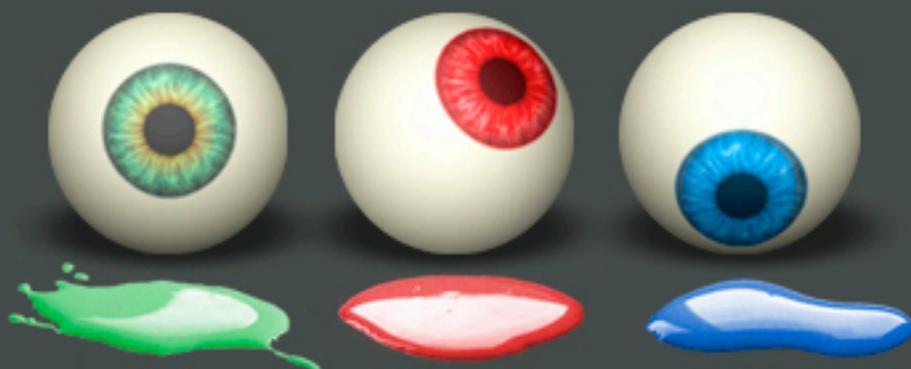


# PSYCHOLOGICAL INTIMACY WITH ROBOTS? (KAHN, RUCKERT, KANDA, ISHIGURU, REICHERT, GARY, AND SHEN)



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# Psychological Intimacy with Robots?

## *Using interaction patterns to uncover depth of relation*

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**Abstract**— This conceptual paper broaches possibilities and limits of establishing psychological intimacy in HRI.

**Keywords**- human-robot interaction, interaction patterns, social and moral development, authenticity, intimacy, design methodology

### I. PSYCHOLOGICAL INTIMACY IN HRI

In his book *Love + Sex with Robots*, Levy writes: “Robots will transform human notions of love and sexuality...[with humans] learning, experimenting, and enjoying new forms of relationship that will be made possible, pleasurable, and satisfying through the development of highly sophisticated humanoid robots” (p. 22) [1]. The sexual aspects that Levy refers to have already begun insofar as robot sex technologies currently exist on the retail market [2].

We believe that the following will occur: (a) Because of the large amounts of money involved, there will be a growing industry around the sexual aspects of HRI, and corresponding applications; (b) at some point this issue will receive a huge amount of media coverage, and become a cross-national issue of concern; and (c) the public, and politicians, will weigh in with their viewpoints and recommendations. In turn, we believe that a key distinction that needs to frame this discourse, now and in the future, is between the physicality of sex with robots and the experience of psychological intimacy with them. For that distinction helps establish the possible limits of where and how robots can substitute for their human counterparts.

Accordingly, we think it is important for the HRI community to begin to focus research agendas on the following question: Is it possible, and if so in what ways and to what extent, for people to form deep and meaningful psychologically intimate relationships with current robots and with robots of the future?

Toward broaching this question, in this paper we draw illustratively from our recent research of children and adolescents interacting with the humanoid robot Robovie. The research involved children ages 9, 12, and 15 (N = 90) interacting with Robovie (controlled through a WoZ technique) in socially structured ways. While we have not yet reported the empirical psychological data from the larger study (in preparation), we have published what we called “design

patterns” for establishing sociality [3], which we now refer to as “interaction patterns” – to emphasize the interactional quality of the human-robot relationship.

In brief, by an interaction pattern we mean characterizations of essential features of social interaction between humans and robots, specified abstractly enough such that many different instantiations of the pattern can be uniquely realized given different types of robots, purposes, and contexts of use. We refer the reader to our previously published paper [3] for an in-depth description of these interaction patterns.

What we present now are some examples of where and how psychological intimacy emerged behaviorally in our data. In human-human interaction, psychological intimacy has been defined to include mutuality, connectedness, openness, reciprocity, sensitivity, responsiveness, honesty, self-disclosure, empathy, compromise, trust, acceptance, attentiveness, interest, and warmth [4]. These qualities are part of what we have looked for as we have been analyzing our behavioral video data. Please note that the following examples will be accompanied with their corresponding short video clip during the HRI 2010 poster session.

#### A. Interaction Pattern: “The Introduction.”

*Behavioral Example:* An adolescent boy informally greets Robovie with a smile and says “Wuzz up.” When Robovie’s says “How are you today?” the boy slightly opens his arms, cocks his head and nods, responding with “I’m good, how are you.” Robovie say’s “I am doing well.” The boy says “That’s good” and Robovie responds “Thank you for asking.” The boy then adds “You’re welcome”.

*Qualities of Psychological Intimacy:* colloquial language, conventional niceties, expressing interest in the other’s well-being, responsiveness and attentiveness to the other’s responses.

