

AROUND THE WORLD WITH PARO: CHALLENGES IN DESIGNING AND USING ASSISTIVE ROBOTS ACROSS CULTURES

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INTRODUCTION

This paper reviews literature from cultural psychology and human-robot interaction and uses the seal-like robot PARO as a case study to describe cultural factors that can affect the acceptance and use of socially assistive robots (SARs) and propose a culturally comparative research agenda and framework that is generally applicable to the field. PARO is a seal-like robot developed to simulate pet therapy and produce mental, physical and psychological benefits in users, which include older adults with various levels of cognitive and physical impairment [1]. PARO was initially developed and evaluated in Japan and is currently used in thirty countries around the world; it became commercially available in Japan in 2005 and in Europe and the US in 2009. PARO’s therapeutic effects have been studied in multiple countries, but there has been little comparative research about user acceptance and practices. Surveys in Europe and Asia suggest cultural variability in the way people initially perceive PARO: while user impressions are positive overall, European users focus on PARO’s similarity to a real animal, while users in Japan and South Korea emphasize its interactive capabilities as the most positive trait [2].

CULTURAL MODELS IN THE ACCEPTANCE AND USE OF SARs

Research in cultural psychology suggests “cultural models” [3]— “presupposed, taken-for-granted models of the world that are widely shared” by the community (p. 4)[4]—can be salient factors in the perception and use of socially assistive robots. Culturally variable *social-behavioral models*, which define the rules for engaging in and interpreting social actions, and *socio-technical models*, which refer to technology’s meaning and role in society [3], can affect how users adopt and use SARs.

PARO’s therapeutic effects rely on tactile interaction and social cues such as vocalization and gaze [1] and an associative function, which encourages people to relate PARO to memories of prior experiences they find meaningful [5]. How users interpret these cues can differ according to cultural expectations. The analytical focus on relationships and context in Asian societies [6] suggests the way PARO is situated within the community may be an important variable in patient’s acceptance and interpretation of the robot in Japan. Western users may be more prone to “paying attention primarily to the object and the categories to which it belongs” (p. 291)[6], so whether PARO is introduced as an animal or technology and the expectations users have of those categories should have salient effects.

Sociotechnical models referring to technology’s role in society can also play a role in users’ perceptions of robots. In Japan, robots are construed as “partners” to be integrated into everyday life, while in the US they are “second selves” that can simulate and replace humans [7]. Users in Japan can be expected to develop a more relational understanding of the robot as a creature in their environment (see Figure 1). Users in the US, on the other hand, may be more likely to project their own characteristics onto PARO, as was noticed by Turkle [5] in what she calls the “Rorschach effect.”

Cultural norms pertaining to the roles and behavior of users can also affect the way people react to and use the robot. Researchers have found that women are more likely to use PARO than men [8]. However, the majority of users of SONY’s dog-like robot Aibo were male [9]. One reason for this may have to do gender norms: Aibo’s metallic angular body has a more “techy” appearance which fits male stereotypes, while soft round PARO seeks to inspire nurturing interactions that call upon female stereotypes. In order to make PARO more acceptable to male users, it may be useful to emphasize its robotic nature. In studies with Roomba, Forlizzi [10] showed that using the robotic vacuum made cleaning, generally coded as female work, more attractive to men and teens.

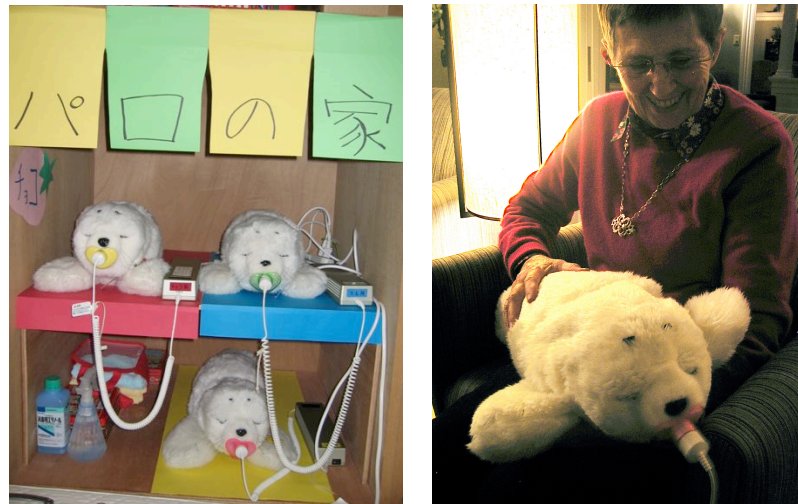


Figure 1. PARO is situated within its own “house” in a Japanese nursing home; Turkle [5] suggests that US users project their own experiences onto PARO, “comforting themselves” as the comfort the robot.

Finally, the institutional context in robots are used can also affect the perceptions, use, and acceptance of users [11]. The institutional setup of care varies from country to country: nursing facilities in Japan, whether public or private, are similarly equipped and staffed, while nursing facilities in the US can vary widely in terms of funding, equipment, staff training and ratio of staff to patients. PARO is also used with patients who have varying levels and types of cognitive and physical function, including individuals with dementia and autism. The former have a documented affinity to robots [12], so introducing PARO as a machine and using it as a mediator to scaffold social interaction and social skill development may be more effective than focusing on its pet-like qualities.

DEVELOPING CULTURALLY SITUATED GUIDELINES

Wada et al [8] have developed a set of preliminary guidelines caregivers can use in therapeutic interactions between users and PARO through observations in five facilities in Japan. These guidelines need to be extended to include practices for facilities in other countries, facilities of different types (private v. public, care home v. nursing home), care givers with varying levels of expertise, and patients with different levels and types of cognitive and/or physical decline. The abovementioned cultural and institutional factors relating to the use of SARs, in our case the seal-like robot PARO, define our program for designing and evaluating robots across cultures. The main questions we focus on are: (1) *how users apply and respond to different socio-behavioral models of robots* (e.g. PARO as robot, pet, or partner); (2) *how users perceive and respond to socio-technical models of the robot* (e.g. relational/utilitarian, companion/replacement); (3) and *how robots are and should be used in different institutional settings* (e.g. what are current practices and possible improvements).

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