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E'Ride on!': The Zwift platform as a space for virtual leisure

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ABSTRACT

Virtual environments as spaces for leisure are rapidly emerging within the zeitgeist of 21st century leisure practices. One such environment is the Zwift cycling and running app which provides a series of virtual worlds where cyclists and runners can train, race, and socialise with a global community from their own home. As four authors, we are all in some way curious or engaged with Zwift as a platform for our own leisure. We therefore developed a 'community of inquiry' to provide an initial foray into Zwift as a virtual leisure space. We each produced a section of the paper which focused respectively on assemblage theory, micro-sociology, gender, and morality. Through critique and the spirit of collegiality, these texts were refined and are presented in the paper as separate yet inter-linked narratives. Our community of inquiry then reconvened to consider the mechanics of game design and to present Zwift as exhibiting the components of an interreality. The paper concludes with implications for further research which includes considering Zwift as a third space and as a panopticon.

Zwift as a virtual leisure space

Zwift (n.d.-a) is a massive multiplayer virtual cycling and running app which 'blends the fun of video games with the intensity of serious training' (para. 2). Through pedalling or running on a connected form of hardware, such as a static indoor trainer, cyclists and runners from across the planet can converge in one common virtual space to train and race in real-time across virtual worlds such as 'Watopia' and 'New York'. In an interview with Reed (2021), Eric Min, one of Zwift's co-founders, explained that there are now over three million accounts on Zwift with hundreds of thousands of active daily users. It is increasingly clear that Zwift, when considered a space for leisure, has traversed the digital realm and has entered the virtual. We may, therefore, begin to position these pre-designed virtual worlds, which can also include games like World of Warcraft, as leisure spaces, and acknowledge that they generate contemporary arenas for leisure participation and research. Here, we four authors interrogate Zwift, a contemporary virtual world for cycling and running, from our different subject specialisms: assemblage theory; micro-sociology; gender; and morality.

Before commencing our inquiry, we will first clarify our theoretical and practical stance. For, as Silk et al. (2016) acknowledge, standard conceptualisations of 'leisure' and the 'body' are shifting within increasingly complex leisure spaces. This increasing complexity becomes starkly apparent when acknowledging that virtual, pre-designed, worlds now facilitate spaces for leisure.

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We therefore draw on DeLanda (2006) and Lupton's (2015) work on assemblage theory and digital leisure respectively, and through these lenses consider social, gendered, and moral elements of Zwift as an *assemblage* of virtual leisure. The assemblage perspective is important as it recognises that individual elements of social life and technical architectures can operate independently, but also develop into assembled wholes which collectively shape reality. These assembled wholes may be affected by other components that are external to them, such as game updates or algorithms. This paper considers assemblage theory as a conceptual platform for recognising individual aspects of the social (e.g. identity, community, connectivity) and the technical (e.g. algorithms, interface, updates), and demonstrates how they may combine within a fluid leisure environment.[1]

Focussing on theoretically siloed aspects of Zwift participation, as we do in this paper, does little to acknowledge the complex social and technical entanglements that generate the virtual leisure experience. We therefore present an initial mapping of *some* constituent elements that frame the virtual leisure experience on Zwift. This responds to Silk et al. (2016) call for 'more nuanced understandings of the critical potential of emerging digital leisure assemblages' (p. 720). The central aim of the paper is to therefore interrogate Zwift as a virtual leisure space, through assessing how and in what ways various fields of well-established thought may come together to explain the foundational elements of Zwift participation.

Building on literature that has outlined the digital leisure and esports fields (e.g. Schultz & McKeown, 2018; Silk et al., 2016), we position Zwift as a unique virtual environment that has become a significant social and training feature within cycling, running, and triathlon communities. At any one moment, professional athletes participate in the same virtual world as those who take part for fitness and fun. As a result of this popularity, academic literature concerning Zwift is emerging (e.g. Supriyanto & Liu, 2021), but little has been written on Zwift as a space where social, gendered, and moral norms may be affected by the purposeful design of these virtual worlds. This paper is as much an initial foray into a virtual leisure environment as it is an invitation for others to join our exploration. It is important to note that whilst Zwift welcomes cyclists, runners, and all the active communities they encompass, the focus of this paper is cycling.

We note that platforms such as Zwift are representative of an emerging field of efitness platforms (e.g. Peloton and SimWay biathlon) that are increasingly providing the means for 'at home' sport and leisure. However, Zwift comes with a series of unique functionalities that distinguish it from other platforms. For those unfamiliar with Zwift, we explain these functionalities before continuing. In Zwift, you are represented by a personalisable avatar that you control within Zwift's virtual worlds; on your home trainer, if you speed up, your avatar speeds up, or, if your avatar is going uphill, the trainer will increase the resistance. Some of Zwift's virtual worlds are replicas of real-world events, including the 2018 and 2019 World Road Race Championship courses at Innsbruck and Yorkshire respectively. There are also gamified factors in Zwift, including level-ups and unlockable equipment. In essence, the further and faster you ride, the more equipment you unlock. This equipment mirrors real-world bikes, wheels, and helmets, as well as additional equipment available only in Zwift that offers performance enhancement. We also see Zwift as a space where users may interact with one another. This is facilitated through a chat function, and you can also give nearby riders a 'ride on', comparable to a social media 'like'. The personalisation, real-world replicability, gamification, and social elements of Zwift generate a distinctive environment for leisure.

