

Body/Persona/Action! Emerging Non-anthropomorphic Communication and Interaction in Virtual Worlds

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ABSTRACT

Avatars are traditionally understood as representing their human counterparts in virtual contexts by incorporating many aspects of a person's real world physical characteristics within the virtual form. An alternate approach, in which avatars are instead imbued with non-human characteristics, challenges the limitations of solely anthropomorphic principles and expands the potential of avatars for virtual world interaction and communication. This paper provides a brief history of non-anthropomorphic avatars, with a focus on exploring the current use of such avatars in virtual worlds. In order to explain the shift in degree of anthropomorphism, we discuss Goffman's theory of symbolic interactionism, which holds that the self is constructed as a persona through social performance and relates identity to social behavior rather than appearance. Since non-anthropomorphic avatars are persistent characters engaged in a prolonged performance in virtual worlds, their use also may motivate emerging social mores, politics and ideologies. This paper argues that such avatar species create new social interactions and modes of communication that may signal interesting directions for future research.

Categories and Subject Descriptors

H. 1.2 [Models and Principles]: User/Machine Systems-Human Factors. I.3 [Computer Graphics] Three-Dimensional Graphics and Realism- Animation, Virtual reality J.4 [Social and Behavioral Sciences]: Sociology

General Terms

Performance, Human Factors, Theory.

Keywords

Avatar, Embodied Agents, Anthropomorphism, Virtual Worlds, Virtual Environments, Symbolic Interactionism, Human-Computer Interaction, Sociology, Performance, Role-Playing.

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1. INTRODUCTION

It is in the interactions, in the mutual questioning and interacting of the world and ourselves, in the changing patterns of the lifeworld that things become clear. . . with a new set of "toys," cyberspace and computer toys, we are taking shape in a new set of relations such that both world and self take on different dimension. . . In short, both human and nonhuman agencies get revealed indirectly.

--Don Ihde, *Bodies in Technology* [1]

An avatar, as defined in the *Bhagavad-Gita*, is the incarnation of a deity in the physical shape of a human being. Today, avatars are more widely known as the physical representation of a user in a virtual world¹. The ability to believably represent oneself to others in such environments is consensual and predicated on two critical aspects: appearing human and manifesting human behaviors. Though sometimes assumed, an avatar need not manifest only one's real-world characteristics. Many people choose to engage in transformed social interactions by decoupling their real-life persona and augmenting their avatic self-representation and behavior ([2]; [3]). Yet, in order to encourage the type of communication and interaction behaviors we exhibit in the real world, avatars are usually conceived along familiar human body forms and provided with a means to manifest typical, familiar human behaviors. In designing avatars, a certain degree of *anthropomorphism* – meaning innate human physical characteristics and properties - is often used to represent the virtual characteristics of the avatar under the assumption that such familiar human qualities are conducive to social interaction. Traditionally, anthropomorphism as a term has been used when humans invest animals with human qualities such as reasoning and emotions in order to better relate to these creatures. In this paper, we look beyond anthropomorphism and ask about the implications of avatars predicated on non-anthropomorphic or non-human principles. Though such avatars may manifest behavior that may be deemed anthropomorphic, they may also exhibit and display communicative behaviors that are non-human or animalistic.

¹ Though popularized by Neal Stephenson in his cyberpunk novel *Snowcrash* (1992), the term avatar was first used to indicate a virtual persona by *Habitat* pioneers Chip Morningstar and Randall Farmer in 1986.

Both the avatar look and behaviors rely heavily on the affordances and the environment of the specific online world in which they are to be used. Some virtual worlds allow a minimal selection of pre-designed avatars, while others allow for personal customization. Behaviors usually include a way to “talk” to other people’s avatars (through voice or text messaging), thus providing the modality of language, though increasingly, animated actions such as gestures are also becoming available.

Not all interactions are limited to standard social mores. Often the participants behind the avatars will mutually agree upon a different set of social rules that must be adhered to in all interactions – rules that create an alternate world in which people role-play through their avatars. This could be, for example, a Victorian steampunk enclave, a town from the American West of the 1800s, or a colony in space. The referenced role-playing modes, however, still rely primarily on human appearance (though perhaps costumed) and interactions, though increasingly, non-human avatars are also used for role-playing in virtual world.

