

The [Object, Me, Symbiote, Other] in the Machine: Insights from Video Game Psychology for Teleoperator-Robot Relations

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Abstract

Avatars serve as embodied representations of user agency in physical, digital, and mixed realities, extending our physical, cognitive, and perceptual abilities into those spaces. From this perspective, there is a tendency to presume that as users assume control of an avatar, they necessarily psychologically merge with and identify as that entity. Borrowing from video game psychology research into player-avatar relations (PAR) and player-avatar interactions (PAX), we present an argument for considering a broader range of sociality regarding user relations with avatar robots: Seeing avatar robots as Object, Me, Symbiote, and authentically social Others. We extrapolate from PAX measurements to tentatively offer a scale for teleoperator/robot-avatar interaction (TARX) and discuss implications of this extrapolation for more comprehensively understanding a future in which avatar robots are more common.

Keywords: Sociality, identification, avatar robots, human-computer interaction, scale development

1. Introduction

Avatar robots are commonly framed in terms of teleoperation (Minsky, 1980)—their ability to extend user agency into physically or digitally distal spaces. A key feature of avatar robots is their human-extensive deployment in which users are the primary agents of input and control (a so-called “avatarization;” Topan et al., 2010), rather than the machine functioning in whole or part on its own (e.g., Barua et al., 2020; Khatib et al., 2016; Krueger et al., 2020; Park et al., 2018). In this way, avatar robots are conceptually and operationally similar to the avatars that inhabit immersive digital worlds. For example, in video games, avatars serve as digital representations that extend the user’s presence and agency into the gameworld to “influence the form and flow of on-screen content” (Banks et al., 2019).

Regardless of the ephemerality or concreteness of the world being engaged, avatars function as *literal* mediators between users and the worlds unfolding, allowing users to interact with the form and content of those worlds (Steuer, 1992). As such, it can be easy to presume that users’ relationships with their avatars (robot or otherwise) are best considered in terms of degrees of identification—that users see themselves as distinct from (i.e., low identification) or embodied by (high identification) the avatar (e.g., in video games; Downs et al., 2019), in virtual reality (Westerman & Skalski, 2009). Although certainly avatars *can* serve as representations of their users (as shown in Figure 1), this need not be the only user-avatar relationship.

Using video game players and their avatars as exemplars, we first summarize extant scholarship that details (a) a typology of player-avatar relationships (PAR) that anchors our heuristic relations with avatars on a sociality vector (i.e., the degree to which relations formed represent a breaking-down of interpersonal independence; Mason & Shan, 2017) and (b) a model for considering discrete qualities of the player-avatar interaction (PAX), where the latter demonstrates psychological properties that help qualify distinctions the former. We then propose that these PAR and PAX models are a useful framework for the consideration of avatar robots—providing critical insights into the wider ranges of sociality with which operations may engage them—and propose an adjusted scale for teleoperator/robot-avatar interaction (TARX) that may productively be taken up in future research.

2. Sociality and Videogame Avatars

From a media psychology perspective, user relationships with on-screen characters have been traditionally understood through theories of parasocial relationships (PSRs, see Dibble et al., 2016). In this work, PSRs are understood as *faux* relationships that resemble the sort of interpersonal connections we would form with close personal others (such as friends and family). They are *faux* insofar as they are

between users and avatars in digital worlds. In her interviews with *World of Warcraft* players, she found evidence of four distinct types of player-avatar relationships (PARs):

- Avatar as Object relationships are those in which users see their avatars as mere tools for achieving personal gameplay goals.
- Avatar as Me relationships see users identifying with their avatars, seeing them as extensions of identity and agency.
- Avatar as Symbiote relationships feature a blending of or alternating between primacy of player and avatar identities such that the two mutually influence each other.
- Avatar as Other are relationships in which players see avatars as separate and authentic social agents with their own motivations, perspectives, and trajectories.

The PAR typology integrates prior perspectives on the monadic merging of user and avatar—these would be represented in the move from Avatar as Object (separated) to Avatar as Me (integrated). However, Banks (2015) extended beyond this prior work by accounting for the potentially dyadic nature of player and avatar relationships, much in the same way that earlier work on PSR accounted for the perceived sociality between users and on-screen characters. PAR re-centers the vector for user-avatar relationships on sociality (rather than identification), ranging from Object relationships representing an asocial relationship to Other relationships representing a fully social relationship (Figure 1).