Finally, before we explore Zwift from our theoretical perspectives, we might ask exactly who uses Zwift? We put forward that Zwift is a serious space for leisure, where performance and training are paramount, and which often attracts cyclists who use the platform as part of their broader training regime. As Zwift (n.d.-a) summarise, the platform is a space for serious training, while also incorporating the fun associated with gaming. With the above in mind, we now take a short ride through Zwift to provide a more applied account of the Zwift user experience.

A ride through Zwift

We position Zwift as a massive multiplayer online game, which provides a virtual space for physical activity and leisure. This short section provides a mock outline of the Zwift user experience from our perspectives. Firstly, we need to select which 'world' we would like to ride in from the app home screen. Alongside the selection of the world, we can also see upcoming events and which professional riders and friends are currently online. Once the world is selected, we can then personalise our appearance and equipment in our 'garage', whilst also being able to select a workout and see personal achievements. With these choices made, we are now ready to start our ride and, once we have set off, become active in the Zwift world. Here, we see lots of other Zwifters, all participating within the same virtual space. On flat sections of the course, we might choose to ride behind other users to gain an aerodynamic advantage. These Zwifters, from wherever they are accessing Zwift, can see our avatar in real-time. We might swap positions with them, giving them an aerodynamic advantage, or we might engage in a pre-arranged race to the top of the nearest hill. As we ride around our selected world, we might also give others a 'ride on', and experience varying resistance from our smart trainer, which, as we have mentioned, reflects the gradient we are cycling on. There is also a Zwift Companion app for mobile devices that is separate from the primary Zwift interface. On this, we can see our previous rides, communicate with other nearby riders through the chat function, control the direction of our avatar, and get our avatar to wave or speak. In the app, it is also possible to follow, and be followed by, other users whilst viewing their ride statistics. For instance, we might see a professional rider in front of us and choose to follow their ride in real-time through 'fan view'. As we are cycling, for every kilometre or mile travelled we also receive experience points (xp) which allow us to 'level up' on Zwift (currently to level 50), and allow us to unlock new kit and equipment. However, in the case of unlocked bikes and wheels, we must then visit the 'drop shop' and spend (sweat) 'drops' which are accumulated through pedalling and are multiplied when cycling uphill. Drops are Zwift's virtual currency and we can spend them on both lighter and more aerodynamic equipment upgrades that contribute to increased speed in-game. Though brief, this initial ride through Zwift provides the context necessary to begin our inquiry.

Approach to the inquiry

The structure of this paper is uncommon in that it does not observe a traditional research approach. Drawing from an 'inquiry as stance' methodology, which has been gaining traction in educational research since the early nineties (Cochran-Smith & Lytle, 1993), this paper's starting point is curiosity, where we four authors are simply asking, *what's going on here?* (Galosy, 2014). This approach spotlights 'inquiry communities' that work together to 'interrogate the assumptions and values that underlie their practices' (Cochran-Smith & Lytle, 2009, p. 41). In this case, our community shares the practice of Zwift. Inquiry as stance approaches also feature 'systematicity', which seeks to understand multiple perspectives. As demonstrated in this paper, once elucidated, these perspectives are openly shared within the community, thereby generating fruitful dialogue that explores the tension between its members' experiences (Cochran-Smith & Lytle, 2009).

Our inquiry adopts an approach similar to Blenkinsop et al. (2016), where five authors came together to consider individual responses to a common question. Given the lack of literature on Zwift as a virtual leisure space, the four of us (a digital researcher, a sociologist, a gender theorist, and a philosopher) as a self-defined community of inquiry came together to explore the theoretical building blocks of Zwift as a platform for virtual leisure. Each author was given a (roughly) 1000-word limit and developed their sections in isolation. All four sections were then compiled, and the authors took turns to comment, critique, and scrutinise each other's work. This iterative process refined each section as the authors challenged one another to sharpen and clarify their arguments (McCaffrey et al., 2012). During this process, and referring to the work of DeLanda (2006), we recognised that capturing every causal mechanism within the Zwift assemblage would have been

futile. That said, the approach taken intentionally responds to Prior (2021) who stated that to take 'software seriously means nothing less than revisiting concepts like social, technological, and cultural' (p. 220). This current inquiry seeks to understand the foundations of Zwift as a virtual leisure space and its impacts on the social and cultural aspects of participating in cycling.

