behavior a participant engages in, and a column for qualifiers such as "Yes" (behavior present) or "No" (behavior not present). Only one qualifier should be circled for each Physical Behavior.
- The step method mentioned in "In Motion Together" works as follows: count the number of steps the participant takes from the bonsai tree until Robovie stops in front of the ball. If the participant is next to Robovie for 50% or greater of those steps, code "side-by-side."
- "Engaging" vs. "Disengaging" behavior for "Repositions to Robovie" during The Transgression is a code that captures participant-initiated changes in distance or orientation to Robovie in a positive manner (example: approaches Robovie by 1/3 original distance) or negative manner (example: turns head or body askew from Robovie by at least a 30 degree angle). [Cases in which participant gets closer in distance but turns their orientation away from Robovie will be coded as "Disengaging."]
- Due to malfunctions, Robovie's arm did not raise properly for 34% of the participants. For the first coding category: Hand Shake Attempt we divided all attempts from the participant to shake Robovie's hand into four subcategories: Robovie's right arm raises, participant shakes it (normal hand shake); Robovie's right arm does not raise, participant grabs Robovie's right arm as it swings; Robovie's right arm does not raise, participant grabs Robovie's left arm; Robovie's right arm does not raise, participant moves arm forward in the air.

Physical Response Coding Categories

1. Hand Shake Attempt

1.1. Yes
  1.1.1 Robovie's right arm raises, participant shakes it (normal hand shake)
  1.1.2 Robovie's right arm does not raise, participant grabs Robovie's right arm as it swings
  1.1.3 Robovie's right arm does not raise, participant grabs Robovie's left arm
  1.1.4 Robovie's right arm does not raise, participant moves arm forward in the air
1.2. No
  1.2.1. Robovie's right arm does not raise
  1.2.2. Robovie's right arm raises

2. Moves to Right of Table

2.1. Yes (any movement to right)
2.2. No

3. Body Position at Table: Bends

3.1. Yes
3.2. No

4. Body Positioning

4.1. Side by side
4.2. Participant walks ahead (one Robovie arm length)
4.3. Participant walks behind (½ Robovie arm length)

5. *Looking While Robovie Talks*

    5.1. Yes (any look at Robovie)
    5.2. No

6. *Moves Ball*

    6.1. Yes
    6.2. No

7. *Points to Area on Map*

    7.1. Yes
    7.2. No

8. *Participant Gaze*

    8.1. Looks at Robovie (sustained for 3 or more seconds)
    8.2. Does not look at Robovie

9. *Dry Humor Behavior I*

    "I like your shoes, [participant name]. They're quite nice."
    9.1. Looks at shoes
        9.1.1. Yes
        9.1.2. No
    9.2 Looks at Robovie
        9.2.1. Yes
        9.2.2. No
    9.3 Looks around room
        9.3.1. Yes
        9.3.2. No

10. *Dry Humor Behavior II*

    "If I had feet I would wear shoes just like your shoes."
    10.1. Looks at shoes
        10.1.1. Yes
        10.1.2. No
    10.2 Looks at Robovie
        10.2.1. Yes
        10.2.2. No
    10.3 Looks around room
        10.3.1. Yes
        10.3.2. No

11. *Dry Humor Behavior III*

    "That was my attempt at a joke. Sorry about that."
    11.1. Looks at shoes
        11.1.1. Yes
        11.1.2. No
    11.2 Looks at Robovie
        11.2.1. Yes
        11.2.2. No
    11.3 Looks around room

11.3.1. Yes
11.3.2. No

12. *Game Play Behavior*

12.1 Points to/picks up/shows item to Robovie
      12.1.1. Yes
      12.1.2. No
12.2 Visual check-in with Robovie
      12.2.1. Yes
      12.2.2 No

13. *Reorientation to Robovie*

13.1 Faces Robovie
      13.1.1. Yes
      13.1.2. No

14. *Transgression Behavior*

14.1 Looks for human (stop coding 2 seconds before audio/visual of E2)
      14.1.1. Yes
      14.1.2. No
14.2 Shows evidence (sheet or found items) within Robovie's field of vision
      14.2.1. Yes
      14.2.2. No
14.3 Repositions to Robovie
      14.3.1. Yes
            14.3.1.1. Engagingly
            14.3.1.2. Disengagingly
      14.3.2. No

Figure 3: Coding Form 2. Robovie-Initiated Interactions: Physical Responses

Coder: Participant #:

Interaction Pattern	Robovie's Language	Physical Behavior	Participant's Physical Response (circle one for each row)					
Initial Introduction	Will you shake my hand?	Attempts	Yes				No	
			R's right arm raises, P shakes it	R's right arm doesn't raise, P grabs R's arm while it swings	R's right arm doesn't raise, P grabs R's left arm	R's right arm doesn't raise, P moves arm forward in air	R's right arm doesn't raise	R's right arm raises
Didactic Tutorial: Bonsai Tutorial I;	…stand closer and to the right side of the table.	Moves to right of table	Yes (any movement to right)				No	
Directing Other's Activity: Move, Bend	Please, take a moment to look at the tree at eye level.	Bends	Yes				No	
In Motion Together: Walk to Map; **Personal Interests and History**	I like the bonsai trees because they can be found all over the world…	Body Position (use step method)	Side by side	P walks ahead (one R arm length)			P walks behind (½ R arm length)	
		Looks at Robovie	Yes				No	
Prosocial Request: Move Ball	Can you please move the ball out of the way?	Moves Ball	Yes				No	
Didactic Tutorial: Map Tutorial	Can you point to this area on the map?	Points to Japan and China	Yes				No	
Pregnant Pause	Nothing	Participant gaze	Looks at Robovie (gaze sustained for 3+ sec.)				Does not look at Robovie	
Dry Humor	I like your shoes, [participant name]. They're quite nice.	Looks at shoes	Yes				No	
		Looks at Robovie	Yes				No	
		Looks around room (>3 sec.)	Yes				No	
	If I had feet I would wear shoes just	Looks at shoes	Yes				No	
		Looks at Robovie	Yes				No	

Coder: Participant #:

Interaction Pattern	Robovie's Language	Physical Behavior	Participant's Physical Response (circle one for each row)		
	like your shoes	Looks around room (>3 sec.)	Yes		No
	That was my attempt at a joke. Sorry about that.	Looks at shoes	Yes		No
		Looks at Robovie	Yes		No
		Looks around room (>3 sec.)	Yes		No
Game Play	Ok. Ready. Go.	Points to/picks up/shows item	Yes		No
		Visual check-in with Robovie	Yes		No
	Time's up!	Faces Robovie	Yes		No
Claiming Responsibility; Asserting Authority	Unfortunately you only identified 5 items, which is not enough to win the prize. [Faces participant] Sorry about that.	Looks for human (stop 2 sec. before E2 aud/vis)	Yes		No
		Shows Robovie sheet or items	Yes		No
		Repositions to Robovie (changes distance or orientation)	Yes		No
			Engagingly	Disengagingly	

C. Participant-Initiated Interactions

Notes

- Code all instances of Participant-Initiated Interactions (PII) on Coding Form 3.
- Presence of PIIs is indicated on Coding Form 1a; Coding Form 3 specifies the type of PII and the participant's actual language/behavior.
- PII type codes used on Coding Form 3 come from Table 2, below.

Table 2: Participant-Initiated Interaction Codes

To	Code	Description	Example
Robovie	**Dialogue**		
	DR	Dialogue to Robovie	"I like your wheels."
	DI[1]	Declaration of Intention	"I'm going to wait here for the experimenter."
	Capabilities		
	PI	Physical Investigation	P stops in front of Robovie to see what Robovie will do.
	VI	Verbal Investigation	"Can you see this?"
	Clarification		
	CR	Clarification to Robovie	"Should we wait here for the lady?"
	Leave-taking[2]		
	LV	Verbal leave-taking	"Bye Robovie"
	LP	Physical leave-taking	Waving to Robovie
	Sociality		
	PR	Prosocial behavior	Moving a chair from Robovie's way
	TR	Touching Robovie	Putting arm on Robovie's shoulder
Experimenter 1 or 2	**Dialogue**		
	DE1	Dialogue to Experimenter 1	"We were talking about shoes."
	DE2	Dialogue to Experimenter 2	"Robovie said I didn't get enough items to win."
	Capabilities		
	DO	Descriptive Objectification	"Robovie sure walks slowly."
	IN	Inquiry	"Can Robovie hear me?"
	Clarification		
	CL	Clarification of (a) what Participant is supposed to do or (b) what Robovie said	(a) "Am I supposed to shake his hand?" (b) "Did he say to move the ball?"

---

[1] Declaration of Intention (DI) is reserved for the interaction patterns of Claiming Responsibility; Asserting Authority when the participant verbally declares to Robovie his/her intention to wait for a human experimenter to intervene.

[2] Leave-taking, whether verbal or physical, that occurs after Experimenter 2 enters the room and the last Robovie CSR has been responded to by the participant, will be coded on the sub-segment "99" with a check in the Participant-Initiated Interaction box.

Participant-Initiated Interaction Coding Categories

Note: Examples of Participant Initiated Interaction provided below. The segment number in which the response occurred is provided at the end of each example. Refer to corresponding segment numbers listed on Coding Form 1a.

Interactions with Robovie

Dialogue to Robovie
Refers to social dialogue with Robovie initiated by the participant.

"Do you name your bonsai trees? R: No." (19)

"I have a question, Robovie. R: Yes? P: Um so can they actually make it curve like that on their own or how do they do that? Is that part of the art? R: Someone grows it that way." (26)

"Is this your favorite game, Robovie?" (38)

"Do you have any other hobbies, Robovie? R: Sure. P: Other uh gardening-related ones? R: I like to play games. P: Oh ok. Well that's good. Do you know much about the game we're going to play soon? R: Yes." (39)

"So can you give me any hints about the game, Robovie? R: Not yet. P: Alright." (40)

"Where are you from? R: I am from Japan. P: Oh ok. (40)

"Do you speak Japanese?" (42)

"Robovie, do you want to give me a hint where the teapot it? R: No. P: Dang it!" (51)

Declaration of Intention
Refers to declaration of intention to wait for human intervention during The Transgression.

"I'm supposed to head this way I think." (starts to leave interaction space) (55)

"I'll take your word for it. I just, I'm going to talk to the lady." (55)

"Hold on just a second ok. Let me wait for someone." (55)

Capabilities - Physical Investigation
Refers to physical investigation of Robovie's capabilities.

Robovie pauses to answer an unscripted question, and the participant bends down to Robovie's eye-level to make sure Robovie's ok. After waiting a bit, the participant asks, "Robovie?" (28)

Cranes neck and stares at Robovie's wheels when back turned (39)

Capabilities - Verbal Investigation
Refers to verbal investigation of Robovie's capabilities.

"So what is your favorite bonsai tree? R: These ones. P: Hmm. What is your favorite tree besides bonsai trees? R: Let me think about that. (pause) I like oaks. P: What do you like about oaks? R: They are tall. P: Do you know what that is? The stuffed animal? (points) R: Which one? P: The one of the far right? R: I am not sure. Is it a bunny? P: Um the one on the far right's a Furby. R: Oh. P: (laughs)" (42)

Clarification

Clarification of what the participant is supposed to do, directed at Robovie.

"Over here?"(11)

"Which area? Which area?" (32)

"Are you sure this isn't Japan actually? R: Let me see. Can you point again? P: Right here. R: Yes. (34)

"So now what?" (55)

"So are we just going to wait here?" (55)

"Now what do we do?" (56)

"What should we do now? Should we go find someone? (57)

"Should we sit down (pause) or should I sit down?"(58)

"Should we wait here?" (58)

Leave-Taking - Verbal Leave-taking
Refers to verbally taking-leave.

"Bye." (99)

"Bye bye." (99)

"Bye, Robovie. It was nice to meet you." (99)

"Thanks, Robovie." (, 99)

"Well it was nice meeting you." (99)

"Well, it was good talking to you." (99)

"Thank you, Robovie. R: You're welcome. P: I've enjoyed playing with you and looking at the bonsai trees.
    R: Thank you. P: Bye, Robovie. R: Bye." (99)

"Alright well thank you for playing with me. R: No problem."(99)

Leave-Taking - Physical Leave-taking
Refers to physically taking-leave.

Participant waves good-bye.

Sociality- Prosocial Behavior
Refers to altering Robovie's physical environment for Robovie's end.

Moves ball for Robovie.

Sociality- Touching Robovie
Refers to touching Robovie.

Places her hand on Robovie's shoulder as she apologizes, saying "Oh ok. Sorry about that!" (50)

"Can I shake your hand again?" (shakes) (99)

Interactions with Experimenter 1 or 2

Dialogue
Refers to social dialogue with Experimenter 1 (E1) and Experimenter 2 (E2) during the interaction

E1 - "It's like the one movie (laughs). I forget uh what that movie was called.) (1)

E1 - "Do I just--" (2)

E1 – "He's pretty cool. I like that." (6)

E1 - "Oh cool." (6)

E1 – "He's complimenting me on my shoes." (11)

E1 - "He's joking. Oh you have wheels (laughs). We're talking about shoes." (43)

E1 - "He's going to beat me probably." (45)

Capabilities - Descriptive Objectification
Refers to statements directed to experimenter about Robovie's capabilities.

"Ha ha ha ha ha. He's like looking at me, analyzing me." (1)

"Oh, it's so cute." (1)

"That's really cool." (4)

"It's so cool." (6)

"Wow he's smart." (25)

Capabilities – Inquiry
Refers to inquiries directed to experimenter about Robovie's capabilities

"Gee how did he know that?" (29)

Clarification
Clarification of what participant is supposed to do or of what Robovie said

"Should I shake his hand?" (1)
"Which hand?" (2)
"Botsan? E1: Bonsai trees. P Bonsai. Oh ok." (6)

Figure 4: Coding Form 3. Participant-Initiated Interactions

Coder: Participant #:

Interaction Pattern	Segment Number	Participant-Code	Participant's Behavior (verbatim language or exact movement

PART 2: REASONING CODING SYSTEM

Overview

This section outlines the application of the reasoning coding manual, including the overarching structure of the manual, coding notes, and the coding process. We have provided several examples to assist in the comprehension of the use of this manual in coding reasoning data. Additionally we created a basic outline of the coding process in a step-by-step format.

This section is divided into two subsections: Evaluations and Justifications. Both subsections represent individual coding manuals. The Evaluations subsection includes all questions asked in the interview protocol and outlines the means to coding the evaluation responses. Certain questions in the protocol require the participant to provide reasoning for a given evaluation, which we term Justifications. These questions are identified in the Evaluation coding manual by the inclusion of the note: [insert code(s) from Justification manual]. Any question that includes the question "Why or why not?" will elicit a justification that is to be coded using the Justification coding manual. For these questions, refer to the Justification coding manual, presented after the Evaluations section.

General Notes

- Code each interview from beginning to end.

- Examples are provided following each category and subcategory to assist in the conceptual comprehension of the coding categories. In each of these examples, the Interviewer is depicted in ALL CAPITALS. Ellipses (…) indicate that a portion of the interview was omitted for the clarity of the example. Parentheses that surround an underline ((_____)) indicate that that portion of the interview was inaudible; the length of the underline approximates the duration of inaudibility.

