Article

A cultural approach to algorithmic bias in games

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Abstract
As algorithms come to govern every aspect of our lives—from bank loans, to job applications, to traffic patterns, to our media consumption patterns—communication research has become increasingly concerned with how we govern algorithms. Building on the methodological frameworks established by critical information researchers like Safiya Noble, Tarleton Gillespie, and Nick Seaver, this essay argues that we do not need to reverse engineer the "black box" to understand its impacts because they can be found through qualitative methodologies instead. This essay rejects the "black box" as an epistemic premise upon which critical algorithmic literacies can be built by using discourse analysis to observe how the unknowable language of the algorithm is deployed discursively within gamer communities to establish and maintain patriarchal power. This essay shows how the "black box" is used by fan communities to advance a patriarchal understanding of what we term paradigms of "balance" and "realism" in game design.

Keywords
Algorithms, culture, discourse analysis, game studies, *Overwatch*

Introduction

As algorithms come to govern every aspect of our lives—from bank loans, to job applications, to traffic patterns, to our media consumption patterns—communication research has become increasingly concerned with how we govern algorithms. Peeking inside the "black box" in order to understand how algorithms work has been a core trajectory in communication and informatics. It is the umbrella topic that the National Science Foundation's "Robust Intelligence" (NSF 18-570) program is primarily concerned with.

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Building on the methodological frameworks established by critical information research-ers like Safiya Noble, Tarleton Gillespie, and Nick Seaver, this essay argues that we do not need to reverse engineer the "black box" to understand its impacts because they can be found through qualitative methodologies instead. Moreover, we have found that reverse engineering the "black box" of game algorithms is already common practice in many player communities and that this practice in particular serves mainly to reproduce a misogynist and biologically essentialist worldview. This essay rejects the "black box" as an epistemic premise upon which critical algorithmic literacies can be built and shows how the unknowable language of the algorithm is deployed discursively within gamer communities to establish and maintain patriarchal power.

A feminist methodology for understanding algorithmic bias must begin with the mate-rial practices of people navigating the occulted realm of the algorithm.[1] In order to hack the "black box," we examine the *Ovewatch* player community where reverse engineering has become an everyday practice. By looking at the techniques that avid players use to understand the statistical capacities of characters in *Overwatch*, we aim to articulate not only how they peek inside the "black box," but also what the cultural significance of this practice is. Building from an anthropological understanding of algorithms as culture, algorithms are revealed to be complicit in the meritocratic ideals of game culture.

We are interested in discussions that compare the narrative content Blizzard has released about characters in *Overwatch* to the invisible algorithmic aspects of character physics. Specifically, how far can one character jump, how much pain can they with-stand, or even how highly pitched their voice is. By foregrounding the way that com-munities of players work to understand algorithms, this article shows how players become increasingly entangled within the very computational logics they seek to con-trol. These logics may seem understated in the context of *Overwatch*, a video game, but they cascade outward to hail a greater set of social implications. By understanding how players work within and work to control the algorithms that structure play in *Overwatch*, we gain insight about how the algorithms deployed by social media networks, banks, governments, and our broader social infrastructures can be navigated, understood, resisted, or used by individuals navigating these structures. This article seeks, in other words, to show how work in game studies on gamer culture is relevant to the broader conversations being had around the use of information communication technologies in today's cultural milieu.

We choose *Overwatch* as a site of analysis due to the popularity and abundance of algorithmic reverse engineering, or theorycrafting, in its forums. We feel that *Overwatch's* genre[2] helps to show the lengths that players will go to in order to understand the game as a quantifiable and algorithmic space. These conversations highlight an interest in game "balance" and "realism," and show players referencing the black box of the algo-rithm in order to gain a form of social capital for their knowledge of this opaque space. Furthermore, we feel that *Overwatch*, as a game, helps to inform the larger conversation around algorithms being had presently in communication. Not only does game studies have a rich literature that has already dug deep into the importance of algorithms in eve-ryday life,[3] but we feel that Chris Paul's (2011) work on theorycrafting in particular helps to show how algorithms replicate the meritocratic ideology of global capital in the 21st century.