Section one: an assemblage approach

Drawn from the early works of Deleuze and Guattari (1976, 1983, 1987), further theorised by DeLanda (2006), and applied to digital leisure by Silk et al. (2016), assemblage thinking is an approach towards understanding how complex social, technical, and cultural spaces are formulated and sustained by innumerable heterogeneous entities. Extensively linked to concepts of fluidity, complexity, and chaos, assemblage thinking can provide a conceptual platform which allows us to investigate the layers and instabilities of 21st century social phenomena. However, pinpointing a definition for assemblage thinking is challenging. As Müller and Schurr (2016) acknowledge, the term's intertextuality and density obscure a single definition for a given context. In this paper, assemblage thinking is defined as the complex, fluid, and multi-scaled relationships between the self, others, and sociotechnical systems, which are collectively marked by both instability and unpredictability. Perhaps above all, this definition offers an overarching viewpoint from which we can begin to explore how separate entities, such as factors associated with micro-sociology, gender, and morality, may flow through ever-shifting assemblages that frame the nature of leisure in the Zwift space. This paper thus aims to contribute to an increased understanding of whether and how technologically mediated virtual leisure spaces, as designed and used by human actors, and sustained by algorithms and servers, may be explained within existing theoretical frameworks.

Hess' (2015) work titled 'The Selfie Assemblage' offers a useful point of access and allows us to outline the constituent components which frame user experiences in the Zwift sociotechnical assemblage. They describe the *self*, the *physical space*, the *device*, and the *network* as four defining features which make up a sociotechnical assemblage. In relation to Zwift, the *self* comprises two entities: the physical self who is cycling on a static trainer who may engage with others online (e.g. on the Zwift companion app) or in person (e.g. family in the home environment), and the avatar self who is cycling through the virtual world and communicating with other avatars. The *physical space* may be any environment where Zwift can be accessed; this may be anything from a user's home to an arena with television cameras for national events. The *devices* required to run Zwift are numerous and constantly evolving. They include multimedia devices such as phones and laptops, and hardware such as a bike, smart trainer, and cooling systems. Finally, the complex *networks* which contribute to the Zwift assemblage are numerous and multifaceted. These include both social and algorithmic networks which contribute to the overarching gaming experience. For instance, Zwift clubs and organised group rides often 'spill over' into our physical realities, whilst server networks sustain the Zwift interface and connect thousands of cyclists globally at any given moment. What these four constituent elements of the self, physical space, devices, and networks tell us is that we may begin to think of Zwift as a complex sociotechnical environment which fluidly connects cyclists across the globe through a common yet enormous multiplayer interface.

Assemblage thinking in relation to Zwift may therefore provide a suitable perspective when deconstructing the nature and scope of sociotechnical entanglements in virtual spaces. There is a trail of literature in relation to online gaming and assemblage theory which stands ready to demonstrate some of the complexity outlined in this section so far. Christensen and Prax (2012) and Banks (2014) describe assemblage thinking as a framework to unpack the entanglement of the virtual gaming space with the physical and embodied reality of the gamer. Leaning on Christensen and Prax (2012) in relation to Zwift, the complex practices which stem from Zwift's software and design directly shape the nature of participation and community. For instance, being able to follow other users through 'Fan View' or engage with nearby Zwifters on message boards creates a complex space where the nature of experience 'spills out' through the

screen into the lives of Zwift users and its communities. It is therefore acknowledged that assemblage thinking provides 'a critique of over-simplified explanations of games and gaming, and [offers] a move toward a recognition of the complexity of gaming' (Christensen & Prax, 2012, p. 736). Taylor (2009) places emphasis on this 'spilling out', describing this as 'the flows between system and player' (p. 332), and further explains how elements of online gaming such as software updates and day-to-day participation may construct a fluid *assemblage of play*. The fluidity referred to here speaks to the ever-changing nature of participation on Zwift; no two interactions with Zwift will be the same, they are products of irreplicable sociotechnical conditions in which the user and their avatar interact at any given time.

In sum, the acknowledgement of Zwift as a virtual leisure assemblage provides important context for the next set of discussions, as we interrogate Zwift from three perspectives and examine how they intersect with the complexity of the Zwift space.

Section two: a micro-sociological perspective

Despite most Zwift riding taking place in solitary conditions, it is – through individuals' online representations on the Zwift application – rendered a social activity. Riders' actions thus become public performances, where they are simultaneously acting for each other while being each other's audiences (Goffman, 1959). The advent of Zwift has added an undeniable element of public performance to indoor cycling in private homes, which has historically been a reclusive practice.

The most obvious feature of public performance through Zwift is manifested through the user interface. One's performance and relative fitness are observable by others through 'fan view', where a user's watts, heart rate, and position in the peloton are immediately viewable. For our inquiry, these visible metrics are self-evident and hold less intrigue. What is of much greater interest is how riders have the capacity for agency beyond the speed at which they make their bicycle travel. For example, riders can communicate with each other verbally (via, e.g. Discord) or through text messaging, and they can alter their speed in response to actions by others. It is also possible for riders to shape how they appear to others, through the procurement of clothing, bicycles, and accessories, which has been made possible through their accumulation of 'drops' that can be spent in the 'Drop Shop'. This quantum shift in indoor cycle training, from the lone to the social, has not been given extensive sociological attention. Here we offer some initial theoretical explanations, as a means to deepen a collective understanding of these changing social patterns. We first draw on interactionist social theory more generally, then move to Goffman's *Presentation of Self in Everyday Life*, and finish by touching on Bourdieu's concept of symbolic capital.

