From Seduction to Fulfillment: The Use of Anthropomorphic Form in Design

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ABSTRACT
In this paper, we discuss the use of anthropomorphic form in the design of products. We assert that anthropomorphic form is not merely an embellishment but that it can be used as a means of solving design problems. Through a series of examples we illustrate the various uses of anthropomorphic form in the design of products. Our distinctions provide designers and researchers a way to classify and understand the use of anthropomorphic form in design and in doing so, increase the potential that anthropomorphic form be used in an appropriate and compelling manner.

General Terms
Design

Keywords
Anthropomorphism, design, design research, product design, interaction design, robots

INTRODUCTION
Anthropomorphic form can be found in the earliest functional product forms and behaviors (Figure 1). As the practice of design has progressed and matured human-like form has remained a common theme. This theme is evident in household products [3], vehicles and humanoid robots [10,15]. In this paper we argue that anthropomorphic form is more than just an embellishment – anthropomorphic form can be understood and practiced as a means of solving design problems.

Our goal is an understanding of the uses and qualities of anthropomorphic form in products. This understanding will lead to more appropriate and compelling products by providing a set of distinctions that can be used to clarify and focus the use of anthropomorphic form towards meaningful goals. This understanding will establish and foster a designerly approach to the discourse on the use of anthropomorphic forms in design.

Before proceeding we must define our terms. Anthropomorphic forms are non-living objects that reflect human-like qualities. Form is the expression of a product. This definition includes the physical characteristics of shape and size as well as qualities of behavior and interaction. This definition of anthropomorphic form is crucial to our discussion. It is not only those things that look

DPPI'03 June 23-26, 2003, Pittsburgh, Pennsylvania, USA.

Figure 1. Example of anthropomorphic form in an ancient Inca vessel. [11]

human-like but also those things that behave human-like – regardless of how they may look. Anthropomorphic form may or may not look animate or "alive".

ANTHROPOMORPHIC FORM AND ANTHROPOMORPHISM
In nearly every facet of the arts, from literature and cartoons to products and architecture, there are objects, buildings, or animals that are ascribed human characteristics. A search of "anthropomorphic" on ebay [7] returns a list of 100+ kitsch items. The majority are salt and peppershakers. But in the short history of product design as a discipline, kitsch is not the only place where anthropomorphic form appears, just perhaps the most notorious. Products such as radios, lamps, kitchen and food products, and even vehicles, mimic human shape and behavior. Instances of anthropomorphic form in design range from the blatant to the subtle. It can be used aggressively, as in the case of kitsch, but it can also be used subtly, carefully, even subversively.

There is a substantial range in anthropomorphic product forms. Sometimes, it ends at the face, as in the case of two eyes and a mouth composed from the dials and tuner on an old radio. Sometimes a less obvious anthropomorphic form appears, as in the desk lamp that replicates the joints of the human arm for adjustability.

Anthropomorphic form is often used to appeal to our innate human instincts. As an example, a current cultural fad is the "cute" and "babylike" anthropomorphic forms of Sanrio's Hello Kitty line [9] and Alessi house wares products [3] (notably the design work of Giovannoni, Mendini, Pirovano, and Venturini). These products attempt to spark our social and nurturing instincts, ultimately to sell the product [14]. In such cases the anthropomorphic form is merely seductive, its use-value ends after the sale is made. Such uses are highly questionable. We propose a deeper, more fulfilling use of anthropomorphic form is possible.

Theories of Anthropomorphism

Anthropomorph*ism* is the *act of attributing* humanlike qualities to non-human organisms or objects. *Why* we anthropomorphize is contested within the social sciences. However, understanding these social theories of anthropomorphism provides insight to our discussion of anthropomorphic form in design.

Familiarity Thesis

The familiarity thesis states that we anthropomorphize because it allows us to explain things we do not understand in terms that we do understand, and what we understand best is ourselves. The familiarity thesis is a primarily cognitive motivation for anthropomorphism: it attempts to understand the world based upon a mental model of the world that we are most familiar with. [8]

Comfort Thesis

In contrast to the familiarity thesis, the comfort thesis is a primarily emotional motivation for anthropomorphism. We anthropomorphize because we are uncomfortable with things that are not like us and "making" things be like us reduces that discomfort. According to the comfort thesis anthropomorphism is "an attempt to feel like we can define and influence the world if it is more like us than not." [8].

Best-Bet Thesis

The best-bet thesis is a cognitive and game-theoretic approach to anthropomorphism. The best-bet thesis states "in the face of chronic uncertainty about the nature of the world, guessing that some thing or event is humanlike or has a human cause constitutes a good bet… if we are right we gain much … if we are wrong, we usually lose little" [8].

