Artificial Pets:
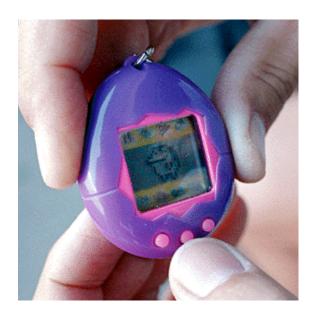# Simple Behaviors Elicit Complex Attachments

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Artificial pets are robotic toys with pet-like behavior.   Unlike traditional robots, which are made to be intelligent tools that serve their owner, artificial pets are autonomous creatures that elicit attachment from their owner.

Artificial pets provide a fascinating arena for examining the relationship between behavior and attachment. Physically, many are unremarkable: one of the most successful artificial pets to date, the Tamagotchi, was a small plastic key-chain egg with simple animations on a low-resolution screen. Yet people became extremely attached to them, giving high priority to caring for them and mourning them when they "died". It is the behavior of the artificial pet that fosters this attachment.

Although artificial pets have been developed in a variety of forms, from the simple "key-chain" pets to complex robots such as Aibo, an artificial dog, they share several key behaviors: they appear to act autonomously, they are dependent on their owner for nurturance, they require frequent interaction and they develop in response to their owner's actions.

Examples of artificial pets. Left, a *Tamagotchi;* Right, an *Aibo.* The *Tamagotchi* was a very popular and inexpensive keychain pet, with behaviors loosely based on a chicken. The *Aibo* is a much more complex, and expensive, artificial dog.   (Tamagotch image from http://star-bulletin.com/97/06/13/features/tamagoform.html ; Aibo image from http://www.mikrobitti.fi/nettijatkot/2001/.)

Autonomy: An artificial pet acts – or, more precisely, appears to act – autonomously. This means that its actions seem to be internally motivated, it appears to have its own goals, feelings, and desires. It does not necessarily accept the commands of a human and instead makes its own demands on the person. When machines work exactly as we expect them to and do what we request of them, we think of them as simply machines. It is when they do not work as expected that they appear to have a will of their own and we ascribe intelligence to them.

Dependence: Most artificial pets start as "infants", which elicits nurturing and affection: we instinctively take care of the young. Throughout their lifespan, the pets are designed to require their owner's help in order to thrive and survive. If the owner does not "feed" or "entertain" them they become ill or even die. The pet's dependence makes the owner feel responsible for it.

Interaction: Feeding, cleaning and playing with the pet all involve interacting with it – and the pet becomes integrated into the owner's daily routine. Having spent a considerable amount of time and energy on the pet, the owner becomes invested in its well-being.

Development: Artificial pets are designed to develop in response to the owner's treatment of them. A pet that is well cared for will be healthier and more tractable. The owner is thus encouraged to take pride in their pet's well being.

Artificial pets are a good example of how we use metaphorical thinking to conceptualize behavior. If we think of them as games, the time spent playing with them is entertainment and somewhat self-indulgent; if we think of them as animals, time spent playing with them is care-taking, an act of responsibility and altruism. It is obsessive to leave a meeting or dinner because a game requires attention, but it is reasonable to do so if a pet is in need. The metaphor we use to think about them changes how we understand the interface, act toward the object, and judge the behavior of others towards similar objects.

Simply calling an interactive program a pet is not sufficient for people to think of it as one. Not every responsive toy that is marketed as a pet manages to achieve that metaphorical status, and comparing those that are perceived as pets with those that are not can help us understand some of our beliefs about behavior, autonomy and agency. For example, screen-based pets did not achieve anywhere near the popularity that key-chain pets did. They had two significant differences. First, the key-chain pets were embodied – the pet is the whole physical package, not just the image on the screen. Seeing the pet as an object, rather than a program, helped lend it credence as a creature. Second, the key-chain pets could not be turned off, while the screen one's could. A pet that could be turned off lacked urgency, and the ability to switch it on or off broke the illusion of aliveness.

There is considerable controversy about the social implication of artificial pets. Do they teach children to nurture – or are they wasting empathy on artificial, commercial objects, empathy that should instead be turned toward real beings? Some argue that they are useful for teaching responsible behavior in a safe setting. Others say that they erode responsibility, by providing people with pseudo-animals that can be neglected to the point of simulated death without moral repercussions. Some proponents of artificial pets hope they can be used as companions for the elderly, providing the emotional support that a real pet provides, without the need for care that an animal has.

The evolution of artificial pets will occur in an environment of market forces and technological development. Today, the trend appears to be towards more com-

plex and "intelligent" pets, robotic creatures that are designed to develop a long-term relationship with their owner. It will be interesting to see what qualities of real animals are replicated in these artificial beings, and what unique features are developed for them; it is an evolution that will provide a new perspective on the co-evolution of humans and domesticated animals.

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