University of California, Irvine

Frame-Perfect: Temporalities in Competitive Gaming

Matt Knutson
School of Humanities, Ph.D. in Visual Studies
2020

Dissertation committee:
A. Braxton Soderman, Assistant Professor (adviser)
Victoria Johnson, Associate Professor
Bonnie Ruberg, Assistant Professor
Paul Dourish, Professor

Table of Contents

List of Figures

Acknowledgements

This work was supported by UCI's School of Humanities Dean's Fellowship, as well as a graduate student researcher position at UCI's Graduate & Postdoctoral Scholar Resource Center.

Chapter 3 was previously published in the journal of *Game Studies* (December 2018).

I'd like to thank my adviser Braxton Soderman, as well as my committee members Vicky Johnson, Bo Ruberg, and Paul Dourish for their countless efforts reading, discussing, and informing my work. I should also thank my partner Emily for her constant support and our children, Autumn and Quentin, for keeping me on my toes. Many mentors have generously provided me their time and insights, in particular Aaron Trammell, Kristen Hatch, Allison Perlman, Fatimah Tobing Rony, and Bliss Lim. My cohort members Ben Kruger-Robbins, Finley Freibert, and Tavleen Kaur all read early versions of this work and provided me with helpful suggestions, particularly Ben's advice to read about queer temporality, which led me to the idea at the heart of chapter 3. Many other peers in the Visual Studies, Anthropology, and Informatics programs at UCI have influenced my research, especially Amanda Cullen, Jason Reitman, and Stephen Rea. Finally, I'd like to offer a special thank-you to Mark Deppe and his staff at UCI esports, including Kathy Chiang and Damian Rosiak, for being generous with their time and enabling me to pursue streaming practice alongside my scholarship.

Vita

EDUCATION

2020	Ph.D. in Visual Studies, UC Irvine
2014	M.A. in English, Boston College
2009	M.Ed. in Secondary Education, University of Minnesota Twin Cities
2007	B.A. in English, University of Wisconsin Madison

PUBLICATIONS

Refereed Journal Articles

2018	"Backtrack, Pause, Rewind, Reset: Queering Chrononormativity in Gaming," *Game Studies,* December 2018

Conference Proceedings

2020	"Living By the Code: Drafting and Enacting Community Guidelines for a More Inclusive Esports Environment," UC Irvine Esports Conference 2019

Book Reviews

2020	"Review: *Intermedia Games: Games Inter Media* (2019)," *American Journal of Play*

HONORS AND AWARDS

2020	Graduate Student Research and Travel Award, UC Irvine School of Humanities
2019	Graduate Student Research and Travel Award, UC Irvine School of Humanities
2013	Henry Blackwell Prize for essays in cultural studies, Boston College
2007	Graduated with honor from the University of Wisconsin Madison

GRANTS AND FELLOWSHIPS

2017	Research Fellowship, The Strong Museum of Play, Rochester NY
2014-2019	Dean's Fellowship, School of Humanities at UC Irvine
2013	Teaching Fellow, Boston College
2012	Academic scholarship, Boston College

CONFERENCE ACTIVITY

Papers Presented

2020	Queerness and Games Conference, "He/She/They: The Risks of Being Outed on Stream" (conference cancelled due to COVID-19)
2020	Dreamhack Anaheim, "Varsity and Beyond: Administrators and Athletics," panel discussion
2020	Society for Cinema & Media Studies 2020 annual conference, "'Golden Age' Pros: An Archival Study of the Pre-History of Esports" (conference cancelled due to COVID-19)
2019	Society for Literature, Science, and the Arts annual conference, "The Distributed Ethos of *Melee* Netplay"
2019	UCI Esports Conference 2019, "Living By the Code: Drafting and Enacting Community Guidelines for a More Inclusive Esports Environment"
2019	Game Developers Conference 2019, "Diversity and Inclusion in Esports: Where It Is, Where It's Going, and How It's Being Done"
2018	Society for Cinema & Media Studies 2018 annual conference, "Buffered Time: Connected Asynchronicity on Twitch" (presented remotely)
2017	Society for Cinema & Media Studies 2017 annual conference, "Frame Perfect: Optimization in the Micro-Temporality of Skillful Play"
2016	Subjected to Play Conference at University of Southern California, "Playing Roles: Games as Sites of Identificatory Performance"
2016	Extending Play Conference at Rutgers University, "Frame Perfect: Optimization in the Micro-Temporality of Skillful Play"
2016	The SOCIAL Conference at Boston University, "Algorithm and Architecture: The Persistence of Disciplinarity in Informatic Control"
2016	Significations Conference at California State University – LA "Raster Romance: Compulsive Heterosexuality in the 1980s Arcade"
2015	Media Fields Conference at University of California – Santa Barbara, "The Dehumanized and the Nonhuman: Empathetic Play in Lucas Pope's Papers, Please"

Dissertation Abstract

Frame-Perfect: Temporalities in Competitive Gaming
Matt Knutson
Visual Studies Ph.D.
University of California, Irvine (2020)
Committee chair: A. Braxton Soderman

As the popularity and cultural import of professionalized competitive gaming has dramatically risen in the last decade, little humanistic research has analyzed how professional gamers optimize their play. Highly skilled players often pursue "frame-perfect" techniques, or actions timed to the one-sixtieth of a second. However, existing game scholarship tends to approach gaming temporality from the perspective of narrative theory, which has little to illuminate on this topic. My dissertation approaches the subject of time in competitive gaming not through narrative theory but through scholarship on media temporalities. The division of continuous experience into discrete snapshots is a familiar topic to both photography and cinema studies, which help elucidate the experience of optimized, perfected play in professional gaming.

The dissertation's first chapter addresses the consequences of perfected gaming: when play is optimized to a frame-perfect extent, play ceases to be playful and instead becomes deterministic. The second chapter considers ways in which lag, inconsistencies, and buffers challenge the semblance of liveness and shared temporality in networked gaming and streaming. The third chapter pivots on the temporal preoccupations of high-stakes, perfected play by identifying a set of oppositional temporal experiences in games through queer theory.

The dissertation contributes to scholarship on games by investigating both the professional attention to micro-temporal play and strategies to recover what is playful about play even in this context of professionalization. Game studies generally and this dissertation in

particular emphasize our need for humanistic values, such as playfulness, as technologies and markets urge us to live, work, and play optimally.

Introduction

It's a Wednesday night in Madison, WI, in 2006, and I'm walking to "Mound House," my buddies' off-campus place on Mound Street. Like most of the college town, their second-story apartment smells faintly of cheap beer and stomach acid. We're there to play *Super Smash Bros. Melee* (just "*Melee*" for short), except we've developed an idiosyncratic ruleset we call "League Play." Normally *Melee* is played as a casual party game with a number of randomized elements, but to reduce randomness in favor of competitiveness, we play with items and "unfair" stages (otherwise known as "levels") turned off. League Play's most important provision, though, is that we select special League Play-only tags (mine is "NUTS," an admittedly bawdy play on my last name) to keep a detailed record of our in-game statistics. We swear not to use the tags outside of League Play, and at the end of every night we review our stats. "I have the greatest flight distance!" "I have the most KOs!" "League Play" as a name encapsulates the (mock-)earnestness of keeping track of who's the best in the group under structured, organized play. We add and drop classes, and romantic interests flare up and burn out, but we never miss a League Play night.

My friends and I did not realize then that our interest in competitive video game play was, for one, shared with millions of others, and secondly, would anticipate an industry of video game competition now referred to as "esports." Esports is, in general, organized video game competition,[1,2] especially that which is broadcasted to an audience,[3] supported by sponsorship,

[1] Taylor, T. L. *Raising the Stakes: E-Sports and the Professionalization of Computer Gaming*. MIT Press, 2012.
[2] Jenny, Seth E., et al. "Virtual(Ly) Athletes: Where ESports Fit Within the Definition of 'Sport.'" *Quest*, vol. 69, no. 1, Routledge, 2017, pp. 1–18. *uci.primo.exlibrisgroup.com*, doi:10.1080/00336297.2016.1144517.
[3] Wohn, Donghee Yvette, and Guo Freeman. "Live Streaming, Playing, and Money Spending Behaviors in ESports." *Games and Culture*, vol. 15, no. 1, SAGE Publications, 2020, pp. 73–88. *uci.primo.exlibrisgroup.com*, doi:10.1177/1555412019859184.

and populated by professional and semi-professional players.[4] Our manipulation of the ruleset for our favorite party game limited randomness in favor of skill, turning a casual game among friends into something more esports-like, and our interest in statistical analyses belied an ontological rationality of video games. These games are from the ground up digital rather than analog, discrete rather than continuous. Esports, a term we had not yet heard despite the ascendency of competitive gaming in South Korea,[5] would eventually produce games like *League of Legends* with multi-million dollar tournaments and employ hundreds (if not thousands) of full-time players. The rationalization and optimization of play that we promoted in our "League Play" lay at the heart of *League of Legends* as well as other games such as *StarCraft* and *CounterStrike*. *Melee*, which serves as a central object of analysis for the present project, went from a party game in 2001 to a small competitive scene in garages and church basements in the mid-2000s[6] to a fully-fledged esport by 2014 with professional players, corporate sponsorships, and massive viewership. *Melee* serves as a microcosm for the growth of esports from obscurity to mass cultural phenomenon, from an object that seems to enable limitless freedom of play to a mapped-out, analyzed, rationalized platform for skillful competition. My own experiences with the game changed over time as I learned more about it in particular and the study of video games generally, and I eventually came to write this project in large part through *Melee*.

In *Melee*, the object is to knock one's opponents off of the stage (see **Figure 1**) while trying not to be knocked off oneself. Attack moves send characters flying into the air, at which point they need to recover back to the stage or else lose a stock – in other contexts, this would be

[4] Hamari, Juho, and Max Sjöblom. "What Is ESports and Why Do People Watch It?" *Internet Research*, vol. 27, no. 2, Emerald Publishing Limited, 2017, pp. 211–232. *uci.primo.exlibrisgroup.com*, doi:10.1108/IntR-04-2016-0085.
[5] Jin, Dal Yong. Korea's Online Gaming Empire. MIT Press, 2010.
[6] Beauchamp, Travis. *The Smash Brothers*. East Point Pictures, 2013.

referred to as a "life," of which each player has four.

Figure 1: *Mario knocks Fox off the stage. The red circle on the side tracks Fox's position as he travels off camera.*[7]

Once one player loses four stocks, that player is eliminated. *Melee* is the second game in Nintendo's *Smash Bros.* series (*Super Smash Bros.* for the Nintendo 64, *Melee* for the GameCube, *Brawl* for the Wii, *Super Smash Bros. for Wii U* and its sister game for the 3DS, and *Super Smash Bros. Ultimate* for the Switch). The most immediately visible quality of the *Smash Bros.* series is that it features characters from across virtually every major Nintendo franchise:

[7] Source: Heeew. *Ranked Random*. *YouTube*, https://www.youtube.com/watch?v=N51Hex-bE4w. Accessed 17 Apr. 2019.