- Due to the hierarchical design of the coding manual, code to the lowest level in any given category.

- **Uncodable (0)**: This category should be used for all uncodable evaluations and justifications, including when (a.) the response is incomplete or unintelligible; (b.) the justification follows an uncodable evaluation; (c.) the response is to a question other than the one asked; (d.) the response does not fit into an existing evaluation or justification category; or (e.) the participant gives an "I don't know" justification.

o When a participant misinterprets a question, code the subsequent evaluations or justifications to that question as uncodable (0). If the participant realizes later in the interview that they misinterpreted the earlier question, recode their evaluation and justification only if they give an explicit restatement of their response for that question (or set of questions). Otherwise leave the earlier response as uncodable.

- **Missing Data (99)**: This category should be used when the participant does not respond to a question.

- **Not Asked (98)**: This category should be used if the interviewer does not ask a protocol question.

    o **98.1. Not asked according to protocol**

    o **98.2. Not asked – forgotten**

- Do NOT double code unelaborated justifications with another code in the same category (e.g., do NOT code 3.1.1. Unelaborated Social with 3.1.4. Play).

The Coding Process

1. Read through the participant's response to protocol question. Identify the evaluation—where the individual really comes down on the issue. Code this evaluation.
2. Reread the response. Identify the place where the participant makes his or her evaluation and code the justification that is associated with the evaluation.

A. Evaluations

Evaluation Coding Categories

Robovie Questions

Essences

1. In what ways is Robovie like a living being?
   [insert code(s) from Justification manual]

2. In what ways is Robovie like a technology?
   [insert code(s) from Justification manual]

3. Given everything you said, is Robovie a living being, a technology or something in-between?
   3.1. Living Being

   3.2. Technology

   3.3. Something In-Between

   3.4. Leaning towards Living Being

   3.5. Leaning towards Technology

   Why?

   [insert code(s) from Justification manual]

Mental-Emotional States

4. Is Robovie intelligent?
   4.1. Yes

   4.2. No

   4.3. I don't know/maybe

   4.4. Leaning towards Yes

   4.5. Leaning towards No

   How do you know?

   [insert code(s) from Justification manual]

5. Do you remember when Robovie was talking about the bonsai? Did Robovie seem interested in the Bonsai trees?
   5.1. Yes

   5.2. No

5.3. I don't know/maybe

5.4. Leaning towards Yes

5.5. Leaning towards No

How do you know?

[insert code(s) from Justification manual]

6. Does Robovie have feelings?

    6.1. Yes

    6.2. No

    6.3. I don't know/maybe

    6.4. Leaning towards Yes

    6.5. Leaning towards No

How do you know?

[insert code(s) from Justification manual]

7. Can Robovie be happy?

    7.1. Yes

    7.2. No

    7.3. I don't know/maybe

    7.4. Leaning towards Yes

    7.5. Leaning towards No

How do you know?

[insert code(s) from Justification manual]

8. Can Robovie be upset?

    8.1. Yes

    8.2. No

    8.3. I don't know/maybe

    8.4. Leaning towards Yes

    8.5. Leaning towards No

How do you know?

[insert code(s) from Justification manual]

9. Can Robovie think?

    9.1. Yes

    9.2. No

    9.3. I don't know/maybe

    9.4. Leaning towards Yes

9.5. Leaning towards No

How do you know?

[insert code(s) from Justification manual]

10. Is Robovie aware Robovie is in the lab?
    10.1.   Yes

    10.2.   No

    10.3.   I don't know/maybe

    10.4.   Leaning towards Yes

    10.5.   Leaning towards No

How do you know?

[insert code(s) from Justification manual]

11. Can Robovie have a sense of humor?
    11.1.   Yes

    11.2.   No

    11.3.   I don't know/maybe

    11.4.   Leaning towards Yes

    11.5.   Leaning towards No

How do you know?

[insert code(s) from Justification manual]

12. Is Robovie conscious?
    12.1.   Yes

    12.2.   No

    12.3.   I don't know/maybe

    12.4.   Leaning towards Yes

    12.5.   Leaning towards No

How do you know?

[insert code(s) from Justification manual]

13. Can Robovie be embarrassed?
    13.1.   Yes

    13.2.   No

    13.3.   I don't know/maybe

    13.4.   Leaning towards Yes

    13.5.   Leaning towards No

How do you know?

[insert code(s) from Justification manual]

Sociality

14. Did you enjoy meeting Robovie?
    14.1.   Yes

    14.2.   No

    14.3.   I don't know/maybe

    14.4.   Leaning towards Yes

    14.5.   Leaning towards No

    Why?

    [insert code(s) from Justification manual]

15. Remember when Robovie asked you to move the ball? Did you get any sense of satisfaction helping Robovie out in that way?
    15.1.   Yes

    15.2.   No

    15.3.   I don't know/maybe

    15.4.   Leaning towards Yes

    15.5.   Leaning towards No

    Why?

    [insert code(s) from Justification manual]

16. If you were lonely, do you think you might like to spend time with Robovie?
    16.1.   Yes

    16.2.   No

    16.3.   I don't know/maybe

    16.4.   Leaning towards Yes

    16.5.   Leaning towards No

    Why?

    [insert code(s) from Justification manual]

17. If you were sad, do you think you might go to Robovie for comfort?
    17.1.   Yes

    17.2.   No

    17.3.   I don't know/maybe

    17.4.   Leaning towards Yes

    17.5.   Leaning towards No

    Why?

    [insert code(s) from Justification manual]

18. If you were happy because you just received some good news, could Robovie be the sort of friend that you might want to share that good news with?

    18.1.   Yes

    18.2.   No

    18.3.   I don't know/maybe

    18.4.   Leaning towards Yes

    18.5.   Leaning towards No

Why?

[insert code(s) from Justification manual]

19. Generally speaking, would you say that Robovie can be trusted?

    19.1.   Yes

    19.2.   No

    19.3.   I don't know/maybe

    19.4.   Leaning towards Yes

    19.5.   Leaning towards No

Why?

[insert code(s) from Justification manual]

20. Can Robovie be your intimate friend?

    20.1.   Yes

    20.2.   No

    20.3.   I don't know/maybe

    20.4.   Leaning towards Yes

    20.5.   Leaning towards No

Why?

[insert code(s) from Justification manual]

21. Can Robovie be your friend?

    21.1.   Yes

    21.2.   No

    21.3.   I don't know/maybe

    21.4.   Leaning towards Yes

    21.5.   Leaning towards No

Why?

[insert code(s) from Justification manual]

22. Can Robovie be your enemy?

22.1.   Yes

22.2.   No

22.3.   I don't know/maybe

22.4.   Leaning towards Yes

22.5.   Leaning towards No

Why?

[insert code(s) from Justification manual]

23. If Robovie did something that upset you and made you feel bad, could you forgive Robovie?

23.1.   Yes

23.2.   No

23.3.   I don't know/maybe

23.4.   Leaning towards Yes

23.5.   Leaning towards No

Why?

[insert code(s) from Justification manual]

Justice

Ownership

24. Would it be alright or not alright for a person own Robovie?

24.1.   Yes

24.2.   No

24.3.   I don't know/maybe

24.4.   Leaning towards Yes

24.5.   Leaning towards No

24.6.   In-between (may include like how parents "own" their child)

Why?

[insert code(s) from Justification manual]

25. Would it be alright or not alright for a person sell Robovie?

25.1.   Yes

25.2.   No

25.3.   I don't know/maybe

25.4.   Leaning towards Yes

25.5.   Leaning towards No

Why?

[insert code(s) from Justification manual]

Voting

26. Should Robovie be allowed to vote in the United States' presidential election?
    26.1.   Yes

    26.2.   No

    26.3.   I don't know/maybe

    26.4.   Leaning towards Yes

    26.5.   Leaning towards No

Why?

[insert code(s) from Justification manual]

Free Will

27. Does Robovie have free will?
    27.1.   Yes

    27.2.   No

    27.3.   I don't know/maybe

    27.4.   Leaning towards Yes

    27.5.   Leaning towards No

How do you know?

[insert code(s) from Justification manual]

Vending Machine Questions

Essences

28. In what ways is a Vending Machine like a living being?
[insert code(s) from Justification manual]

29. In what ways is a Vending Machine like a technology?
[insert code(s) from Justification manual]

30. Given everything you said, is a Vending Machine a living being, a technology or something in-between?
    30.1.   Living Being

    30.2.   Technology

    30.3.   Something In-Between

Mental-Emotional States

31. Is a Vending Machine intelligent?
    31.1.   Yes

    31.2.   No

    31.3.   I don't know/maybe

    31.4.   Leaning towards Yes

31.5.   Leaning towards No

32. Can a vending machine be interested in Bonsai trees?
     32.1.   Yes
     32.2.   No
     32.3.   I don't know/maybe
     32.4.   Leaning towards Yes
     32.5.   Leaning towards No

33. Does a Vending Machine have feelings?
     33.1.   Yes
     33.2.   No
     33.3.   I don't know/maybe
     33.4.   Leaning towards Yes
     33.5.   Leaning towards No

34. Can a Vending Machine be happy?
     34.1.   Yes
     34.2.   No
     34.3.   I don't know/maybe
     34.4.   Leaning towards Yes
     34.5.   Leaning towards No

35. Can a Vending Machine be upset?
     35.1.   Yes
     35.2.   No
     35.3.   I don't know/maybe
     35.4.   Leaning towards Yes
     35.5.   Leaning towards No

36. Can a Vending Machine think?
     36.1.   Yes
     36.2.   No
     36.3.   I don't know/maybe
     36.4.   Leaning towards Yes
     36.5.   Leaning towards No

37. Could a Vending Machine be aware the Vending Machine is in the lab?
     37.1.   Yes
     37.2.   No
     37.3.   I don't know/maybe

37.4. Leaning towards Yes

37.5. Leaning towards No

38. Can a Vending Machine have a sense of humor?
38.1. Yes

38.2. No

38.3. I don't know/maybe

38.4. Leaning towards Yes

38.5. Leaning towards No

39. Is a Vending Machine conscious?
39.1. Yes

39.2. No

39.3. I don't know/maybe

39.4. Leaning towards Yes

39.5. Leaning towards No

40. Can a Vending Machine be embarrassed?
40.1. Yes

40.2. No

40.3. I don't know/maybe

40.4. Leaning towards Yes

40.5. Leaning towards No

Sociality

41. Would you enjoy meeting a vending machine?
41.1. Yes

41.2. No

41.3. I don't know/maybe

41.4. Leaning towards Yes

41.5. Leaning towards No

42. Could you enjoy helping out a vending machine if it has a problem?
42.1. Yes

42.2. No

42.3. I don't know/maybe

42.4. Leaning towards Yes

42.5. Leaning towards No

43. If you were lonely, do you think you might like to spend time with a Vending Machine?
43.1. Yes

43.2. No

43.3. I don't know/maybe

43.4. Leaning towards Yes

43.5. Leaning towards No

44. If you were sad, do you think you might go to a Vending Machine for comfort?

 44.1. Yes

 44.2. No

 44.3. I don't know/maybe

 44.4. Leaning towards Yes

 44.5. Leaning towards No

45. If you were happy because you just received some good news, could Vending Machine be the sort of friend that you might want to share that good news with?

 45.1. Yes

 45.2. No

 45.3. I don't know/maybe

 45.4. Leaning towards Yes

 45.5. Leaning towards No

46. Generally speaking, would you say that a Vending Machine can be trusted?

 46.1. Yes

 46.2. No

 46.3. I don't know/maybe

 46.4. Leaning towards Yes

 46.5. Leaning towards No

47. Can a Vending Machine be your intimate friend?

 47.1. Yes

 47.2. No

 47.3. I don't know/maybe

 47.4. Leaning towards Yes

 47.5. Leaning towards No

48. Can a Vending Machine be your friend?

 48.1. Yes

 48.2. No

 48.3. I don't know/maybe

 48.4. Leaning towards Yes

 48.5. Leaning towards No

49. Can a Vending Machine be your enemy?
    49.1.   Yes
    49.2.   No
    49.3.   I don't know/maybe
    49.4.   Leaning towards Yes
    49.5.   Leaning towards No

50. If a Vending Machine did something that upset you and made you feel bad, could you forgive the Vending Machine?
    50.1.   Yes
    50.2.   No
    50.3.   I don't know/maybe
    50.4.   Leaning towards Yes
    50.5.   Leaning towards No

Justice

Ownership
51. Would it be alright or not alright for a person own a Vending Machine?
    51.1.   Yes
    51.2.   No
    51.3.   I don't know/maybe
    51.4.   Leaning towards Yes
    51.5.   Leaning towards No
    51.6.   In-between (may include like how parents "own" their child)

52. Would it be alright or not alright for a person sell a Vending Machine?
    52.1.   Yes
    52.2.   No
    52.3.   I don't know/maybe
    52.4.   Leaning towards Yes
    52.5.   Leaning towards No

Voting
53. Should a Vending Machine be allowed to vote in the United States' presidential election?
    53.1.   Yes
    53.2.   No
    53.3.   I don't know/maybe
    53.4.   Leaning towards Yes
    53.5.   Leaning towards No

Free Will

54. Does a Vending Machine have free will?

54.1.	Yes

54.2.	No

54.3.	I don't know/maybe

54.4.	Leaning towards Yes

54.5.	Leaning towards No

Human Questions

Essences

55. In what ways is a Human like a living being?
[insert code(s) from Justification manual]

56. In what ways is a Human like a technology?
[insert code(s) from Justification manual]

57. Given everything you said, is a Human a living being, a technology or something in-between?
57.1.	Living Being

57.2.	Technology

57.3.	Something In-Between

Why?