George Herbert Mead laid the theoretical foundations of interactionism in the early 1900s. Central to Mead's (1934) theory was human beings' ability to take the role of the 'other' and visualise themselves from another person's point of view. Taking the role of the 'generalized other' – which is conceived as 'the laws and the mores, the organized codes and expectations of the community' (p. 197) – means that an individual's thoughts and actions are heavily influenced by those around them. So, even if one is riding alone in one's bedroom, through participation in the broader Zwift world, what one thinks and does is, to a certain degree, mediated by fellow riders. Charles Horton Cooley's (1964) concept of the *looking glass self* builds on Mead's foundational premise. Like Mead, Cooley believed that the self was formed by an individual's reflexive relationships with their social world. He outlined how we are all constantly engaged in processes where, 'I imagine your mind, and especially what your mind thinks about my mind' (pp. 200–201). The looking glass self contributes to this discussion by emphasising how, in the Zwift space, this central feature of individuals interpreting others' interpretations of a shared social interaction contributes toward the user experience.

Mead and Cooley provide us with the sociological platform to further develop our theoretical understandings of social interaction through Zwift. In sum, during interactions, individuals use their interpretative abilities to consider the outcomes of different courses of action before they act, as if through the eyes of others. The work of Erving Goffman gives us further conceptual tools, however.

Goffman's (1959) landmark book, *The Presentation of Self in Everyday Life*, employed the language of the stage to explicate his theory of face-to-face interaction. While Goffman's book predated the world wide web by more than 35 years, its theoretical usefulness has seen a renaissance in the last 10 years (Radmann et al., 2021). Impression management involves actors using *expressive equipment* that is 'intentionally or unwittingly employed' (Goffman, 1959, p. 32). This equipment enables actors to present audiences with a *front*, which comprises one's appearance (e.g. clothing and accessories) and manner (e.g. gestures and speech). These fronts are crafted in such a way that they match the expectations audiences have for the actors. Appearances are greatly aided by expressive equipment, which, within Zwift, is reflected by choices made concerning the presentation of the avatar self, which includes choices about clothing, bicycles, wheels, and accessories. An example of this is observed through the procurement of the 'Tron bike': a luminous and colour customisable concept bike only accessible by experienced riders, and which reflects what Goffman refers to as a prop used by actors to demonstrate personal status and role.

Interactionist social theory gives us the conceptual language to understand how the choices, actions, communications, and representations made while participating in the Zwift world are all influenced to a greater or lesser degree by other co-actors. This assumption about social interaction through Zwift is crucially important, as it makes plain the notion that all words and deeds expressed through Zwift are mediated by the presence of others: the interactionist view thus posits that even the most independent thinker rider on Zwift is constantly considering the actions and responses of their audience(s) before they act themselves. All riders are, at some level, wondering how their actions may be perceived by others. It is natural for people to have different motivations for acting in certain ways. As mentioned in section four, some might have a deeply-rooted moral engine that seeks to do good to others, while others might wish to be regarded as a certain kind of person by those around them (e.g. fast, handsome, skilled, or kind). This is where the final concept of our initial Zwift sociological framework enters the discussion, courtesy of Pierre Bourdieu.

Bourdieu (1986) gave the world of social theory many gifts and four of them are 'the capitals': economic, cultural, social, and symbolic. Symbolic capital is of particular conceptual use for our inquiry as it refers to the prestige and recognition that individuals garner in the eyes of others. This kind of capital most often comes from others being impressed by a particular action that one has taken. In the Zwift ecosystem, recognition is afforded to those who have amassed enough xp to arrive at higher levels. Higher levels bring benefits such as 'more clothes and accessories for your avatar, more available bikes and wheels in the Drop Shop, and access to certain level-gated areas on Watopia' (Zwift, 2019, para. 2). These goods thus become expressive equipment (Goffman, 1959) that are used as signs of social distinction (Bourdieu, 2010).

It doesn't matter if the language of avatars and gated areas seems foreign; what is of significance is this intersection of the interactionist view of a participant's appearance and manner being heavily influenced by the perceived expectations of one's audience and the Bourdieusian view of opportunities to accrue symbolic capital through legitimised avenues created by the corporate entity that is Zwift. The importance of employing this decades-old micro-sociological perspective lies in its capacity to provide an established framework for interpreting emergent and novel forms of social interaction.