Communication, algorithms, and audiences

In concluding their introduction to a recent special section of an issue of *International Journal of Communication* dedicated to computational propaganda, editors Samuel Woolley and Philip Howard devote a good deal of their introduction to the role algorithms play as agents of communication. They explain that because algorithms are deeply embedded within our communication infrastructure, communication research ought to take seriously their agency to make decisions and affect social, political, and cultural dynamics (Woolley and Howard, 2016: 4887). Their argument is supported by several other essays on similar topics contained in the special issue. For instance, Sandvig et al. (2016) discuss how algorithms like HPs photodetection algorithm could not identify Black folks as people (pp. 4974–4975) and Murthy et al. (2016) discuss the agency of bots in political campaigns (p. 4954) (an issue that has only become more relevant since its publication in the seemingly naïve political climate of 2016). In short, Woolley and Howard deliver a strong justification for how imperative it is for communication researchers to turn their attention to algorithms and recognize that they are often acting with as much agency as human participants in communication networks.

The imperative to take algorithms seriously should resonate strongly with communication researchers. Our aim in this essay is to compel a counter-perspective drawn from approaches in anthropology and examples from game studies that situate algorithms in a different light. As we will describe later in this essay, Nick Seaver (2017) suggests that algorithms themselves may take on characteristics reminiscent of human agency only because we provide them with a social and cultural platform to take action. What's more, this action is predicated upon an understanding of algorithms as a phenomenon that is primarily technical. We aim to flip the script and question the ways that agency is imagined and distorted by the people working closely with algorithms and interpreting them.

In this way, we are emphasizing the *code* that Stuart Hall (2003) foregrounded in his prescient "Encoding/Decoding" to consider how the dynamics of reception analysis might help us to reconsider the animus that we observe algorithms being given by game players. By attributing agency to algorithms, we are socially participating in a ritual where we are neglecting our own agency in interpreting and making meaning of them. The very agency we neglect in ourselves by attributing it to algorithms is the precise ritual that permits them to reinforce the social order. It is the delusion that allows modern Western society to behave as if it is, in part, governed by machines.

Algorithms, like any other form of technology, are a collection of human social behaviors and meanings. While algorithms are described as the penultimate form of applied rationality and logic, what is crucial to the success of algorithms is what Seaver (2018) describes as "human sensitivity" (p. 378). Contemporary algorithmic systems are built of little moments of human communication and response. In other words, algorithms communicate and apply the sense-making processes of their human creators. "There is no such thing as an algorithmic decision; there are only ways of seeing decisions as algorithmic" (Seaver, 2018: 378).

Research on critical algorithms

The goal of this section is to compare research on procedurality in game studies to research on algorithms in critical cultural studies. Research on algorithms has long been a part of game studies research, but it has been often listed under the umbrella term *procedurality*. Surprisingly, this discourse around games and procedurality rarely engages with or is engaged by research on the burgeoning research algorithms and culture being performed by scholars of Science and Technology Studies, Critical Information Studies, and Critical Communication Studies. We aim to set these discourses around games, algorithms, and culture into dialogue with one another so that we can show how the representational characteristics of game algorithms impact the subject positions embraced by game players.

At their heart, all discussions on the culture of algorithms tell the same story. We learn of how a set of invisible and ubiquitous processes kept secret by non-disclosure agreements (NDAs) have come to organize our social structure and cultural practices. Algorithms are allegories of 21st-century culture.[4] For this reason, contemporary scholarship on algorithms has been focused on the toxic and sensational algorithms that are embedded not only in our games but also our search engines, recommendation systems, image processors, banking software, and more (Gillespie, 2014). Safiya Noble's (2018) book *Algorithms of Oppression* seizes on this very point and illustrates how the logic of ranking embedded within search algorithms reproduces the stereotypical beliefs of its users and designers. It is not enough to simply foster awareness about the intersection of algorithms and everyday life; we must proactively engage developers and encourage them to reveal their design practices so that they might be able to one day design better systems.

Perhaps Ian Bogost (2006) has laid a blueprint for understanding how these systems operate. In his book *Unit Operations*, Bogost proposes a theory for understanding how the guiding principles behind object oriented programming languages intersect with the principles of social theory. The procedure a game algorithm follows in modern programming languages relies on it labeling particular clusters of code as "objects" and creating a syntax for objects to interact with one another. Nested within each object are other objects that themselves are constituted by objects. Flat and empirical, Bogost's work on the procedures of computation rarely strays into the experiential domain of human experience. It stands in stark contrast to Noble's ethically conscientious and politically motivated work.