Mario, Bowser, Peach, Pikachu, Zelda, Kirby, and Donkey Kong represent some of the most recognizable ones, but the cast includes more obscure characters such as Marth (*Fire Emblem*), Captain Falcon (*F-Zero*), Fox (*Star Fox*), and Ness (*EarthBound*) (**See Figure 2**). In line with Nintendo's historical family-friendly aesthetics,[8] *Melee* represents its characters and stages in bright, vivid color schemes, typically accompanied by upbeat, happy music. The game excels at producing unpredictable matches when four players hop into a free-for-all with randomized item drops on hazardous stages; players form alliances and betray each other mid-game in order to take the lead or exact vengeance. In this regard, *Melee* has gained a reputation as a casual party game, but amazingly this exterior of unpredictability disguises a core game that delights competitive players.

[8] Kline, Stephen. *Digital Play: The Interaction of Technology, Culture, and Marketing*. McGill-Queen's University Press, 2003.

Figure 2: *The* Super Smash Bros. Melee *character select screen.*

I moved around after college, getting a job before going back to school for another degree (then a second and third), got married and had a kid (and a second) – but I did not get to enjoy a regular schedule of *Melee* until 2014 when I discovered *The Smash Brothers*, a community-sponsored documentary of the competitive *Melee* scene. While I was not looking, this Nintendo party game from 2001 grew a small competitive community into a big scene when in 2013 *Melee* blew up at EVO ("Evolution Championship Series"), the premier yearly fighting game tournament. *The Smash Brothers* studies seven American players who topped the player rankings over the game's competitive history. The seventh episode documents how the community raised

over $100K for charity for its EVO 2013 bid and how Nintendo almost succeeded in suppressing the competitive scene by barring *Melee* from the EVO online stream.[9] Fan backlash made Nintendo relent; the controversy and the documentary prompted a massive influx of new interest and players in this twelve-year-old game (already ancient by competitive gaming standards). I got involved in the competitive Smash community at UC Irvine, which turned out to be the number one ranked college team in the nation at the time. Instead of NUTS, my tag became AGON, a Greek term for games of skill.[10] During my time there, UCI would emerge as the nation's first esports program at a public university and distinguish itself by hosting events such as the annual academic conference on esports, UCI ESC.

Playing competitively made me rethink how I saw *Melee* and approach its structure. The object was still the same: force the opponent off the stage four times in eight minutes and recover back to the stage when the opponent tries to do the same to you. But underneath this game's entertaining exterior was an uncompromising computational machine I had not previously come to terms with. Competitive players study "frame data," a visualized sort of information about quantifiable elements of gameplay such as move duration and damage (see **Figure 3**). On an NTSC-compatible (North American) version of *Melee*, the console updates the game state about sixty times per second. All animations are measured by the frame, so a 15-frame animation lasts about a quarter of a second. I learned that my character (Falco) jumps on the sixth frame, that his jab comes out on the second, and that I can cancel his reflector on frame four; I developed muscle memory to make use of this quantitative information. To give an example of technical gameplay (usually referred to as "tech"): moving toward my opponent's character, I hit jump, cancel out of jump by dodging into the stage (called a "wavedash"), hit reflect to try to damage

[9] Beauchamp, Travis. *The Smash Brothers Episode 7: The Natural*. East Point Pictures, 2013.
[10] I will return to *agon*, as Roger Caillois uses the term, later in the chapter.

my opponent, cancel out of reflect by jumping, dodge into the stage again ("waveshine"), and then if the reflector connected with my opponent, I try to knock them offstage with an aerial attack while they're still vulnerable to attack ("in hitstun") from the reflector. A sequence like this unfolds in a little less than a second. Studying play in *Melee* by the frame reoriented my temporal understanding of the game: I learned what I could and could not react to, and I began to view the game's 60 frames per second as a sort of metronome that structures the whole of the play experience.

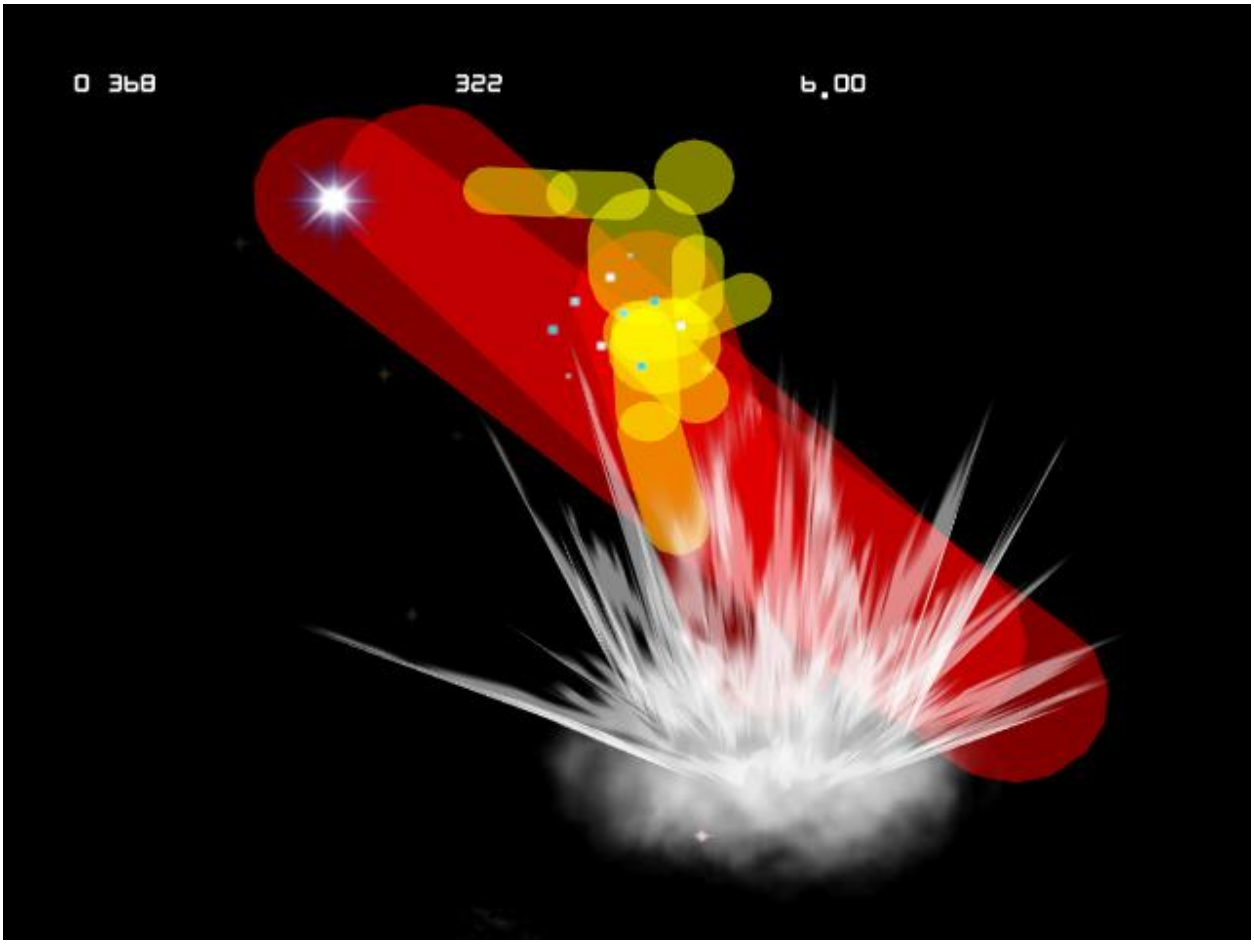


Figure 3: Marth frame data in *Melee*: the yellow represents the "hurtbox," or where Marth is vulnerable to attack. The red represents his "hitbox," or where Marth can deal damage to other

characters.[11]

Coming back to *Melee* after an absence also helped me identify and denaturalize some of the discursive norms surrounding the game. I recognized the "dudespeak" I had previously looked past as something hegemonically masculine and full of ambivalences towards women generally and women in gaming more specifically. This kind of speech surfaces in *The Smash Brothers* documentary, in the Twitch chat client running alongside any given streaming video, and occasionally in person. Most of the truly egregious language is absent from in-person communication. Unlike gamer lingo in 2006, using the word "rape" to describe a dominant victory is now widely frowned upon, and I have not heard anyone use the word "gay" to describe cheap tactics since college. The live game-streaming service Twitch debuted during my absence, and Twitch chat is, regrettably, its own animal of toxicity. Various Twitch streamers employ different tools (to various levels of success) to curb toxic language without discouraging hype and ecstatic reactions to electrifying performance, but predominantly streamers either reproduce that language themselves or approach it with a "boys will be boys" attitude. The "dudespeak" and casual bigotry has become more covert and anonymized rather than cut out of the gaming experience entirely. Instead of writing outright racial slurs or homophobic insults, Twitch users can use emotes (small pictographic symbols, like emoticons or emoji, but specific to Twitch) as shorthand for markers of difference and form these emotes into memetic constructions of racist or homophobic intent. Altogether, the discursive tendencies of "dudespeak" form part of the normative background noise around esports that I will respond to in chapter 3.

UCI launched an esports initiative in the fall of 2016, opening an esports arena and putting eleven student athletes on partial scholarship. These players were recruited to compete in

[11] *Data - Kadano's Perfect Marth Class -- Advanced Frame Data Application | Smashboards*. https://smashboards.com/threads/kadanos-perfect-marth-class-advanced-frame-data-application.337035/. Accessed 16 May 2020. p 21.

League of Legends, the largest esport in terms of active players and concurrent Twitch viewers. The school's *Melee* players (*Melee* being a comparatively small esport) were given dedicated space in the arena for console setups, but there were to be no scholarships for them in the initiative's beginning phases. This reflected both the size of the esport and the commitment of the developer to that esport's success – which is to say none, since Nintendo is overall disinterested in supporting esports financially,[12] let alone a teenaged game from multiple console generations ago. The console setups in the arena display *Melee*'s old-school apparatus. In the interest of minimizing latency, console *Melee* is played exclusively on Cathode Ray Tube (CRT) televisions, which the GameCube was designed for. Counterintuitively, the now-ubiquitous high-definition television has a *higher* latency for legacy hardware like the GameCube because that console sends low-definition information to the TV, which then briefly pauses to "upscale" the image before displaying it. This delay amounts to a fraction of a second, but when players measure their reactions in frames, this lag makes serious competitive play impossible. So CRTs are the standard in the esports arena and at all *Melee* tournaments. Between Nintendo's disavowal of the game and the outdated televisions required for competitive play, *Melee* is a sort of red-headed stepchild of the esports scene.