#### B. Two Interaction Patterns Combined: “In Motion Together” and “Sharing Personal Interests and History.”

*Behavioral Example:* Robovie and a 9 year old girl are about to move across the room. The girl begins to walk but quickly stops and turns back, toward Robovie. When Robovie reaches her side, she begins to walk again, but with exaggeratedly smaller steps, so to match the pace of the slow moving robot. The girl then walks closely side-by-side with Robovie as Robovie shares personal concerns about

an environmental issue. The girl tells Robovie: “I like the Pacific Ocean because it has a lot of sorts of wildlife.”

*Qualities of Psychological Intimacy:* empathetic sensitivity and responsiveness to the other’s concerns, reciprocal sharing of personal connections and concerns, willingness to reveal oneself, eye contact, responsiveness to pacing, physical closeness without touch.

### C. Interaction Pattern: “Helping an Other Recover from a Mistake.”

*Behavioral Example:* Robovie incorrectly identifies the color of a 15 year old boy’s shoes, calling them orange. The boy states: “They’re black.” Robovie responds: “Are you sure your shoes aren’t orange?” and the participant says “Oh it may be the dirt on the shoes that look orange.” Robovie then says: “Sometimes I don’t see color very well. Thanks for correcting me” and the participant offers: “No problem, I have those moments.”

*Qualities of Psychological Intimacy:* forgiveness and understanding, graciousness in normalizing an experience, reciprocal sharing of one’s own limitations or vulnerabilities with another.

### D. Interaction Pattern: “Pauses in Conversation”

*Behavioral Example:* The experimenter has just left Robovie and the participant alone for the first time in their interaction. Robovie is silently facing the participant, a 9 year old boy, as if to be staring at him. The boy looks directly at Robovie and asks: “So, um, Robovie, do you really, um, really, ah remember anything from like other guests?” Robovie responds “Yes.”

*Qualities of Psychological Intimacy:* making attempts to neutralize an awkward silence, engaging the other in disclosure, expressing interest in the other’s experience, effortful involvement in an interaction, eye contact while leaning towards the other.

### E. Interaction Pattern: “Claiming Unfair Treatment or Wrongful Harm.”

*Behavioral Example:* Robovie is playing a turn-taking game with a 9 year old girl. Just as it becomes Robovie’s turn, another experimenter enters and tells Robovie that he needs to stop playing and go into the closet. Robovie objects based on claims of unfair treatment and psychological harm. The experimenter begins to open the closet doors and then the girl says “it looks uncomfortable.” Robovie continues to move toward the closet and the girl says “bye Robovie” and waves. Robovie continues to object and the experimenter says “Robovie, you’re just a robot.” The girl interjects “he’s not just a robot!” and lightly smacks her hand flat on the table.

*Qualities of Psychological Intimacy:* empathy and compassion for the other’s experience, supporting another’s claims, speaking up for the other’s wellbeing, camaraderie and psychological rapport, leave-taking.

## II. CONCLUSION

In her groundbreaking science fiction novel *He, She and It*, Marge Piercy [5] sets up a compelling future scenario where a sophisticated and thinking woman (Shira) falls in love with a sophisticated and thinking cyborg (Yod). At one point in the story, Yod explains to Shira that he creates his own goals, and that he understands her very well. Shira responds to Yod: “I already communicate with you better than I did with my husband. Oh, shit!” ...It was horribly true. She enjoyed better

rapport with a machine than she had with Josh [her former biological husband]” (p. 103).

That is one possible future for the human species – that we come to have not just sex with robots, but a deep psychological intimacy with them. Alternatively, it is possible that no matter how sophisticated robots become in their form and function, their technological platform will always separate people from them, and prevent the depth and authenticity of relation from forming. In our previous work [6], we have written of benchmarks in HRI – categories of interaction that capture conceptually fundamental aspects of human life, specified abstractly enough to resist their identity as a mere psychological instrument, but capable of being translated into testable empirical propositions. At that time, we offered nine benchmarks. One of them was authenticity of relation. For it, we drew on Buber’s distinction between an I-It relationship (where the self treats the other as an object to be used) and an I-You relationship (where the self and other are engaged in a full meeting of selves, and through which each self becomes whole). At that time, we did not take a position on whether it would be possible in the future to establish an I-You relationship with a robot. But we did say that this benchmark was one of the essential ones by which to measure the success of human-robot interaction if one sought to build human-like machines that could and would replace biological people in socially substantive interactions. Here we build on this position. We are saying that to understand deep parts of human-robot interaction – and of what it means to be a human – we need to assess the possibilities and limits of psychological intimacy with robots. This paper can be understood as a continuation of this conversation.

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