From a science and technology studies perspective, Bogost's approach is complicated. Critical media scholar Taina Bucher (2018) proposes that algorithms can be understood not as objects or code, but instead as Bruno Latour might argue, a set of processes and relations. She writes, "algorithms operating in contemporary media platforms are simply neither black nor box but *eventful*. For a conceptualization of algorithms, this implies a rejection of essences and permanence and an ontological shift towards a world of process and relations" (p. 28). This turn toward situating algorithms in a world of processes, practices, and relations is echoed by anthropologist Nick Seaver (2017) who suggests that there can be another way. For him, the study of algorithms and culture is less about defining what "algorithm" means as an absolute technical term and more

about understanding "what algorithms are, in practice" (p. 2) to the people who use them. Seaver also describes how the study of algorithms benefits from qualitative research methods, particularly those of the anthropologist who is often concerned with thinking through and explaining both formal knowledge structures and the practices of everyday life. The relational turn in critical algorithm studies focuses on highlighting the ways that algorithms reproduce structuring structures—social power relations like patriarchy, White supremacy, and homophobia.

Recent work in digital journalism, like the work of Seaver and Bucher forefronts the role of audiences when negotiating algorithms. One key set of studies in this area concerns the degree to which news readers appreciate or feel concerned with the efficacy of news personalization and recommendation algorithms. Like the paradigms of balance and realism that we detail later in this essay, a similar discussion is taking place in digital journalism studies about the degree to which users desire a diverse set of news sources (Bodó, 2019) or are content to live within a filter bubble (Borgesius et al., 2016). Others advocate for a negotiated position where algorithmic selection is predicated upon an established database of user needs (Thurman et al., 2018). Tellingly, some in this domain suggest a new question to better understand the social relations established by algorithms. Lewis et al. (2019) suggest that instead of asking what a machine (or algorithm) can add to a conversation, asking "what is left unsaid?" in order to probe how social relationships have changed in the new algorithmic context (p. 420). What often goes unsaid is that despite technological advancements in algorithms and machine learning, the patriarchal power dynamics that have historically mediated gamer culture remain.

Importantly, algorithms are deployed within conversations in gamer communities as a way of establishing a patriarchal relationship of knowledge between players. Gillespie (2014) explains how community discourse that reiterates and emphasizes the objectivity of the algorithm encourages users to believe that algorithms are, in fact, objective and neutral (p. 180). Noble (2015; cited in Gillespie [2014]) traces this problem back to the design pipeline and argues that because Silicon Valley hires many White male engineers, algorithms are anything but objective:

> Commercial search prioritizes results predicated on a variety of factors that are anything but objective and value-free . . . By rendering people of color as nontechnical, the domain of technology "belongs" to Whites and reinforces problematic conceptions of African Americans. (pp. 65–66)

Here, Noble suggests that the design of algorithms is spearheaded by a group of privileged White men. Likewise, our work shows how gamers use the algorithm to establish a hierarchy of knowledge within their community. This hierarchy mimics the patriarchal structure of knowledge that Noble critiques. Understanding how gamers use algorithms discursively to construct hierarchical relationships within the community helps us to see how algorithms do the same work in our culture more broadly. Being able to optimize search engine results, YouTube hits, or even one's credit score is as much a form of theorycrafting as the work that is done by the *Overwatch* players in this study.

Drawing on Seaver, Bucher, and Noble, we insist that analyzing deeply held human prejudices, biases, and beliefs are the starting and ending point for better understanding

algorithmic culture. The persistent belief that both players and users *can* understand and control games and algorithms is itself an ideological axiom. We argue that it is this desire to control the algorithm that leads to a reductionist and computational way of thinking that reinforces binaries and dehumanizes others through quantification. We can hack the black box only by producing a theory for understanding how the black box is imagined and instrumentalized by players and users.