Social Thesis

Caporarel and Heyes have put forth a theory of anthropomorphism they term the *Species-Specific Group-Level Coordination System*, which we have translated to the social thesis. This thesis claims the psychological discussion of anthropomorphism is not neutral but is in fact value laden and defines our interaction with the environment. "From this perspective, attributing human characteristics to animals is a way of changing the values we place on them and how we can behave towards them". In the social thesis the *act* of anthropomorphizing reflects values and possesses the potential for social consequence. [5]

Object Subject Interchangeability

The concept of object subject interchangeability proposes that people attribute meaning to other people and objects in the construction, adaptation, and maintenance of the self. The distinction between the influence of other people and objects is not always firm. Anthropomorphism may be used to attribute a human-like quality to an object that has particular salience in defining who we are individually or culturally. [6]

Phenomenological Intersubjectivity

The concept of phenomenological intersubjectivity proposes that anthropomorphism is a reflection of how we experience and order the world. This concept argues we experience objects that seem to be animated by human consciousness and will, causing the distinction between self and other to be blurred, and that anthropomorphism is a pragmatic response to such objects in order to make sense of them. [12].

Command and Control

In discussion of the activity of collecting, Belk, states that people anthropomorphize objects so that they can place them within a "little world of an intimate family in which the collector reigns as an absolute sovereign." [4] This suggests that anthropomorphism is used to explain relationships with and exert authority over objects.

Recent Issues in Anthropomorphic Form and Design

The issue of anthropomorphism within design is different from that within the social sciences. It has not been addressed in terms of "how" or "why" people anthropomorphize, but "whether" designers should or should not use anthropomorphic forms. The debate is foremost situated within the field of visual interface design and highlighted by the work of Brenda Laurel (arguing in defense of anthropomorphism) and Ben Schneiderman (arguing against the use of anthropomorphism [1]. To simplify the argument, those in favor of anthropomorphism tend to view it as an effective design method because it facilitates certain social modes of interaction. Those against argue that it establishes false expectations and dangerous relationships with our machines.

Rather than becoming just as another footnote in this debate we forgo passing judgment on the use of anthropomorphic form and accept it as a fact, allowing us to proceed to investigate its uses within design.

ANTHROPOMORHIC PRODUCT FORM

To understand the uses of anthropomorphic form as a means to achieve specific design goals, we reviewed the field of design and identified products to use as examples. We selected six products that exemplified the diverse range of anthropomorphic form found in product design: perfume and soap bottles, the Koziol pot scrubber, the Happy/Sad Mac icon, the Kneeling Bus, the ASIMO domestic robot, and automobiles. These products reflect four uses of anthropomorphic form in design. They serve to 1) Keep things the same, 2) Explain the unknown, 3) Reflect product attributes, and 4) Reflect human values. Each example serves more than one use; the uses will be discussed further in the next section.

Example 1: Perfume and Soap Bottles

The human torso, particularly the female torso, is an easily recognizable shape. The basic proportions of the torso, wider than it is deep, with a ratio of shoulder to waist to hip dimensions create a familiar form. These proportions: 3-2-3 are presented as a measure of perfection for the ideal female torso in mainstream Western culture. Many bottles have these proportions scaled down, with the bottle-neck leading up to a bottle cap for a head. These anthropomorphic bottles serve to create a shape for the shapeless liquid products inside. Three bottles with human torso designs are shown in Figure 2. The two Gaultier perfume bottles (left) tend toward the seductive side of anthropomorphic bottle design. They appear sexualized in lingerie, with some detail in the breast and pubic areas. The Ivory soap bottle (right) is the most recent update on decades of anthropomorphic dish soap bottle designs.

Figure 2. Anthropomorphic perfume and soap bottles.

These anthropomorphic bottle forms serve similar design goals; they maintain conventions. For the perfume, the form reinforces the sensuality inherent in the contents with visual and tactile sensuality. That perfume is sexual or sensual is a centuries old notion, these bottles reinforce the idea. For the soap, the form connects the contemporary design to the decades of anthropomorphic liquid dish soap bottles that came before. It may also further a gender bias that dish soap is for "women's work". The use of anthropomorphic form in the design of these bottles is as much about keeping form ideas familiar to users as they are about perfume or soap. Keeping things the same is one use of anthropomorphic form in design.