I began bringing my controller to campus to play "friendlies" (non-tournament games) in the arena whenever possible, but when I needed to practice I played at home. Lacking a CRT, I played an emulated version of *Melee* on my home computer through the GameCube emulator Dolphin and a USB peripheral that lets one plug in GameCube controllers. Many players in the community also use Dolphin, in part because there is an online competitive community complete with ranked matches and an easy interface for connecting with other interested players. The

[12] "Nintendo's President Explains Its Reluctance To Fund Smash Bros. Tournament Prizes." *Kotaku*. *kotaku.com*, https://kotaku.com/nintendos-president-explains-its-reluctance-to-fund-sma-1840886267. Accessed 16 May 2020.

community (SmashLadder) features its own chat, a region locator, and its namesake ladder (the dynamic list of top-ranked players). Through SmashLadder one can connect with players within a certain geographical radius: for Southern California, that extends as far as Arizona, the Bay Area, and sometimes even Oregon, Colorado, and Washington state. The greater the distance, the greater the latency, so it would be pointless trying to connect with someone in, for instance, North Carolina, because the latency would preclude serious play. With lag growing as distances increase, the temporality of online play figures into *Melee* through Smash Ladder in a way I could not have anticipated in 2006. The SmashLadder system provides the *Melee* community with increased options for competitive play – even for top players – but in general there is no substitute for in-person play via console. The latency in person is ideal, and only in-person tournaments carry substantive prize purses.

Since 2006, esports in America went from small competitions whose winnings could sustain perhaps a handful of the very best competitors to prize pools in excess of $1m for major games like *League of Legends* and *DotA 2*. *Melee* has nowhere near that level of financial support, but after the aforementioned explosion in 2013, competitive *Melee* grew to sustain about twenty full-time professionals.[13] These players assemble a living from prize winnings, sponsorships, and Twitch subscriptions. Major esports teams like Cloud 9, Alliance, Team Liquid, and Counter Logic Gaming now sponsor *Melee* players, with the team acting as a middleman between its players and the companies that produce gaming peripherals, energy drinks, etc. who sponsor the teams. Twitch, the streaming video service mentioned above, generates revenue for itself and its streamers through subscriptions: users pay $5/month to

[13] Since the time this chapter was first written, the *Melee* professional scene has diminished in size. While other esports can more nimbly adapt to online-only tournaments that can function during the COVID-19 pandemic, *Melee* tournaments must be in-person. As such, not only are major tournaments cancelled, but so are local events, and this may cause lasting damage to the community.

support their favorite players, gain acknowledgment from those players, and access player-specific emotes that they can type in anyone's Twitch chat. The most successful *Melee* streamer, Mang0, currently maintains about 10,000 subscriptions, which translates to an estimated income of $35K per month (after Twitch takes its cut); that is before his stipend from Cloud 9, his team; and that does not include tournament winnings, fan donations, or the occasional paid appearance in advertisements. Players like Mang0 have "made it" in the world of esports in a way that no *Melee* player would have imagined in 2006.

As *Melee*'s competitive community developed, not only did financial stakes change, but the sophistication of gameplay did too. Over time, players discovered new techniques, improved their strategies for countering common options, and honed their gameplay towards cleaner and more consistent results. The process of working towards a more polished and efficient execution of gameplay is commonly referred to as optimization. Play tends to become optimized when dominant strategies are established and one player can anticipate and respond to all of another player's possible responses. Outside of the game, players think through situations in which decisions are limited in order to create a plan to counter their opponent's every available option. "If you do A, I do X; if you do B, I do Y." These decision trees, as they are commonly referred to, connote inevitability of outcome when they are executed proficiently. A real-time application of chess-style puzzles ("Black mates in three moves"), optimized decision trees structure certain game scenarios that had previously been thought open to contingency and unpredictability.

Melee as a party game, as a grassroots competitive scene that became an esport, as a rationalized digital object, as a game around which a community has formed, as an analyzed platform for competition, as a temporally regulated piece of digital media, and as a game one can become a professional in, informs this project's analysis of the temporality of competitive

gaming. Looking at competitive games the way professionals do, as optimizable objects marked by rational temporal intervals, alters how we understand and play games. This project explores the extent to which fully rationalized play can even be considered play. The "Perfect" in this work's title "Frame-Perfect" undermines the contingency, the freedom, and the creativity of play in ways that should be explicated and accounted for if we wish to understand what might still be playful in the context of the kind of high-stakes gaming enjoyed by millions of esports players and spectators. And this project draws connections between optimization of digital labor in esports and wider trends toward optimization in the digital workplace generally; what we see in esports is not an isolated example of some odd cultural practice but a signal about broader trends in digital labor. Post-fordist digital labor tethers one to an electronic device beyond the confines of an office; [14] it presents itself as flexible even while extracting optimal productivity from workers;[15] and it commits one to a sustained position of precarity of labor without benefits or contract, often on a proprietary platform. While this project examines esports, it also reveals all of these qualities of contemporary digital labor. This project is not itself a broad assessment of such labor, but it does gesture outward to this topic from its close analysis of esports.

The Art of Play in the Age of Frame-Perfection

The frame is the smallest unit of time in animation. A single frame is a still image, both in film and in video games; displayed in rapid succession, frames convey an illusion of movement. In games, a frame is computed before it is displayed.[16] Player inputs influence this computation and alter what the frame currently displays, as well as what will be displayed momentarily.

[14] Deleuze, Gilles. "Postscript on the Societies of Control." *October*, vol. 59, The MIT Press, 1992, pp. 3–7. JSTOR.
[15] Galloway, Alexander R. "Allegories of Control." *Gaming: Essays on Algorithmic Culture*, University of Minnesota Press, 2006.
[16] West, Mick. "Programming Responsiveness." *Gamasutra*, 9 July 2008. *www.gamasutra.com*, https://www.gamasutra.com/view/feature/130359/programming_responsiveness.php.

Frame-perfect play is an input or technique entered on the first available frame and no later. In a fixed-framerate game such as *Super Smash Bros. Melee*, the game console is synchronized with the television set flickering at a constant 60 frames per second. As the *Melee* community uses the term, frame-perfect play is that which is timed to within one-sixtieth of a second. Some techniques can only be executed in a one-frame window; others are simply best executed on the first possible frame. Frame-perfect play highlights the fact that in games, and most obviously in those with set frame rates, our ostensibly continuous experience of play is in fact chopped up into discrete units of time. We do not have such an open-ended temporal relationship to the gaming apparatus as we might like to believe; video games close off play into the cybernetic loop between operator and apparatus, enveloping human input into the rationalized temporality of the game.

In approaching time in gaming at the granularity of the frame, this work offers an intervention into how temporality is discussed in game studies scholarship. From early on, game studies scholarship has frequently adapted narrative studies of temporality to the video game: Juul (2004), Eskelinen (2004), Nitsche (2007) Mateas & Zagal (2010), and Wei et al. (2011) all take this approach. This scholarly tradition draws important narratological distinctions between, for instance, the length of time one sits at the gaming console and that of the story's scope. Narrative theory helps us better understand how games condense months or years in the story into hours of gameplay; or how games offer the sensation of hyper-awareness through "bullet time" mechanics; or how a pause menu or loading screen ruptures our sense of one-to-one correspondence between time played and in-game time. But this narratological approach is not well suited to studies of games' internal, computational rhythms or of games as apparatuses for reliable performance (of both the hardware and of the player). This apparatus-centric approach is

precisely how esports players understand time in the pursuit of frame-perfect play. The question of whether a given character's narrative takes place in a story longer than the amount of time the player spends playing the game is moot to the tournament participant. Instead, the most pressing temporal concerns this player has are whether they can react fast enough, whether their briefly timed motor movements are optimized, and whether their muscle memory succeeds in performing a frame-perfect technique under pressure. When we look at games as predictable apparatuses, we can better understand games' temporality *qua* games, rather than the narrative time suggested by a game's story.

The Stakes of Play in Esports

This work is about time in competitive video games such as *Melee* and how standardizing time (through frame rates and through authoritative server time in online games) upends the playfulness of play as we know it. I use this term to describe the humanistic essence of play: when play is not contrived, forced, calculated, or feigned, but instead spontaneous, free, creative, and open to contingency. The extent to which play may still be playful even in a professional context is a key question for this work. Professional play, an apparent contradiction in terms, may be familiar to sports but is relatively new to video games. Acute attention to time in games has definitional importance to the concept of play. As players fixate on discrete temporalities in games such as frame data, frame-perfect performance, micro-temporal (at the timescale of less than a second) tactical decisions, and drilled muscle memory for fraction-of-a-second timings, their behaviors resemble play less and less. Play theorists have commonly described play as free, voluntary, and unproductive, among other characteristics, while pro gaming has incentivized a kind of play that is rote, contractually obligated, constrained, deterministic, and prone to bringing about foregone conclusions. What is at stake in the proliferation of esports is that which makes

play playful in the first place. This work both identifies the ways in which the playfulness of play is undermined in temporally optimized professional gaming and, just as importantly, it suggests strategies for recovering the playfulness of play. Why should we keep playing if the type of play on offer has no potential for creativity or freedom or contingency? Is the concept of play in esports fraught from the beginning and irredeemable? And if it is, why should we care? As professionals pursue multi-million dollar prizes in international tournaments for games such as *League of Legends* and *DotA 2*, maybe the status of play is a moot point to the players themselves. Maybe we do not get "play," exactly, but "fun" instead – the kind of fun we can have at a theme park or from watching a movie, or any other amusement that does not privilege creativity/freedom/contingency the way play does. And maybe fun ought to be good enough for esports.

These questions matter, I argue, because play for its own sake means more than just play, as self-contradictory as that may sound. But it is precisely when we *do not* mobilize play for certain ends that it becomes the most valuable to us. The playfulness of play is not rationalizable, and it sheds its skin in response to every attempt to grasp it, package it, sell it, reproduce it on command, or confine it to a specified zone. Packaging, selling, and rationalizing play is exactly what the games industry sets out to do, and exactly what esports players and professional streamers for the most part try to reproduce. But playfulness shows up in the unexpected, in the unplanned, in our most vulnerable and personal moments when we are not paying attention – and then it disappears. This project recognizes the ineffable qualities and manifestations of play as it emerges out of the professionalized and optimized context of esports.

Over the course of this work's three main chapters, normalized temporalities of play (frame-perfect optimization and authoritative server time) open up to a discussion of queer time

in games. Queerness in games is not solely a matter of representation/simulation of queer experiences; time itself may be queered when we consider what is normalized and standardized in order to better understand what is peripheral, deviant, or outside the norm in terms of temporality in games. Instead of the uncompromising sequentialism of frame-perfect play, what about games that rewind and backtrack through past moments? Instead of high-stakes matches arbitrated by a game company's server with its authoritative account of time, what about games with low stakes, in which players do not compete with each other, requiring no central authority to resolve temporal differences, and instead accepting consequent ambiguity? This argumentative arc bridges chapters one and two to chapter three.