Theorycrafting

Of course, Galloway and Bogost are not the only games' scholars who have investigated the impact of algorithms. Theorycrafting is a research trajectory that explores how players develop theories about working within and in a way hacking game algorithms. Recognizing that virtual worlds are built of code and algorithms which "turn databases into worlds" (Golub, 2010: 19), it is not uncommon for players to take a virtual world and turn it back into a database. Players do this in order to create forms of knowledge that they find useful for their experience of the game (Chen, 2009) that are not provided by the game or its designers. It is a trait of almost every game that players supplement the intent of the developer in a variety of ways (e.g. mods and fan fiction). Players especially are responsible for developing the social norms and practices that "ultimately help define what it means to be a player of a particular game" (Chen, 2009: 50). In this case of *Overwatch* players, they are attempting to make sense of the ways that algorithms and other technical processes within the game work, developing theories of their own to explain the results. In other words, these players are engaging in theorycrafting, a process of reverse engineering that suggests the optimal way for players to understand the game and improve their own play (Paul, 2011; Wenz, 2013). Although theorycrafting as a practice has been commonly associated with massively multiplayer online (MMO) games, the same practices are seen in *Overwatch* because the game prioritizes skillful, competitive play (Cullen, 2018). Theorycrafting as a practice has been likened to a "scientification of gameplay" (Wenz, 2013: 181), a process whereby players not only improve their gameplay but also increase their understanding of scientific methods. While it is true that theorycrafters often improve their skills in data mining, what interests us here is how theorycraft creates a "discourse that reshapes play" (Paul, 2011: 2) and limits choices, different perspectives, and even diversity of players through an enforcement of supposedly objective truths about the game derived from these scientific methods.

Like others before us, we show that video games are not made compelling because they are capable of projecting a sense of realism from their code and algorithms, but that they are made real through the sense-making and theorycrafting practices of the players who create the real for themselves. Indeed, theorycrafting is "real work" in that it is a complex activity that creates particular understandings of knowledge and value in relation to a game (Carter et al., 2016: 23). A real result of the process of theorycrafting, also known as creating the "meta" or metagame (Paul, 2018: 148), is that highly standardized ways of playing a game are created by a small group of players, with all other players expected to fall in line and adopt this way of playing. Theorycrafting, as Christopher Paul (2018) has argued, is based in perceptions of the optimal playstyle for players who

are presumed to be the most skillful (typically White, heterosexual men; Gray et al., 2018) and ignores the structural inequalities that make it difficult for others to achieve the same level of skill. This creates a toxic hierarchy in games which favors a meritocracy (Paul, 2018) that adversely and disproportionately affects particular player groups, like women (who are widely marginalized in games culture; Gray et al., 2018), as well as individuals who cannot access the opportunities or equipment necessary to interrogate algorithms and put that knowledge to use.

Considering how games are platforms for cultural development (Paul, 2009) and how these sociotechnical systems create and reflect values from broader contests (Golub, 2010) allows us to think about how these behaviors are seen across games, in game communities, and beyond. Research on theorycrafting accepts the conceit that understanding the algorithm can be a powerful tool to elevate one's gameplay. In contrast, our research is agnostic about the efficacy of understanding the algorithm, and instead argues that paradigms of understanding algorithms reveal a good deal about the social impacts of algorithms.

Background and methods

Overwatch is a competitive team-based first-person shooter released by Blizzard Entertainment in 2016. By the end of its first year, the base of registered players surpassed 30 million; by the end of its second year, that number grew to 40 million. Play typically occurs in teams of six using a combination of 30 heroes that fill three basic roles: damage, support, tank; this means there are thousands of possibilities for team construction in the game. Many *Overwatch* players invest a great deal of time exploring how to optimize heroes and team composition in the game, exploration that includes attempts to understand the algorithms written in the game code. The algorithm that Blizzard uses for matchmaking when assembling teams has never been revealed and Blizzard has never publicly commented on how their algorithms work, but Blizzard has openly discussed experimenting with machine learning in order to adjust the balance of the game, attempting to account for both the functionality of gameplay and player behavior (Fogel, 2018; Grayson, 2018).