Example 2: Koziol Pot Scrubber

The Koziol pot scrubber shown in Figure 3 includes a foot shaped stand at the base, an organic body shape along the length, leading to a head like scrubber tool at the top. Its posture, shoulders and feet reference the human form. The Koziol pot scrubber uses anthropomorphic form to assert values about an activity – scrubbing dishes. By adding character, personality, and attitude to the form of a tool, this product attempts to make scrubbing pots *seem* like something fun. [13]. However, the notion of "fun scrubbing" is questionable. This pot scrubber is projecting upper class western values – it embodies the idea that domestic work is trivial. Projecting human values is one use of anthropomorphic form in design. The scrubber's anthropomorphic form serves another purpose; the feet allow it to stand upright.

Figure 3. Koziol Pot scrubber.

The anthropomorphic form in the design of the Koziol pot scrubber lures us to this product over other similar (and probably better functioning) products. In this example anthropomorphic form questionably adds whimsy to the design of an otherwise serious tool for accomplishing a rather important task.

Example 3: The Happy/Sad Mac Icon

The earlier versions of the Macintosh operating system (pre-OS X) used an iconic representation of the computer with a face, shown in Figure 4, to alert the user of the state of the machine. Upon start-up, if all was well, a "Happy Mac" appeared on the screen, if all was not well, a "Sad Mac" appeared along with an error code. If the situation was dire, a flashing question mark appeared in place of the face (perhaps suggesting the personality of the machine was lost!).

Figure 4. Macintosh startup icons.

The Happy/Sad Mac icon uses anthropomorphic form to explain a complex technology. Rather than relying solely on obscure error messages, the iconic representation of the machine provides immediate and understandable information. This graphic icon is an expression of the computers internal state. Explaining the unknown is one use of anthropomorphic form in design.

The Happy/Sad Mac also functions as a playful instantiation of the social message of Apple computers – that computers should be user-friendly and accessible by everyday people. Admittedly the cuteness of the Happy/Sad Mac might make it seem trivial, but it is not. The Macintosh OS, especially in the context of early personal computing, attempted to be a humanistic product and not just a complex adding machine. In doing this anthropomorphic form was also used to project human values.

Example 4: The Kneeling Bus

Kneeling Buses, shown in Figure 5, use a hydraulic mechanism to lower the front side of the bus closest to the curb to allow elders and those with physical disabilities to more easily step onto the bus.

Figure 5. Kneeling bus.

This kneeling bus is an example of the use of anthropomorphic form in its behavior to explain a complicated technology in a succinct and understandable manner. The alternate options would be to name the bus after the technology, which would complicate matters, or label the bus "for short, weak, elderly and disabled people", which would stigmatize the function. The behavior of the bus facilitates a more equitable and accessible approach to public transportation and thus the anthropomorphic form is also used to projects human values.

Example 5: Domestic Robots

Many real and fictional domestic robots use anthropomorphic forms. An example is the Honda ASIMO robot shown in Figure 6. The technology that makes domestic robots possible is extremely complex. This technology could take almost any form, however the use of anthropomorphic form is highly effective in clarifying the purpose of the product; it explains the unknown.

ASIMO also makes use of anthropomorphic form as a means of keeping things the same. Although we have few examples of actual domestic robot products, science fiction has presented us with visions of such robots for 80+ years and these visions have almost exclusively been anthropomorphic. Until the public becomes familiar and comfortable with domestic robots, straying from an anthropomorphic form may cause confusion about the product's purpose and function. Finally, the use of anthropomorphic form in ASIMO draws us to the product and makes an offer of a cooperative social experience with a machine that might extend our human capabilities. This use of anthropomorphic form in the product serves to reflect important attributes of the product. Reflecting product attributes is one use of anthropomorphic form in design.

Figure 6. Asimo robot built by the Honda Corporation. [10]

Example 6: Vehicles

Few formal cues are necessary for people to anthropomorphize a face [2]. It is generally accepted (though rarely written about) that the front end of most vehicles are anthropomorphic, looking like a face [16]. Our convention of two headlights and a radiator grill between them reflect the appearance of two eyes and a mouth; the windshield and hood serve as brow and forehead. These parts are functional conventions; it is the design of the front-end details that give vehicles anthropomorphic personality.

The front-end "face" design of two vehicles are shown in Figure 7. Subtle differences make the VW Beetle appear cute and the Dodge Ram appear rather menacing. The Beetle has soft curves, wide eyes, and a hood parting line that hints at a smile. The Ram on the other hand has harder lines, a grill like flared nostrils, and a hood parting line that etches a stern frown above the headlights.