The PAR typology serves as a useful heuristic for developers, researchers, and users alike to quickly classify the player-avatar relationship into discrete social categories. For example, PAR categories subsumed several other metaphors common in avatar research (Banks & Bowman, 2015), with *toy*, *tool*, and *puppet* clustering together (representative of Object relations) and *identity*, *mirror*, and *extension* clustering together (representative of Me relations). In turn, *person* and *partner* clustered together (representative of Other relations). PAR categories were representative of distinct motivations for gameplay as well, with finding Object relations were mostly concerned with challenge and competition, Me relations saw players concerned with social and ritual play, while in Symbiote relations players used avatars to engage in coping and social identity work, while Other relations were motivated by narrative transportation and escapism (Banks, 2015).

In follow-up work, Banks and Bowman (2016b) further explored these categories to better understand distinct characteristics of these relationships as perceived by players. Their approach was to consider

existing models focused on psychological merging (such as the character attachment model; Lewis et al., 2008) and test their compatibility with models focused on sociality and differentiation (Banks, 2015). In that latter work, aspects of sociality were captured with concepts assessing players' emotional investment (i.e., "I would be heartbroken if I lost this avatar." and perceptions of anthropomorphic autonomy (i.e., "This avatar has its own thoughts and ideas."). Using exploratory and confirmatory factor analysis techniques, Banks and Bowman (2016b) found evidence of a four-factor model of player-avatar interactions that retained elements of both social and parasocial perspectives suggesting that these relations do indeed span a spectrum of sociality. Later research replicated the factor structures in Chinese-, English-, and German-speaking samples (Banks et al., 2019), speaking to the replicability and generalizability of the four dimensions:

- Relational closeness is one's emotional attachment to and interdependence with the avatar.
- Anthropomorphic autonomy is the perception that the avatar has a human-like agency separate from the player.
- Critical concern refers to caring for the avatar's consistent and coherent situatedness in its diegetic or narrative world.
- Sense of control is the feeling of functional governance over the avatar and its actions.

These four PAX dimensions have theoretically and meaningfully relevant relationships with respective PAR categories (Figure 1). For example, in Object relations, player assessments of relational closeness, anthropomorphic autonomy, and critical concern are lowest, whereas the players' senses of control over the avatar are highest. In the context of video games, Object relations see avatars as utilitarian vehicles for gameplay (Banks & Bowman, 2021). For Me and Symbiote relations—representing a complete or partial merging of player and avatar identities and agency—scores on all four PAX dimensions are overall moderate and likely adjust depending on the specific context. Follow-up work (Bowman et al., 2021) likewise found that Me and Symbiote relations tended to have the highest scores on various metrics of identification, such as perceptions of embodiment (Van Looy et al., 2012), value homophily (Eyal & Rubin, 2003), and physical similarity (Trepte et al., 2009). Most relevant to discussions of authentic sociality is the Other relation, which represented the *highest* levels of the social factors of relational closeness, anthropomorphic autonomy, and critical concern, along with the *lowest* sense of control. In Other relations, players discuss avatars as having their

own backstory (Banks & Bowman, 2019) and tend to use anthropomorphizing third-person pronouns (“she,” “her,” “him”) and references to social processes and family (Banks & Bowman, 2016a).

3. Extending PAR/PAX to Avatar Robots

To date, the majority of PAR and PAX scholarship has focused on digital avatars in video games. Extensions of the model to playful contexts such as the analog game *Dungeons & Dragons* found that players’ orientations toward avatars can be strongest when people represent the characters through multiple modalities—digital, physical, or textual formats (Banks et al., 2018)—suggesting that the models are extendable to physically embodied agents. One implication is that PAR and PAX considerations are less about the materiality or ephemerality of the character, and more about the player-user’s perception of and engagement with the avatar’s role and function within the relational context.

Broadly speaking, avatar robots are teleoperated much in the same way as are video game avatars—interfaces vary in their modes of embodiment (see Biocca, 1997) but there is nonetheless a *de facto* distance between the teleoperator and the avatar. Thus, on a basic level, the four PAR typologies (and their requisite PAX dimensions) should be equally applicable to avatar robots.