This research used a combination of content and discourse analysis applied to player comments pulled from the official *Overwatch* forum that is owned and moderated by Blizzard Entertainment. In July 2018, searches of the forum were made using the following terms: "body," "bodies," "algorithm," and "measurement." We chose these terms because what we were particularly interested in understanding was how *Overwatch* players use algorithms and measurement to develop what they believe to be an objective understanding of the bodies of the characters in the game. On the Blizzard *Overwatch* forums, relevant posts are presented with the subject title of each thread and an accompanying preview of the comment in that thread which matches the search term.[5] Approximately 100 thread subjects and their previews were read in total for all of the search terms. In these forum comments, players frequently engaged in experimentation and debate about the best method to reverse engineer (theorycraft) information about *Overwatch* heroes that are hidden inside the game's algorithms. In all the 100 threads, the use of algorithms reinforces Gillespie's (2014) point that algorithms are used within

discourse to argue for an objective sense of measurement. That said, we highlight these 14 threads because they emphasize the logic of how algorithms can be used to measure things in *Overwatch*. The 14 threads selected for further examination prominently featured language that represented how players were applying logic or scientific analysis to *Overwatch* hero bodies and abilities to explain how they were represented in the game. The relevant language included references to data, information, testing, experimentation, results, and theories. The 14 sample threads analyzed and presented in this work foreground two major paradigms of understanding algorithms for *Overwatch* players, balance and realism.

Although previous accounts of theorycrafting have engaged with it in the context of MMOs, typically through participant observation within the game world, we chose to apply discourse analysis to a forum associated with a competitive FPS (first-person shooter). As *Overwatch* features competitive play and is a major title in esports, it is a perfect example of a game where many players are concerned with optimizing their performance. Forums offer the opportunity to observe how hundreds of people interact according to social norms and practices enforced by theorycraft. The official forums for Overwatch were therefore the ideal place to find discourse from players concerned with this optimization, but this group and our sample only represents one part of the overall player population and one set of practices associated with the game.

In the context of our work on algorithms, describing the makeup of the *Overwatch* player population is less important than a consideration of how their practices result in the reproduction of patriarchal logics. We are interested in how discourse around algorithms created by theorycrafting in *Overwatch* contributes to a social reality wherein particular bodies are considered more or less real or realistic in relation to gameplay, but also in the culture of the game. For us, this relates to how players approach a paradigm of game "realism." A feminist lens applied to game studies examines how gender and conceptions about gender are produced, reproduced, and practiced in digital games and in communities surrounding games (Gray et al., 2018). Our analysis is feminist because we focus on the community discussion threads that most clearly show how the algorithm mediates and reinforces patriarchal power structures within the *Overwatch* player community. The logics underlying *Overwatch* player understandings of realism and representation as revealed in their forum comments suggest that some bodies are read as less realistic and more stereotypical (Noble, 2018), and therefore less important and less powerful, in the context of games.

The algorithm reinforces patriarchy by reinforcing culture. As bell Hooks (2010) explains,

> Patriarchy is a political-social system that insists that males are inherently dominating, superior to everything and everyone deemed weak, especially females, and endowed with the right to dominate and rule over the weak and to maintain that dominance through various forms of psychological terrorism and violence. (p. 1)

Our analysis highlights the various ways players claim to understand the work of the algorithm in *Overwatch*. Regardless of what the algorithm is achieving computationally, it is always already being deployed rhetorically by a player base that maintains

patriarchy by controlling discourse around the algorithms. We refer to these conversations around fairness and who gets to play as the paradigm of "balance."

While qualitative methods can reveal how algorithms are understood as a part of a cultural rhetoric, in this case, how *Overwatch* players explain the logics of the game, what this research cannot do is reveal the algorithms themselves. The black box remains opaque without access to the Blizzard development team, but a more important task is recentering the discourse on the human element of algorithmic systems and further developing methodology for understanding how people talk about technology. In addition, the work algorithms often cannot be known because of their complexity, multiple programmers, impossibility of understanding machine learning processes. As we noted earlier, we feel that avoiding the technical space of algorithms and exploring the social space is important to engaging with algorithms through a feminist lens. By focusing on how people interpret algorithms, we have taken care to forefront how technology always exists within a social milieu, and thus have taken care to focus on the material implications of algorithms in the everyday lives of players.