Figure 7. Volkswagen Beetle and Dodge Ram truck.

The manifestation of the facial expression in the front end of vehicles reflects attributes of the vehicle. Functionally the vehicles depicted have a lot in common, to a pedestrian or another vehicle, the amount of threat they pose is different. Because of its size, weight and power, a collision with the Ram truck would be much worse than a collision with the Beetle; and the Ram's facial expression warns this. Trucks look menacing because they are menacing.

The anthropomorphic form of a vehicle's front end can also serve its designer and manufacturer by projecting values. Imagine the companies behind the vehicles above. Which one is tough? Which one is happy? It could be either, however the values they project to the world are clear. Volkswagen wants to project kindness; Dodge wants to project power. The anthropomorphic form of these and many other vehicles also serves to maintain a convention.

DISCUSSION

From our review of product design we identified two primary themes that are evidence to the use anthropomorphic form as a means to achieve design goals. The first of these themes is *the uses of anthropomorphic form in design*, which states how anthropomorphism functions within a product. The second of these themes is *the quality of anthropomorphic form in design*, which describes our experience of anthropomorphism.

THE USES OF ANTHROPOMORPHIC FORM IN DESIGN

We identified four primary uses of anthropomorphic form in design of products. The uses address the designer's question of why to use anthropomorphic form – they answer what design problems might be solved by the use of anthropomorphic form.

The four primary uses are 1) Keeping Things The Same, 2) Explaining The Unknown, 3) Reflecting Product Attributes, and 4) Reflecting Human Values. These uses are not mutually exclusive, neither are they always instantiated with the same magnitude – some anthropomorphic forms may be weaker in their usage than others. Most anthropomorphic product forms that we have found apply more than one of these uses.

1. Keeping Things The Same

Some products have utilized an anthropomorphic form for so long that they are defined by it and an anthropomorphic form becomes a convention for a class of products. This use of anthropomorphic form is to maintain conventions because to stray from such a form might cause substantial confusion about the identity, function, or purpose of the product.

Bottles, vehicles, the ASIMO domestic robot are examples of products that use anthropomorphic form to maintain the shape conventions that define their product class.

2. Explaining The Unknown

In contrast to maintaining the conventions of existing products, anthropomorphism is often used to explain products with new functions or technologies. This use of anthropomorphic form provides the designer with a way to describe the purpose and functioning of the product and lessen resistance to the new or foreign.

The Happy/Sad Mac icon and the kneeling bus are examples of products that use anthropomorphic form to explain the unknown.

3. Reflecting Product Attributes

Some products use anthropomorphic form to structure our relationship and interaction with the product based upon how a product operates. This use of anthropomorphic form provides the designer with a way to direct the experience with the product based upon the product's qualities, capabilities, and limits.

The ASIMO domestic robot and vehicles are examples of products that use anthropomorphic form to reflect product attributes.

4. Projecting Human Values

Some products use anthropomorphic form as a manner of expressing (personal, social, or cultural) values related to the product or the activities the product supports. In contrast with reflecting product attributes this use is focused on the socio-cultural experience of the product. This use of anthropomorphic form provides the designer with a way to direct the experience of the product in relation to the human context.

The Happy/Sad Mac icon, the Koziol pot scrubber, and the kneeling bus are examples of products that use anthropomorphic form to project human values.

THE QUALITY OF ANTHROPOMORPHIC FORM IN DESIGN: FROM SEDUCTION TO FULFILLMENT

The use of anthropomorphic form is not neutral and all expressions of anthropomorphic form are not equal. We identified two primary qualities of anthropomorphic form in design – seduction and fulfillment. These qualities address how anthropomorphic form is used and the experience of interacting with anthropomorphic forms. (Figure 8)

As designers, we maintain that good designs make promises to users. These promises go beyond the concept of affordances and suggest how the product will meet the users cognitive, emotional, social, and cultural expectations. The qualities of seduction and fulfillment reflect how the product uses anthropomorphic form in relationship to the promises that it makes.

Seduction

Seductive anthropomorphic form uses the power of anthropomorphic form to lead users to consumption, either through purchase or use. We use the term "seduce" because these products may or may not fulfill on their promises. For example, the Koziol potscrubber (Figure 3) uses anthropomorphic form to seduce users to the product, making promises of a fun experience of scrubbing dishes that it cannot fulfill. In this product, the use of the anthropomorphic form is not related to the purpose or experience of the product, it is to lure the user.