Section three: a perspective on gender and representation

This section seeks to unpack the Zwift experience from a feminist standpoint. As hooks (2000) outlines, given the breadth and diversity of intersecting issues/purposes that sit beneath the feminist umbrella, identifying a singular definition is often both elusive and unproductive. But, for the

purposes of this paper, we acknowledge Dillard's (2000) understanding that the underpinning feminist endeavour is to question 'the traditions, perspectives, viewpoints [and] cultural understandings' (p. 663) that reproduce norms specifically regarding gender roles, expectations, and female physicality. The following section will seek to explore how gender influences the user experience of Zwift, with particular emphasis on how and where cultural norms are reproduced in the virtual arena. For initial context, Lethbridge (2022) reported in 'Zwift Insider' that, of the racing population on Zwift (those who actively participate in Zwift races), only 8% are women. There is also no opportunity for gender expression beyond the female-male binary, despite much conversation on the topic on Zwift Forums (2020a)

To many, the bicycle has been a symbol of women's emancipation. Yet there were always rules and caveats that came with women riding bikes:

> don't faint on the road; don't wear tight garters; don't attempt a 'century' [100 mile ride]; don't boast of your long rides; don't ask 'what do you think of my bloomers?'; don't discuss bloomers with every man you know; don't cultivate a 'bicycle face' (Popova, cited in 2021, para. 2).

Whilst such overt gender discrimination, taken from a list of 'don'ts for female cyclists' published in the New York World newspaper in 1895, is less apparent now, cultural norms still dictate how women and girls interact with cycling and the cycling community.

Infrastructure, perceptions of safety, harassment, and the male gaze (Stredwick, 2017; Sustrans, 2018) are some of the widely-recognised mediators of the relationship between women and bikes. Perez (2019) digs deeper, pulling up systemic issues relating to infrastructure, gender roles, and unpaid care responsibilities, revealing their profound impact on women's access to things like the bicycle. Enter Zwift: a virtual blank canvas and purpose-built environment to 'make more people, more active, more often' operating under the mantra of 'one Zwift for all' (Zwift, n.d.-b, para. 1). Indeed, as founders of the women's and non-binary Zwift community 'Chicks Who Ride Bikes', Katey Bates and Jordana Mullen (Zwift, 2021) point out 'women are often in caregiver roles, and exercise falls off the priority list. Zwift provides access to exercise as well as community on a flexible schedule' (Para. 19). So, would it be reasonable to assume that gender-based barriers to cycling fade into the pixelated backdrop of Zwift's virtual façade?

In Zwift, the avatar forms a central part of the gameplay experience. As Freeman and Maloney (2021) contend, avatars are central to identity and communication in virtual worlds and, significantly, Nowak and Rauh (2005) find that real-world social norms and gender expectations are often seamlessly integrated with our virtual counterparts. Imagine you are in a Zwift group ride, pedalling through idyllic landscapes with a mixed-gender group of riders. As a female rider, you may notice the stark difference in leg definition between your avatar and the male rider alongside you (see, Figure 1). Perhaps they are just a stronger rider than you. But the closer you look, the more you notice that all the male avatars around you have the same notable muscular definition, whilst all female avatars do not. You may also notice the slight body of the female avatar and excessively slender arms (see, Figure 2). Indeed, there are only two avatar body sizes for women on Zwift, compared to the three offered to men (Schlange, 2019). The irony of multiple world and Olympic cycling champion Marianne Vos appearing a tiny unmuscular shadow of her amateur male counterparts on Zwift is not lost here. Zwift racer Van Houweling (2022) captures the issue; 'the men seem to have more diversity in terms of various body shapes, while all women look slightly similar with their slim arms, tiny waists, and ridiculous hairstyles' (Para 18).

Perhaps unsurprisingly, Zwift has reproduced the deep-rooted male gaze that pervades modern gaming culture (Gray et al., 2018). Szende (2020), Brennan (2020a), and Langer (2020) all provide insightful accounts of their own experiences and subsequent frustration at the oppressive representation of female bodies on Zwift and the platform's apparent oversight of female physicality. On a broader scale, the issue of representation goes much further than female bodies; the absence of the hijab and (until recently) the afro has not gone unnoticed by Zwift's loyal followers (Zwift Forums, 2020b).

Figure 1. Differences in definition.

Figure 2. Slender arms.

Beyond the Zwift avatars themselves, the virtual environment also serves to affect and shape the user experience. Safety has long been a reported concern for women when cycling in real life, as reported by Sustrans (2018) in their UK-wide Bike Life survey. Whilst this concern has well-founded roots in vehicle-related aggression and verbal harassment (Sustrans, 2018), it is also borne out of the long-standing narrative that women are simply less able in physical endeavours and thus perceive risk at a heightened level. Indeed, Warrell (2016) argues that it is the 'confidence gap', where female ambition is tempered by a perceived lack of ability or self-worth, not the 'competence gap', that needs closing.