In making an argument about play in the context of esports through a study of temporality, this project draws on multiple areas of scholarship. The following literature review groups scholarly areas by topic: play as freedom, media temporality, time in games, the "frame" in game scholarship, and esports scholarship. The more general topics at the start set up the more specific topics to follow; altogether these topics provide context for this work's scholarly interventions and contributions to game studies and the topic of media temporality.

Time and Play: Freedom, Creativity, and Contingency

Studies of play long preceded the advent of game studies as an academic field. Johan Huizinga's *Homo Ludens* (1944)[17] examines human and animal play as well as play's relationship to religious ritual. His work explores the idea that culture and society (even at their most serious) ultimately stem from play. Huizinga describes play as having central, definitional characteristics: play "is free, is in fact freedom" (8); play "is distinct from 'ordinary' life" (hence his influential concept of the "magic circle" (10)); play "has its rules" (11): summing up, Huizinga describes play as:

[17] Huizinga, Johan. *Homo Ludens; a Study of the Play-Element in Culture.* Beacon Press, 1955.

> a free activity standing quite consciously outside 'ordinary' life as being 'not serious,' but at the same time absorbing the player intensely and utterly. It is an activity connected with no material interest, and no profit can be gained by it. It proceeds within its own proper boundaries of time and space according to fixed rules and in an orderly manner. It promotes the formation of social groupings which tend to surround themselves with secrecy and to stress their difference from the common world by disguise or other means. (13)

Huizinga's mention of "boundaries of time and space" between play and "ordinary" life reflects a common distinction between work and leisure time. Play transpires outside of the designated boundaries of the 9-5 work schedule, for example. As such, Huizinga's idea of the temporality of play is shaped by the standardizations and structures of the Fordist economy. Leisure time can be "free" inasmuch as it is not bound within work time. More specifically to sports and competitive games such as Bridge, Huizinga emphasizes that professionalization violates both the unseriousness and non-material interest of play (199). Professional sports and card games with a financial stakes are, to Huizinga, therefore not places of play. It would seem Huizinga would say the same of esports today.

In *Man, Play and Games* (1958),[18] Roger Caillois (another sociologist) responds to Huizinga's work and extends it in certain ways, such as creating categories for types of games. Caillois lists in order the defining characteristics of play: it is 1) Free; 2) Separate from the everyday; 3) Uncertain of outcome; 4) Unproductive; 5) Governed by rules; and 6) Make-believe in a "free unreality" (9-10). Both Huizinga and Caillois place "free" first among their descriptions of play, and for both that freedom appears opposed to an instrumentalization of play: Huizinga argues that play has "no material interest," and Caillois describes play as "unproductive." In fact, he claims that "Play is an occasion of pure waste: waste of time, energy, ingenuity, skill, and often money" (5-6). This sets the professional player (of sports or, in our case, esports) as a self-contradiction. If one plays for some end rather than seeing play as an end

[18] Caillois, Roger. *Man, Play, and Games*. University of Illinois Press, 2001.

in itself, then according to Huizinga and Caillois, one is not in fact playing: Caillois even states explicitly that professionals "are not players but workers" (6). I am sympathetic to this argument, and indeed this work discusses the loss of playfulness in the professionalization and optimization of esports. Simultaneously, however, this work investigates the ways in which playfulness nonetheless asserts itself even in this post-fordist context. Like Huizinga, Caillois is writing in a context of Fordist labor; how these two might respond to the temporal intermingling of labor and leisure in the post-fordist economy—where time spent at play becomes mobilized toward a productive end—is an open question.

Approaching the topic from the method of a dialectical philosophical treatise, Bernard Suits's *The Grasshopper* (1978)[19] inquires into play through the eponymous Grasshopper of Aesop's fables, who spends his life in leisure and stores no food for the winter. This work explores the relationship between the Ant's work and the Grasshopper's play, and yet Suits does not follow Huizinga and Caillois in saying that the professional cannot be considered to be playing. Rather, Suits argues that just because there is an external purpose for the professional player, that does not mean that the "lusory attitude" (or, in other words, the will to win) that Suits emphasizes in play is lost or that the professional player is not *also* playing, to use a common phrase, for the love of the game (144). Suits's condensed definition of play is "the voluntary attempt to overcome unnecessary obstacles" (41). While this definition is constructed differently from Huizinga and Caillois's descriptive lists of things that play is, Suits nonetheless places "voluntary" foremost in his definition. Play, all three stress, cannot be play if it is not freely chosen. Suits allows for the professional's ability to make free choices in a given game and maintain a lusory attitude.

One influential text that applies theories of play to game design (and video game design)

[19] Suits, Bernard Herbert. *The Grasshopper: Games, Life, and Utopia*. University of Toronto Press, 1978.

is Salen and Zimmerman's *Rules of Play*.[20] The authors' definition of play bears clear resemblance to Caillois': "Play is free movement within a more rigid structure" (304). This definition is broader than the others and would seem applicable to many situations that do not intuitively resemble play. For example, the boy in Mark Twain's *Tom Sawyer* that Sawyer tricks into painting the fence: to this boy, fence-painting is a free choice within a structured activity and therefore by Salen and Zimmerman's definition play. But such an activity would not satisfy Huizinga or Caillois as sufficiently distanced from the everyday (among other reasons). Notably, if one follows Salen and Zimmerman's definition, the professional player is engaged in play so long as that player exercises discretion in one form or another. What pitch to throw in baseball, or where on the court to shoot from in basketball – even for professionals who are compensated for their performance and may standardize their play, they still act freely in how to manipulate the ball, as well as where and when to act. To relate this sense of room for play back to Caillois, he offers a metaphor of the "*play* of a gear," describing "the range of movement of the parts of a machine" (8, emphasis in the original). This metaphor affords both the rigid structures of the rules and the "give" required in the space between these structures: yes there is a mechanical basis in play, but just as importantly there must be open space for free movement therein. Caillois says this of play generally, but it bears special relevance to esports, even if Caillois would not have considered them play. The metaphor lends itself well to the machinelike structure of esports, in which players train themselves for consistency and optimal performance. And yet there is a space for play, room for the gear-like players to adapt, create, and respond to contingency. There is room for things like "style," which I define below and discuss in chapter 1.

Another scholar to address Caillois on the distinction between play and work is TL Taylor in her chapter "Beyond Fun: Instrumental Play and Power Gamers" in *Play Between*

[20] Salen Tekinbaş, Katie, and Eric Zimmerman. *Rules of Play: Game Design Fundamentals*. MIT Press, 2004.

Worlds (2006).[21] Examining the "power gamer" as described through her experiences in *EverQuest*, Taylor describes this figure as someone motivated to progress through levels and pursue loot efficiently and through technical know-how. Taylor brings up Caillois as a voice in game studies critical of instrumentalized or work-like play, and then she poses the question: "But might we imagine a space in which our games at times are not always 'fun' and, conversely, our labor can be quite pleasurable?" (89). She argues that there are complex pleasures in gaming, as exemplified by the power gamer, that do not cleanly adhere to the work/leisure divide argued for by Caillois (among others). This work on power gaming would in part prefigure her future research on esports, as will be discussed below. As for this chapter by itself, it has clear implications for how we might approach the intermixing of work and leisure in competitive gaming. I agree that the pleasures of play are complex, especially when we ask players to explain their own diverse lived experiences, but I do not wish to put aside entirely the romantic idea of play for its own playful sake. There still is something about play that gets lost in professionalization, and there is value in recovering playfulness.

Contrary to earlier writers such as Huizinga who set play apart from the everyday, McKenzie Wark in *Gamer Theory* (2007)[22] offers "gamespace" as a reversal of this notion. It is not that we live in the non-game everyday and venture out to play in "magic circles" set aside from regular life; rather, games have extended outward into every corner of the everyday, and life begins to seem like an unsatisfying game. This extension of games into the everyday has particular relevance to esports, which not only testify to the dissolution of the work/leisure divide but also amass data within, without, and around a given game and its players. To Wark the unsatisfying game that is our everyday surroundings does not offer us a fair chance to win. As

[21] Taylor, T. L. *Play between Worlds: Exploring Online Game Culture*. MIT Press, 2006.
[22] Wark, McKenzie. *Gamer Theory*. Harvard University Press, 2007.

such we are prone to resent "the obvious fact that the dice are loaded, the deck stacked, the table rigged and the fix–in" (1). Combining a Marxist critique with a media studies appreciation for the social significances of networked communication and algorithmic texts, Wark argues that the topological flow of information over all points in the network serves to concentrate wealth in the hands of the elites who influence the flow of information and capital. To Wark, "topological" signifies a new mode of connecting things and people together: it is an especially digital mode of connection that seems to collapse space and put all points in quantifiable relation to all other points – a paradigm shift from the "topographic" of maps and routes. As such, play seems already compromised in gamespace: the game industry is a business about offering players the ability to control the flow of information, but in practice the industry concentrates information and capital in the hands of its established companies. Borrowing a term from Suits, Wark suggests we might "trifle" with games rather than attempt to win them, if while playing a game like *The Sims* we are "interested in style, in details, in furniture, or telling stories, or creating interesting worlds" (40). In the figure of the trifler there may be some kind of contrary play that runs against the predominant win conditions of games as competitive platforms. But in Wark's presentation of gamespace, play's gesture toward alterity and transcendence generally rings hollow as play is abbreviated to commodified fun. And in the all-encompassing topological line that games are exemplary of, there seems to be no possibility for moving outward to new contingencies or utopian possibilities. There is also no possibility for a division of work and leisure time as in Huizinga and Caillois, nor can we imagine a pure grasshopper when play is instrumentalized while work is made ubiquitous.

Ian Bogost's *Play Anything* (2016)[23] paints a different picture of our relationship to the

[23] Bogost, Ian. *Play Anything: The Pleasure of Limits, the Uses of Boredom, and the Secret of Games*. Basic Books, 2016.

material world and our capacity for play. Connecting some themes from his previous work on "alien phenomenology" to play, Bogost encourages "worldfulness" (6-7), or an attentiveness to the materials that surround us, as a position to challenge the more prevalent concept of "mindfulness." To play anything is to discover what objects "obviously and truly *are*" (9). Unlike Wark's suggestion that digital play is symptomatic of an all-encompassing topology of fungible quantities and information flow, Bogost uses "play" as a way to call our attention to the physical reality of our bodies in the world and the agency we have to act and interact with it. Bogost's argument is not to advocate for play for play's sake: "Play isn't our goal, but a tool to discover and appreciate the structures of all the malls and fishbowls we encounter" (12) – the "malls and fishbowls" being two previous examples Bogost offers of material conditions that can be manipulated playfully.