Fulfillment

Fulfilling anthropomorphism uses the power of anthropomorphic form to lead users to a meaningful understanding of the product's purpose and a more appropriate engagement with it. Fulfilling anthropomorphism leverages our relationship to human form to inform and guide users. For example, the Happy/Sad Mac icon (Figure 4) uses anthropomorphic form to reinforce a more natural and humane way to interact with a computer, and fulfills on the promise that the form offers. We use the term "fulfill" because these products honor their promises – the anthropomorphic form is an integral part of the product that cannot be easily separated from its purpose or function.

From Seduction To Fulfillment

The distinctions of seduction and fulfillment need not be perceived as a value judgment. Although seduction often is maligned, it can be an enjoyable and rewarding experience. Not all products need to be fulfilling, designers must be careful not to create engagements with products that cause users to rely on them in inappropriate or unethical ways. The issue with seductive anthropomorphic form is that often it is used for the benefit of the producer at the expense of the consumer, to increase the chances

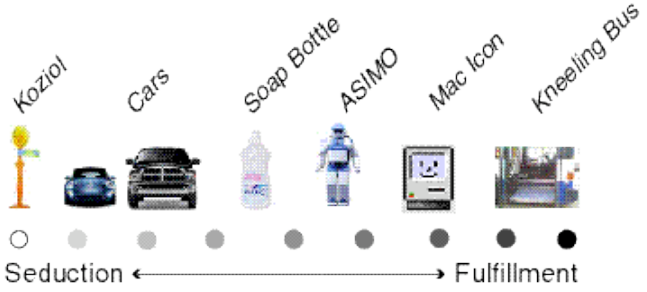

Figure 8. The quality of anthropomorphism in design

of purchase rather than as an opportunity to provide a substantive means of explanation and communication.

Additionally, the continuum from seduction to fulfillment does not necessarily represent static positions. Many, fulfilling products use seduction to bring users to the product, and then fulfill on the promise. For example, the Honda ASIMO domestic robot seduces users to interact with it through its cute form and sophisticated behavior and then fulfills on the promise of a cooperative social experience with a machine.

CONCLUSION

Anthropomorphic form is a powerful means of solving design problems and shaping our experience with products. There are

three issues relating to the use of anthropomorphic form that warrant further investigation: a deeper look at the values that forms project, a study of the impact of cultural context on anthropomorphic forms, and research into the overlap between ergonomics and anthropomorphic form.

The argument that anthropomorphic form creates inappropriate expectations and relationships with products is an ethical as well as a usability issue. If anthropomorphic form can be used to project human values, it is important to reflect on what those values are. When we use human-like forms to perform a task we are making a statement about humans, even if a robot is performing the task. For example, creating a servant class of humanoid robots would necessarily reference a history of human exploitation. The ethical and social implications of such references cannot be ignored in the research and design of new products.

A promising area for the use of anthropomorphic form is the development of culturally appropriate product forms. Every culture anthropomorphizes differently; every culture has different representations of the human body and different ideas about anthropomorphic forms. By examining and understanding culturally specific anthropomorphic forms and representations of the body, we may be able to create product forms that acknowledge and respect cultural differences in a unique and compelling manner. Identifying the appropriate and inappropriate contexts for the use anthropomorphic form is an important research topic.

The area of ergonomics presents an interesting relationship with the use of anthropomorphic form. Often when designers approach a problem with the "human factors" in mind, the resulting design mimics the human form in some way. This resulting humanistic form is not a direct use of anthropomorphic form, but rather a complementary method that results in an overlap with anthropomorphic form. For example the Ivory soap bottles' curved torso is also an ergonomic solution that uses an anthropomorphic form - it fits the hand well, and is easy to grasp with a wet soapy hand. The connection between these two approaches to design solutions will be explored in future work.

In our design practice and research we accept the phenomena of anthropomorphism rather than attempting to solve it. We focus our efforts on understanding the role of anthropomorphic form within design. We pursue the strategic and appropriate use of anthropomorphic form in the design of products. The uses and qualities of anthropomorphic form identified in this paper provide an initial approach. Specifically, the distinction of the four uses of anthropomorphism and the two qualities of anthropomorphism can be used by designers and researchers to clarify and focus the use of anthropomorphic form towards meaningful goals. We hope this work raises ideas and questions that contribute to future design research on anthropomorphic form.

ACKNOWLEDGMENTS

We thank Jodi Forlizzi, Sara Kiesler, and our other colleagues in The Project on People and Robots in the Human-Computer Interaction Institute and Craig Vogel in the School of Design, at Carnegie Mellon University. This research was supported in part by National Science Foundation grant #IIS 0121426.

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