The focus on designing avatars around human physical principles is currently complemented by the increasing use of various non-anthropomorphic avatars such as dragons, animated objects and tiny creatures that may neither look nor act human, and therefore may ask us to relate to them in varying degrees of anthropomorphism. Part of interacting with these creatures might require role-playing that focuses on new modalities and mores. We know that such role-playing establishes a link between performance and identity, yet we need to ask how identity might change when character interaction is based on non-anthropomorphic principles and extends human interaction into the realm of the non-human.

Interacting with and inhabiting non-anthropomorphic avatars may ultimately define new ways of being and interaction that go beyond human-centered principles, but how are these principles determined? For instance, if you are a small creature, is it proper to ask a dragon if you can ride it? The motivations and affordances for non-anthropomorphic interactions are not yet well understood, nor is the possible enrichment of interaction principles as a result of people using and role-playing non-anthropomorphic avatars. While virtual humans are a long-standing goal and practical metaphor underlying virtual world interaction, the appearance of non-anthropomorphic characters introduces important questions that require us to go beyond the human and embrace emerging modalities of interaction, social mores and behavior.

To that end, this paper asks what we can gather from behaviors and interactions of various non-anthropomorphic avatars now appearing in online virtual worlds. We first provide a brief history of non-anthropomorphic avatars, and provide examples of their use in early graphical online worlds, text-based virtual worlds, and today’s more exotic virtual world offerings. We next explore theoretical implications of non-anthropomorphic avatars, including performance, identity and social presence through the lens of symbolic interaction, which holds that interaction is based on the real-world meanings we ascribe to objects and people. We argue that non-anthropomorphic interactions require such theories also to be expanded to take into account emerging forms of virtual (non-real world)

interaction. Finally, we speculate on what non-anthropomorphic avatars may portend for future digital social interactions such as etiquette, inhabiting (role-playing), and various forms of communication.

2. A BRIEF HISTORY OF NON-ANTHROPOMORPHIC AVATARS

Avatars have been used since the earliest days of online virtual worlds. LucasFilm’s *Habitat* (1986), the first graphical (2D) online virtual world, allowed players to have a great deal of flexibility in the design of their avatars, with many choosing to take on the look and persona of both animals and a wide range of non-human characters (see figure 1). *Traveler*, (1994) used simple low-fidelity (3D) depictions of faces to represent inhabitants of that world (see figure 2). But even here, non-human avatars were often chosen by the participants, and included cats, flamingos and other exotic fauna. Perhaps the online world with the most flexibility was that of the text-based *Lambda Moo* (1990) created by Pavel Curtis, which had an unlimited range of avatars types since intricate written descriptions, limited only by the power of the participant-writer, were presented in the chat-based interface.



Figure 1: Two non-anthropomorphic 2d avatars in LucasFilms’s *Habitat* (1986-1988).



Figure 2: Non-Anthropomorphic & Anthropomorphic Avatars in the online world *Traveler* (1994).

Recent developments in computing power and graphics cards now support highly detailed 3D avatars with highly modifiable physiognomy, gender attributes, hair styles and body shapes.

The ability to create custom avatars of such detail has allowed people to represent themselves in countless virtual contexts. This flexibility in design has also afforded not only more detailed human avatars, but also non-human identities with various new physical affordances and kinematics, new social mores, etiquettes and gestures for interaction (cf. [4]).

Second Life, for instance, is an extremely popular virtual world that provides opportunities for players to fabricate an extensive range of personal avatars (see figures 3-4). New subscribers are given a choice of default avatars with which to start, from plain “girl and boy next door” forms to a harajuku girl. Another recent choice is that of a “furry”—an avatar that is in the form of an animal such as a dog or a cat (albeit bipedal). Most people, however, take great pride and pleasure in customizing their avatars in various ways. While a significant percentage of Second Lifers customize their avatars to look like their real world selves, others take advantage of the opportunity to create fantastic avatars from legends (dragons or “wyrms”, vampires), mythology (minotaurs, seraphim, devils), the animal world (butterflies, horses, dogs), to pure imagination (skeletal beasts, spaghetti monsters). A very popular group of avatars fall into the category “tinies” which, through clever manipulations of the basic skeletal form *Second Life* provides, such as folding up the extremities into an exoskeleton, manifest a much smaller size than otherwise possible.