Likely few would argue against the applicability and utility of the Object relation as it likely represents a dominant perspective for the development of avatar robots in the first place—the robot is a tool to be used to extend the agency of the user. For example, early work (Minsky, 1980) discussed the potential of avatar robots to be placed in environments injurious to humans, and later development has focused on the ability for avatar robots to serve specific tasks. From combing the ocean floor (Khatib et al., 2016) to using avatar robots in customer service roles (Baba et al., 2021), avatar robots can serve as asocial objects or tools for a variety of specific functions and contexts.

That said, to the extent that humans are operating avatar robots, we cannot rule out the potential for human operators to both *implicitly* and *explicitly* engage those avatar robots as increasingly and variably social. When designing avatar robots for chronically ill children, Børsting and Culén (2019) explained the importance of the robots serving both a functional role (facilitating learning) and a social role (helping children avoid the deleterious effects of social isolation). Although the former task could be achieved with a basic Object orientation, the latter would require a deeper consideration of the extent to which the children-as-teleoperators are able to feel as though

they are being represented and included in the spaces—that their avatar robots are to some extent “Me” in the sociocultural environment of the classroom and beyond (also see Culén et al., 2019).

In a case study of a patient with social anxiety disorder and autism diagnosis normally apprehensive to speak in front of others, they were willing to speak to others through an avatar robot (Yoshida et al., 2022). As others interacted with and responded positively to the patient *vis-à-vis* the avatar robot, there was an observed decrease in social anxiety in the patient. Such an effect could be indicative of a Proteus effect (Yee et al., 2009) observed with digital avatars, by which using an avatar robot can influence how teleoperators see themselves during and after the interaction.

In a similar vein, research has found that when avatar robots are designed to incorporate the non-verbal cues of their teleoperators (e.g., gestures, facial expressions), humans can make accurate personality judgments about that teleoperator (Bremner et al., 2017; Bremner & Leonards, 2016). In similar work, teleoperators expressed feelings of guilt and shame when their avatar robots used offensive language during interactions with others, even when that language was added by a third part (i.e., not used by the teleoperator; Aymerich-Franch et al., 2020). It was not clear if guilt and shame were byproducts of the teleoperators feeling a sense of “ownership” for the avatar robot, but future research could consider how variable sociality may explain these findings. For example, agency-extensive Me orientations would most likely lead to intense negative feelings if teleoperators felt as if they themselves were being represented in those negative conversations. Likewise, Object or Other relations might see diminished negative affect as one can psychologically distance themselves from the robot as a “malfunctioning tool” (the former) or “inappropriate partner” (the latter). Alternately, as Symbiote orientations might suggest, it could also be experienced as an alternation between Me and Other as they could feel ownership over the body and actions but not over the offensive expression.

In line with the known import of customizability in fostering connections between players and avatars (e.g., Takano & Taka, 2022), scholars have explored the extent to which users would desire avatar robots customized to represent the teleoperator (Häkkinen et al., 2022). Albeit based on a small sample of individuals with some human-computer interaction background, there were indications that customization supports a Me relation—some users mentioned desires to use avatar robots in social contexts, especially if they could adequately represent the teleoperator’s

Table 1. Proposed items for a Teleoperator-Avatar Robot Interaction Scale.

TARX Dimension	Proposed Scale Item
Relational Closeness	I feel very close to this machine.
	I am emotionally invested in this machine.
	I have a meaningful connection with this machine.
	This machine and I have a close relationship.
Anthropomorphic Autonomy	This machine has its own thoughts and ideas.
	This machine has its own feelings.
	This machine is autonomous and acts on its own.
	This machine has its own sense of right and wrong.
Critical Concern	I pay attention to errors or contradictions in this machine’s environment.
	It is important to check for inconsistencies in this machine’s environment.
	I concentrate on inconsistencies in the machine’s environment.
Sense of Control	This machine responds to my inputs as I expect.
	My commands have a visible impact on this machine’s actions.
	I affect this machine directly.
	I am in charge of what this machine does.

emotions during an encounter. That said, others expressed concern about the avatar robots not being *too similar* to their teleoperators. For example, some participants wanted simplified portrayals (i.e., “like a caricature”) over high-fidelity ones. Especially compelling related to Other orientations were discussions of dressing the avatar robot in ways that may increase humanlikeness (i.e., having the avatar robot “wear jeans and a wig, and a white t-shirt”). Even in a small and informed sample of users in that study, the possibility for a wide range of teleoperator-avatar robot sociality approaches is evident.