Paradigm of balance

Twenty-eight heroes with unique abilities and skill sets in a competitive atmosphere has meant that conversation between players on the official *Overwatch* forums frequently focuses on the balance of the game. Balance as a concept refers to how the game functions and infers that a properly functioning game is deep, fair, and interesting for all players (Jaffe et al., 2012). With a game like *Overwatch*, which has added several heroes since the title launched and which also has a thriving esports and competitive gaming scene, efforts by game developers to balance the game are ongoing and complex. These efforts are not often articulated to players, who out of frustration and a desire to understand Blizzard's balance decisions will attempt to reverse engineer the game algorithms. This process of deconstruction and reconstruction also provides the basis for the rationales players provide for competing opinions on how the game should be balanced. In understanding the paradigm of balance, we must underline the implication that a norm such as balance might exist. As the examples below show, often balance is just code for the inscription of toxic and misogynist practices in gaming culture.

Techniques of deducing balance

One way that players both attempt to understand Blizzard's decisions and support their own suggestions regarding balance is to find objective ways to discuss the heroes and their abilities. These attempts are typically based in the measurement of the heroes and their abilities using both information provided by Blizzard as well as data generated through the player application of real-world physics to the game world.

While it is clear that Blizzard uses meters as the basis of measurement when discussing balance changes (Goodman, 2018) and has even provided an area in the in-game practice range where the floor is marked out in meters, it is not obvious to most players if these meters have a 1:1 correlation between meters in game and meters in the actual world as this quote from the Blizzard forums illustrates:

I am honestly curious about the unit of measurement used to describe their measurements. I feel like this needs to be brought up because the numbers given are kind of vague because we don't have any frame of reference for how much of a change has actually gone on. (ConnieAmore, 2018)

However, explanations of how measurements in-game correlate with the real world is unimportant to most players attempting to use scientific inquiry to explain *Overwatch* balance; what they profess to value is having an objective system that can measure heroes in game and yield data that can be analyzed and ultimately applied to in-game scenarios. Many *Overwatch* players on the Blizzard forums dismiss comments about balance as baseless opinion if they are not accompanied by a demonstration of a scientific under-standing of the game, as evidenced by this quote from a player suggesting the correct way to understand in-game balance: "Therefore you study the game for years, you exper-iment with heroes, you get measurable results and make theories after collecting all the data necessary," (Medal, 2018). *Overwatch* forum threads discussing the balance of the game are typically framed using terms and concepts that suggest scientific objectivity. In one thread discussing the imbalanced nature of one hero, a player (BigPig, 2018) pro-vides a lengthy description of how they tested the character Tracer's firing range using meters and seconds within the in-game practice range, including instructions for how to replicate their testing procedure:
    "How to Replicate":

1.   Go to the above location, stand as close to you can to the middle of the line.
2.   Aim as close as possible to the Enemy Bot's center. Not their head, not their arm, the center of their torso.
3.   Shoot at listed distances

Ludic Subjects

The strategies that players take when navigating game space co-constitute their under-standing of the world. At least this is what we (Trammell, 2015) term ludic subjectivity a subjectivity wherein game players (1) quantify and reduce the **world** around them to a set of numbers and (2) adopt a militaristic and oppositional mind-set which flattens all space to opponents, obstacles, and goals. Ludic subjectivity is nurtured by the mathe-matical equations that structure all digital game mechanics and many analog game mechanics as well. Ludic subjectivity can be observed in player communities around conversations of balance. Balance as an axiom of gameplay has ties to competition as a foundational element of play. To discuss balance is to assume that all players share equal access to success, thus reinforcing the social similarity between games, capital-ism, and meritocracy. Players discuss balance because they want to believe that their success in games correlates with their success in other aspects of life. Intriguingly, we found that players were interested in the idea of balance as something that could be regulated by algorithms. Players and designers both assumed that the machine could regulate the balance of games and therefore competition—that which is taken for granted and foundational to late capitalist society.

Although it is not possible to access the algorithms to understand how Blizzard conceives of balance in *Overwatch*, on the forums, we can observe how Blizzard developers talk about balance and algorithms in their game. We can also observe how players talk about these same topics in relation to game bodies in their attempts to logically explain how the game does (or does not) work. BigPig and their process for testing the character Tracer, for example, was accused of being too theoretical despite the level of detail provided for replicating the test. But this case shows that even amid forum posts discussing the logic of measurements in *Overwatch* there persists a recognition among the players that bias exists when it comes to explanations of game balance, often attributed to other players favoring their preferred heroes or attempting to discredit a hero that is judged to be OP (overpowered).