Figure 3: Spaghetti Monster in *Second Life* (courtesy of nwn.blogs.com)



Figure 4: A Tiny and two animal avatars in *Second Life*

What motivates people to create such a range of avatars? Are they expressing an alter ego, perhaps revealing some deeply hidden part of themselves that, within the comparative anonymity of the online world, feels safe enough to manifest? Are they striving for attention, or fulfilling unrequited desires? The increasing use of such avatars raises important philosophical questions about the performance of self as related to various forms of embodiment, as well as how non-anthropomorphic representations of self affect one’s identity and behaviors. Towards this end, we will now turn to the theory of symbolic interactionism, which argues that the self is constructed through rituals of everyday social exchanges.

3. SYMBOLIC INTERACTIONISM

As the 18th century philosopher George Berkeley declared, “Esse est percipi” – to exist is to be seen by someone else. We play different roles in different contexts, depending on who we know, what we know, and how much we choose to reveal about ourselves to others in social exchanges. Researchers in sociology have greatly expanded upon Berkeley’s original idea by explaining the construction of the human self as greatly dependent upon social interaction (e.g. [5]; [6]; [7]; [8]). From this view, the self is constructed through a process of social interactions with various communities, physical structures, environments, as well as with other humans and objects. The theory of *symbolic interactionism* explains the construction of the self as achieved through interactions with other objects and persons, where the self is engaged in an ongoing performance that is always being redefined as it represents itself symbolically in relation to other elements (whether human beings, objects or places) ([5]; [6]). The self is expressed within a persona, which is a construct we project in order for others to see us in a desired way. Media ecologist Corey Anton sums it up thusly:

I do not have a face; other people have mine and I have theirs. [...] Rigid boundaries between others and self need to be loosened because part of me is manifest only through others. Said simply: nothing separates me from others. ([9], 66)

In essence, symbolic interactionism makes clear the hybrid nature of the self as performed in social situations as greatly dependent upon the interactions with others (see figure 5).



Figure 5: Symbolic Interactionism relates the performance of self as related to a variety of environmental factors (e.g. [6]; [7])

An important aspect of symbolic interactionism hinges on the perception of self as mediated through its performance in various structures, where aspects of the self may be revealed selectively through performance of one’s identity as afforded by one’s environment, the reactions of others, and social structures surrounding the self. Symbolic interactionism has therefore greatly influenced human-computer interaction research by emphasizing the importance of social situations and structures of everyday life. As such, theories developed in sociology have helped inform principles of everyday objects and social structures used to shape virtual worlds that permit users to innately understand virtual contexts ([10]; [11]; [12]). Further, the study of everyday conversation rituals that provide social cues (such as eye gaze and gestures) have been used to design embodied agents and avatars for human interaction ([13]; [14]; [15]). Through the use of such approaches, a strong correlation has been formed between real-world behaviors and the design and implementation of virtual behaviors.

However, with virtual worlds, symbolic interactionism takes on new and expanded meanings as people represent themselves in novel ways through avatars unrelated to their real world selves. What expectations of social interactions are there between two people communicating as dragon avatars? The appearance of non-anthropomorphic avatars provides new affordances for behavior in virtual worlds. In so doing, they question and expand the use of familiar, everyday communication principles for interaction. The increasing use of non-anthropomorphic avatars obviates the question of whether or not avatars need be anthropomorphic in order for us to interact with them, leading us to ask whether or not newer interaction principles may

emerge for virtual species communication within virtual spaces. While we know there is an intelligent human agent behind each non-human avatar (which means the thinking and behaviors will of necessity retain human aspects), it remains to be seen if habitation of non-human avatars will shape thinking the way our normal bodies do in real life.