I have brought up much of the aforementioned work to give a scholarly background for what I call "the playfulness of play." But I should also acknowledge that Sebastian Deterding's essay, "The Ambiguity of Games,"[24] offers some criticism of the concept of pure play. Deterding points out that Huizinga and Caillois's emphases that play is necessarily free are themselves modernist claims (25). Indeed, we cannot perceive a work time / leisure time division until there is such a thing as leisure, a contextualized rather than eternal concept. Deterding sorts out many groupings of argumentative positions into eleven rhetorics. In terms of Deterding's schema, my interest in the playfulness of play would fall under, appropriately enough, the "Rhetoric of Playfulness" (47). I acknowledge that the present work responds to a certain tradition of taking play as something free and freeing. And while Huizinga and Caillois may very well be making historically contextualized arguments, play's inherent characteristic of freedom nonetheless rings

[24] Deterding, Sebastian. "The Ambiguity of Games: Histories and Discourses of a Gameful World." *The Gameful World: Approaches, Issues, Applications,* edited by Steffen P. Walz and Sebastian Deterding, The MIT Press, 23.

true. However newly-found playfulness may be as a concept, it still seems very much worth finding and recovering.

Miguel Sicart is a prominent example of a scholar in Deterding's rhetoric of playfulness. Sicart's *Play Matters* (2014)[25] takes issue with the instrumentalization of play that Deterding describes in several rhetorics around gamification, or the application of game structures to countless other contexts. In Sicart's words:

> Mine is a romantic theory (or rhetoric) of play, based on an idea of creativity and expression that has been developed in the highly postromantic cultural environment of the early twenty-first century. I write this theory of play as a reaction to the instrumentalized, mechanistic thinking on play championed by postmodern culture industries. This is a theory that acts as a call to playful arms, an invocation of play as a struggle against efficiency, seriousness, and technical determinism. (5)

Sicart seeks a playfulness of play that he suggests gets lost in the instrumentalization of play for the sake of optimization of one kind or another. In identifying his project as a "romantic" response to a "postromantic" era of play, he calls up earlier projects such as that of Suits for their celebration of play for its own sake.

Sicart ties together a number of topics relevant to my project soon after his discussion of the romantic sense of play:

> For instance, playfulness can take place when games are played or when sports are practiced. Athletes can be playful when they perform in ways that are not optimal for reaching their purpose. Many of the flourishes with which Magic Johnson adorned his basketball game were not practical and goal oriented; they were a show for the gallery, a way of enjoying the game while playing it at the highest stakes. This beautiful playfulness created a stark contrast with the serious context of professional play, making those actions more beautiful and an embodiment of the ideal of the game. (22)

Like Sicart, I am interested in locating what playfulness there may yet be in a context of optimized and professionalized play. The "flourishes" that Sicart attributes to Magic Johnson suggest a similar source of playfulness, although Sicart does not use the word: style. Style is the

[25] Sicart, Miguel. *Play Matters*. The MIT Press, 2014.

"how" of execution. As with fashion, style in video game play comprises the choices that a given player tends to make in a given situation. In a broad sense, style may refer to one's aggressive or defensive approach; more specifically to *Melee*, style refers to the choices one makes that disavow optimization and instead emphasize flashiness and even disregard for the outcome of the match. The role of style as an instrument for recovering the playfulness of play from esports is a point of focus in chapter 1.

Like Sicart and some of the other aforementioned play theorists, this work takes a romantic approach to play. Such an approach is merited because it can best identify that which might be lost in the professionalization and optimization of play present in esports. Key to understanding how exactly esports impact the playfulness of play is how they function in terms of temporality. Video games as a convergence medium bring together a host of temporal traditions from other media – traditions that are largely extraneous to play as abstractly theorized but must be considered in order to understand the relationship between the gaming apparatus's temporality and play in competitive games.

Media Temporality

As visual new media objects often played over a network, games act temporally like many types of media: photograph, film, networked communication, etc. As in a VCR, games can be paused, some slowed down, and they can make recordings such as machinima; as in networked communication, they can connect players across great distances; as in television standards such as NTSC, games observe frame rates; as in photography, they can produce screenshots and capture in-game characters and environments. Games do not draw on a single media temporality; rather, by attesting to a convergence of all major forms of media in one, games offer many temporal relationships with which to understand and analyze them. As I argue

above, narratological theories by themselves are not enough to capture the full extent of game time because games are not solely narratives. By the same token, the traditions of media temporality offer relevant insight into how it is that games do time because different qualities of games do different things temporally. Games are not solely like the cinema, or television, or network, or VCR; they share attributes with many media forms.

As such, to study the temporality of games, especially in terms of the gaming apparatus, it is necessary to understand the temporality of media types of which games are a convergence. Photography offers perhaps the most famous example of a temporal insight produced by a new medium. Muybridge's photographic study of horses at full gallop is commonly regarded as the earliest practical application of the instantaneous photograph's revelatory power of figures in motion. Prior to Muybridge, the question of whether all of a galloping horse's hooves were ever simultaneously off the ground was not concretely resolved. As Prodger in *Time Stands Still* (2003)[26] and de Duve in "Time Exposure and Snapshot" (1978)[27] both discuss, horse portraiture conventions prior to Muybridge favored painting horses galloping "belly to the ground" with their legs stretched out in front and behind. This style of illustration symbolized rather than recorded a gallop, but the convention was eventually abandoned after Muybridge's work. As a technological medium, photography in effect offered a newfound ability essentially to stop time and make the instant legible. As a representational medium, photography offered a paradigm shift on how we perceive objects in time, especially at high speed. The still images of instantaneous photography would become the frames to be reconstituted into moving images in the cinema (and, in turn, television and gaming).

[26] Prodger, Phillip. *Time Stands Still: Muybridge and the Instantaneous Photography Movement*. Oxford University Press, 2003.

[27] De Duve, Thierry. "Time Exposure and Snapshot: The Photograph as Paradox." *October*, vol. 5, MIT Press, 1978, pp. 113–125. *uci.primo.exlibrisgroup.com*, doi:10.2307/778649.

Henri Bergson's writings on duration as a continuous, consummately dynamic experience of time (*Time and Free Will* 1889,[28] *Matter and Memory* 1896,[29] and *Creative Evolution* 1907[30]) illustrate how cinema by contrast divides up time into instants and movement into positions. During Bergson's lifetime, photographic technology developed into the antecedents of motion pictures and then into cinema. Bergson responds to a kind of thinking that, like these photographic technologies, divides up our continuous experiences into rationalized segments. To Bergson, reducing something like a dance to a series of poses would miss movement and the continuity of "duration," his term for the experience of the present. Duration, in all its dynamism of interpenetrating emotional states, illustrates for Bergson the reality of experience as something constantly piled on top of the past, never isolated from the previous moment. In the cinema with its succession of 24 frames per second, Bergson's work identified a technology that at base divides time in order to recreate the illusion of movement but not movement itself. Cinema seems to manipulate time but only if the viewer accepts the illusion as a real recreation of something that has happened. Bergson highlights the limitations of this technology's illusion of movement as well as the habit of thinking that the technology exemplifies: both attempt to rationalize time by cutting it into discrete segments, but both lose the continuity that Bergson takes as definitional to human experience. After Bergson's time, this cutting-up of time would not disappear but become exacerbated, as in NTSC television standards of 60 frames per second – the same for consoles on which these TVs' games are played – and in variable-framerate games that can process hundreds of frames per second.

[28] Bergson, Henri. *Time and Free Will; an Essay on the Immediate Data of Consciousness*. GAllen & Company, 1910.
[29] Bergson, Henri. *Matter and Memory*. Humanities Press, 1978.
[30] Bergson, Henri. *Creative evolution*. University Press of America, 1983.

Mary Ann Doane's *The Emergence of Cinematic Time* (2002)[31] examines film at the end of the nineteenth and beginning of the twentieth centuries as occurring at a moment when other temporal shifts are also going on. The proliferation of pocket watches, the standardization of time zones, and the cinema (itself standardized) demonstrate a rationalization of time in service of industrial capital. One anxiety of the moment, as Doane writes, is the loss of contingency. The photograph would seem to see the world for what it is by creating a dispassionate index of the visual. Time-motion studies like those of Taylor and Gilbreth would recognize this indexicality of the image as capable of turning movement into something that can be studied, optimized, and perfected through efficient technique. In this light, contingency is something to be eliminated for the sake of capital. As Doane writes, while an excess of contingency is anxiety-inducing for its chaotic uncertainty, the total elimination of contingency produces its own anxieties: namely, that the subject is wrapped up in a system from which there is no escape. Doane's analysis locates a sort of sweet spot of contingency in the cinema, where subjects are captured in images and rationally projected in an ordered sequence of time, but they are nevertheless open to the unexpected, and contingency is necessary for films to entertain and surprise their viewers. To Doane, yes the cinema rationalizes time and can be therefore said to produce new temporalities, but any kind of new temporality the cinema might produce is itself open to the subject. Rationalization of time (in both the cinema and in industrial capital) does not preclude freedom, chance, or uncertainty, and therefore the cinema does not impose upon us something inescapable. I take a similar approach to games' openness to contingency despite rationalization (and optimization) in competitive gaming.

Anne Friedberg's provocatively titled essay "The End of Cinema; Multimedia and

[31] Doane, Mary Ann. *The Emergence of Cinematic Time: Modernity, Contingency, the Archive*. Harvard University Press, 2002.

Technological Change" (2000)[32] recognizes three pre-digital technologies that prepared cinema's spectator for the interactivity of the home computer, which would significantly alter how movies are viewed, stored, and engaged with. Those technologies are the VCR, the cable network, and the remote control. Most relevant for the present purpose is her discussion of the VCR, which, as she claims, freed the TV viewer from the confines of the network schedule. Programmable VCRs could record a broadcast without anyone needing to be home to "tape it," effectively enabling their users to be in two places at once. In their operation, VCRs radically enabled users to stop, restart, pause, reverse, and even slow down televisual media. They offered users unprecedented control over media that had previously belonged to broadcasters (and to a lesser extent projectionists). Experientially, the VCR allowed agency over media temporality that the average spectator had never enjoyed unless they themselves made film. Friedberg's essay predates broadband streaming, the proliferation of video editing tools, and televisual media platforms such as YouTube, but her analysis of the temporal capabilities of the VCR have bearing on these digital media objects, as well as tools within games to pause, slow down frame rates, etc. Temporal manipulation not unlike that of the VCR is a central topic to this work's chapter 3.

Regarding the network itself, Robert Hassan's chapter on "Network Time" in *24/7* (2007)[33] suggests, contrary to any intuitive sense that digital media simplify linear timekeeping, that the network offers "connected asynchronicity" rather than true simultaneity. Hassan asserts that network speed also necessitates network lag: we may see simultaneity at first blush, but we soon encounter delay through lag. Messages sent and messages received are subject to fluctuating connections, and interactivity between users necessarily happens at a delay. The

[32] Friedberg, Anne. "The End of Cinema; Multimedia and Technological Change." *Reinventing Film Studies*, edited by Christine Gledhill and Linda Williams, Arnold, 2000, pp. 438–52.
[33] Hassan, Robert, and Ronald E. Purser. *24/7: Time and Temporality in the Network Society*. Stanford Business Books, 2007.

expectation of complete simultaneity can never be reached through the network. Time can be standardized, and indeed technologies like GPS have to be rigorously standardized (and constantly recalibrated) to the tiniest fractions of a second, but lag will not be eliminated, and our sense of connection must necessarily account for lag, delay, and connection contingency. It is nonetheless common to call these technologies "live" in one form or another; I explore the significance of microtemporal lag and the illusion of liveness in competitive gaming in chapter 2.