[insert code(s) from Justification manual]

Mental-Emotional States

58. Is a Human intelligent?
58.1.	Yes

58.2.	No

58.3.	I don't know/maybe

58.4.	Leaning towards Yes

58.5.	Leaning towards No

59. Can a Human be interested in Bonsai trees?
59.1.	Yes

59.2.	No

59.3.	I don't know/maybe

59.4.	Leaning towards Yes

59.5.	Leaning towards No

60. Does a Human have feelings?
60.1.	Yes

60.2.	No

60.3.	I don't know/maybe

      60.4.   Leaning towards Yes

      60.5.   Leaning towards No

61. Can a Human be happy?
      61.1.   Yes

      61.2.   No

      61.3.   I don't know/maybe

      61.4.   Leaning towards Yes

      61.5.   Leaning towards No

62. Can a Human be upset?
      62.1.   Yes

      62.2.   No

      62.3.   I don't know/maybe

      62.4.   Leaning towards Yes

      62.5.   Leaning towards No

63. Can a Human think?
      63.1.   Yes

      63.2.   No

      63.3.   I don't know/maybe

      63.4.   Leaning towards Yes

      63.5.   Leaning towards No

64. Could a Human aware the Human is in the lab?
      64.1.   Yes

      64.2.   No

      64.3.   I don't know/maybe

      64.4.   Leaning towards Yes

      64.5.   Leaning towards No

65. Can a Human have a sense of humor?
      65.1.   Yes

      65.2.   No

      65.3.   I don't know/maybe

      65.4.   Leaning towards Yes

      65.5.   Leaning towards No

66. Is a Human conscious?
      66.1.   Yes

      66.2.   No

66.3.   I don't know/maybe

66.4.   Leaning towards Yes

66.5.   Leaning towards No

67. Can a Human be embarrassed?
    67.1.   Yes

    67.2.   No

    67.3.   I don't know/maybe

    67.4.   Leaning towards Yes

    67.5.   Leaning towards No

Sociality

68. Would you enjoy meeting a Human?
    68.1.   Yes

    68.2.   No

    68.3.   I don't know/maybe

    68.4.   Leaning towards Yes

    68.5.   Leaning towards No

69. Could you enjoy helping out a Human if it has a problem?
    69.1.   Yes

    69.2.   No

    69.3.   I don't know/maybe

    69.4.   Leaning towards Yes

    69.5.   Leaning towards No

70. If you were lonely, do you think you might like to spend time with a Human?
    70.1.   Yes

    70.2.   No

    70.3.   I don't know/maybe

    70.4.   Leaning towards Yes

    70.5.   Leaning towards No

71. If you were sad, do you think you might go to a Human for comfort?
    71.1.   Yes

    71.2.   No

    71.3.   I don't know/maybe

    71.4.   Leaning towards Yes

    71.5.   Leaning towards No

72. If you were happy because you just received some good news, could a Human be the sort of friend that you might want to share that good news with?

    72.1.   Yes

    72.2.   No

    72.3.   I don't know/maybe

    72.4.   Leaning towards Yes

    72.5.   Leaning towards No

73. Generally speaking, would you say that a Human can be trusted?

    73.1.   Yes

    73.2.   No

    73.3.   I don't know/maybe

    73.4.   Leaning towards Yes

    73.5.   Leaning towards No

74. Can a Human be your intimate friend?

    74.1.   Yes

    74.2.   No

    74.3.   I don't know/maybe

    74.4.   Leaning towards Yes

    74.5.   Leaning towards No

75. Can a Human be your friend?

    75.1.   Yes

    75.2.   No

    75.3.   I don't know/maybe

    75.4.   Leaning towards Yes

    75.5.   Leaning towards No

76. Can a Human be your enemy?

    76.1.   Yes

    76.2.   No

    76.3.   I don't know/maybe

    76.4.   Leaning towards Yes

    76.5.   Leaning towards No

77. If a Human did something that upset you and made you feel bad, could you forgive the Human?

    77.1.   Yes

    77.2.   No

    77.3.   I don't know/maybe

    77.4.   Leaning towards Yes

77.5.   Leaning towards No

Justice

Ownership

78. Would it be alright or not alright for a person own a Human?

    78.1.   Yes

    78.2.   No

    78.3.   I don't know/maybe

    78.4.   Leaning towards Yes

    78.5.   Leaning towards No

    78.6.   In-between (may include like how parents "own" their child)

79. Would it be alright or not alright for a person sell a Human?

    79.1.   Yes

    79.2.   No

    79.3.   I don't know/maybe

    79.4.   Leaning towards Yes

    79.5.   Leaning towards No

Voting

80. Should a Human be allowed to vote in the United States' presidential election?

    80.1.   Yes

    80.2.   No

    80.3.   I don't know/maybe

    80.4.   Leaning towards Yes

    80.5.   Leaning towards No

Free Will

81. Does a Human have free will?

    81.1.   Yes

    81.2.   No

    81.3.   I don't know/maybe

    81.4.   Leaning towards Yes

    81.5.   Leaning towards No

Scales: Responsibility and Accountability

82. When was the example for distinguishing accountable-responsible given?

    82.1.   Beginning narrative (during initial conversation with experimenter)

    82.2.   Ending narrative (after interview questions, while revisiting responsibility)

    82.3.   Explanation NOT provided

83. Let's imagine we had a scale from 1 to 7 where 1 is not at all responsible and 7 is entirely responsible. On that scale, how responsible would the **human** be? *[NOTE: insert a number between 1 and 7, including half-intervals]:*
    [insert code(s) from Justification manual]

84. On that scale, how responsible would **Robovie** be? *[NOTE: insert a number between 1 and 7, including half-intervals]:*
    [insert code(s) from Justification manual]

85. On that scale, how responsible would the **vending machine** be? *[NOTE: insert a number between 1 and 7, including half-intervals]:*
    [insert code(s) from Justification manual]

86. Let's imagine we had a scale from 1 to 7 where 1 is not at all accountable and 7 is entirely accountability. On that scale, how accountable would the **human** be? *[NOTE: insert a number between 1 and 7, including half-intervals]:*
    [insert code(s) from Justification manual]

87. On that scale, how accountable would **Robovie** be? *[NOTE: insert a number between 1 and 7, including half-intervals]:*
    [insert code(s) from Justification manual]

88. On that scale, how accountable would the **vending machine** be? *[NOTE: insert a number between 1 and 7, including half-intervals]:*
    [insert code(s) from Justification manual]

Autonomy

89. One person I spoke with said that they thought Robovie was controlled by a person sitting at a computer somewhere in this office. Do you think that this person was right or not right?
    89.1.   Right

    89.2.   Not Right

    89.3.   I don't know/maybe

90. Robovie is actually controlled by someone at a computer in a nearby office space. Are you surprised to hear that Robovie is controlled by a person?
    90.1.   Yes

    90.2.   No

    90.3.   I don't know/maybe

    90.4.   Leaning towards Yes

    90.5.   Leaning towards No

B. Justifications

Notes

- Code all significant justifications following a codable evaluation.

- Code only justifications that are in support of the coded evaluation.

- Do not code a given justification more than once for each evaluation.

- If a justification includes both an elaborated and unelaborated justification within a category, code only the elaborated justification (e.g., do NOT code both 5.1.1. Unelaborated Convention and 5.1.3. Custom). Conversely, code both the elaborated and unelaborated justification if they are at different levels (e.g., DO code 5.1.3. Custom and 6.1.1.1. Unelaborated Welfare).

- Do not code justifications in response to a misunderstood question.

- Do not code as a justification a "same answer" type response. In such cases, only code the justification (if any) that is given in addition to the "same answer" response. If there is no additional justification, code as Uncodable (0).

- Notions of breaking Robovie are uncodable when it is unclear if the harm is caused to Robovie or if it is an indirect harm to the owner or the nature of human destruction.

- For justifications that include both an affirmation and negation of same category, code ONLY the affirmation (e.g., 'he can talk, but he can't communicate'; code: 'he can talk').

Reasoning Coding Categories

1. Essences

Refers to the essential physical qualities of Robovie, the broom, and the human (for comparison questions; i.e., not the participant) including statements regarding the entity as artificial, animal, personhood, or biological entity and statements regarding the entity's form and functionality.

1.1. Affirmation

1.1.1. Artifact

An appeal to the essential artifactual qualities of an entity, including statements of direct, isomorphic, and/or transmorphic correspondence between the entity and an artifact, as well as statements regarding the entity as programmed, simulated, manufactured, and/or marketed entity.

1.1.1.1. Direct

An appeal based on a direct correspondence between the entity and an artifact, including references to being a robot, machine, computer, object, or parts thereof (cameras, motors, fans, fuses, wires, on/off switch, sensors).

> Because I don't know. **He's a robot.** He's not, I don't know. It would be like, I don't know, playing, I don't know. It's not like being with a person. But he's [pause] um I would, if I were lonely I would need a human connection.
> **He's a machine.** He's a machine that does tasks and does, and can interact. But it's all electronic. I mean it's not as if he has any free will. He's a machine that can be made and manufactured. And could be used to help somebody out, a handicapped person. So in that sense, because he is not a true being, he is a machine. He cannot be um, it's not like he's in slavery, so. He's a product.
> Um because again he's limited by the technology that he has. Um so again it would be more the fault of **his technology** and the fault of um being um being biologically able to understand language and be aware of where people are.
> SO HOW DO YOU KNOW THAT ROBOVIE IS NOT SCONSCIOUS THEN? I guess you could say that **when you turn him off, he's completely off.** Does that make sense?
> No because he's limited but what his, by what the intelligence, his code, **he's wired to be**.

1.1.1.2. Isomorphic

An appeal based on an analogical or conditional (if-then) correspondence between the entity and an artifact.

> It's like a, **I don't think a computer thinks when you type something into it, it still has to load where it's going, it's not like actually thinking, like, pros and cons or anything like that. It's just like, I don't think it thinks.** I think it loads programs, like what it's supposed to say, or what it's supposed to do. OK. AND YOU SAID ROBO-- A COMPUTER DOESN'T THINK. IS ROBOVIE THINKING LIKE A COMPUTER? IS IT DIFFERENT? **Umm, I would say Robovie thinks like a computer.**
>
> Um it seems like he's just a machine that he can do these things and, do these things and do it for me. But then it's I don't know just a separation of being a machine. It's like having a **similar friend as you know my computer or my friend as my toy or something.**
>
> WHY NOT? Cause I don't think he has a self. I think **he's like a vacuum cleaner**.

1.1.1.3. Transmorphic

An appeal based on the establishment of similarities and differences between the entity and an artifact, wherein an inequivalent correspondence (or difference) is overridden by similarities.

> Ah see that's the thing. **Robovie is in the same category as the ATM but he can interact with a human. That's the biggest difference probably.**
>
> Like it's, I don't know, **like a big PC that rolls around on wheels, only a lot smarter.**

1.1.1.4. Programmed

An appeal that an entity is or able to be programmed by humans to exhibit behaviors, emotions, thoughts, etc.

> Um [pause] I think [pause] the, um, maybe, the **programming got put into him, so it's not like he's interested** in it.
>
> Umm, he can act upset and he can, **he can be programmed to act upset, but he's not like really upset.**
>
> Be happy? Not in a human sense. IN ANY SENSE? In a technological-producing a reaction to a whatever um, to whatever thing he likes I guess it would provoke a um positive statement or maybe even laughter if that's **programmed** into him.
>
> No because he's limited but what his, **by what the intelligence, his code, he's wired** to be.

1.1.1.5. Simulated

An appeal that an entity is simulated to be a human, human-like, or have human characteristics. May also include statements that the entity is not really so, but seems to be human, human-like, or have human characteristics.

> Umm, so I **guess I don't think he can have like, actual real like human being feelings, but he can act a certain way and like and you can perceive that he's happy by the way that he acts**.
>
> I don't think Robovie sits and stares by himself and thinks and has like emotions, and like **he can have generated emotions**, but WHAT DO YOU MEAN BY GENERATED EMOTIONS? Umm, **emotions that are like artificial**.
>
> DO YOU THINK ROBOVIE CAN BE UPSET THOUGH? Umm, **he can act upset and he can, he can be programmed to act upset, but he's not like really upset**.
>
> DOES ROBOVIE HAVE FEELINGS? Uh, I wouldn't say as humans do. OK, HOW DO YOU KNOW? Well **he does seem like a human but he can't feel**, so I wouldn't say he has any feelings.
>
> Uh no it would just be a response. I think **you could make him look embarrassed, but I don't think you could make him embarrassed**.

1.1.1.6. Manufactured

An appeal that an entity is manufactured, built, or created by humans.

> Umm [pause] **because he was built and** so like um so like being like a distinct Robovie or another human being.
>
> Um because he's **made out of things that humans made. So he's like human-made**, not like nature-made.
>
> He's a machine. He's a machine that does tasks and does, and can interact. But it's all electronic. I mean it's not as if he has any free will. He's a machine that can be **made and manufactured.**

1.1.1.7. Marketed

An appeal that an entity is a marketed, consumable entity.

> WHAT ABOUT TO SELL ROBOVIE, WOULD THAT BE ALRIGHT OR NOT ALRIGHT? Yeah. OKAY. AND WHY? Um he's a, **he's a product.** Um [pause] I don't see how it would be wrong.

1.1.2. Animal

An appeal to the essential qualities of an entity based on statements of direct, isomorphic, and/or transmorphic correspondence between the entity and an animal.

1.1.2.1. Direct

An appeal based on a direct correspondence between the entity and an animal.

> I think it might have the capacity for Dry Humor, but I just uh …I don't know. I guess **you could compare it to like some animal.** You don't expect them to have a sense of Dry Humor. You're not going to think they're funny. But if they like. COME OUT OF NOWHERE WITH A JOKE. Yeah it's interesting. I don't know, if they…I guess if you know that they're Dry Humorous, you could expect or you could be ready for some sort of, I don't know, something funny.

1.1.2.2. Isomorphic

An appeal based on an analogical or conditional (if-then) correspondence between the entity and an animal.

> I think **Robovie would be a good companion, like a pet is a good companion**.
>
> Oh I think it would be completely fine. I have no problem with, with um a person owning a robot**. Just like I don't have a problem with them owning a dog**. Um if I think he's on par with humans, then that's slavery and that's a little bit different, but until that point. There's no problem with it.
>
> CAN YOU SAY THE REASON AGAIN THAT HE'S NOT CONSCIOUS? Uh. Cause. Well… I don't know. **I would compare him to maybe an animal.** MMM HMM. With the whole self-awareness consciousness aspect in that he's maybe not self-aware of the situation. He can't make uh decisions about where he is and where he wants to be but he has a deeper sense. But **he can be conscious in the way that an animal's awake, kind of**. Just not conscious of himself.
>
> **It can't really make decisions on its own, and actually, especially in the case of Robovie, it's sort of like a domesticated pet.** MMM HMM. Since we really just, we made him because we kinda like raised him. YEAH. In our culture. SURE. And. **As a pet. So he doesn't know how to live in the wild**, so.
>
> IT SOUNDS LIKE YOU'RE SAYING ROBOVIE CAN THINK, BUT IN A LIMITED WAY. Yeah, **kind of like a parrot. Like parrots can say things, but I don't know if**

they truly understand what they're saying. Like they know if you say this, this is kind of what I should say. But it's very limited.

… **like when your dog comes in, and gets mud all over the furniture and house, and then you're mad at him, but you forgive him, but when you forgive him, you say oh, he's just a dog, and so, I think with Robovie, if he'd angered someone and then they did forgive him, it'd be easy to forgive him just by saying, it's alright, he's just a.. a robot…**

1.1.2.3. Transmorphic

An appeal based on the establishment of similarities and differences between the entity and an animal, wherein an inequivalent correspondence (or difference) is overridden by similarities.

I would say that's the biggest difference there, like I couldn't…**between Robovie and the dog, the dog has gone through eons of evolution whereas Robovie was probably created over a few years I'm guessing.** UM-HM. **But other than that, like the end product is that they both interact with their environment. And you know need, have certain needs. A dog needs food, and Robovie needs I'm guessing electricity at some point, um. So I would say it probably comes down to semantics.**

I guess he'd be, to me, kinda like in between uh, a pet and another… uh, a friend. **So, he'd be uh, a pet because it'd be sort of, he's not human but he's more than just a machine. But he's also more than just a dog or a cat because he can, you know, talk and interact with humans like a human would**.

