

# Robotic Pets in the Lives of Preschool Children

Peter H. Kahn, Jr.<sup>1</sup>, Batya Friedman<sup>2</sup>, Deanne R. Perez-Granados<sup>3</sup>, and Nathan G. Freier<sup>2</sup>

<sup>1</sup>Department of Psychology  
University of Washington  
Seattle, WA, USA  
pkahn@u.washington.edu

<sup>2</sup>The Information School  
University of Washington  
Seattle, WA, USA  
{batya, nfreier}@u.washington.edu

<sup>3</sup>School of Education  
Stanford University  
Stanford, CA, USA  
granados@stanford.edu

## Abstract

This study examined preschool children's reasoning about and behavioral interactions with one of the most advanced robotic pets currently on the retail market, Sony's robotic dog AIBO. Eighty children, equally divided between two age groups, 34-50 months and 58-74 months, participated in individual sessions that included play with and an interview about two artifacts: AIBO and a stuffed dog. Results showed similarities in children's reasoning about the two artifacts, but differences in their behavioral interactions. Discussion focuses on how robotic pets, as representative of an emerging technological genre in HCI, may be (a) blurring foundational ontological categories, and (b) impacting children's social and moral development. More broadly, results inform on our understanding of the human-robotic relationship.

**Categories & Subject Descriptors:** H.1.2 [Models and Principles]: User/Machine Systems – *Software psychology*; I.2.9 [Artificial Intelligence]: Robotics; K.4.2 [Computers and Society]: Social Issues.

**Keywords:** AIBO, children, companionship, ethics, human-robotic relationship, human values, moral development, robotic pets, social responses to technology, user conceptions, Value Sensitive Design, virtual pets.

## INTRODUCTION

Animals have long been an important part of children's lives, offering comfort and companionship, and promoting the development of moral reciprocity and responsibility [5]. Yet in recent years there has been a movement to create technological substitutes for pets, such as the Tamagotchi, i-Cybie, Tekno, and Poo-Chi. In turn, researchers have begun to ask if technological pet counterparts, now or in the future, can provide children with similar developmental outcomes [7,10]. In this study, we investigated preschool children's reasoning about and behavioral interactions with one of the most sophisticated deployed personal robots on the market – Sony's robotic dog AIBO. This artifact, AIBO, represents the integration of two long-standing areas of research within the CHI community. The first area involves computer persona that exist on the desktop computer or through voice interfaces, including virtual embodied agents and social responses to computer technology [8]. The second area involves computational artifacts (without a persona) that link people to a physical world, including augmented reality, tangible computing, and telepresence [4]. By bringing both areas of re-

search together – through the use of computation to embed interactive persona into physical artifacts – personal robots represent a new genre for human-computer interaction.

Building on Friedman, Kahn, & Hagman [3], and principles of Value Sensitive Design [1,2] we sought data that would inform on how robotic pets (as representative of this emerging technological genre in HCI) may be (a) blurring foundational ontological categories, and (b) impacting children's social and moral development.

## METHODS

### Participants

Eighty children participated in this study, equally divided between two age groups, 34-50 months and 58-74 months. There were equal numbers of males and females in each age group.

### Artifacts

Two main artifacts were used in this study: a robotic dog and a stuffed dog. The robotic dog was Sony's version 210 AIBO, at the time of data collection (2001-2002) the most advanced robotic animal on the retail market. The stuffed dog was roughly the same size as the robotic dog and made of a soft-plush fabric. Both the robotic and stuffed dog were black-hued in color.

### Procedures and Measures

Each of the 80 children participated in an individual session lasting approximately 45 minutes. One part of the session involved an interactive period with AIBO, and another part an interactive period with the stuffed dog (which we called SHANTI). The presentation order of the two artifacts was counterbalanced.

With each artifact (AIBO or the stuffed dog), the child first engaged in a short (2-3 minute) unstructured introductory "play" period. Then the child was allowed to continue to play with the artifact while engaging in a semi-structured interview. In order to limit the total number of questions asked of any one child – to fit within the 45-minute session – children by sex and age were randomly divided into two groups. One group was asked 10 questions that pertained to each artifact's *biological properties* (e.g., "This is a dog biscuit. Do you think AIBO will eat this?"), and *mental states*, including intentionality (e.g., "This is a doggie toy. I'm going to put it here. Do you think AIBO will try to get the toy?") and emotion (e.g., "Can AIBO feel happy?"). The other group was asked 12 questions that pertained to each