The connection between physical characteristics and anthropomorphic behavior has been long utilized by artificial intelligence practitioners who understand that computers and robots both seem more approachable when they act human, even if they do not look human ([16]; [17]). This development has led to a shifting definition of human characteristics based on displays of agency and intentionality rather than human appearance (e.g. [18]). Nowak and Biocca (2003) present two positions based on different presumptions about what an avatar should be: 1) *Human primacy*, which attributes human characteristics on the basis of human appearance and 2) *Automatic Social Responsiveness*, which attributes human characteristics based on the ability to act social regardless of appearance ([19], 483). In short, Nowak and Biocca’s distinction makes it clear that we attribute human characteristics based on varying degrees of anthropomorphism regardless of appearance, and suggests perhaps these characteristics may exhibit more plasticity (go beyond the human) as a result of social interactions in virtual worlds.

Researchers in Human-Computer Interaction (HCI) often use the principle of “presence” to explain various ways that humans recognize and relate to other human beings in virtual worlds (e.g. [19], [20]). In general, presence can be defined as the ability of people to experience the self in a virtual environment without feeling that the environment is a product of technological mediation. When a participant in a virtual world feels presence, the role of the computer in presenting the virtual world is no longer noticed, thus the experience is lived as direct and authentic. Three major types of presence are widely recognized: 1) Telepresence 2) Co-presence and 3) Social Presence. Telepresence is the ability to experience a feeling of “being there” in a remote virtual environment, for instance by experiencing feedback through moving one’s avatar in that environment. *Co-presence* is the ability to be seen as “being there” by others, and relates to the self as reflected in awareness of others and others in relation to the self, which is emphasized in symbolic interactionism ([6]). Lastly, *social presence* is the ability to experience interpersonal connections with others through a sharing of social information about the self in relation to others using various social cues such as head nods, gestures, and other forms of verbal and non-verbal communication ([22, 23]). In short, telepresence relates the representation of the self in an environment, co-presence relates awareness of the self and others in a shared environment, and social presence relates the performance of the self while communicating with others. The behavior of people in virtual worlds is thus greatly based on their ability to experience their own presence within a virtual world, and social awareness of others and the ability to exhibit coherent social behaviors.

Results from an experiment by Nowak and Biocca that compared avatars with anthropomorphic, less anthropomorphic and no anthropomorphic (no image) characteristics, indicated that participants felt increased telepresence when asked to

interact with anthropomorphic avatars, whereas interacting with no anthropomorphic (no image) avatars increased a feeling of co-presence and social presence in participants ([19]). In other words, instead of relating only to anthropomorphic avatars, participants experienced a higher degree of social presence and co-presence with no or non-anthropomorphic avatars, meaning they related more to avatars displaying less human-like depictions and perceived more social salience with them.² The researchers speculated that the anthropomorphic avatars “brought about higher expectations that were not met” and so reduced participants’ experience of social presence in interacting with these avatars ([19], 491). Therefore, while there is a degree of representation necessary to believe in an avatar, Nowak and Biocca’s work indicates it need not be visual in order to be socially coherent to others. The fact that people can relate to anthropomorphic *and* non-anthropomorphic qualities in avatars presents opportunities for investigating and designing new ways of interacting beyond principles from the stance of *human primacy* or *automatic social responsiveness*.

As Biocca and Nowak’s research indicates, the concepts of telepresence, co-presence and social presence are interesting frameworks in which to study the various ways non-anthropomorphic avatars may facilitate different kinds of presence. Non-anthropomorphic avatars can use varying degrees of anthropomorphic and non-anthropomorphic behavior to reveal different aspects of themselves or their character, and therefore it is important to look at how the degree of anthropomorphism affects these various forms of presence. For instance, how does the use of non-anthropomorphic non-verbal communication gestures (and what kinds) help establish social presence? How are such social gestures initiated? Do different species require different types of co-presence? What aspects of identity and self are revealed through forms of presence experienced by non-anthropomorphic avatars?