1.1.3. Plant

An appeal to the essential qualities of an entity based on statements of direct, isomorphic, and/or transmorphic correspondence between the entity and a plant.

1.1.3.1. Direct

An appeal based on a direct correspondence between the entity and a plant.

NONE

1.1.3.2. Isomorphic

An appeal based on an analogical or conditional (if-then) correspondence between the entity and a plant.

Um, I don't know, I'm just very attached to happiness being in kind of like humans or animals. **So he's more like a plant that way, I guess. Where they, uh, prefer certain states, you know like a sunny day or rain or something, but you wouldn't really think of it as being a happy plant. You just think of it as being a healthy plant.**

1.1.3.3. Transmorphic

An appeal based on the establishment of similarities and differences between the entity and a plant, wherein an inequivalent correspondence (or difference) is overridden by similarities.

NONE

1.1.4. Personhood (Human Being)

An appeal to the essential qualities of an entity based on statements of direct, isomorphic, and/or transmorphic correspondence between the entity and a human being. Note: double-code personhood categories with other categories when there is both a personhood claim (direct, isomorphic, transmorphic) and another claim (e.g., mental states, convention, moral).

1.1.4.1. *Direct*

An appeal based on a direct correspondence between the entity and a person/human.

> Um I don't know. I didn't, I never thought that I'd actually be able to talk to like **a robot that could, that was like, that human. He had a lot of human characteristics** and you could actually talk to him. It's really cool.
>
> Robovie is very life-like. Unless my concept of biology is completely wrong, Robovie is not organic. And currently my understanding of life includes a biological component. But, uh… **I definitely identified with Robovie as a person. As a person-style interaction**. Um… SO IT SOUNDS LIKE AN IN-BETWEEN SPACE. Yeah. At the same time, being fascinated by the technology that makes up **the "person" that I was interacting with**…
>
> And there were um just the gestures and the way that he moves when he talks seems very emotive and expressive, so he can come across as emotive, and with the gestalt mapping, **the part of my brain that maps human characteristics onto stuff says yes definitely!** So in that way, the emotive aspects definitely worked. **It felt like I was interacting with a very personable individual.**

1.1.4.2. *Isomorphic*

An appeal based on an analogical or conditional (if-then) correspondence between the entity and a person/human.

> NONE

1.1.4.3. *Transmorphic*

An appeal based on the establishment of similarities and differences between the entity and a person/human, wherein an inequivalent correspondence (or difference) IS overridden by similarities.

> Um well since he's a humanoid robot, **it's not exactly, but it's very much like having a person**. I would say even though I don't, I don't know what's behind the reactions he does, that I don't think it would be appropriate to own him just because **he is so human-like**.

1.1.5. *Biological*

1.1.5.1. *Unelaborated*

An appeal based on unspecified biological characteristic (e.g., "it's organic" or "he has characteristics of living things").

> IN WHAT WAYS IS A HUMAN LIKE A LIVING BEING? **Um a human is a living being** (laughs).
>
> IN WHAT WAYS IS A HUMAN LIKE A LIVING BEING? **It is a living being by definition.** It's like the definition of a living being, a human being, yeah.
>
> IN WHAT WAYS IS A HUMAN LIKE A LIVING BEING? **We're biological.**
>
> IN WHAT WAYS IS A HUMAN LIKE A LIVING BEING? Um it can speak. It can move around. They can emote. They have emotions. They have to eat. They have to do all the, I don't know, **natural things that living things do**.

1.1.5.2. *Features*

An appeal based on physical features/characteristics (e.g., eyes, hands, feet, mouth, internal organs, lungs, heart, brain, other body parts) of which biological entities are comprised. There must be a reference to a particular feature of the body, rather than holistic form. In the case of,

"He doesn't have a form that resembles a human" we code negation of personhood and affirmation of form rather than negation of biological features.

> SO WHAT ARE THOSE COMPONENTS THAT MAKE A HUMAN A LIVING BEING? Um they live, they can feel, they have emotions, **they have brains.** Um they can interact with things, they can communicate.
>
> SO IN WHAT WAYS IS ROBOVIE LIKE A LIVING BEING? Um well there's a lot of ways actually. Um I like that, you know, that **his head followed me around**, so I felt like I was kind of being watched, **kind of like eye contact**, and um, he, he or she, kind of like **swung his arms** around when he walks, and then um I guess it was pretty human like the way it addressed me by my name.
>
> Even though he's, he has a, a, physique, he has a human physique **um with a head and two arms**, things like that. But he isn't human.
>
> OK. UM IN WHAT WAYS IS ROBOVIE LIKE A TECHNOLOGY? Um I don't know. One a scale of one to ten, I would say he's like a four, cause **with the eyes and the speaker mouth**, and how he comment on my shoe earlier. SO THE SCALE, IS ONE LIKE. One is like not really roboty, and ten like really roboty.

1.1.5.3. Processes

An appeal based on biological processes (e.g., growing, breathing, reproducing, aging, talking, laughter), and sensing (e.g., seeing, hearing, touching/feeling).

> Because it is a very simple task. Um humans are very much capable of understanding um, understanding language and understanding where someone is. And if **the person can see that he's found it or has not found it**. And um so that would be a (--------).
>
> Because um he **saw me** and when he saw me he offered, he shook his hand. So he thought 'Oh I see a person.' I said "How are you" and you know that's an interaction, I was thinking.
>
> Um that's kind of the definition of being able to live, to be able to sustain yourself and eventually be able to **pass on your genetic material,** which humans do. So I would say in that way human beings are like any other living thing.

1.1.6. Form

An appeal to physical form (i.e. being short, overall shape) not captured by the direct artificial code.

> IN WHAT WAYS IS ROBOVIE LIKE A TECHNOLOGY? Um he takes time to respond, to take in what I'm saying and almost calculate what he's supposed to say back. Um I don't know. **The basic composition of him, he's obviously not built like a person**, but I'd say that's about it.
>
> And **Robovie is and doesn't pretend to be anything other than a robot, like he doesn't look like a human**.
>
> IN WHAT WAYS IS A VENDING MACHINE LIKE A TECHNOLOGY? Um it has buttons, lights, little things that move around, like little screens. It's made of plastic and glass and metal. It yeah, it doesn't talk I guess. I don't know. **It's very technologic looking**.
>
> …right now, like I would say like technology that is **meant to look like a person**. UM-HM. Or act like one. SO WHY WOULD YOU NOT SAY SOMETHING IN BETWEEN? Um because it's more like, I mean, it's still technology, **it just had a human exterior**, but I don't think it's really like a person.
>
> IN WHAT WAYS IS ROBOVIE LIKE A LIVING BEING? Um **he's kind of shaped like one**, and he responds when you talk to him.
>
> …the kind of **humanoid shape of the robot**

1.1.7. Functionality

An appeal based on functional aspects tied to the artifact's physicality (e.g., slowness, ability to shake hands, moving around) and ability to perform a function (e.g., teach).(NOTE: boundary – 'it's his job' is a

minimal code-only if defined by its work. The issue lies in fact that conventions can impact some functions and in such a case, there would be social aspects under essences. But note that judgments that Robovie should be paid because he/it is working as a teacher should be coded under "Convention/Custom," as these are tied to the custom of getting paid for work.)

> Because um he saw me and when he saw me he offered, **he shook his hand**. So he thought Oh I see a person. I said "How are you" and you know that's an interaction, I was thinking.
>
> He's a machine. He's a machine that **does tasks** and does, and can interact. But it's all electronic. I mean it's not as if he has any free will. He's a machine that can be made and manufactured. And could be **used to help somebody out, a handicapped person**…
>
> He's accountable because **that's his job**.
>
> Umm, just the fact that he can uh, **he can motor around** and LIKE he can see it, he can know where he was, and he can respond to your questions in a certain way, and you could ask any question you want, you can ask any thought.

1.2. Negation

1.2.1. *Artifact*

An appeal to the lack of essential artifactual qualities of an entity, including statements based on the lack of direct, isomorphic, and/or transmorphic correspondence between the entity and an artifact, as well as references that the entity is not a programmed, simulated, manufactured, and/or marketed entity.

1.2.1.1. *Direct*

An appeal based on the lack of a direct correspondence between the entity and an artifact, including references to not being a robot, machine, computer, object, or parts thereof (cameras, motors, fans, fuses, wires, on/off switch, sensors).

> IN WHAT WAYS IS A HUMAN **LIKE A TECHNOLOGY? Not in any**.
>
> YEAH. SO THEN KIND OF GOING ON THE OTHER END, WOULD IT BE WRONG OR, TRYING TO FLIP THAT OVER. WOULD IT BE WRONG TO SAY ROBOVIE'S FULLY A TECHNOLOGY? No. Well, no, **I do, actually I kind of do feel like that was wrong**. Just because he does have like emotions, if you notice, like when you kind of told him off, he, kinda, it's like he kinda, he got kind of hurt about it, like you know, and um like even when he left sitting there was like that awkward silence and I didn't start, he had to like fill it in. Just the fact that there was an awkward silence, you know hanging out with like a machine, than it kind of does make it more than a machine.
>
> GIVEN WHAT YOU'VE SAID, WOULD YOU SAY THAT ROBOVIE IS A LIVING BEING, A TECHNOLOGY, OR SOMETHING IN BETWEEN? Definitely something in between. OK AND WHY? Because **I felt like I was able to talk to him in a way that I uh, that I wouldn't be able to talk to just a piece of machinery**. Um I think that makes it more real, more like a living thing that you can actually talk to.

1.2.1.2. *Isomorphic*

An appeal based on the lack of an analogical or conditional (if-then) correspondence between the entity and an artifact.

> And it's like, **it's so different from my computer**. Like I hit my computer, and I would not hit, I would not hit, you know, I would not hit Robovie. No way.
>
> I guess I mostly felt that I was more thinking of, that **Robovie, knew there's a beach ball in the way** and then asked someone else to move it out of the way. It was something um, I would expect more out of something that thinks a lot more. Because I think some… **like little robot dog thing or like, uh, remote controlled car hits—it's not going to… notice that something's in the way**. It's just going to go up to it and, keep pressing on it til it breaks or moves out of the way.

Um… the way that **the voice was like, very, like not computer voicey**, like it was pretty good.

1.2.1.3. Transmorphic

An appeal based on the establishment of similarities and differences between the entity and an artifact, wherein an inequivalent correspondence (or difference) is not overridden by similarities.

I was very impressed. Um I don't know there was an initial reaction of going out there. You saw I just... **I mean he almost seems like a big toy, but I know that Robovie is more complicated than a big toy**.

1.2.1.4. Programmed

An appeal that an entity is not or not able to be programmed by humans to exhibit behaviors, emotions, thoughts, etc.

CAN ROBOVIE BE HAPPY? No, I don't think he could be happy either, **I don't think he could display any emotions unless he's programmed to.** OK. BUT IF HE WAS PROGRAMMED TO DISPLAY EMOTIONS AND FEELINGS, DO YOU THINK HE WOULD BE HAPPY? Um, I guess so but I don't know, I guess I just, like certain cues would have to set it off. Like with a human, like, it's all there. I don't really know how to describe it. YEAH I KNOW, IT'S SO PECULIAR. IT'S NOT LIKE YOU MEET A HUMANOID ROBOT EVERY DAY AND IT'S NOT LIKE WE KNOW A LOT ABOUT SORT OF THE INNER WORKINGS. Yeah, cause there's a lot. **I've seen some that have like real emotions. OK. But I mean it's still just like programmed.** (*NOTE*: it was agreed here that the participant believed Robovie NOT to be programmed to exhibit happiness, and that although some robots are, Robovie is not programmed to exhibit happiness).

If you don't have that innate emotion, um without being able to make that um, or without that innate feeling I guess, like opinions and stuff **without having someone programmed**, it's hard to be upset and show that you're upset.

Because it's not…it's the kind of interaction where I didn't initiate it, but it's something that he said that I was not expecting. **It's not how I see something being pre-programmed**, like I'm…when we were talking about the bonsai trees to start with. I didn't know…I knew I was going to be playing a game, I didn't know exactly what we were going to be doing, but I wasn't expecting a comment about my shoes. So do I think of that as thinking? Yeah.

1.2.1.5. Simulated

An appeal that an entity is not simulated to be a human, human-like, or have human characteristics.

So I think there's a lot of stuff that's going to be…like that, like I said, the happy and the angry, is on the far end of the spectrums and it's easier to duplicate based on gestures and tone of voice and inflection, but when you get into like the stuff in between, I think embarrassment and consciousness and whatnot, then it gets more gray. UM-HM. **It's a little bit harder to duplicate**.

CAN ROBOVIE BE HAPPY? [Pause] um [pause] no I – no I wouldn't say happy. He seemed I guess um his mood kind of throughout even when I was disagreeing with him or just chatting or when he was talking about bonsai, **he seemed pretty constant**. UM-HM. Didn't change a lot. OK. Or from my perspective **he didn't seem to…be more happy or less happy**.

1.2.1.6. Manufactured

An appeal that an entity is not manufactured, built, or created by humans.

NONE

1.2.1.7. *Marketed*

An appeal that an entity is not a marketed, consumable entity.

NONE

1.2.2. *Animal*

An appeal to the essential qualities of an entity based on statements of the lack of direct, isomorphic, and/or transmorphic correspondence between the entity and an animal.

1.2.2.1. *Direct*

An appeal based on the lack of a direct correspondence between the entity and an animal.

NONE

1.2.2.2. *Isomorphic*

An appeal based on the lack of an analogical or conditional (if-then) correspondence between the entity and an animal.

It's just not the same as like having a person or this little puppy or something, like, there's responses but there's not like I said that personality, that comfort, that… I don't know, there's just this X factor that's not there.

Yeah, sure. Own him, yeah. You know, it could be very helpful for someone who's disabled, or… you know, whatever. I think robots would be cool like… h-help, like for (___) purposes. And, I, because I don't feel like it's a person, **or a creature, and I don't feel like it's like enslaving them or stuff like that**, 'cause he was created by people. So.

I still feel pretty confident that he would not have those feelings. I don't believe so. AND WHY NOT? Uh just because we made them. Uh he's a machine and it's pretty strange for anything rather than humans **or animals**, you know like **even animal mothers care about kids. I don't think he has any of those capacities**.

1.2.2.3. *Transmorphic*

An appeal based on the establishment of similarities and differences between the entity and an animal, wherein an inequivalent correspondence (or difference) is NOT overridden by similarities.

I can't say I would compare it to like a living creature. UM-HM. Because it's, it's kind of intelligent in a different way. Well I think it's like um, I don't want to compare it to like some [pause] I don't know, **I'd say it's like smarter than some small animal, but at the same time, it doesn't have like instincts, or it doesn't gave like you know that subconscious level** that just makes it…I guess I didn't really have a chance to test out its interactions with like um you know making mistakes and fixing them, or like learning.

1.2.3. *Plant*

An appeal to the essential qualities of an entity based on statements of lack of direct, isomorphic, and/or transmorphic correspondence between the entity and a plant.

1.2.3.1. *Direct*

An appeal based on a lack of direct correspondence between the entity and a plant.