There were two main approaches to balance that we saw players take in this study. In one approach, we saw players argue that a diverse cast of characters and abilities was central to balance. On the other hand, some players were okay with managing a shorter cast of characters if it was the case that a short list of characters was well tuned toward competitive play in the metagame.

Both approaches demonstrate the degree to which all players participating in the conversation around balance behave as ludic subjects. By breaking *Overwatch* down into a comparative and quantitative logic, a conversation can be had about whether or not *Overwatch* is a balanced game. Then, in both conversations, players felt that they could suggest strategies to help adjust for an ideal and imagined state of balance within the game. In both senses, the algorithm allows players to imagine the game as something that is controlled and something that can act as an ideal space of wish fulfillment. Players imagine that the algorithm can be used to balance the game just as they imagine that the algorithm can be used to balance the world. A proposition as well defined by the ideological baggage of game theory as it is by the ideology of cybernetics.

Paradigm of realism

The primary concern of Overwatch players on the forums may be related to in-game balance, but their suggestions are typically couched in terms of scientific analysis, which suggests a concern with objective truth and ultimately what can be considered real. However, when *Overwatch* players refer to realism they are not attempting to recreate the world beyond the game space, but instead the real acts as a basis and a reference point for an in-game logic of algorithms, mechanics, and lore that constitutes its own reality. Like balance, realism too is a social construct that pulls heavily from the toxic and misogynist norms of gamer culture.

Techniques of deducing realism

Although the majority of players discussing balance within *Overwatch* are ostensibly focused on in-game data and measurement in order to maintain an advantage in game (or to deny advantages to players who prefer other heroes), ultimately this focus on in-game measurement shows an attention to realism. Attempts by some players to justify the rationale of their proposed balance changes are often grounded in a logic of what is

"realistic." Instances of players expressing this rationale on the *Overwatch* forums include arguments that the character Torbjorn's hitbox is not proportional to the size of his shorter body (ScatterArrow, 2018) and that heroes with larger bodies, particularly the character Doomfist, should have more health than heroes with smaller bodies.

In the Torbjorn discussion, other players vehemently express their opinion that Torbjorn should have a large hitbox because that is appropriate to the level of damage that he is capable of causing. In their explanation, the game would be unbalanced and unrealistic if he were capable of inflicting a greater level of damage with a small hitbox that made him harder to stop. A similar argument is made against Doomfist having more health; while in some games, it is realistic that a person with a larger body should have more health, in this case, if Doomfist reflected that trend he would be unrealistic in the logic of *Overwatch*. In yet another case, the character Pharah is presented as a hero who wears a great deal of armor but who inexplicably has lower health than other heroes who are also armored. The justification that other players give for this is that the realism of the game would be jeopardized if she were given a greater amount of health (commensurate to her body type and armor) because of Pharah's ability to fly above the other heroes. In the logic and realism of *Overwatch*, the character Pharah has lower health because the armor she is wearing is light for flying and therefore offers less protection than the armor of grounded heroes:

> I always have and always will support Pharah getting 250 HP, she is literally the most physically armored hero in the game (aside from tanks) with her head to toe bulky military armor, where only half of her face is showing at any given time and in any skin. Not to mention how 60% of the healers don't reach her and none of the aoe healing/ults do, and none of her team's tanks/shield protection. (Taiga, 2018)

Conversations about how bodies are quantified extend from the algorithmic to the paratextual as well. A discussion of the character Brigitte's body began with a post suggesting that her waist was so tiny that it was inhuman, and therefore unrealistic. Other players disagreed, stating that a person as in-shape as the character Brigitte would naturally have a small waist: promoting an assumption that a person who is truly in-shape will have smaller measurements. This thread revealed another complex relationship that players have in reality, and this relates heavily to the concept of representation in games. In a reply to the thread about the realistic depiction of Brigitte's waist, one user commented, "But then again it's not necessary to play or enjoy her as a hero so who gives a flying ~,"[6] (Encaya, 2018). Realism as it relates to gameplay is considered necessary for the health of the game and is therefore valued, but realism as it relates to representation in the game world is not only undervalued by many *Overwatch* players on the official forums, it is often dismissed or ridiculed. The basis of this rejection is usually professed as focus on gameplay, accompanied by a suggestion that aesthetic details that have no bearing on the mechanics of the game are irrelevant and trivial.