Like photography, a game's frame is a still image displaying an instant of time; like cinema, games are visually (and computationally) composed of such frames. High stakes gaming, especially with respect to frame-perfect timing, resembles the time-motion study of Taylor and Gilbreth in its attempts to optimize movement for the sake of performance. And analysis of one animation frame at a time bears striking resemblance to Muybridge's photo series. Like the VCR, games can be paused, some rewound, some slowed down; they can be recorded and replayed, both through in-game recording features and through screen capture applications. And games online open themselves up to the temporal qualities and fluctuations of the network. No one of the above temporalities captures completely the nature of time in games, nor can theories of narrative time alone. As a medium of convergence, games operate on all of these temporal levels simultaneously. Having established that game time can and does borrow from numerous media traditions, we can now turn to how time has been discussed in game studies scholarship, as well as what those discussions may have thus far overlooked.

Time in Games

Much of the existing scholarship on time in games – such as that of Juul (2004), Eskelinen (2004),[34] Nitsche (2007)[35] Mateas & Zagal (2010),[36] and Wei et al. (2011)[37] – draws

[34] Eskelinen, Markku. "The Gaming Situation." *Game Studies*, vol. 1, no. 1, July 2001, http://www.gamestudies.org/0101/eskelinen/.

on narrative theory to discuss game temporality. Eskelinen employs narratology to distinguish "user time (the actions of the player) and event time (the happenings of the game)" (39). Juul elaborates on his construction of "play time" and "event time" (which is similar to Eskelinen's distinction of event and user times) through models that uncover the many different ways the two temporal references do not always map 1-to-1 onto each other (132-136). Nitsche connects narrative theories of time in games to considerations of the spatial to argue that the two are best considered together. Building off of narrative-focused work such as that of Juul, Zagal and Mateas detail four "frames" of temporality: "real-world," "gameworld," "coordination," and "fictive" time frames (1). And Wei et al. seek to establish a codified language to describe "how time and space are structured in game narratives." These authors are all concerned with how the player constructs and experiences time relative to diegetic events, as well as the player's participation in meaningful interaction with such events.

My project is engaged with a very different question of temporality: that of the apparatus, not of the player's narrative interpretation of the game (to the extent that there is a narrative). Tanenbaum and Bizzocchi (2009)[38] touch on the apparatus's role in the temporality of games with their term "temporal resolution" as it pertains to sampling rate and lag in games such as *Rock Band* ("Rock Band: A Case Study in the Design of Embodied Interface Experience," 129). Still, scant scholarship has commented on the extent to which the gaming apparatus envelopes the player in a particular kind of temporality – especially that pertaining to frames. Even

[35] Nitsche, Michael. *Mapping Time in Video Games - University of California Irvine*. 2007, pp. 145–51,
[36] Zagal, José P., and Michael Mateas. "Time in Video Games: A Survey and Analysis." *Simulation & Gaming*, vol. 41, no. 6, 2010, pp. 844–868. *uci.primo.exlibrisgroup.com*, doi:10.1177/1046878110375594.
[37] Wei, Huaxin, et al. "Time and Space in Digital Game Storytelling." *International Journal of Computer Games Technology*, vol. 2010, no. 2010, 2010, p. 23. *uci.primo.exlibrisgroup.com*, doi:10.1155/2010/897217.
[38] Tanenbaum, Tess, and Jim Bizzocchi. *Rock Band: A Case Study in the Design of Embodied Interface Experience*. ACM, 2009, pp. 127–134. *uci.primo.exlibrisgroup.com*, doi:10.1145/1581073.1581093.

Christopher Hanson's recent *Game Time* (2018)[39] does not touch on the animation frame. Hanson cites Bergson and mentions Bergsonian duration, and he describes how the computational nature of games runs contrary to our duration-oriented experience of play, but he never goes so far as to connect the frame in games to the frame in film, the medium Bergson was responding to (73). Likewise, Hanson discusses speedruns through mastery and repeat performance, but again does not bring up frame-perfect play (122). An even more recent monograph, Federico Alvarez Igarzábal's *Time and Space in Video Games: A Cognitive-Formalist Approach* (2019), [40] employs cognitive science to make sense of how video games do time. Some of Alvarez Igarzábal's chapters, including "The Groundhog Day Effect" and "The Hybrid Narrator," follow the narratological angle on game time. Elsewhere, his comments on perceptual simultaneity illuminate the microtemporal considerations of temporal coherence in games, and he briefly discusses frames in the context of simultaneity. The frame is therefore a productive place to build off of the work of Hanson, Alvarez Igarzábal, and others into as-yet undeveloped aspects of game temporality. Though there is little analysis of animation frames in game studies, there are scholars who use "frame" in other contexts and for other purposes, and these uses should be addressed for clarity's sake.

The "Frame" in Game Scholarship

Game studies scholarship has used "frame" in a variety of ways, most of which not pertaining to the animation frame as in "frame-perfect." Zagal and Mateas in "Temporal Frames: Understanding Framework for the Analysis of Game Temporality"[41] even use "frame" (twice in the title alone) to discuss temporality, but they use the word in the conceptual sense. Rather than

[39] Hanson, Christopher. *Game Time - Understanding Temporality in Video Games*. Indiana University Press, 2018.
[40] Alvarez Igarzábal, Federico. *Time and Space in Video Games: A Cognitive-Formalist Approach*. Transcript Verlag, 2019.
[41] Zagal, José P., and Michael Mateas. "Temporal Frames: A Unifying Framework for the Analysis of Game Temporality." *3rd Digital Games Research Association: "Situated Play,"* 2007.

"frame" as a still image, "frame" in their essay refers to "a set of events, along with the temporality induced by the relationships between those events" (516). The frames they describe are "Real-world Time," "Gameworld Time," "Coordination Time," and "Fictive Time"; like Juul and Eskelinen, Zagal & Mateas examine the slippages between these temporal frames.

Elsewhere in game studies, "frame" takes a sociological meaning. Gary Allen Fine's *Shared Fantasy,*[42] an anthropological study of *Dungeons and Dragons* play, cites the work of Alfred Schutz, William James, and Erving Goffman in discussing "frames of experience" (181). Fine summarizes Goffman's "frame" as "a situational definition constructed in accord with organizing principles that govern both the events themselves and participants' experiences of these events (1974: 10-11)" (181-182). In other words, Fine is taking up this meaning of "frame" to describe a particular and distinguishable context for social interactions. Viewing the topic of play through this lens suggests that the "magic circle" might be counted as one frame of the many a person is likely to experience within a given day.

Other game studies scholars mention "frame" in passing rather than as a weighted term. Miguel Sicart describes rules in *Play Matters*[43] as "facilitators that create a context for play, frames within which play takes place" (8). Salen and Zimmerman in their *Rules of Play*[44] discuss the "frame" of a game's happening (94); later they describe the "immersive fallacy" as the "idea that the pleasure of a media experience lies in its ability to sensually transport the participant into an illusory, simulated reality [...] so complete that ideally the frame falls away so that the player truly believes that he or she is part of an imaginary world" (450-451). Ian Bogost in *Persuasive Games*[45] borrows "frame" from George Lakoff and Mark Johnson to describe the way one

[42] Fine, Gary Alan. *Shared Fantasy: Role-Playing Games as Social Worlds*. University of Chicago Press, 1983.
[43] Sicart, Miguel. *Play Matters*. The MIT Press, 2014.
[44] Salen Tekinbaş, Katie, and Eric Zimmerman. *Rules of Play: Game Design Fundamentals*. MIT Press, 2004.
[45] Bogost, Ian. *Persuasive Games: The Expressive Power of Videogames*. MIT Press, 2007.

conceptualizes the world for political discourse. Here "frame" is again a way to identify or conceive of a given context. This sense of context holds for uses of "framework" as in Feenberg and Grimes's "Rationalizing Play":

> "positioning games as systems of social rationality operating within the larger sociohistorical context of modernity, and by providing a framework (ludification) for a more comprehensive exploration of the processes through which game rules become technically mediated, play practices become institutionalized, and players become rationalized (and professionalized or commodified)." (116)

This non-exhaustive sample of scholars from across game studies who mention "frame" for one reason or another should illustrate that the word is common enough to game studies, and most of the time when it is used, it has nothing to do with the animation frame. In fact, the list of game studies texts that use this sense of "frame" is far shorter than the list of other uses of the word, and none spends an extended time exploring the concept for analysis of its temporal significance.

Two works that discuss the animation frame directly are Mark JP Wolf's *The Medium of the Video Game*[46] and Paul Ward's essay "Videogames as Remediated Animation" from *Cinema / Videogames / Interfaces*.[47] Wolf mentions the frame as a way of discussing stillness in visual media (77-79); Ward discusses the difference between capturing something live on film and constructing something through animation "frame by frame" (123), citing Giannalberto Bendazzi's work on animation for the cinema. Ward's essay is on realism and how games create their own standards of realism despite being computed, displayed, and animated one frame at a time. Both Ward and Wolf discuss the temporality of the frame only briefly, and both works predate the rise of esports with their stress on frame-perfect play.

Frames matter most when the stakes are high, as in when a career in professional gaming rides on a single performance. But when success is just a personal endeavor some idle afternoon

[46] Wolf, Mark J. P. *The Medium of the Video Game*. University of Texas Press, 2001.
[47] Ward, Paul. "Videogames as Remediated Animation." *Screenplay: Cinema/Videogames/Interfaces*, edited by Geoff King and Tanya Krzywinska, Wallflower, 2002.

at the home console in the basement, the frame is hardly the first place one would turn to understand the significance of the game. As such, it should not be surprising that research on time in games has paid little attention to the temporality of the frame, but with the rise of esports in recent years to an undeniably popular phenomenon, new critical attention to frames is in order.

Esports Scholarship

Organized competitive video game playing has existed in one form or another since the 1970s, but "esports" as a term for the sport of video game play is a 21st-century concept. Game studies scholarship has touched on the pre-history of esports: Carly Kocurek's *Coin-Operated Americans* (2015)[48] details some of the history of 1980s competitive arcade goers and institutions such as *Twin Galaxies* that maintained official scoreboards. David Sudnow's *Pilgrim in the Microworld* (1979)[49] likewise concerns the "golden age" of the arcade, offering a highly personal account of Sudnow's fixation on gaining skill at *Breakout*. If we take this era to predate esports as we know them today, as an early period in which players obsessed over how to optimize performance and compete for high scores, then Sudnow's work offers some insight into how this obsession with optimization manifested before live-streamed events and high-stakes competition.