Being a virtual platform, Zwift removes perceived risks associated with motor-vehicle aggression and infrastructure (Brennan, 2020b). It may also foster a supportive social environment where groups of women can cycle together, empower one another, and bridge the 'confidence gap'. Indeed, returning to Katey Bates and Jordana Mullan, they speak of the 'supportive environment'

which allows riders to keep 'motivated simply by wanting to catch up with the girls for a chat' (Zwift, 2021, para. 21). Langer (2020) adds, 'I might see one other serious woman cyclist on a three-hour ride out my front door. However, there are oodles of women on Zwift at any given moment' (para. 10). What Langer goes on to describe, however, is the spill over of real-life harassment into the virtual space: 'as the virtual world has become more realistic . . . the interactions have become more like those out on the IRL [in real life] roads' (Langer, 2020, para. 18). Anecdotally, comment threads on Zwift forums draw similar conclusions, by referring to the consistent use of sexist and inappropriate language on Zwift's public chat function. As multiple Ironman world champion Janine Willis tells Langer (2020), in the wake of persistent harassment, 'sometimes it's just easier to walk away, modify your session or call it a day' (para. 24).

Having explored the user-experience of Zwift from a feminist standpoint, it is apparent that many of the gendered norms that influence cycling in everyday life are reproduced, and even emphasised, in Zwift. Whilst there are important areas of advancement to acknowledge, such as the removal of commonly cited barriers for women around infrastructure and perceived risk of motor-vehicles, the virtual environment of Zwift does little to challenge the status-quo; the avatar itself is a constant reminder that women are not allowed to appear as strong as their male counterparts. Until Zwift can move beyond the gendered and hegemonic fabric of modern gaming, it will remain a virtual leisure space that does little to challenge the often oppressive factors that impact women's experiences of cycling.

Section four: a philosophical perspective

In this section, we wish to explore the moral dimension of Zwift. We have seen how Zwift introduces opportunities for social interaction, which, as Heron and Belford (2014) contend, invariably create ethically demanding circumstances. Although a workout tool, Zwift's status as a complex virtual arena for leisure creates latitude for sportspersonship, which is a concept replete in ethical content. While sportspersonship could be approached from a variety of ethical traditions, we will focus on what Arnold (1983), a philosopher of sport, calls its 'altruistic' vein. The virtues associated with altruistic sportspersonship include empathy, benevolence, compassion, and a general concern for the welfare of another, whether on one's 'side' or not. When acting from this ethos, the player (in our case, the Zwifter) aims to alleviate the 'suffering, travail, misery, or pain of another', and, at minimum, bring 'comfort in some way' (Arnold, 1983, p. 68).

These combined traits may bring to mind an ethic of care, most popularly espoused by Noddings (2002, 2005), and, indeed, ethical research into both video games (Murphy & Zagal, 2011) and cycling (Womack & Suyemoto, 2010) have noted the relevance of care theory. Although often considered an individual sport, Womack and Suyemoto (2010), writing from a feminist ethical perspective, celebrate the care that can accompany group cycling. For instance, they claim that a commitment to others' growth and development (athletic and otherwise), through the mentoring/relational investments typical of long hours on a bike, creates an inclusive respect that nurtures community. Citing the Feminist Majority Foundation (n.d.), Womack and Suyemoto (2010) describe this approach to cycling as a 'partnership' (pp. 89–90) model of sport, which privileges health, cooperation, enjoyment, and friendship over winning at all costs.

Suggesting the Zwift platform as a means to care is immediately problematic, however. Noddings' theory relegates caring and being cared for largely to the private realm (i.e. those 'near' and 'dear'), whereas Zwift's participant composition is global and intercultural. To explain, Noddings (2005) intuitively observes that thoughtful care requires understanding the life situation of the one being cared-for and thus fairly posits that we can best care for those most proximal. Online leisure communities, however, are challenging traditional definitions of proximity. It is becoming apparent that it is possible to develop a sense of togetherness and belonging in virtual spaces despite being thousands of miles from those with whom we directly engage with in the Zwift world. While this may address the first of Noddings' noted constraints – that care is most often

given to those 'near' to us – what of the second constraint: those 'dear' to us? That is, how could Zwifters come to care for and be cared for by those known only through a virtual space on the other side of the world? This constraint is harder to overcome and has been recognised as a shortcoming of care theory (see, McKenzie & Blenkinsop, 2006 for critique). The concern is that an ethic of care does not adequately obligate us to care for those distant and/or unknown, and thus falls short of a standard of justice beyond the private realm. Slote (2010a) has addressed this limitation and proposes grounding care theory in the Moral Sentimentalist tradition, which, through its emphasis on empathy, can explain the moral distinctions we intuitively make between our obligations to those near and far and dear and unknown.