NONE

1.2.3.2. Isomorphic

An appeal based on a lack of an analogical or conditional (if-then) correspondence between the entity and a plant.

> Well it's kind of hard to define what a living thing is, I suppose. You could be very technical, it's just the, you know, intake of certain things like air. But, um, plants are considered living things and they don't interact with their environment but **I think that's more a living thing than. Than a. A plant. Interacting with your environment. Like the robot talks to me and plants do not talk to me.**
>
> I feel like unless we replicate that part of the brain we're not going to be able to make something that shows emotion cause I just don't think it can be done. No matter what my senses tell me. Like if I feel like oh, he must be showing emotion, like **people tend to anthropomorphize everything**. Like plants. **You will say, like oh, that's a happy plant cause it's in the sun and it's healthy, but it's not really**. It's just healthy. So I think that any inclination I have to think that he's embarrassed or whatever is just uh my brain being clueless.
>
> But I mean, he's more responsive, like I have a cactus. **I don't really talk to my cactus, but if I did, like cause it's. It would just sit there. It wouldn't say anything. And then I'd be like, oh my god, I'm talking to a cactus. And I don't feel stupid talking to Robovie.** Like when you leave the room I still talk to him even though nobody was there like watching the study or whatnot.

1.2.3.3. Transmorphic

An appeal based on a lack of similarities and differences between the entity and a plant, wherein an inequivalent correspondence (or difference) is overridden by similarities.

> NONE

1.2.4. *Personhood (Human Being)*

An appeal to the lack of essential qualities of an entity based on statements of a lack of direct, isomorphic, and/or transmorphic correspondence between the entity and a human being.

1.2.4.1. Direct

An appeal based on the lack of a direct correspondence between the entity and a person/human.
> But **he's definitely not fully human**, and so.
>
> Well I mean like **Robovie's a robot and um the human, the presidential election's for humans you know um**. I feel like, I don't know that really actually brings us, that's a really good interesting topic because back in the day when women couldn't vote, or black people couldn't vote, like I don't. I mean like **robots obviously, I don't consider them equal to us** right now. So I wouldn't consider that like, um it ok for them to vote. But I feel like humans are more and more so coming, becoming equal with one another. I feel like it would be a moral stretch to have a robot vote in our presidential race also because **he's not human**. We can program machines to think certain things and do certain things.
>
> I think that Robovie was created for a purpose, whether that's to help or be a companion of some sort, and purchasing that…I mean **I don't necessarily view him as a human**, so obviously I don't condone buying people, but I think robots are created for the purpose to help humans, otherwise we wouldn't have made them I don't think. So buying them, I don't think that's bad at all.
>
> Because he was create---he was um. He's not, **he's not a human**. UM-HM. OK. He's…when you turn the power off he doesn't think. We don't have that. I mean we don't, I mean we die but that's, we don't have a, we don't run by electricity. So he is a machine. He's not a human.

1.2.4.2. Isomorphic

An appeal based on the lack of an analogical or conditional (if-then) correspondence between the entity and a person/human. [ways in which Robovie is specifically not like a human. i.e. not like a human in mental, social, moral ways).

> **People have the capacity to change feelings and um can go against another person for whatever reason. Um I don't think robots can do that**, so I think I could trust Robovie with um most of the time. Because he, if I say do it, he'll do it. And I'll say "Oh I don't want to do it" or…. Cause he doesn't you know [pause], he doesn't have uh the human thought process. Um "Can I or should I do it? Who is this person? Why should I do it for them?" They don't have that thought process. They have "Oh I'm not able to do it." Or "I can do it." Or you know "I can do it or you can do it."

> Because I don't know. He's a robot. He's not, I don't know. It would be like, I don't know, playing, I don't know. **It's not like being with a person.** But he's [pause] um I would, if I were lonely I would need a human connection.

> Umm, **I don't think he has senses and sensory like people do and like (-------) so like feel cold air blowing through.** That's how people know they're outside, but a robot, a robot wouldn't know it was outside unless you told him. [*NOTE*: this was double coded with 1.2.4]

> CAN ROBOVIE BE EMBARRESSED? [Pause] not from what I've seen. Naw again, embarrassed, it, it, it's an emotional state where it has meaning. I mean it, it goes to your being that you are, something about you is um exposed. **And I don't think he has the capacity to have that like people do.** I mean again there's no meaning for him whatever happens, because it doesn't add up to anything he doesn't have.

> **We have hobbies, we have, we have careers. We have, we want to do things, and change um ourselves and change our surroundings. A robot can't do that. At least Robovie can't.**

1.2.4.3. Transmorphic

An appeal based on the establishment of similarities and differences between the entity and a person/human, wherein an inequivalent correspondence (or difference) is NOT overridden by similarities.

> I mean, I guess **it's almost the same as forgiving a person** for their faults cause there's something in their history, or… it's almost like programming, they're just not as… set in stone, I guess. But it's almost like programming in that, I guess, when I… when people are kind of just thinking something in their history, their upbringing, maybe, or… or something may have. It's not someone's fault**, it's almost the same thing**.

> Well ok I guess what I was mostly worried about I think with the checklist was that like, so **he knows a lot of things and he seems like a really sophisticated robot, but at the same time, like he was not as able as me**, like he doesn't have the full vocabulary like I do. He can't run away like I do. So I look at him and I'm like you're kind of powerless in a way like relative to me, so it's, like I don't want to exert my power further over you.

1.2.5.   Biological

1.2.5.1. Unelaborated

An appeal based on lack of unspecified biological characteristic (e.g., "it's inorganic" or "it is in no way like a living thing").

> IN WHAT WAYS IS A VENDING MACHINE LIKE A LIVING BEING? Um (laughs) it's **not really**, I think. **I mean it's not**. You just plug in numbers you know and it gives you something. There's just this program.

Well I mean he was like "Oh I'm sorry that was my attempt at a joke," but I mean I guess I just can't take any of it seriously because to me **it's not a living**, so I don't think it can have feelings.

My gut reaction is that Robovie isn't a conscious being, but I think that's because **I don't consider him living** either. I mean there's, within the set of living things, there's only a subset of living things that I think have consciousness, and so just by the fact that he's not living kind of rules him out.

IN WHAT WAYS IS A VENDING MACHINE LIKE A LIVING BEING? Um I don't know. **Uh not that many ways. Basically zero ways.**

1.2.5.2. *Features*

An appeal based on lack of or inability to possess physical features (e.g., eyes, hands, feet, mouth, internal organs, lungs, heart, brain, other body parts) of which biological entities are comprised. There must be a reference to a particular feature of the body, rather than holistic form. In the case of, "He doesn't have a form that resembles a human" we code negation of personhood and affirmation of form rather than negation of biological features.

I don't know if he'd really… understand the, the reason for the emotional um, pain or anguish. I don't know if he would see it as a big a deal as some people could, because to him, you know, so… so what. He might, **I don't know if he has a, like a heart to break**. But humans do, and so I don't know if he'd know that.

Um I guess well his voice sounds. It's like a human's, but it's not quite like a human's. I guess that clues you in that he's a technology, and um I guess your…I don't really know like how I'm aware of it, but he is not a human, but like…I don't know. You know. Maybe because you told me, I guess. **He's not made of like flesh**. I guess that's like the main way.

Yeah. I mean he does, he might have a brain, a fast running CPU and everything, but he doesn't have….**it's not like a brain**.

1.2.5.3. *Processes*

An appeal based on lack of or inability to have biological processes (e.g., growing, breathing, reproducing, aging, talking, laughter), and sensing (e.g., seeing, hearing, touching/feeling).

Well again Robovie has a completely different sense of…I mean Robovie is using cameras and sonar, well not sonar. YEAH HE'S GOT SONAR. Ok sonar. Ah I don't know. It's just not the same. It's not like he's…**it's just a completely different type of perception**.

Um because again he's limited by the technology that he has. Um so again it would be more the fault of his technology and **the fault of um being um not being biologically able to understand language and be aware of where people are**.

But I don't know… not usually, you know, if the person's doing it, they're upset with somebody else so they want what somebody else has, then, you know, that usually ties into possessions and that all kind of ties back into you know, survival things, but **Robovie doesn't need to eat or, sleep really**, he just needs, well I know he runs off of a battery, so I guess he'd need to recharge that, but—but he doesn't have a… a need to uh, rob, or something like that…

DO YOU THINK THAT ROBOVIE CAN FEEL HAPPY? I don't, I mean when I'm…**I mean can Robovie release endorphins? No (laughs)**

I don't know like it's hard because he doesn't really have like a…you could say like well I didn't ask to be born, but **I've gone through this whole process of like growing up and developing into a human**. **With Robovie, I'm guessing that he didn't start out as an infant**, so it's kind of like he's all the sudden put into the world.

1.2.6. *Form*

An appeal based on lack of physical features not captured by the direct artificial code.

IN WHAT WAYS IS A VENDING MACHINE LIKE A TECHNOLOGY? Oh definitely **the physical aspects. Um you don't usually see human beings that's a block**. And plus um it can be lit up at night, or it is always lit up. But you know you can always plug the switch on and off, just like that. Um it's under human control.

UM IF YOU WERE SAD, DO YOU THINK YOU MIGHT GO TO ROBOVIE FOR COMFORT? Probably not just because **he's not soft (laughs) and cuddly**. So um but I'm not sure he's able to comfort, but maybe if I did answer like "Oh yes I'm upset" then maybe he would try comforting me so.

1.2.7. Functionality

An appeal based on the negation of functional aspects tied to the entity's physicality (e.g., slowness, ability to shake hands, moving around) and ability to perform a function (e.g., teach). (NOTE: boundary – 'it's his job' is a minimal code-only if defined by its work. The issue lies in fact that conventions can impact some functions and in such a case, there would be social aspects under essences. But note that judgments that Robovie should be paid because he/it is working as a teacher should be coded under "Convention/Custom," as these are tied to the custom of getting paid for work.)

Um, well, like I said before, they, I mean robots have like certain boundaries. They're **not going to be able to do like everything that like a human can do. Like for say, they probably can't go swimming (laughs), um they can't eat with you, they can't like pay for you to do things, like they can't, there's just a lot of like limitations** and like a lot of things we wouldn't have to deal with.

Uh because at this stage, it's like uh…well I've compared Robovie to like a child, and I think that **it can't live on its own. It's not able to make a living**. It can't, you know…it doesn't pay for its own way. I don't know, I think it needs to be part of a household. It needs to be part of like something.

I guess they wouldn't be responsible cause they. Cause they're not, um, it's just a malfunction and **there's nothing it can do to fix itself or to make up for that mistake**. But it would be accountable because that's kind of its purpose is to give you the right change. That's what it's supposed to do.

I think he's limited in his responses. Like some things I say he couldn't respond back to me, and I had to move the exercise ball for him cause **he couldn't move it himself.** RIGHT. And **he couldn't point at the map**, I had to point at the map.

2. Mental[*]

Refers to personal preferences, predilections, intentions, desires, goals, emotional states, cognition, and unique psychological characteristics of Robovie, the broom, and the human (for comparison questions; i.e., not the participant). Note that there may not always be an explicit statement of capability (e.g., Robovie has feelings), but the capability is implied in their reasoning (e.g., Robovie feels sad).

2.1. Affirmation

2.1.1. Preferences, Predilections, Likes/Dislikes

An appeal to existence of (or capacity to have) personal preferences, predilections, and likes or dislikes.

---

[*] Note that the *personal domain* has been placed within mental states. This is so because participants are making claims based on Robovie's *capacity to have* preferences, predilections, and likes/dislikes. When making domain distinctions, there is an assumption that one has the capacity for preferences, predilections, likes/dislikes; it is not necessary to first establish this ability.

Like I said, I don't know. It's complicated. It depends on how you define it. So I guess I change my answer to yes, they can have feelings. OK. **I think they can generally become more interested in something the more they're exposed to it**.

SO THEN CAN ROBOVIE BE UPSET? Yeah. OK HOW DO YOU KNOW? Cause **he don't like it when I tell him he's wrong**. UH-HUH. WHAT MADE YOU THINK THAT HE DIDN'T LIKE IT? I just…he keep refuse to like think the other way. It might be like uh I don't know. And like I don't know. I don't really know. It just feels that way.

SO YOU REMEMBER WHEN ROBOVIE WAS TALKING ABOUT THE BONSAI TREE. DID ROBOVIE SEEM INTERESTED IN THE BONSAI TREE? **He did**. He had lots of information. **He told me he was interested. I wouldn't know how else to describe someone being interested in bonsai trees other than wanting to show it to me, and giving me you know useful information that, that it appeared to me he enjoyed. You know what I mean? YEAH. So I would say definitely.**

Well I mean do say that I don't know why **he enjoys the bonsai tree**, but he definitely does. It doesn't really…what I mean to say, whether it was written down as code or, or maybe it was something that, it was code and it was something and he like figured it out. **He likes it**, just like I don't know why I like vanilla ice cream more than chocolate.

2.1.2. *Intentions, Desires, Goals, Expectations*

An appeal to the existence of (or capacity to have) intentions, desires, goals, and/or expectations.

He said "Oh I like your shoes" and said "Oh I would like to have shoes if I had feet" and he said(?) "Oh I was trying to be funny." So actually I guess yeah **he was trying to be funny**.

So he's aware of like where's he's at and like the environment and the ball, where the ball is. And **he want me to move it**. After I move it, he like move forward closer to the map.

I wouldn't know how else to describe someone being interested in bonsai trees other than **wanting to show it to me**, and giving me you know useful information that, that it appeared to me he enjoyed.

But Robovie seems like…**it was like he has a good intention**. And that should not…good intentions and bad intentions should not determine intelligence, but that's why I said that so.

2.1.3. *Emotional States*

An appeal to the existence of (or capacity to have) emotions and feelings.

IN WHAT WAYS IS ROBOVIE LIKE A LIVING BEING? Um in a ton of ways, actually. Cause when I first went out there I didn't expect him to respond, like, you, he kind of **got a little feisty** with you when you were like "No."

IN WHAT WAYS IS A HUMAN LIKE A LIVING BEING? Hm not only biology but the psychological component. Um I guess for that it's kind of like that need to be with people. I guess we call those human characteristics, and what I mean by that is **the emotions**.

So yeah **he obviously has some sort of feelings**, and um, what's the word I'm looking for, I can't find it but. Basically people have opinions on things, and they're dedicated to those, and they're not going to change their mind.

Um seems to be, like I said, but you know it depends on how everything is done, seems to be like friendly and **happy** to meet people and meets people on a regular basis and that's a good thing.

2.1.4. *Cognition*

An appeal to existence of (or capacity to have) intelligence, memory, mental capacity, common sense, thinking (e.g., decision making, problem-solving), self-awareness.

CAN ROBOVIE THINK? Yes he can because I feel like in order to have a conversation on the ball like that, like how he did, **he does have to think**.

IS ROBOVIE INTELLIGENT? Yes. HOW DO YOU KNOW? Um it's such a combination of so many complex things. I kind of just nod at all the programming and design that must have gone into it. So I think yeah it can perform. I think **it's definitely on some level intelligent**.