Traditional frameworks for studying virtual world interactions have been centered around the notion that in order for us to recognize something as human, it must appear human or act human; few, if any studies have been done on how non-anthropomorphic avatars may initiate different kinds of interactions. Yet, virtual worlds do not require us to look human or even act human. The use of non-anthropomorphic avatars therefore introduces an interesting question: If an object does not look like a human or act like one, how do we approach it? Is it acceptable to do so if we are not of that same “species” or must we be a part of that species’ *magic circle* with mutually agreed upon rules, mores and role-playing? Are mixed species interactions desirable and if so, how are such interactions negotiated within virtual worlds? No longer bound by ordinary modes of reality, or limited to human to human interaction, possibilities expand exponentially. So too, do the possible ramifications of what face and body we choose to take on in virtual worlds – what persona we present to the virtual world. In order to examine the relation of the self to such expanded embodiment, we will now turn to theories of identity and performance.

² This is also evident in the text-based virtual world, *Lambda Moo*, described earlier, where human characteristics were attributed to an avatar via textual description.

4. PERFORMANCE OF THE SELF

According to Stanford researchers Lakoff and Johnson, the way we interact, think or conceptualize the world is primarily metaphoric, defined by input from physical embodiment (our sensorimotor system) and structured by internalized embodied concepts that inculcate our thinking and language [24]. A common example of this is our ability to transport ourselves through our bipedal motor actions, which has not only introduced commonly shared spatio-temporal relations, but has also promoted spatial and temporal metaphors in our speech and thinking that are based on our bipedal awareness of space and time. For example, to progress in an activity (such as writing a paper) is to take the next step. Failure to progress is described as falling down, or stopping short. The use of ingrained embodiment metaphors as central to our thinking and language raises the question of whether or not non-anthropomorphic avatars introduce new metaphors that can guide human thought and action in new ways. In virtual worlds, when we perform non-anthropomorphic avatars, the form of that embodiment influences our interactions to the point where the metaphors we inculcate may be greatly expanded.

Indeed, there may be a “Proteus effect” where people rise to the imagined and expected behaviors of their avatar. Nick Yee and Jeremy Bailensen have conducted several experiments to test this behavioral effect between people and their avatars. ([25], 274; [26]). They found that the representation of the self through an avatar not only affects behavior but actually may have continued effects on behavior in the real world. According to Yee, we do not simply choose our representation for the virtual world; far from being a one-way process, our avatars may actually come to change who we are. This implies that a sense of confidence experienced in the online world via a positive avatar may continue even when we are no longer inhabiting that avatar. In this sense, the representation of our avataric self in virtual worlds not only has important consequences for the way we behave in those environments, but also for our everyday lives. While Yee and Bailensen’s research focused on human attributes, such as facial attractiveness and increased height, their work did not cover effects that persistent performance of a non-human persona in a virtual world might generate.

Other researchers have also argued that computers let us reconstruct and discover new elements of the self as we perform our identity through self-exploration and role-playing ([27]; [28]). Concordantly, some maintain that performance may help express aspects of one’s identity that were blocked or relegated to the realm of fantasy, and so express these aspects in a socially acceptable manner or appropriate context ([29]). Sociologist Gary Alan Fine writes extensively on performance during role-playing in fantasy games. He notes that in fantasy games, people become characters in a scene that has its own affordances, rules, regulations and social mores. As people perform their character within the context of such scenes, they tend to stay “in character” and speak and act in a way consistent with this adopted persona [30]. In playing a character, Fine argues, people thus also adopt mental frames that are different from everyday reality. Hence, the “game space” of fantasy games separates players from everyday reality and allows them to fully adopt a new persona as they mentally “dress up” ([4]). In real life this putting on of other faces and bodies has been safely

relegated to the realm of fantasy games, costume parties, Renaissance fairs, Halloween, Carnival, and other institutionalized (and therefore safely accepted) events and activities. Yet, in virtual worlds, these performances do not only occur at proscribed times, but persist and are performed in a continuous manner. This begs the question of whether such persistent alternate embodiments might enact persistent changes in the way we see and experience the Self. In virtual worlds such as Second Life people using non-anthropomorphic avatars are able to keep performing their character while existing in a persistent social world, and therefore can expect some measure of stability and ongoing evolution of their character in that world.