Eighteenth century British Sentimentalists (e.g. Hume & Hutcheson) deemed humanity's innate capacity to empathise as central to moral motivation, decision making, and action (Blackburn, 2016). That is, the feelings and motivations that arise through empathy provide a 'reliable guide to acting morally' (Slote, 2010a, p. 8). Said another way, 'our very notions of right and wrong are based in empathy' (Slote, 2010b, p. 128). Significant to our discussion here, psychological research (e.g. Hoffman, 2001) reveals that empathy is educable and that humans can and do develop empathetic responses towards those distant and unknown. Through purposeful consideration of another's (difficult) predicament, an agent can increasingly come to 'see' and feel life's circumstances from the other's perspective. This 'Sentimentalist Moral Education' (Slote, 2010b) means that as an agent gains greater life experience and cognitive ability, he or she (or they) 'becomes capable of more and more impressive "feats" of empathy' (p. 132). We are suggesting that Slote's empathetically expansive account of a sentimentalist care ethic overcomes care theory's lamentable relegation of care to those near and known, and thereby provides a conceptual framework for legitimising care expressed through Zwifting.

The likelihood of expressing and receiving care through Zwift becomes all the more probable when one considers the deliberate way Zwift's software and algorithmic structures organise social interaction within the game. Heron and Belford (2014), who examine empathetic actions within video game play, explain that 'immersion' (the identification of oneself with the virtual reality within the game) and 'verisimilitude' (the degree to which a game mimics social realism) are essential if a player is to genuinely feel the ethical weight of their actions. Relevant to Zwift, they note that first person, multiplayer games with few layers of abstraction between a player and their avatar, create an ideal locus for ethical play. Through its likeness to actual cycling, Zwift creates immersive experiences with great social verisimilitude. For instance, a Zwifter's ride is affected by: wind resistance or drafting, the rider's weight, and the type of bike and wheels (which are purchasable with sweat 'drops' earned through play). Additionally, a host of communicative tools available in-game and through the Zwift Companion App allow a rider to: ring a welcome bell, wave a hand, signal a need for relief (elbow flick), offer encouragement through a 'ride-on' (a big thumb), compliment others' efforts (happy face that says 'nice'), and admit exhaustion ('I'm toast'). Augmenting this communication is an in-game text-messaging service, which many players further supplement with VoIP conversation (e.g. Discord).

Should the reader remain unconvinced regarding Zwift's potential to express and receive care, we close this section by referencing the care-based mission of a group-ride community and an example of care on a virtual ride. Zwifters are welcome to join group rides hosted by specific communities. One such community is 'team tfc' (http://www.teamtfc.com), which is a 'close-knit' group where riders can: give and receive advice and support; encourage their teammates; respect all participants; and help those who are struggling. Similarly, 'The Herd' (http://www.theherd.club/) is an inclusive community of supportive cyclists that focuses on compassion and encouragement, and provides helpful sweepers that prevent riders from falling behind. Finally, in 2020, Author A shared an experience as the recipient of care when they, watching Zwift's in-build map, purposefully dropped off the back of a Zwift group ride to explore what might happen. Immediately, the designated sweepers texted words of encouragement and slowed to offer assistance. Author A was showered with encouraging messages sent by nearby Zwifters, who continued to offer

congratulatory praise as they re-joined the group. Accounts like this suggest Zwift's potential as a medium for care, and affirm its slogan as a place to 'chase goals with a community' (Train at Home, n.d).

The mechanics of game design and interreality

After crafting the preceding sections, our community of inquiry reconvened to consider how the four theoretical threads stood alone, overlapped, and diverged – and, importantly, what contribution this might make to the extant corpus of literature that discusses the intersection of physical and virtual leisure pursuits. We were immediately struck by the applicability of assemblage writing which accounts for the sheer level of technological and social complexity exhibited within Zwift. More specifically, this affirmed our initial conviction that our micro-sociological, gender, and moral perspectives of Zwift practice were inherently intertwined. Additionally, it was through attempting to answer our original question of how these four perspectives could more deeply explain Zwift as a virtual leisure platform that new questions emerged. These include: How do concepts within presentation of self and symbolic capital collectively influence a sense of empathetic and ethical play performances? How might demonstrations of care intersect with heteronormative gender stereotypes within the virtual leisure space? In what ways might sociotechnical leisure architectures affect how people extract meaning from their leisure practices?

At their core, the four sections highlight that Zwift facilitates a virtually prescribed public performance for its users. Whilst users may shift their avatar's appearance and purchase new and faster equipment, it is important to recognise that these are pre-designed components within the game; player engagement is dictated by game design. Zubek (2020) describes games, which we take to include Zwift, as dynamic machines which facilitate artificial environments that come with a set of rules for use and engagement. The four perspectives have identified some of these in-built rules of engagement and, whilst Zwift provides a degree of autonomy (in terms of route, engagement with others, and so on), these all take place within a space that facilitates certain interactions and social norms, while discounting and ignoring others.

