Chapter 31

Building a Technoself:
Children's Ideas about and Behavior toward Robotic Pets

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ABSTRACT

This chapter focuses on how the technoself develops in children through relationships with a "personal" robot technology, robotic pets, especially the robotic dog AIBO. Drawing on studies of children and AIBO as well as similar robotic technologies, I examine children's ideas about and behaviors toward such robotic pets in order to describe three domains of the technoself: (1) ideas about the robot (the technological object); (2) ideas about the child's relationship with the robot; and (3) ideas about the self-in-relationship with the robot. A dynamic developmental perspective is applied to each of the three domains of cognition and behavior—technological object, relationship, and self-in-relationship-- that make up the technoself. This perspective asks how variability in child characteristics, such as developmental level, gender, temperament, personality or intelligence; in contextual factors, such as family background or prior experience with other technologies; and in robotic pets themselves predict these three aspects of the technoself.

INTRODUCTION

As children engage with technology, their cognitions and behaviors are likely to change in a number of interesting ways. On a superficial level, children are learning about the properties of new objects and the potential ways of responding to them. Given even very young children's comfort with computers, smart phones, and videogames, such technologies rapidly assimilate into the child's world of toys and gadgets. Robotics especially is diffusing with particular speed among children. As Brooks (2002) argues, the "robotics revolution" is reaching children even before adults, since robotic technology is often used first in toys. Indeed, Turkle (2011) describes "our time as the robotics moment" (p. 9).

Technologies such as robots are not merely novel objects. Children are entering into new *relationships* with such technologies. The construct

of relationship with (rather than manipulation of, use of, or even interaction with) a technology implies a number of characteristics: (1) reciprocity and contingency, whereby children initiate and respond to properties of the technological object in a coherent and purposeful way; (2) developmental change in the relationship over time, from first to last encounter; (3) emotional, social and even moral dimensions, in which children develop feelings and ideas about the technological object and their relationship with it; (4) embeddedness of the relationship in a network of other relationships, including but not limited to family, peers, school, neighborhood, media, and cultural artifacts (Bronfenbrenner, 1979); and (5) relationship change stemming from endogenous child factors, such as developmental age, gender, temperament, self-regulation, cognitive function, etc., as well as environmental factors.

All these aspects of a child's relationship with a technology have implications for the child's sense of self. From a dynamic systems perspective (Fogel, 1993; Melson, 2008), children develop through relationships. Their sense of self grows out of and is dependent upon the many relationships that children have. From birth, within the first attachment relationship, the infant develops a sense of herself—a "working model" (Ainsworth, 1979)—that does not exist apart from the relationship, but consists of *self-in-relationship*. As development expands the number and complexity of relationships, the self-in-relationship also expands. The proliferation of computer based technologies means that as children enter relationships with these technologies, a *technoself* emerges.

As a relatively new construct, the technoself lacks a unified definition or theoretical framework. A first stab at definition might be: The technoself is that sense of self, or "working model," that pertains to a person's relationships with particular technologies. Like other aspects of the self, the technoself is an internal, individual construction, both cognitive and emotional, which is shared with others and reflected in behavior, but is ultimately private. Heuristically, one might consider the technoself to be composed of three domains: the individual's sense of the technological object itself, for example, a laptop, videogame, smartphone, or computer; the sense of one's relationship with the object, and the sense of self-in-relation to this object. From a developmental perspective, each of these domains or components—technological object, relationship, and person—are dynamically changing. Change derives from maturation and developmental change within the person, from changes in the child's environments, and from changes in technologies and modes of engaging with them (Melson, 2010).

This theoretical framework of self as developing in and through relationships is applicable to individuals throughout the lifespan. However, in this chapter, we focus on children. The role of relationships with technology, and in particular, robotics, in self development is especially important during childhood, for several reasons: (1) as noted above, children, from infancy, are growing up with such technologies; and (2) early relationships, while not determinative, lay the foundation for later self development.

The idea of technologies as relationships is not new. There is considerable evidence that people of all ages relate to computers as social actors (Reeves & Nass, 1996; Nass & Moon, 2000). For example, Nass and colleagues (1997, 2000) showed that young adults obey politeness norms, respond to computer "personalities," are susceptible to computer praise and view computers as male or female much in the same way as they respond to human social actors. Adding anthropomorphic details, such as a talking face to a computer voice, causes young adults to attribute personality traits, present themselves in a more positive light, and become more attentive, following similar patterns of responses to humans (Sproull, *et al*., 1997). Recent advances in ubiquitous computing are further deepening and extending social engagement. Mobile devices are interactive, location sensitive, adaptive to specific environments, capable of

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