5. BEHAVIOR AND SOCIAL CONTRACTS

In *I, Avatar*, Mark Stephens Meadows relates the story of the Second Life interspecies Gorean-Fur wars [31]. Gorean and Furies, are, to use a term from evolutionary theory, a part of sympatric speciation – they have emerged from the same environment (Second Life), but have quickly developed into two separate groups with differing politics, ideologies and social structures despite both being engaged in roleplaying activities. The Goreans are a role-playing humanoid community with strongly delimited, hierarchical society. Furies are more animalistic (non-anthropomorphic) looking and engage freely in a more liberal, open organization (see figure 6).



Figure 6: Furry enclave in *Second Life*

Both societies engage in role-playing with different social expectations based on their mutually agreed upon rules. For instance, before entering Gorean territory, a contract has to be accepted that the avatar acknowledges the rules for social interaction within Gorean space: “The agreements were there for the members of the group to recognize the kind of behavior that was allowed and what ideas, words, actions, and interactions were, and were not, part of their emerging culture.” ([28], 44). The use of such agreements shows the direct link between symbolic practices of such avatars and their social contract. In this sense, to be accepted, to enter into the magic circle, one’s avatar agrees to follow a particular set of social rules for interaction. Being such an avatar is not without consequence; the use of that form engenders strong social responsibilities.

This awareness of social rules and mores exist on many levels. Meadows describes how the animosity between the Goreans and

Furies was manifest even in the types of warfare practices they undertook. Whereas Goreans, knowing their enemies’ predilection for open interaction, planted themselves in Furry communities, posed as Furies and spread rumors that would fracture the tight-knit Furry community. Furies retaliated by offering for sale in the *Second Life* marketplaces items much-sought after by Goreans. When these items were purchased and used however, they devoured so much bandwidth that it slowed down the Goreans’ connection to the *Second Life* server, making their experience less than pleasant. In this, the Goreans chose psychological role-playing; whereas Furies were playing the technology, as both chose different actions based on their social contract and community identity. Such fierce battles can not simply be attributed to merely putting on a different avatar, as attested by the different strategies of each species. According to Meadows, “An avatar is an identity container, one with boundaries. When those boundaries are challenged, battles break out at the border.” ([31], 43). Choosing an avatar, therefore is no innocent act, as it engenders choosing a virtual identity that comes with specific social values, strategies and interactions with others.

Various avenues for study can be deduced from this example (see figure 7). For instance, what types of interactions exist within each species, and between species? What may be learned from intra-species interactions? What types of emerging behaviors can be gathered within the various species of non-anthropomorphic avatar, and how are these behaviors modified by interactions with other anthropomorphic/non-anthropomorphic species? How would (players performing as) black bear avatars interact with (players performing as) feral wolf avatars? Would they stay true to their actions of their real world counterparts, or form their own unique interactions? How would those avatars performing creatures with no real world counterparts negotiate their social interactions, both internal and external?

Persistent Performance of Character
Introduces Emerging Forms of:

- Social Mores
- Behaviors & Etiquettes
- Avatar Appearance
- Verbal & non-verbal communication

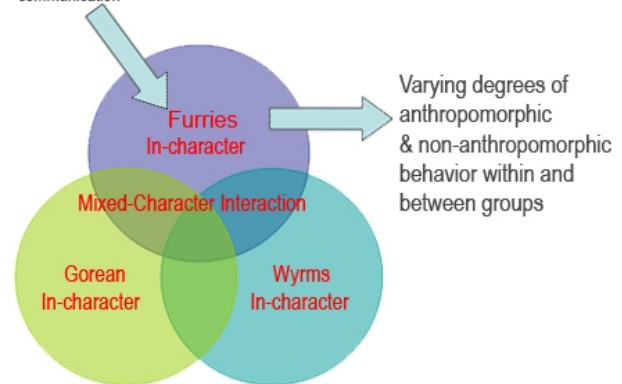


Figure 7: Non-anthropomorphic and Anthropomorphic Groups in *Second Life* invite persistent role-playing and so develop newer forms for dynamic social interaction of varying anthropomorphism