Despite these described parallels, it is possible that robots’ larger-scale, material embodiments could shift whether and how each PAX dimension is applicable as we propose. For instance, avatar-robot operators must be concerned with their controlled machines bumping into people or objects, whereas avatars often can pass through them. This possibility—along with potential influences of other material characteristics like limited power, teleoperation range, dependence on certain infrastructures—is well-suited for empirical investigation.

3.1. Assessing teleoperator-avatar robot interactions (TARX)

Application of the PAR categories to explain avatar robots is fairly straightforward, as the relationship categories themselves—Avatar as Object, Me, Symbiote, and Other—maintain their heuristic and semantic meaning. However, the PAX dimensions and interaction operationalizations require some theoretical and empirical refinement before application to avatar robots. In Table 1, based on the literature reviewed above, we tentatively propose an extrapolation from the PAX metric: A Teleoperator-

Avatar Robot Interaction (TARX) scale. Importantly, we make no claim to originality of this scale, as we present it here largely intact, extrapolating from prior PAX scholarship (Banks & Bowman, 2016b; Banks et al., 2019) based on its argued logic as a useful framework and tool. Moreover, the proposed scale here would require empirical validation.

This TARX model has theoretical and empirical support that could be extended to avatar robots with some nuance. First, we recommend shifting the referent from “avatar” (PAX scale) to “machine” for generic use of TARX, rather than the seemingly obvious choice of “avatar” or “robot.” The use of “avatar” may be too far removed from the robotic nature of the use experience, and use of “robot” may artificially promote Other-relation responses given non-experts understandings of robots as autonomous task-performers (Banks, 2020). Second, we highlight the tentativeness of our proposal since the conceptual extrapolations may or may not manifest in humans’ lived experiences of avatar robot relations, and they may or may not comprehensively represent important dimensions of this specific kind of human-technology relation. The suggested metric requires validation for the proposed use case. Nonetheless, we argue that past scholarship points to the likely construct validity of the scale. Conversely, the use of “avatar” or “machine” and how this might influence teleoperator perceptions of an avatar robot is a worthy empirical question in its own right. Yet another approach could be to use the specific name of an avatar robot as the referent item in the scale—either the name assigned to the avatar robot by the manufacturer (e.g., NAO) or the name or label assigned to the avatar robot by the teleoperator themselves.

Regarding relational closeness, we again consider the extent to which teleoperators feel affective connections with the avatar robot, toward a sense of

partnership and kinship. Importantly here is that relational closeness is *not* understood as psychological merging; rather, it is predicated on the formation of authentic empathy for a distinct social other (Banks, 2015; see also Bowen, 1978). Recall that relational closeness is correlated with increased sociality and thus is highest among Avatar as Other relations. Thus, feelings of closeness, emotional investment, and being meaningfully connected typify a dyadic relationship between teleoperator and avatar robot.

In a similar way, anthropomorphic autonomy can be understood as representing a teleoperator's shift from asocial to fully social relations with their avatar robot. While it makes sense that Me relations would need to engage an avatar robot as somewhat human (i.e., to map onto the lived experience of the teleoperator themselves; Lee et al., 2008), higher scores signal the user sees the avatar as increasingly human-like in terms of independent agency. It is possible that an avatar robot's agency may indeed need to be human-like in some sense that is recognizable to humans (e.g., seemingly autonomous thoughts, feelings, behaviors) if it is to be recognized by humans as authentically social. However, that is an extrapolation that (as with other dimensions) would require empirical examination. Research into the perceived moral patiency of robots—the extent to which robots are deserving of moral considerations from humans (Banks, 2021)—already demonstrates that humans can easily see social robots as legitimate Others, although those robots are designed and presented as social companions (i.e., as already distinct from the teleoperator). However, other research indicates that the actual format of the human-robot relation matters less than how the human interlocutor *perceives* that relation (Banks et al., 2021). These operations and perceptions will become increasingly important to understand as debates intensify around the extent to which robots should have the same rights as humans—as authentic persons (Gunkel, 2018; Gunkel & Wales, 2021). Importantly, this dimension is distinct from identification in that it is not capturing the way an avatar robot is “like me” but the extent to which it is perceived as “like a human” with respect to independent existence.