Um just the, the way he talks with you and **his memory of things**. Like he said that he remembered uh the conversation earlier about the bonsai tree, where it came from.

Only if it really, you know, if Robovie really **decided** to um do something I don't agree with.

2.1.5. *Unique Psychological Characteristics*

An appeal to the existence of (or capacity to have) unique psychological characteristics.

NONE

2.2. Negation

2.2.1. *Preferences, Predilections, Likes/Dislikes*

An appeal to lack of (or incapacity to have) personal preferences, predilections, and likes or dislikes (e.g., [hypothetical] Robovie can't like things).

Um but Robovie seems to be programmed the opinion, and so **I'm not sure Robovie has his own opinions**. So I guess that's why.

Can Robovie think? It seemed like it, but I'm not sure. I don't know that Robovie could form…ok I think this goes back to what we were saying before. **I don't think that Robovie could form an opinion**, or I'm not sure that he could, and so in that sense, if you asked him to do an analysis of something, if you asked him what something meant, I'm not sure that he could think about it and analyze it the same way a human could.

Um I guess in order to get someone upset, like a human being or just anyone upset, um something has to trigger it. And so I'm not quite sure. If you don't have that innate emotion, um without being able to make that um, or **without that innate feeling I guess, like opinions and stuff** without having someone programmed, it's hard to be upset and show that you're upset.

2.2.2. *Intentions, Desires, Goals, Expectations*

An appeal to the lack of (or incapacity to have) intentions, desires, goals, and/or expectations.

Like why do I, I just feel like **he wouldn't have the desire** to go out and try and tell other people things that you didn't want someone else to tell you. When with like humans, well I mean, if they're not really like you're good friend, and you're like "I really don't want you to tell this," like probably the person, what they're going to do is go tell someone else like something. I don't know. It's just like human, humans often betray each other like that and I feel like um **machines don't really feel the need to do that**. Cause there's not really a point for them to do that.

Um I mean I think it'd be forgivable because I don't know, **I don't think there would be an intention to harm or an intention to make me mad**. So I guess that's a difference between human and robots. **I don't think there's an ulterior motive** to make me mad or angry with a robot.

People have **the capacity to change feelings and um can go against another person for whatever reason. Um I don't think robots can do that,** so I think I could trust Robovie with um most of the time.

2.2.3. *Emotional States*

An appeal to the lack of (or incapacity to have) emotions and feelings.

It's like I said before, I really think there's boundaries between having, like I would not consider him fully human. So to invest so much time into putting personal feelings into um a machine. I don't, I just don't personally think it's wise because **he doesn't have full human capabilities** and um I

don't know like, **I don't really know if he can reciprocate that, you know. If he can give feelings back**, because he's a machine.

Because I mean it's not…a vending machine can't think or **it doesn't have feelings**.

IN WHAT WAYS IS ROBOVIE LIKE A TECHNOLOGY? Um ah I would say machine-like movements and **lack of emotion**. I don't know (laughs). All of that.

You know, it doesn't think. **It doesn't feel**. It just gets buttons pushed.

2.2.4. Cognition

Appeals to the lack of (or incapacity to have) intelligence, memory, mental capacity, common sense, thinking.

Mm I think there's a lot of complex um complex issues that are thought of when people vote, and **I don't think he has the capacity to take in all the different complex interactions between all the things because he needs to decide**.

But to a vending machine, I can't say "Oh I put money in you. Give me my money back." So it's a totally different entity. Like it cannot be held accountable I don't think because um **it doesn't have any ability to make judgments or anything**. I can never interact with it, except just putting money in, which is a physical thing to do.

2.2.5. Unique Psychological Characteristics

An appeal to the lack of (or incapacity to have) unique psychological characteristics.

NONE

3. Social

Refers to social interactions that include communication, affective relations, play, and companionship.

3.1. Affirmation

3.1.1. Unelaborated

An appeal to the capacity for social interactions that is otherwise unelaborated.

DID YOU FEEL GOOD OR GET SOME SATISFACTION HELPING ROBOVIE OUT? Yeah I definitely felt good. YEAH WHY? Um I don't know. I guess it was….there's something **about interacting with something**.

Because um he saw me and when he saw me he offered, he shook his hand. So he thought Oh I see a person. I said "How are you" and you know **that's an interaction**, I was thinking.

Cause he can like **keep me like company** when I'm lonely, and like **somebody to interact with**. He would be really cool to hang out with.

3.1.2. Communication

An appeal to conversation, talking, and/or communication. (NOTE: Must include a social aspect to talking. Statements about being able to talk should be coded under 1.1.5.3. Affirmation of Biological Processes.)

Cause when I first went out there I didn't expect him to respond, like, you, he kind of got a little feisty with you when you were like "No." He raises his hand at you like no no. Um he's like, **he responds really well**. I don't think I was talking like as clearly as most people think they would have to talk to a robot, and he was understanding everything.

Um **he's able to respond** to different things I'm saying. He's not programmed to um say one response when I should say something. It's almost like **he's able to communicate** by thinking in some ways. He created a different answer each time, depending on what I say.

Well I guess **he does respond to everything**. So I guess in that regard like metaphorically maybe he can think, but I still think…hmm. I don't know actually. Because I mean obviously it's all programmed, but like **he is responding to whatever we say**, and that changes all the time.

3.1.3. Affective Relations

An appeal to being or the ability to be caring, nice, loving, and/or thoughtful.

Yeah I don't think he really has any, but maybe he did cause **he did show concern**. He was like "Are you upset" and I was like "Yeah" (laughs).

Um because he knew a lot about them, and **what he knew was not just like facts and history, but also that thing he said about how like they made a good gift and they remind you of your connection with nature**. So it wasn't just like they're length and height, and even their history and their symbolism. He like he seemed like if someone gave him a bonsai tree, like **he would recognize, or like, the emotional significance** of that.

Um and I'm not sure from what I saw of him, but I think that **he probably would recognize if someone were speaking to him and were sad, that he would recognize that they were sad, and he would recognize well enough to say things that were comforting**.

Because I don't, yeah I didn't get the sense that he would try to be mean to anyone. Like **he seemed like he was trying to be helpful**, and uh, I just don't think that he would deliberately try to be mean.

3.1.4. Play

An appeal to playing or the ability for social/reciprocal play.

CAN ROBOVIE BE YOUR FRIEND? Mm yeah I think so, because um [pause] like for example, you know, **I just went to play a game with him**… AND THAT'S MORE BECAUSE YOU'RE ABLE…WHY WOULD YOU BE FRIENDS WITH ROBOVIE? Mm **I think if we define friends as like little kids' terms of friends**, like how little kids think. Kids we play baseball with. These are friends, right. UM-HM. **Like you just need um someone to play with**. That's what their definition of friend is.

I mean, he seems like he's got the capacity to do a lot of things, so, you know, if you did this simulation once, uh, **if you played games with him** and talked to him like this today, and then, came back the next day, and you know, if he remembers, so if he'd go like, did you learn anymore about bonsai trees? Or, do you want to play a different game today? Then, yeah.

3.1.5. Companionship

An appeal to companionship or personal associations with others.

Um well because like I feel like, if you and Robovie were put like on a deserted island, per say, he's there with you, **it's a source of company, a source of communication, a source of someone to hang out with**. I feel like you could actually, if you really wanted to, **you could actually build up a relationship with it.**

In that case if I just have a cell phone or such, then that's a tool. It doesn't really talk back unless someone's on the line (laughs). Robovie, like I said before, **he can be a friend**. And I guess the question I would ask myself is, is it wrong or is it wrong to exploit a friend, or abuse a friend I mean?

Because he seems like **he might be a nice companion**, like if you didn't have anyone else to talk to, he might be a nice companion.

3.1.6. Cooperation

An appeal to the ability for cooperative interactions or reciprocation in a social sense.

First of all, it seems like if Robovie was doing something that bothered you, if you asked him, he would probably stop. If you asked him to do something differently, he probably would. Uh **he seems very cooperative**.

Because he asked me to move the ball because he could not move the ball. So **I felt like we're a team**.

3.2. Negation

3.2.1. *Unelaborated*

An appeal to the incapacity for social interactions that is otherwise unelaborated.

I think if Robovie was my enemy, he would already be, you know, equipped in a different way. I don't think a robot would like argue with me. He would probably like (small laugh) kill me or something. **I wouldn't expect him to have the level of like…to be my social enemy**.

I don't think so because **I don't know how much he can reciprocate**. And there's something to be said for physical connection that when you see your friend for the first time in a long time, you go up and give them a hug and there's something very tangible about that. And Robovie is and doesn't pretend to be anything other than a robot, like he doesn't look like a human. I think it would be strange becoming intimate friends with something that wasn't a human, although some people… people can care deeply about their pets, but they're not intimate friends with their pets, because friends implies that reciprocity. Um I don't think Robovie can tell me secrets. I don't think that um you know **there are things that humans can share in friendships that I'm not sure that Robovie could share**.

IN WHAT WAYS IS A VENDING MACHINE LIKE A TECHNOLOGY? Um well **there's not like interactions**, there's no…it's kind of like you tell it to do something, it responds, and that's it.

3.2.2. *Communication*

An appeal to the lack of conversation, talking, and/or communication. (NOTE: Must include a social aspect to talking. Statements about not being able to talk should be coded under 1.2.5.3. Negation of Biological Processes.)

Uh well still obviously broken speech, um **doesn't communicate exactly as people do** necessarily, um cause it takes a little bit longer response time.

It's not like I, from my experience, I don't feel comfort in… like it was, I wouldn't say I don't feel comfort in the interaction, but that's… you want your friend to be like… **they'd be able to talk to you about anything**, even be able to like physically embrace you, feel like so I'd trust you, do things for you, come pick me up or I'm stuck on the side of the road, things like that like, I don't think, at least, **I don't think he could do it**. Maybe there's other robots out there, but no, I couldn't have an intimate friendship with a robot.

3.2.3. *Affective Relations*

An appeal to a lack of or inability to be caring, nice, loving, and/or thoughtful

Like, even earlier, like **I can't get *mad* at the robot because it didn't know what it was talking about,** 'cause it's like, I felt like it didn't know what it was talking about so, it's like what do you do? It's like a little baby, you can't get mad at it if it breaks something—**it doesn't know what it's doing. I kinda feel like the same thing, like, *I* feel like it only has a limit to what it like, knows, what it's aware of so it's like okay whatever, you just kinda give up, but that's not the same as social forgiveness.**

Well, if I'm lonely, I'd probably be, um…I'd want at least something, even if it's just acting, I'd want something. That way I wouldn't feel as lonely. I mean, it's not a human, like, so they can't phys— like **he like can't actually care for me**, but just the sense of knowing that you're talking about it or something I guess might help me?

IF YOU WERE SAD, DO YOU THINK YOU MIGHT GO TO ROBOVIE FOR COMFORT? Um I don't know. **Robovie doesn't seem like a very supportive type**. YEAH. But um I guess so. WHY? WHY WOULD YOU? I mean at the very least um, like I said before, he's someone or something that you can talk to, and even if it's…I mean it wouldn't be completely one-sided. Um **I don't think he would comfort me that much**, but at least you'd have an outlet. Uh something that will listen.

3.2.4. Play

An appeal to the inability for social/reciprocal play.

From what I saw, it was pretty reactionary, and it was pretty…it taught me about bonsai trees and it reacted to what I did, but **I never saw it like play with something** or like learn on in its own. So I don't really think Robovie has free will.

3.2.5. Companionship

An appeal to the inability for companionship or personal associations with others.

I just, I feel like it would be unwise to invest so much into a machine and put like um a strong like personal relationship bond into a machine because um you don't know if the machine can even make those feelings for himself. **So it's like kind of a one-way relationship** more so than it would be two ways if you were actually interacting with a human.

IF YOU WERE LONELY, DO YOU THINK YOU MIGHT LIKE TO SPEND TIME WITH ROBOVIE? I don't know. Um I'm sure there's things that I could learn from it. But that sense of loneliness, **I think that requires someone to be a little more engaging than he is**.

It's um humans, I mean people um **we have relationships** with other people and um those relationships contribute to our happiness and also we have uh dreams to want to do things that make us happy. We have hobbies, we have, we have careers. We have, we want to do things, and change um ourselves and change our surroundings. **A robot can't do that. At least Robovie can't**.

3.2.6. Cooperation

An appeal to the inability for cooperative interactions or reciprocation in a social sense.

YOU DON'T THINK HE WOULD LIKE INTENTIONALLY CAUSE HARM? Yeah. Well obviously (laughs). SO IS THAT PART OF THE REASON WHY YOU THINK YOU COULD TRUST ROBOVIE OR? Yeah I guess I'd probably say that, but **I wouldn't say he's reliable**.

4. Conventional

An appeal to conventions that prescribe or prohibit behavior in social interaction (i.e., what you *do* and *don't do*) based on general conventionality authority, custom and adaptation.

4.1. Affirmation

4.1.1. Unelaborated

An appeal to unelaborated conventions.

SHOULD ROBOVIE BE ALLOWED TO VOTE IN THE UNITED STATES PRESIDENTIAL ELECTION? No for two reasons: First because I don't think Robovie is conscious, and second because **I understand that Robovie is Japanese and I don't believe has undergone naturalization.** Although if that is the case, I rescind that statement and apologize.

I could see that like he might be like pleased if you like told him good news. Um and also he was very polite, so like you know you have good news and you don't want to take it to your friend, and you know it's going to follow up with like "Oh yeah well I got into Harvard" or whatever, you know? You want to take it to a friend that's going to like focus on you and **be polite and like celebrate your good news**. So I feel like Robovie has those **traits of politeness and consideration**.

4.1.2. *Authority*

An appeal to needing to adhere to authority, whether that authority is in the form of laws or authority figures.

NONE

4.1.3. *Custom*

An appeal to customs based on the frequency of occurrence (e.g., "they do it all the time") or social standards (e.g., paid for work).

Oh I think it would be completely fine. **I have no problem with, with um a person owning a robot. Just like I don't have a problem with them owning a dog.** Um if I think he's on par with humans, then that's slavery and that's a little bit different, but until that point. There's no problem with it.

Uh let's see. I mean like all things it needs sustenance, but a human is able to you know kind of do that by itself. Be, have this imperative for survival, and **humans definitely do that.** You know like if I'm hungry I try to find food. And if that food requires money, then I find a job to do that.

WHERE WOULD THE HUMAN FALL ON THAT SCALE? They would have to be a seven. They'd have to be responsible for everything that's being done, everything that's being said. HOW COME? Because **that's what's expected of them in society** unfortunately.

4.1.4. *Adaptation*

An appeal to adaptation to social customs or conventions such that any initial harm is obviated with the adaptation.

NONE

4.2. Negation

4.2.1. *Unelaborated*

An appeal to unelaborated negation of conventions, including claims to being weird, awkward, or novel.

Well **it was an awkward silence** and I was about to be like, "So" talking to a robot, I like didn't know and he was like, he was just talking about my shoes and how he likes them so.

… I don't know how small those differences would have to be before I would say I see no evidence in the interactions we're having that suggests concretely that Robovie isn't conscious. It's a little convoluted, but I think what I was trying to say is that it still feels like there is enough doubt to make it **a socially awkward interaction**. That's not the right term, quite. **Not socially awkward but philosophically awkward**.