One aspect of *Overwatch* where attempts to capture realism in terms of representation are supported by other players relates to the application of in-game content to the real in the form of cosplay. Players who want to discuss the realism of in-game characters and their measurements as a part of their efforts at cosplay are often met with support from

the community. Cosplay allows logic about the game world to achieve a firmer sense of realness and thus becomes a measurement for how *Overwatch* players believe bodies can be realistically and objectively measured.

Conclusion

The fan community analyzed by this article encourages us to see the physics of algorithmic representation in games as an ideological space that is actively negotiated by players. Thinking alongside Nick Seaver, we advocate that the shape of the ideological space produced by game algorithms is more important than the lines of code that constitute the materiality of the algorithm. Furthermore, the sense-making activities of players reveal that algorithms are not abstract processes hidden inside the game; algorithms play an active role in the production of knowledge in everyday life. By investigating fan discourse, our research reveals that players were either interested in game algorithms because they helped reveal how the game was balanced and thus allowed them to optimize their game strategy or were interested in a conversation about the realistic representation of bodies in game space. In neither dialogue were players actively interested in parsing the game code, instead discourse centered around their experience of the game design. Algorithms either helped them to understand the degree to which the game was balanced or the degree to which the game was realistic.

Both conversations around game algorithms are troubling. The single-minded focus on game balance invokes what Chris Paul (2018) refers to as toxic meritocracy and what Aaron Trammell refers to as ludic subjectivity (2015). Players seeking to establish themselves as worthwhile individuals in late capitalist society must contend with an ever increasing set of social pressures that convince them that their individual worth is tied to their economic status. Winning games is easy for players who have been trained to quantify, compare, and overcome every aspect of the game worlds they inhabit on a daily basis. Balance, in this sense, is an ideological value that some players appreciate in so far as it helps them to make sense of and navigate their everyday lives.

The other conversation we observed around game algorithms, that algorithms simulate reality, is troubling for a completely different set of reasons. In the second conversation, bodies are understood as a set of quantities—numerical capacities that can be compared and understood against the standards set by an imagined and pseudo-scientific social norm. Here, the female body is given the most scrutiny as it is suggested that one cannot be "accurately" represented as too thin or too fat. When it is assumed that bodies can accurately be reduced to a set of numbers, people are dehumanized. They are turned into objects and compared against an invisible, stereotypical, and impossible standard.

We end this article by asserting that when players work to understand the algorithm they are doing the work which maintains patriarchy. By asserting control over the algorithm—which we argue cannot actually be known—players position themselves as discursively more knowledgeable than others. This hierarchical relationship between players reinforces the very patriarchal power structures that inundate gamer culture. Algorithms do reveal an allegory of society, but we feel that this allegory is so deeply rooted in prejudices that move beyond, around, and through the potentialities of quantitative reasoning

that it is only fair to see algorithms through Seaver's (2017) suggested lens—extensions of our culture.

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Notes

1. We discuss this topic in more detail in the "Background and Methods" section below. Succinctly, we consider our methods feminist because we aim to reveal structural inequalities in how algorithms are socially used and understood.
2. *Overwatch* is a first-person shooter game. In this genre, very little quantitative information about character bodies is given to players. Players are expected to learn the unique physics of their character's body through gameplay.
3. We dig deeper into this literature in the section on "Theorycrafting" later in this essay. Early work includes Ian Bogost's (2006) Unit Operations, Alexander Galloway's (2006) Gaming, and MacKenzie Wark's (2007) Gamer Culture. Although these conversations structured an early moment of game studies, they are largely secondary to conversations about algorithms in the field of communication today.
4. In his book *Gaming: Essays on Algorithmic Culture*, Alexander Galloway (2006) uses the term *allegorithm* (a portmanteau of allegory and algorithm) to describe this relationship (p. 91). Understanding the algorithmic structures of games means recognizing the way that games (and other related algorithms) are always already at work structuring the interactions we have with one another.
5. The search terms "body" and "bodies" yielded the same sets of results.
6. Also censored in the original thread.

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