Recognising Zwift as a designed virtual architecture takes us back to the work of Taylor (2009) and their description of 'the flows between system and player' (p. 322). We have seen that the system (Zwift) can directly influence the player (cyclist) and, crucially, that the player can directly influence the system and others within it. This creates a hybrid environment where the physical and virtual intersect to form what we describe as an *interreality*, which is a technological paradigm that has been employed in literature on mental health and patient treatment (e.g. Repetto & Riva, 2011; Riva et al., 2010). Whilst the clinical relevance of such an approach is not applicable here, the fundamental principles of interreality do hold resonance in the Zwift context. Outlined by Serino et al. (2013), interreality is characterised as the bridge between the virtual world and the real world. The end user may therefore occupy both the virtual and the physical at the same time. An interreality also provides an immediate feedback loop whereby actions in the real world affect what happens in the virtual world, and vice-versa. Applying interreality as a concept to Zwift, we see firstly that physical performance and practices in the real world directly shape how a cyclist experiences the virtual world. By this, we mean that things such as route planning, pushing hard to catch a group in front, or feeling physically exhausted, all shape how the virtual is experienced. And secondly, social performance (e.g. avatar identity), standard practices (e.g. dropping back to help a dropped rider), and limitations in game design (e.g. visual representations of gender and strength), shape how a cyclist experiences their physical world. In many ways, Zwift acts as a leisure space which facilitates the development and maintenance of an interreality.

By examining features such as social performance, gender, and morality, we have seen how the development of meaning, community, and participation create a leisure-based interreality of enhanced complexity. Indeed, despite the Zwift ecosystem offering a potentially equitable blank virtual canvas, we have seen that both male gaze and patriarchy collide with self-presentation and

morality to dismiss any notions of simplicity and predictability in the virtual leisure mosaic: it is infinitely complex. Crucially, when the theoretical interpretations presented in this paper are taken collectively, they offer a standpoint from which we may begin to understand how algorithmically designed, and socioculturally maintained, virtual assemblages establish multiple layers and forms of participation which shape the very nature of an end-user's interreality.

Suggestions for further research

Through the process of writing the current paper we have identified two other perspectives for further interrogating the Zwift assemblage. The first is Oldenburg's (1999, 2001) conceptual framework of 'third spaces'. In *The Great Good Place*, Oldenburg (1999) explains how one's first place is home, and second place is work. Whilst this distinction has become increasingly blurred of late, his presentation of a third place, an important social space where diverse groups of people can come together on reasonably equal terms, is of particular interest.

An initial consideration of Zwift as a third place with Oldenburg's (1999) seven defining features shows promise, with the Zwift space featuring various degrees of: being a kind of neutral ground; status levelling; lively conversation; regular attendees; a playful mood; and a home away from home for its participants. Further exploration using Oldenburg's conceptual tools could offer a fascinating critical appraisal of the Zwift assemblage.

Another avenue for future scholarship might investigate how power, surveillance, and discipline are negotiated through the 'panopticon' of Zwift. Foucault (1995) uses Bentham's 18th century prison design, the panopticon (or inspection-house), as an analogy to examine these very themes. A panopticon is a circular prison, where each cell is separated from its neighbours. In the centre of the circle stands a guard tower, positioned so that a guard can inspect each cell while remaining out of the inmates' view. Interestingly, the surveillance's power lies less with the guard or institution, and more with the prisoners (public) who monitor and check their own behaviour (because of real and perceived surveillance) in order to cooperate and align with socially determined and externally imposed expectations. That is, effectively, the public surveils itself!

We surmise that Zwift functions something like a panopticon. While we suggest this association as a vein of future research, others have recognised the role of surveillance and discipline within digital leisure spaces. For example, Whitson (2015), in a piece called 'Foucault's Fitbit', celebrates the potential of self-tracking technology and the use of gamification as tools that encourage self-governance and regulation. To put it plainly, gamification becomes 'a tool for self-mastery and self-improvement' (Whitson, 2015, p. 354). Something similar might be posited for Zwift. Who is, by analogy, in each Zwifter's guard tower? Their followers? Their own conscience? The leaderboards? How might this surveillance be both repressive and productive?

Conclusion

This paper began by exploring how Zwift can be considered a virtual leisure space. Extending Silk et al. (2016) use of assemblage theory in digital leisure, assemblage theory was applied to the virtual leisure domain as a way of unpacking the ever-evolving complexities that are present within platforms such as Zwift. Under the caveat that virtual leisure spaces are hypercomplex platforms which cannot be fully explicated in a single paper, three of the authors then sought to explore Zwift from their own unique areas of expertise (micro-sociology, gender, and philosophy).

What emerged was an initial theoretical scoping of Zwift as a virtual leisure space. Moreover, as an intentionally-designed gaming platform, it allowed us to explore the architectures that exist in such spaces, how we interact with them, and how they relate to the social conditions of real life as they evolve. This led the authors to examine the potential of Zwift as an interreality, where the virtual directly affects the physical and vice-versa (Serino et al., 2013). Whilst assemblage theory was used to unpack how inherently complex a virtual leisure space such as Zwift can be, the concept of

interreality allows us to position this complexity within the user-experience and explore how it may moderate and mediate the life of a Zwifter. Emerging throughout the paper is the recognition that Zwift can be considered a space for leisure, and that virtual environments, where both the physical and virtual fuse to generate an interreality, are ripe for further examination within the fields of leisure studies.

Note

1. What we discuss here is subject to change through Zwift updates.

Disclosure statement

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