TL Taylor's *Raising the Stakes* (2012)[50] has earned a central place in esports research as a seminal text that did much to open up esports as a field of study.[51] Taylor's sociological approach to documenting and analyzing esports culture between 2003 and 2011 draws mainly on field notes and interviews. Her work opens discussions for many topics, including industry

[48] Kocurek, Carly A. *Coin-Operated Americans: Rebooting Boyhood at the Video Game Arcade*. University of Minnesota Press, 2015.
[49] Sudnow, David. *Pilgrim in the Microworld*. Warner Books, 1983.
[50] Taylor, T. L. *Raising the Stakes: E-Sports and the Professionalization of Computer Gaming*. MIT Press, 2012.
[51] It was not strictly the first, as Jin's *Korea's Online Gaming Empire* (2010) and Wagner's "On the Scientific Relevance of eSports" (2006) both preceded the work, but its influence on the field since 2012 has been especially significant.

studies, gender studies, additional anthropological work, and studies of discursive practices in esports. One corrective that Taylor discusses early in the work is that esports is not merely about players and tournaments but a wide cast of other persons and entities not directly involved in the competition itself.

> Professionalization is happening within broader structural, institutional, and social contexts, and includes tournament organizers, broadcasters, owners, referees, coaches, sponsors, and fans. It is also happening in the midst of debates about the nature of computer game play in our contemporary lives and what role, if any, e-sports should have there. (17)

Taylor readily accepts that she is approaching her ethnographic work from the perspective of a non-player of esports, which – as she discusses – offers the researcher both advantages and disadvantages. While my project is not directly related to the sociological questions of what it means to be a player of esports within a given socio-geographical context, professionalization is an important factor in my work that Taylor discusses at length. What is remarkable about esports in the early 2000s is not that there were organized competitions of video games (those had been around for decades already) but that there is a professional class of players at the top starting around then. Her project is to explore the social and cultural inflections of this professionalization; my project draws upon this work (and others) to examine what happens to play amidst this professionalization, as well as and optimization.

Since Taylor, esports as an industry has ballooned in value, and esports scholarship has advanced in qualitative as well as quantitative fields. Boluk and LeMieux's *Metagaming* (2017)[52] builds off of Taylor's work by analyzing competitive gaming as one area of games with clear metagames. A metagame is a game about games, or the state of play in a given game. In esports, "the metagame" refers to the prevailing strategies such as character choice and tactical

[52] Boluk, Stephanie, and Patrick LeMieux. "The Turn of the Tide: International E-Sports and the Undercurrency in Dota 2." *Metagaming: Playing, Competing, Spectating, Cheating, Trading, Making, and Breaking Videogames*, 2017.

selections at a given level of play. Another scholar who builds off of TL Taylor (and a former advisee of hers) is Emma Witkowski, who has published on multiple topics around esports, such as their sportiness: "On the Digital Playing Field: How We 'Do Sport' with Networked Computer Games" (2012).[53] Witkowski asserts that the skills necessary for success in esports like *CounterStrike* are not so remote from those in traditional sports – especially fine-tuned motor movement. Some qualitative analyses such as those of Boluk & LeMieux are critical of how esports collect data for the instrumentalization of play and the accruing of capital. But elsewhere in esports research that same data – such as keystrokes, mouse movement, and amounts of experience gained/gold earned, all meticulously recorded linearly according to an in-game clock – is the object of study, and analyses are conducted to help players optimize their performance. Such quantitative analyses have proliferated through these modes of data collection.

Scholarship on *Melee* has analyzed it both as a competitive game and as a social setting. Boluk and LeMieux's *Metagaming* mentions *Melee* among the other *Smash Bros.* games as a competitive video game and also as one that has meaningful textual features like the gloved "Master Hand" (itself reflecting a tradition in blackface). Elmezeny and Wimmer's "How gaming achieves popularity: The case of *The Smash Brothers*" discusses the grassroots documentary about competitive *Melee* as a site of social identification.[54] Firoiu et al.'s "Beating the World's Best at Super Smash Bros. Melee with Deep Reinforcement Learning"[55] describes the design of a *Melee*-playing AI that, through machine learning, became skilled enough at the game to defeat humans ranked in the top 100 – some of whom are professional players. An essay

[53] Witkowski, Emma. "On the Digital Playing Field: How We 'Do Sport' With Networked Computer Games." *Games and Culture*, vol. 7, no. 5, 2012, pp. 349–374.
[54] Elmezeny, A., and J. Wimmer. "How Gaming Achieves Popularity: The Case of The Smash Brothers." *Proceedings of the 205 DiGRA International Conference: Diversity of Play, 2015.*, 2016.
[55] Firoiu, Vlad, et al. "Beating the World's Best at Super Smash Bros. with Deep Reinforcement Learning." *ArXiv.Org*, 2017.

from another group or authors, Parr et al.'s "Nintendo Super Smash Bros. Melee: An 'Untouchable Agent,'"[56] similarly designed an AI in *Melee*, but their bot's goal was to keep from getting hit by the in-game AI for as long as possible. Not all scholarship on *Melee* has concerned itself with competitive play. Matsuda and Hiraki's "Sustained decrease in oxygenated hemoglobin during video games in the dorsal prefrontal cortex A NIRS study of children"[57] happened to use *Melee* as one of two test games in the experiment, which had nothing to do with competition or sport. And Jakobson & Akira's "Playing with the Rules: Social and Cultural Aspects of Game Rules in a Console Game Club"[58] examines a club in Sweden's particular rule set for "Random Smash" as a way for the authors to discuss the complex and social negotiation of rules broadly. Scholarship on *Melee* has been both quantitative and qualitative, with some examples (such as Firoiu et al.) taking the desirability of optimization as a given, whereas others (such as Jakobson & Akira) explore the randomized and intentionally suboptimal corners of *Melee* as an object of study.

Two recent publications on time in esports bear mentioning: Stephen Rea's "Calibrating Play: Sociotemporality in South Korean Digital Gaming Culture" in *American Anthropologist* (2018)[59] and Jason Reitman's "Distributed Cognition and Temporal Knowledge in League of Legends" in *International Journal of Gaming and Computer-Mediated Simulations* (2018).[60] Reitman's piece discusses how teams of *League of Legends* players communicated temporal knowledge (such as time remaining on one of their cooldowns or how long until opposing

[56] Parr, Ben, et al. *Nintendo Super Smash Bros. Melee: An "Untouchable" Agent*. 20171208.
[57] Matsuda, Goh, and Kazuo Hiraki. "Sustained Decrease in Oxygenated Hemoglobin during Video Games in the Dorsal Prefrontal Cortex: A NIRS Study of Children." *Neuroimage*, vol. 29, no. 3, 2006, pp. 706–711.
[58] Jakobsson, Mikael, and Baba Akira. *Playing with the Rules: Social and Cultural Aspects of Game Rules in a Console Game Club*. 2007.
[59] Rea, Stephen C. "Calibrating Play: Sociotemporality in South Korean Digital Gaming Culture." *American Anthropologist*, vol. 120, no. 3, 2018, pp. 500–11. *Wiley Online Library*.
[60] Reitman, Jason Ginsberg. "Distributed Cognition and Temporal Knowledge in League of Legends." *Int. J. Gaming Comput. Mediat. Simul.*, vol. 10, no. 1, Jan. 2018, pp. 23–41.

players can use a "Flash"), both over voice and text communication – the latter offering the ability to copy and paste chat log information. Reitman emphasizes how crucial it is to a team's success to be able to communicate accurately whether an ability is "up" or still on cooldown. Rea's piece connects temporal considerations in Korean games to an overarching socio-temporal Korean term: *ppalli ppalli munhwa*, or as Rea translates it, "chop chop culture." Rea positions "actions per minute" (APM), a temporal statistic of central importance to success in *StarCraft II* and "*nogada*," a practice of grinding one's way to higher levels in an MMORPG, in relation to *ppalli ppalli munhwa*. Rea discusses the precarity of contemporary labor practices for young Koreans and how they "calibrate" themselves by "[aligning] their individual, embodied play with sociotemporal expectations that stress qualities of both quickness and endurance" (501). Reitman and Rea examine very different considerations of temporality: one about temporal communication between team members, the other about gaming practices that connect to wider socio-temporal considerations within a cultural context. Both consider the stakes of temporality in esports, and both examine temporal questions quite separate from the frame and frame-perfect timing.

In October of 2018, UC Irvine hosted the first annual Esports Conference (ESC), which drew international scholarly participation, after already having held a symposium on esports in 2017. A special issue of *Games and Culture* includes essays selected from this conference, including an esports literature review. "Esports research: A literature review" (Reitman et al.)[61] covers esports research across methodologies and divides its analysis into topics such as how esports is defined, trends in scholarship over time, and international presence. The field is new enough that some central terms are not entirely settled: is esports competitive gaming, which has

[61] Reitman, Jason G., et al. "Esports Research: A Literature Review." *Games and Culture*, Apr. 2019, p. 1555412019840892. *SAGE Journals*.

been around since the 1970's, or does "esports" signify socio-technological phenomenon that necessarily includes live-streaming, sponsorships, full-time professionals, etc.?

As the field continues, it may have to wrestle with two conflicting scholarly interests. On the one hand, studies of how to maximize player performance quantitatively. Such research may make models to predict success when taking strategy X or picking character Y; they may analyze and compare actions per minute among top players; they may make "heat maps" of the areas in the playing arena with the most and least player traffic. This style of scholarship offers findings with potentially great financial interest to esports teams, publishers, and sponsors. And on the other hand are critical analyses of esports as a social or capital institution. One such example is Boluk and LeMieux's discussion of the "undercurrency" of Valve's aggregation of capital and labor through microtransactions and modding communities respectively. Game studies offers both the tools to maximize competitors' performance by understanding the finer quantitative points of play, and the rhetorical tools to critique the business of esports (as well as its appropriation of scholarship toward capitalistic ends). This conflict may turn out to be a lasting division within the field.

This is a firmly qualitative project that nonetheless discusses some fine points of the gaming apparatus and of networked interactions. There is no data collection for this project, but there is a little math involved when we discuss things such as how many milliseconds a frame lasts and how to buffer latency over networked multiplayer. It is necessary to be specific on such points because, again, this is generally how professional gamers understand the temporal dimensions of the games they play. In this way, the present work follows a researched trajectory outlined by Bogost and Montfort in their platform studies series;[62] through in-depth analysis of the gaming apparatus, platform studies informs our analyses of the cultural import of digital

[62] Montfort, Nick, and Ian Bogost. *Racing the Beam: The Atari Video Computer System*. MIT Press, 2009.

objects. I should also note that one personal research interest of mine is to examine how games change at higher levels of skill. Anyone can hop into a four-player game of *Melee* and have fun messing around and causing chaos; skillful play uncovers the detailed mechanics of the game, including how many frames a certain move lasts or how to chain one move into another. By getting into such specifics we better understand what kind of temporal structures define the parameters of a play experience and how our intuitively guided play becomes rationalized, even to the point of machinelike reproducibility. Games are played differently at higher levels of skill, to the extent that we ought to question whether professional play is play in a meaningful sense. This project gets into the specifics of time in competitive games in order to explore transformations of play and, in the process, strategies for recovering the playfulness of play wherever we might have lost it.