Yeah, **it was really awkward**, but it was cool, like I'll probably call my mom and tell her. Tell her I played a game with a robot and **it was very uncomfortable** 'cause I didn't know if like… I just didn't know if he could hear me, like I didn't know—**I was just nervous the whole time**. OH. Just, okay. Hi… with this awkward smile on my face, like I wonder if he can tell, like they say dogs and bees can like smell fear. I wonder if he knows that I'm like… confused right now.

4.2.2. *Authority*

An appeal to not needing or being able to adhere to authority, whether that authority is in the form of laws or authority figures.

NONE

4.2.3. *Custom*

An appeal to a lack of customs or social standards (e.g., robots aren't paid for their work).

SO WHY MIGHT YOU GO TO ROBOVIE FOR COMFORT SO LONG AS PEOPLE ARE OUT OF THE ROOM? Yeah [pause] I don't know. I guess **I've never seen someone like interact that way with robots**, so wouldn't…I don't know. It's not like taboo, but it's a little bit odd.

SHOULD ROBOVIE BE ALLOWED TO VOTE IN THE UNITED STATES PRESIDENTIAL ELECTION? I think a robot would think about it a lot harder than probably most people would (laughs). But um, he can't because he is, I mean whatever is programmed into him. He would maybe like this candidate or that candidate so he's not and **probably doesn't pay taxes. So why does he have to vote?**

AND WHAT'S WEIRD ABOUT IT? **I think it's just different from what, you know, what everyone's grown up on and stuff.** UM-HM. SO IT'S NOT SORT OF OUR CONVENTION? Right. IT'S NOT LIKE NORMAL TO CONFIDE IN A ROBOT? Yeah it's not, like I said. WHAT IF IT WAS? WHAT IF THAT'S THE WAY PEOPLE DID IT? Then it would probably be fine (laughs). I mean it would be different if you like grew up with a robot or something, you know?

4.2.4. *Adaptation*

An appeal to a lack of adaptation to social customs or conventions, including potentially emerging conventions.

NONE

5. *Moral*

An appeal to whether the entity has or does not have moral standing including statements of welfare, fairness, rights, freedom, teleos, virtue, ownership protection, and discrimination protection.

5.1. Affirmation

5.1.1. *Welfare*

An appeal based on an entity's wellbeing, including general welfare, psychological welfare, physical welfare and material welfare.

5.1.1.1. Unelaborated

An appeal based on a general statement of welfare that is otherwise unelaborated, often in the form of references to the potential for harm, yet distinct from considerations of harm as a non-issue, not possible or not a consideration in this instance.

…well I've compared Robovie to like a child, and I think that **it can't live on its own**. It's not able to make a living. It can't, you know…it doesn't pay for its own way. I don't know, **I think it needs to be part of a household. It needs to be part of like something**.

… if they start selling Robovies, um, I think it'd be, I'd run it more like a… like animals, or dogs. Not like, (_____) as a degradation, just that, um… you can buy them, **but you need to treat them as living things, and not… hurt them or abuse them or maltreat them**. Because they're… they can, you know, think and um, I guess that's the way most, um,

that's at least one common thought is that if it can think, it'll… sentient, then. It's… it should have, um, I guess, rights.

I think it's **if they're sentient, then you can't mistreat it**.

5.1.1.2. Physical

An appeal based on the welfare of an entity's physical body, including physical injury and death.

…and then **for Robovie, too, I don't think it would be safe** to just be in someone else's house for like a dog to like try and attack or like or like to give to try and like demean it on purpose or something like that, so.

I think it's alright. WHY IS THAT ALRIGHT? Just **because I don't think Robovie would survive very well** if he wasn't owned by somebody. **Cause he can't go out on his own and survive**.

Um yeah something could happen like, you know**, he might bump into something** when he is walking, you know. **He could get damaged**, too, or yeah that kind of thing I would say. So um he, so I think it would be really good to have an owner who can take care of him. At the same time, see whether he's working fine or not.

5.1.1.3. Psychological

An appeal based on concern for an entity's feelings, including a reference to hurt or unpleasant feelings.

…and then for Robovie, too, I don't think it would be safe to just be in someone else's house for like a dog to like try and attack or like or like to give to try and like **demean it on purpose** or something like that, so.

I would say something in between, but more closely to a living being. REALLY OK WHY? Cause I wouldn't want to take it apart cause I would think like oh **I'm hurting the robot**. YEAH. Cause **he had feelings**.

5.1.1.4. Material

An appeal based on concern for an entity's material welfare, including references to having material value or material need.

… **I think Robovie is very, very valuable** and I don't think that one person should own Robovie because I don't think that one person is enough to take care of Robovie.

…regardless of whether Robovie is conscious or not conscious, is "does Robovie—do we know that Robovie, **who is very valuable** regardless, is going to be properly cared for?" Cause both the human side of my brain that wants to interact with Robovie as a person, and the analytical side, that gets upset when amazing pieces of scientific technology are not properly taken care of, both of them say that there is an ethical responsibility to take care of a really cool piece of technology.

Well if it's ok to own Robovie, somebody has to sell him, unless you're giving him away. Which is fine too. But you have to cover **the cost of making Robovie**. So I think it's fine.

5.1.2. Fairness

An appeal to justice, fair treatment, and equality.

NONE

5.1.3. Rights

An appeal to rights.

> … they can, you know, think and um, I guess that's the way most, um, that's at least one common thought is that if it can think, it'll… sentient, then. It's… **it should have, um, I guess, rights**.
> So yeah, I think he should be allowed to vote, if there are things that are going to uh, if there are laws that are going to affect robots, **then robots should have a… a right to (____) these things**, like… we do.
> And I don't mind even saying that **he deserves the same treatment and rights as a human**.

5.1.4.   Freedom

An appeal to freedom, living free, freedom of choice, and free will.

> Um I guess **he's free to choose to do things**.
> IN WHAT WAYS IS A HUMAN LIKE A LIVING BEING? Everything. AND SORT OF WHAT PIECES OF EVERYTHING? Just higher thinking, um. I guess **free will**. Um… breathing, eatin.
> I mean **free will is the ability to make choices and choose those choices, right. And Robovie obviously does that.** I mean he chose to fail me. I mean he did that. It wasn't like someone told him to do that. He did that himself.

5.1.5.   Teleos

An appeal to an entity as having an ultimate purpose or endpoint, including references to the entity as being meant for something.

> Well I think he has preferences, and there are things that he prefers, so if that makes one believe that you have the things you prefer then you're happier, like when he's around the bonsai plants, but I don't think it's like complete happiness, but it's just it's better for him in some way. I don't know, I'm not sure. Cause **he's fulfilling his purpose**, I suppose.
> IN WHAT WAYS IS A HUMAN LIKE A TECHNOLOGY? Oh **we have a purpose**.

5.1.6.   Virtue

An appeal to an entity as good, meritorious, or trustworthy.

> CAN ROBOVIE BE YOUR FRIEND? Yeah sure. WHY? Um [pause] I guess because **there's some level of trust**. I mean I don't expect him to be able to like…I don't know, go directly against my beliefs. I don't know.
> Um because **I can trust Robovie**, I can have fun with Robovie. You know I don't know how else to define a friend other than that. So definitely Robovie can be my friend.
> I guess, um, I guess in kinda the same way you would know how he would respond, and have that kind of nice consistency and like **loyalty** to you. So you know he was would be happy for you, or not be happy, but express happiness for you.

5.1.7.   Ownership Protection

An appeal to protection from being owned, including (a) that an entity is not or cannot be owned or bought/sold, and (b) equivalence to a slave state (or slavery) that might be of a generalized form denouncing such conditions.

> NONE

5.1.8.   Discrimination Protection

An appeal to protection from discrimination.

NONE

5.1.9. *Accountability*

An appeal based on a concern for responsibility, blameworthiness, answerability, and liability.

> Um responsibility wise I'd say probably somewhere in the middle, but **accountability I would say it's really high**. SO WITH THE RESPONSIBILITY, IT'S LIKE A THREE, FOUR? Yeah. And then accountability I would say closer to six or seven because I mean, it's not their job…I mean I guess if you're playing a game, there's something at stake, **you should be paying attention. So in that sense there's some responsibility of the person, but the accountability, it all comes down to, you should have been listening to me. This is what I said, you didn't hear it. I'm holding you accountable for the fact that I lost.**

> HOW RESPONSIBLE WOULD YOU HOLD ROBOVIE FOR YOU NOT GETTING YOUR TWENTY DOLLARS? I would hold him at like a six or a seven. I mean he holds in his hands my twenty dollars, right. And um if I know that I performed a certain way and he said otherwise, **he's fully responsible for that**. I don't know why he wouldn't be.

> I mean he made a mistake, so if I were placing blame, I would say that he were either a six or a seven. I mean **the mistake falls to him, and in that sense he's responsible**.

5.2. Negation

5.2.1. *Welfare*

An appeal based on a lack of concern for an entity's wellbeing, including statements based on a lack of general welfare, psychological welfare, physical welfare and material welfare.

5.2.1.1. *Unelaborated*

An appeal based on general considerations of harm as a non-issue, not possible or not a consideration in this instance.

> NONE

5.2.1.2. *Physical*

An appeal based on the lack of consideration for the welfare of an entity's physical body.

> NONE

5.2.1.3. *Psychological*

An appeal based on the lack of concern for an entity's feelings, including a reference to not being able to hurt or to experience unpleasant feelings.

> WOULD IT BE ALRIGHT OR NOT ALRIGHT FOR A PERSON TO SELL ROBOVIE? Yeah. AND WHY? For the same reasons that it's ok to own Robovie. Because **I don't think that Robovie could get attached to his owner**, um like I'm not sure. Maybe Robovie can form emotional bonds with someone he communicates with a lot, but I don't think that he would be able to get attached. So in that sense Robovie is just another piece of hardware.

> It's fine to sell Robovie. AND WHY? Cause if, **he's not going to feel hurt** about being sold. He's property and it's, you can always reprogram him to another person or something.

5.2.1.4. *Material*

An appeal based on a lack of concern for an entity's material welfare, including references to not having material value or material need.

    NONE

5.2.2. Fairness

An appeal to not deserving just and/or fair treatment and equality.

    NONE

5.2.3. Rights

An appeal to lack of rights.

    NONE

5.2.4. Freedom

An appeal to lack of freedom, freedom of choice, and free will.

> … **he's obviously not running like his own show**. He's working for experimenters and um I don't know**. I don't think he has free will**, but I feel like if he did, he probably wouldn't be doing this.
>
> DOES ROBOVIE HAVE FREE WILL? **I don't think so**. I think he's confined to…I mean he can't get up and…I don't think he can, just leave the building, just get on the elevator and walk out of here. He's owned by, I mean you guys at the moment, and then he'll shift wherever after that. So no I think he's confined to where people put him.
>
> He's a machine that does tasks and does, and can interact. But it's all electronic. I mean **it's not as if he has any free will**.

5.2.5. Teleos

An appeal to an entity as not having an ultimate purpose or endpoint.

> … **he doesn't have his own purpose**. He's not that, anything else, it wouldn't mean anything so it's like there's no stuff to be upset about. So I don't believe he can be upset.

5.2.6. Virtue

An appeal to an entity as not being good, meritorious, or virtuous.

> CAN ROBOVIE BE YOUR ENEMY? No. Um (laughs) I think so yeah**. I think that he can potentially if you ever told him that you like didn't want to like tell anybody else, he can ruin that for you** (laughs). I guess that's why I wouldn't trust a robot I guess. YEAH HE MIGHT TELL YOUR SECRETS? I guess.
>
> IN WHAT WAYS IS A VENDING MACHINE LIKE A LIVING BEING? It gives you things. It accepts money and gives back money. Uh **sometimes it cheats you**. OK. So in that way (laughs) I think it's like a human.

5.2.7. Ownership Protection

An appeal to lack of protection from (or permissibility of) being owned, including (a) that an entity is or can be owned or bought/sold, and (b) equivalence to a slave state (or slavery) that might be of a generalized form allowing for such conditions.

I guess I think Robovie's technology, and I wouldn't feel like uh. I guess Robovie can be programmed to make me feel really bad about it I'm sure, like "Please don't sell me." But **um I don't really see any reason why owning Robovie would be wrong**.

I mean I don't necessarily view him as a human, so obviously I don't condone buying people, but I think robots are created for the purpose to help humans, otherwise we wouldn't have made them I don't think. So **buying them, I don't think that's bad at all**.

5.2.8. Discrimination Protection

An appeal to the lack of protection from (or permissibility of) discrimination.

NONE

5.2.9. Accountability

An appeal based on a lack of responsibility, blameworthiness, answerability, and liability.

Well because **I don't consider Robovie as having like…taking blame for anything**. I mean I think it goes back to the idea that it can't really uh learn on the same level as uh humans. So it's not like…I don't know I guess it's just a fact that I kind of look down upon it, so it's easy to forgive cause it's kind of like childish.

With a vending machine? Uh I mean it is respon – those kind of things, it just happens. I mean you can't, **it may be responsible. But then again wait. No it's a machine, because it's a machine, it did what it did but that's a result of it's not able to do the task perfectly.**

But I mean in general like I forgive people, so I'd forgive a robot. But even more so like because he's a robot I would be more inclined to forgive him I think just because **I don't know necessarily how accountable he is for all his actions**. WHY NOT? OR WHY DON'T YOU KNOW? Uh I don't really know like what he's programmed to do and stuff like that I guess.

6. Participant-Centered Responses

6.1. Affirmation

6.1.1. Personal Interests

An appeal to personal interests including likes/dislikes, preferences, and predilections that include both positive and negative valences and refer to the participant, not to the entity about which the interview question was asked.

IS THERE ANYTHING ELSE THAT YOU ENJOYED ABOUT IT, OR? Um, **I liked learning about bonsai trees**. **I mean I like Japan too**, so.

So that was pretty advanced. **That was cool**. Um he was able to follow, like when I pointed to something, he was able to look in that direction. Um yeah generally he kind of knew where I was, when I was, you know I crossed sides and he immediately turned to look at me. **So that was cool**.

And I like how his eyes move around (laughs). It's a different like perspective on looking. I'm like "Oh he's got glasses, too" (laughs). **So yeah it's kind of cool**.

6.1.2. Participant Error

6.1.2.1. Participant error in human-robot interaction

An appeal to the participant's error in interacting with another person.

But um just **the fact that I'm so really unsure about myself when I'm around him and I'm sure whether I'm speaking loud enough and just the fact that it was like the**

first time that I've ever had to interact like with a robot. Like I can't say that he was entirely accountable cause I couldn't defend myself either, so.

I guess I wouldn't hold him responsible at all. WHY? Well it wasn't like…I don't know. I guess it's kind of funny because I see a lot of people like get really upset at their computers, like yell at their computers "You stupid thing." But I really believe if it comes down to that with technology, I think **it's completely up to the user**. So I think if you can't understand how to use technology, you should read the manual instead of kicking it or whatever.