Critical concern is a dimension that needs unpacking, as it was borne from the “suspension of disbelief” that gamers often engage in when entering fictional digital worlds—a willing dismissal of the knowledge that a thing or idea is unreal (Coleridge, 1817) so that one may gain some value from that non-reality (such as entertainment, by accepting actions in that environment as interesting and meaningful). Prior PAX research (Banks & Bowman, 2016b; Banks et al., 2019) explains critical concern as the attention to and

accounting for the believably and cohesion of the avatar's positionality in the narrative world such that they actively look for confirmation of that cohesion; confirming that cohesion can enhance the perceived realism of the experience (see Busselle & Vierrether, 2022). Although the origin of the suspension of disbelief concept relates to fictional worlds, most avatar robot interactions unfold in actual reality. This leaves open the question of whether and how the dimension may manifest in teleoperators' engagement with avatar robots. For instance, perceived situational coherence may depend on the extent to which the user sees both the robot and its context as “really real”—or at least that the robot and context are matched in their perceived realness. Part and parcel of this dimension is the fact that *context matters* such that teleoperators may be concerned that their controlled, self-extensive machines are fitting in to the spatial, social, and functional operations of deployment contexts.

Sense of control is perhaps the most straightforward dimension of TARX applicable to avatar robots insofar as the technologies are commonly developed with the end goal of extending teleoperator agency into other spaces and places, stemming back to the earliest engagement of the notion of teleoperation (Minsky, 1980) to various contemporary applications of avatar robots (Barua et al., 2020; Khatib et al., 2016; Krueger et al., 2020; Park et al., 2018). Yet what is interesting from the TARX perspective is that an over-focus on sense of control could engender Object relations rather than Me relations toward an avatar robot, which could diminish desired sociality in these spaces, or perhaps even diminish one's sense of ownership or responsibility for robot-enacted events. In other words, focusing on control without carefully considering other TARX dimensions could result in unwanted asocial orientations towards an avatar robot: Users casting themselves strictly as teleoperators as “puppet-masters” rather than extending themselves into other social spaces. Again, an analogous line of reasoning can be pulled from video game research, in which video games with increased cognitive demands can pull the player's attention away from emotional engagement with characters and narratives (Bowman, 2021), diminishing the actual robot-mediated outcomes in physical environments.

3.2. Social interactions between avatar robots

Finally, the emergence of avatar robots carries with it the eventuality that these machines will encounter other avatar robots and these avatar robots will mediate human interpersonal interactions. We can again extrapolate insights from a relational matrix

model of player-avatar relations (Figure 2; Banks & Carr, 2019). This evidence-based model outlines how seemingly dyadic avatar-mediated interactions actually comprise *four* phenomenologically distinct actors (two users, two avatars). This quartet is operationally and subjectively important to how human-machine relations could influence interactions between human operators. For example, in video games a common complaint and source of frustration is the phenomenon of trolling, whereby some players actively seek out ways to disrupt others' gameplay experiences (Cook, 2019). Trolls will often justify their actions as “just playing” with others, seeing their avatars merely as Objects to enact their own agency within the video game, with a distinct lack of relational closeness with or critical concern for the avatar or its environment (see Paul et al., 2015). Moreover, the target of the trolling is not necessarily the player (or even the avatar). Likewise, we cannot assume that in any given interaction between two avatar robots, the teleoperators behind those avatar robots have a synchronized relationship with their respective avatar robots—or that they see the encountered robot's operator as relevant at all.

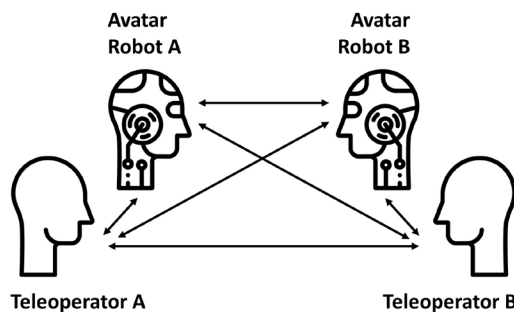


Figure 2. Possible relationships between two teleoperators and their avatar robots.

4. Conclusion

Extrapolations from video game psychology offer a data-driven framework that holds promise for understanding both the heuristic (a)social relationships that people can have with avatar robots as well as the specific mechanisms by which they may manifest those orientations. By shifting away from identification as a necessary ideal and recentering the spectrum of possible relations—and the values ascribed to those relations—around sociality, we may more comprehensively explore the possible range of relations between users and avatar robot, as well as the productive and problematic effects of those relations. This recentering is critical, lest we reduce these relations to mere puppetry.

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12. References

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