Role-played non-anthropomorphic characters, which represent novel ways of inhabiting and representing identity, also create opportunities for interaction that may not be grounded in real-world interaction. For non-anthropomorphic characters, staying “in character” may mean not speaking or engaging with others who are unlike their own species. For instance, a character may decide to act like a butterfly, and not speak to other humans, but fly around them. Alternately, parts of their character may adopt more anthropomorphic features and engage in chat exchange in character with another species, but answering in the voice of that character and require an adaptation of logic be made on behalf of the other person interacting and realize that they are “in character”.

In addition, to add to the complexity of this new realm of social interaction, in *Second Life* multiple hybrid identities may also be involved. One person may collect and inhabit many forms of avatars, which they put on (as one does a costume) to suit a particular need or social context. Such identities can therefore be fluid and chimerical. Yet, it seems that many in the virtual realm have no problem maintaining a consistent identity for each of these personas. As is shown in the example of the Goreans and Furies, avatar embodiment becomes a choice of what rules of interaction, ideology, politics and identity one chooses for the moment.³

Even though avatars originally represented a god in the flesh, today they represent an evolution of a persona that goes beyond the human. As a rebuttal of intelligent design, *Second Life* founding member Corey Linden created a chimerical “Flying Spaghetti Monster” to satirize those believing evolution does not take place in virtual worlds. In doing so, he illustrated the importance of avatar plasticity and a move away from anthropomorphism, as there simply is no need to only design avatars reflecting our (human) image: people with their boundless creativity will envision and inhabit continually evolving forms of avatic representation.

6. CONCLUSION

Avatars represent us, but in representing us, they open up a Pandora’s box of greater dimensions that go far beyond the human shape we have inhabited for most of our existence. Choosing a specific avatar in *Second Life* also means observing particular forms of etiquette, playing specific roles, and engaging in various forms of verbal and non-verbal communication.

Media artist Peggy Weil from USC uses the term “veritar” to define an avatar that mirrors its human counterpart. While the etymology of the word avatar indicates they embody the user in virtual flesh, avatars in virtual worlds are malleable representations that can be anthropomorphic or non-anthropomorphic. The avatars we create need not necessarily be representative of their human counterpart or behave in human ways, or even manifest real world social behaviors to be a part of virtual worlds. While traces of us necessarily exist in our avatar, our avatars need not be veritars.

In a virtual world such as *Second Life*, it is clear that avatars are no mere shells - they represent important choices of inhabiting

³ It is not uncommon to find people switching identities and social coherencies by moving from group to group.

different social mores, etiquettes, politics and ideologies which are fiercely guarded. Human avatars will always present challenges and opportunities for ongoing research, but with emerging behaviors, etiquettes and social mores, non-anthropomorphic avatars provide further intriguing and interesting areas of study, that have yet to be examined. Human to human avatars, human to non-anthropomorphic avatars, and virtual interspecies avatar behaviors each generate questions and possibilities for new forms of communication and interaction and their effect on the humans who engage in them.

For this reason, we propose further work be done on the emerging hybrid identities that emerge from non-anthropomorphic avatars. A variety of questions await us within this domain: What principles of interaction can be gathered from non-anthropomorphic objects acting as subjects and vice versa? Are interactions between non-anthropomorphic avatars and humanoid avatars different (i.e. do the former stay in character, or simply act as a human in surface level costume?) than between humanoid avatars? How much verbal and non-verbal communication takes place between and within each species? What are the effects of shifting levels of anthropomorphism? What kinds of social behavior can be inferred from emerging in-group behavior? What different kinds of social presence are developed? And viewing these questions in a larger context: how does such role-playing affect us in the real world? None of the above questions are easy to answer, but it is clear more work needs to be done studying interactions that go beyond the notion that avatars represent only our real world human shape or behavior.

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