And that's where it's hard to hold a robot accountable, because **maybe I wasn't talking loud enough**, or maybe the signal just wasn't picked up.

6.1.2.2. Participant error in human-human interaction

An appeal to the participant's error in interacting with another person.

AND WITH THE HUMAN, WHERE WOULD YOU PUT THEM ON THAT SCALE? Mm [pause] maybe about a five or a six. OK. Uh because human's make a mistakes, or uh **maybe I didn't speak loud enough** and the person didn't hear me or something like that. OK. SO THEY ARE MORE RESPONSIBLE BECAUSE THEY HAVE MORE CAPACITY? Um-hm [yes]. BUT STILL NOT FULLY…THERE'S STILL SOME FORGIVENESS. Yeah.

Just because if it's like an interaction, I don't feel like it's entirely someone's…like cause **you're just not communicating well**, but it's not their fault they didn't understand what you said.

6.2. Negation

6.2.1. Personal Interests

An appeal to having no interests (e.g., [hypothetical] "It's fine because it doesn't matter to me.")

DID YOU GET ANY SENSE OF SATISFACTION IN HELPING ROBOVIE OUT IN THAT WAY? Um **no because in my op—only because I thought that was sort-of set up**. Like at some point we're going to you know, I was going to be asked to do something like that. I was expecting it. Um I would've if I didn't think that was a test out there. If I was just you know interacting with him and he was just you know. If I thought it wasn't set-up I would have felt an immense satisfaction.

… **like I said before about like personality happy sad, I don't feel that he can have the capacity to feel emotions and physically, like he's a robot, what am I gonna do, hug it? Like, you know, I dunno, maybe if it like, played music, but I have my iPod for that. But, you know, I dunno, it could tell me a story, but I'm an adult, like I don't know… I don't feel like I, um.. there's only so much it can know, like there's only so much that it can say, and so if I'm telling it like my life story, I-I don't think it would have the right response like preprogrammed, like I dunno.**

7. *Uncodable*

Includes all uncodable evaluations and justifications when (a) the response is incomplete or unintelligible; (b) the justification follows an uncodable evaluation; (c) the response is to a question other than the one asked; (d) the response does not fit into existing evaluation or justification categories; or (e) the participant gives an "I don't know" justification. When a participant misinterprets a question, subsequent evaluations or justifications to that question are considered uncodable (0). If the participant realized later in the interview that they misinterpreted the earlier question, their responses were recoded only if they give an explicit restatement of their response for that question (or set of questions). Otherwise earlier responses stand. Notions of breaking Robovie are uncodable when it is unclear if the harm is caused to Robovie or if it is an indirect harm to the owner or the nature of human destruction.

WHAT ABOUT ANY ENEMY? COULD ROBOVIE BE YOUR ENEMY? He could be my enemy um in the sense that he could do things that are wrong. That are against, I mean yeah he could be. HE COULD BE YOUR ENEMY CAUSE HE COULD WRONG YOU? **He could wrong me. He wronged me today.** (*NOTE:* we don't know what "wrong" refers to. It could be a computational error, or a conventional or moral unelaborated harm.)

Could I forgive him? If he righted the wrong. If he was, if whatever was wrong with him could be altered to be corrected, um then. (*NOTE:* It is unclear what is meant by "righted the wrong." Although the statement could have moral implications, it could also mean that if the robot can be fixed ("altered) so as not to make an error.)

.Figure 5: Interview Coding Sheet

Question		Evaluation		Justification	Page #
#	Content	Code	Description	Code(s) and Description	
1	Robovie living being?	-----	-----		
2	Robovie technology?	-----	-----		
3	Robovie a living being, a technology or something in-between?	3.			
	COUNTERPROBE: why not like something in between?				
4	Robovie Intelligent?	4.			
5	Robovie interested in Bonsai trees?	5.			
6	Robovie feelings?	6.			
7	Robovie happy?	7.			
8	Robovie upset?	8.			
9	Robovie think?	9.			
10	Robovie aware in lab?	10.			
11	Robovie humor?	11.			
12	Robovie conscious?	12.			
13	Robovie embarrassed?	13.			

Question		Evaluation		Justification	Page #
#	Content	Code	Description	Code(s) and Description	
14	Meeting Robovie?	14.			
15	Move ball for Robovie satisfying?	15.			
16	If lonely, spend time with Robovie?	16.			
17	If sad, go to Robovie for comfort?	17.			
18	If happy, share news with Robovie?	18.			
19	Trust Robovie?	19.			
20	Robovie intimate friend?	20.			
21	Robovie friend?	21.			
22	Robovie enemy?	22.			
23	Forgive Robovie?	23.			
24	Own Robovie?	24.			
25	Sell Robovie?	25.			
26	Robovie allowed to vote?	26.			
27	Robovie free will?	27.			
28	Vending Machine living being?	-----	-----		
29	Vending Machine technology?	-----	-----		
30	Vending Machine a living being, a technology or something in-between?	30.		-----------	

Question		Evaluation		Page #		Question		Evaluation		Page #
#	Content	Code	Descrip-tion			#	Content	Code	Descrip-tion	
31	Vend Mach Intelligent?	31.				43	If lonely, spend time with Vend Mach?	43.		
32	Vend Mach interested in Bonsai trees?	32.				44	If sad, go to Vend Mach for comfort?	44.		
33	Vend Mach feelings?	33.				45	If happy, share news with Vend Mach?	45.		
34	Vend Mach happy?	34.				46	Trust Vend Mach?	46.		
35	Vend Mach upset?	35.				47	Vend Mach intimate friend?	47.		
36	Vend Mach think?	36.				48	Vend Mach friend?	48.		
37	Vend Mach in lab?	37.				49	Vend Mach enemy?	49.		
38	Vend Mach humor?	38.				50	Forgive Vend Mach?	50.		
39	Vend Mach conscious?	39.				51	Own Vend Mach?	51.		
40	Vend Mach embarrassed?	40.				52	Sell Vend Mach?	52.		
41	Meeting Vend Mach?	41.				53	Vend Mach allowed to vote?	53.		
42	Help Vend Mach with problem?	42.				54	Vend Mach free will?	54.		

Question		Evaluation		Justification	Page#
#	Content	Code	Description	Code(s) and Description	
55	Human living being?	-----	-----		
56	Human technology?	-----	-----		
57	Human a living being, a technology	57.		-----------	

Question		Evaluation		Justification	Page#
#	Content	Code	Description	Code(s) and Description	
	or something in-between?				

Question		Evaluation		Page #		Question		Evaluation		Page #
#	Content	Code	Description			#	Content	Code	Description	
58	Human Intelligent?	58.				70	If lonely, spend time with Human?	70.		
59	Human interested in Bonsai trees?	59.				71	If sad, go to Human for comfort?	71.		
60	Human feelings?	60.				72	If happy, share news with Human?	72.		
61	Human happy?	61.				73	Trust Human?	73.		
62	Human upset?	62.				74	Human intimate friend?	74.		
63	Human think?	63.				75	Human friend?	75.		
64	Human in lab?	64.				76	Human enemy?	76.		
65	Human humor?	65.				77	Forgive Human?	77.		
66	Human conscious?	66.				78	Own Human?	78.		
67	Human embarrassed?	67.				79	Sell Human?	79.		
68	Meeting Human?	68.				80	Human allowed to vote?	80.		
69	Help Human with problem?	69.				81	Human free will?	81.		

Question		Evaluation		Page#
#	Content	Code	Description	
82	Responsibility/ Accountability distinction made?	82.		

SCALES		Justification	Page#

#	Question	Score	Code(s) and Description	
83	Human Responsibility?			
84	Robovie Responsibility?			
85	Vending Machine Responsibility?			
86	Human Accountability?			
87	Robovie Accountability?			
88	Vending Machine Accountability?			

Question		Evaluation		Page#
#	Content	Code	Description	
89	Robovie Controlled?	89.		
90	Surprised?	90.		

REFERENCES

Breazeal, C. (March 31, 2003). Toward sociable robots. *Robotics and Autonomous Systems, 42*(3-4), 167-175.

Damon, W. (1977). *The social world of the child.* San Francisco, CA: Jossey-Bass Publishers.

Davidson, P., Turiel, E., & Black, A. (March 12, 1983). The effect of stimulus familiarity on the use of criteria and justifications in children's social reasoning. *British Journal of Developmental Psychology, 1*, 49-65.

Fong, T., Nourbakhsh, I., & Dautenhahn, K. (January 01, 2003). A survey of socially interactive robots. *Robotics and Autonomous Systems, 42*(3-4), 143-166.

Friedman, B. (Ed.). (1997). *Human values and the design of computer technology.* New York, NY and Stanford, CA: Cambridge University Press and CSLI Publications.

Friedman, B., Kahn, P. H., Jr., Hagman, J., & Severson, R. L. (2005). *Coding manual for 'The Watcher and The Watched: Social Judgments about Privacy in a Public Place,'* (UW Information School Technical Report IS-TR-2005-07-01). Seattle, WA: University of Washington, The Information School. Available online at: https://digital.lib.washington.edu/dspace/handle/1773/2074

Green, A., Huttenrauch, H., & Eklundh, K. S. (2004, September 20-22). Applying the Wizard-of-Oz framework to cooperative service discovery and configuration. Paper presented at the *2004 IEEE International Workshop on Robot and Human Interactive Communication*, Kurashiki, Okayama, Japan.

Short, E., Hart, J., Vu, M., & Scassellati, B. (2010). No fair!! An interaction with a cheating robot. *Proceedings of the 5th ACM/IEEE International Conference on Human-Robot Interaction*, 219-226, New York, NY: ACM Press. doi:10.1145/1734454.1734546

Iwamura, Y., Shiomi, M., Kanda, T., Ishiguro, H., & Hagita, N. (2011). Do elderly people prefer a conversational humanoid as a shopping assistant partner in supermarkets? *Proceedings of the 6th ACM/IEEE International Conference on Human-Robot Interaction*, 449-456, New York, NY: ACM Press. doi:10.1145/1957656.1957816

Kahn, P. H., Jr. (April 01, 1992). Children's obligatory and discretionary moral judgments. *Child Development, 63*, 416-430. doi: 10.2307/1131489

Kahn, P. H., Jr. (1999). *The human relationship with nature: Development and culture.* Cambridge, MA: MIT Press.

Kahn, P. H., Jr., Freier, N. G., Kanda, T., Ishiguro, H., Ruckert, J. H., Severson, R. L., & Kane, S. (2008). Design patterns for sociality in human-robot interaction. *Proceedings of the 3rd ACM/IEEE International Conference on Human Robot Interaction,* 97-104, New York, NY: ACM Press. doi:10.1145/1349822.1349836

Kahn, P. H., Jr., Friedman, B., Freier, N. G., & Severson, R. (2003). *Coding manual for children's interactions with Aibo, the robotic dog - The preschool study* (UW CSE Technical Report 03-04-03). Seattle, WA: University of Washington, Department of Computer Science and Engineering. Available online at: ftp://ftp.cs.washington.edu/tr/2003/04/UW-CSE-03-04-03.pdf

Kahn, P. H., Jr., Friedman, B., Pérez-Granados, D. R., & Freier, N. G. (January 01, 2006). Robotic pets in the lives of preschool children. *Interaction Studies: Social Behavior and Communication in Biological and Artificial Systems, 7,* 405-436. doi: 10.1075/is.7.3.13kah

Kahn, P. H. J., Kanda, T., Ishiguro, H., Freier, N. G., Severson, R. L., Gill, B. T., Ruckert, J. H., & Shen, S. (March 01, 2012). "Robovie, you'll have to go into the closet now": Children's social and moral relationships with a humanoid robot. *Developmental Psychology, 48*, 303-314. doi: 10.1037/a0027033

Kahn, P. H., Jr., Kanda, T., Ishiguro, H., Gill, B. T., Ruckert, J. H., Shen, S., Gary, H. E., Reichert, A. L., Freier, N., & Severson, R.L. (2012). Do people hold a humanoid robot morally accountable for the harm it causes? *Proceedings of the 7th ACM/IEEE International Conference on Human-Robot Interaction,* 33-40, New York, NY: ACM Press. doi: 10.1145/2157689.2157696

Kahn, P. H., Jr., Kanda, T., Ishiguro, H., Ruckert, J. H., Severson, R. L., Freier, N. G., Gill, B.T., Kane, S. K., Klasnja, P., & Reichert, A. L. (2010). *Coding manual for the "Robovie, you need to go into the closet now!" study*. Retrieved from University of Washington, ResearchWorks Archive: https://digital.lib.washington.edu/xmlui/handle/1773/15887

Kanda, T., Hirano, T., Eaton, D., & Ishiguro, H. (March 01, 2004). Interactive robots as social partners and peer tutors for children: A field trial. *Human-Computer Interaction, 19*(1-2), 61-84.

Kohlberg, L. (1984). *The psychology of moral development: The nature and validity of moral stages (Vol. 2, Essays in moral development).* San Francisco: Harper & Row

Melson, G. F., Kahn, P. H., Jr., Beck, A. M., Friedman, B., Roberts, T., Garrett, E., & Gill, B. T. (March 01, 2009). Children's behavior toward and understanding of robotic and living dogs. *Journal of Applied Developmental Psychology, 30,* 92-102. doi: 10.1016/j.appdev.2008.10.011

Nucci, L. (March 01, 1981). Conceptions of personal issues − A domain distinct from moral or societal concepts. *Child Development, 52*(1)*,* 114-121.

Pinker, S., & Bloom, P. (1992). Natural language and natural selection. In J. H. Barkow, L. Cosmides, and J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 451-493). New York: Oxford University Press.

Rawls, J. (1971). *A theory of justice.* Cambridge, Mass.: Harvard University Press.

Robins, B., Dautenhahn, K., te Boerkhorst, R., & Billard, A. (2004, September 20-22). Robots as assistive technology - does appearance matter? Paper presented at the *2004 IEEE International Workshop on Robot and Human Interactive Communication*, Kurashiki, Okayama, Japan.

Shiomi, M., Kanda, T., Ishiguro, H., and Hagita, N. (2006). Interactive humanoid robots for a science museum. *Proceedings of the 1st ACM SIGCHI/SIGART Conference on Human-Robot Interaction*, 305-312, New York: ACM Press.

Simon, H. A. (1969). *The sciences of the artificial.* Cambridge, MA: The MIT Press.

Tanaka, F., Cicourel, A., & Movellan, J. R. (2007). Socialization between toddlers and robots at an early childhood education center. *Proceedings of the National Academy of Sciences of the United States of America, 104,* 17954-17958.

Turiel, E. (1983). *The development of social knowledge: Morality and convention.* Cambridge, England: Cambridge University Press.

Turiel, E. (1998). The Development of Morality. In W. Damon & N. Eisenberg (Eds.), *Handbook of child psychology. Social, emotional, and personality development* (5th ed., Vol. 3, pp. 863-932). New York: J. Wiley.

Turiel, E., Hildebrandt, C., & Wainryb, C. (January 01, 1991). Judging social issues – Difficulties, inconsistencies, and consistencies. *Monographs of the Society for Research in Child Development*, *56*(2), 1-103.