Chapter Overview

This work is laid out in an arc: concepts from the first chapter are built upon in the second, and the third offers an argumentative pivot to analyze that which is opposed to the preceding chapters' emphases. The first chapter introduces key concepts about temporally optimized gameplay that the second chapter in turn builds upon, extending considerations of optimal play and fair competition over the temporally standardized network; the third responds to the first two's emphasis on normativity in competitive gaming by discussing normativity's opposite through queer theory. Optimization and professionalization of play in esports challenge the playfulness of play, which the work offers strategies for recovering over its chapters.

Chapter one addresses the temporal significance of the animation frame in competitive gaming. It takes *Super Smash Bros. Melee* as its central object to exemplify set-framerate games – in this case a game flickering at a constant 60 frames per second. By studying game

temporality through the animation frame (rather than through game studies' previous emphasis on narrative time), one can perceive the game in the more technically precise way that competitive players do. Breaking gameplay down to the discrete number of frames a given animation has, diagramming the finite number of decisions a player might have in a given situation, perfecting one's muscle memory to execute a given technique within a one-frame window: these play behaviors lead competitive players to better results, but they call into question certain basic characteristics of play. If play is fundamentally creative, free, and open to contingency, then can one reconcile these characteristics with the esports player's soundly optimized, rotely memorized, practically deterministic execution of play? This chapter grapples with the apparent oxymoron of "esports play" by examining where playfulness slips through the cracks of optimization and professionalization. "Style," a key term in this chapter, offers one strategy for redeeming playfulness despite its apparent absence in pro gaming. To style is to pick unexpected, suboptimal options during a match. Styling as a display of creativity even within the professional *Melee* scene brashly resists optimization; as a strategy for recovering the playfulness of play it encourages us to look closely within a context of optimization for oppositional resistance.

Chapter two moves from in-person competitive gaming to gaming over the network to examine the temporal concerns of play at a distance. In order for play to be competitively sound, the *agon* of Caillois requires equal footing among competitors (or at least the appearance of equal footing). When distance makes equal footing virtually impossible to achieve, networked gaming offers different tricks for negotiating temporal discrepancies that inevitably arise online. Two such tricks are frame buffers and authoritative server time, which the chapter discusses at length. In the process, the chapter examines the heterogeneous temporalities experienced by

player, opponent(s), server, viewer, "stream sniper," in-person audience, etc. Networked gaming and especially live-streamed gaming (on services such as Twitch) offer putatively "live" experiences, but that liveness is always already illusory. This kind of temporality in games is again distinguishable from narrative time as something produced by the technical qualities of a given game, a given server, or a given live-streaming platform. The chapter poses the question of why these technologies should work so hard to provide an illusion of liveness and considers the impact of networked communication and spectatorship on the playfulness of play. It identifies intimacy as the experience commonly offered across networked media: couch multiplayer at a distance, face-to-face conversations at a distance, sexual interaction at a distance, etc. – all of these promise intimacy through networked communication. Competitive gaming illustrates the limitations of liveness over the network because of its intense focus on precision at the scale of milliseconds and the acutely felt impact of lag. Close scrutiny to lag in networked communication reveals the ideological construction of intimacy at a distance promised by these platforms.

In distinction from chapter one's interest in optimized and professionalized play, as well as chapter two's interest in authoritative server time and resolution of temporal discrepancies into a coherent singular time, chapter three turns to specifically non-normative time in games. Taking up a term from queer theorist Elizabeth Freeman, "chrononormativity," the chapter identifies the most temporally standardized, rationalized, rigid, and normative setting in games as esports. By flipping the temporal expectations of esports around, the chapter identifies a set of temporal corollaries to time in esports as instances in games in which time flows back on itself: backtracking, pausing, rewinding, resetting, etc. Rather than esports' preoccupation with linear sequencing, high-stakes decision-making, and optimized micro-temporal performance, queer

temporalities of play disavow uncompromising linearity in esports and its obsession with normative milestones such as build orders, event minute marks, cooldown timers, seasonal tournament schedules, etc. Queer theory offers its own method for re-encountering the playfulness of play by looking to the non-normative periphery: identifying what makes the normative normative and celebrating its opposite. The chapter discusses *Life Is Strange* as an object that both embodies queer time mechanically through a rewind mechanic and offers queer story content. The chapter's discussion of nonnormative temporalities contributes to wider capabilities of queer play to explore alterity and resist normative structures.

The conclusion returns to the playfulness of play and weaves together common threads from the preceding three chapters to assess whether and how one might still find playfulness in play despite overwhelming trends to optimize and professionalize play. One particular site of optimization that this work saves for the conclusion is the Tool-Assisted Speedrun (or TAS) and its machine perfection of play, optimized to the frame. It concludes with a case study of Narcissa Wright, a competitive player and speedrunner whose hand injury (ostensibly from repetitive gameplay) and transition as a genderqueer person coincided, and whose move from optimized play to art streaming presented two fundamentally different temporal performances. The conclusion reexamines the work's proposed strategies for recovering playfulness from play while constructing archetypes similar to Bernard Suits' archetypes of the player, the cheat, the trifler, and the spoilsport. The conclusion offers a similar set of characters: the esports player, the styler, the sandbagger, and the person who embraces queer play. In mapping these figures out, the conclusion puts together the project's various strategies for recovering the playfulness of play in the context of optimization and professionalization of play in esports. If there is something

special about play, then we owe it to ourselves to recover it instead of feeding it to mere instrumentalization and commodification. What follows are my efforts to do so.

Perfectibility's Dystopia: Game Temporality and the Perils of Optimization

> SCAR: What is 20XX?
> TOPH: Hax has this joke: "The year is"–it goes like this. "The year is 20XX. Everyone plays Fox. No other characters are viable! And sets are now determined–in fact, like the – at the highest level of play, you rock-paper-scissors for port priority, and because everyone capitalizes on everything perfectly, and any advantage leads to victory, you R-P-S for port priority and that's the set."[63]

In October of 2013, at The Big House 3, a *Smash Bros.* tournament hosted in Ann Arbor Michigan, commentating duo Bobby "Scar" Scarnewman and Kris "Toph" Aldenderfer got on the mic and, as they often do, filled time between sets with conversation about *Smash Bros. Melee* and its players. As Aziz "Hax" Al-Yami approached the console for his tournament match, Toph and Scar made chuckling references to "20XX," a running joke of Hax's creation about a dystopian future in which *Melee* tournament play becomes completely deterministic. In the play dystopia of 20XX, all players opt for the top-tier character, Fox, and all players execute their play flawlessly: as a result, winners are determined solely from players' starting positions, which are themselves established by the rock-paper-scissors contest that begins each tournament set.

This dystopian consequence of perfected play, the metagame shift from skill (*agon*) to chance (*alea*), requires some unpacking. The present chapter analyzes the concept of 20XX as a play dystopia, connecting specific anxieties around perfected play to broader anxieties of cold optimization[64] in the digitally-enhanced present extending well beyond games. Related to, but distinct from, existing concerns about automation ("Will I be replaced at work by a machine?"), digital optimization offers the often unsettling proposition of relinquishing human agency for a

[63] motbob. *Scar and Toph Commentary Highlights at Big House 3*. 2014. *YouTube*, https://www.youtube.com/watch?v=MBctSbV3rRE.
[64] Grimes and Feenberg's "Rationalizing Play: A Critical Theory of Digital Gaming" describes "optimization of game play" as an outcome of "precision" in play. As such, optimization helps transform play "into a quantifiable and predictable set of activities."

safer, more efficient result. The chapter investigates opportunities for resistance to the kinds of digital optimization that eliminate contingency, human agency, creativity, and self-expression. One opportunity for resistance arises from play itself: "style," a concept that also emerges from the discourses surrounding the *Melee* competitive community.

These discourses surrounding competitive gaming should inform approaches to studying time in games, but existing scholarship on game temporality does not fully account of the kind of time that players of games like *Melee* constantly engage with. What professional, optimized gaming brings to the front of the player's mind is the gaming apparatus's exact, mechanical structure that sets a precise pace underneath the game, especially in the case of fixed-framerate games. However, much of the existing scholarship in game temporality – such as that of Juul,[65] Eskelinen,[66] Nitsche,[67] Mateas & Zagal,[68] Alvarez Igarzábal,[69] and Wei et al.[70] – concerns itself with the application of narrative theory to game temporality.[71] Eskelinen employs narratology to distinguish "user time (the actions of the player) and event time (the happenings of the game)."[72] Similarly, Juul elaborates on his construction of "play time" and "event time" through models that uncover the many ways in which the two temporal constructs do not always map 1-to-1 onto each other.[73] For example, when a game such as *Civilization* compresses centuries into minutes,

[65] "Introduction to Game Time." *First Person: New Media as Story, Performance, and Game*. Ed. Noah Wardrip-Fruin and Pat Harrigan. Cambridge, Mass: MIT Press, 2004. 131–142. Web. 5 Mar. 2017.
[66] Eskelinen, Markku. "The Gaming Situation." *Game Studies* 1.1 (2001). Web. 5 Mar. 2017.
[67] Nitsche, Michael. "Mapping Time in Video Games." Vol. 4. University of Tokyo: N.p., 2007. Web.
[68] Zagal, José P., and Michael Mateas. "Time in Video Games: A Survey and Analysis." *Simulation & Gaming* 41.6 (2010): 844–868. *SAGE Journals*. Web.
[69] Alvarez Igarzábal, Federico. *Time and Space in Video Games: A Cognitive-Formalist Approach*. Transcript Verlag, 2019.
[70] Wei, Huaxin, Jim Bizzocchi, and Tom Calvert. "Time and Space in Digital Game Storytelling." *International Journal of Computer Games Technology* 2010 (2011): e897217. *www.hindawi.com*. Web.
[71] Chris Hanson's book, *Game Time - Understanding Temporality in Video Games*, draws more from performance theory than narrative theory. Nonetheless, like the others mentioned it does not investigate the role of the apparatus in structuring time in games.
[72] Eskelinen, Markku. "Towards Computer Game Studies." *First Person: New Media as Story, Performance, and Game*, edited by Noah Wardrip-Fruin and Pat Harrigan, MIT Press, 2004, 39.
[73] "Introduction to Game Time," 132-136.

or when the ostensibly real-time action of a game is broken up by loading screens and pause menus, or when a mechanic such as "bullet time" slows movement down in-game. Nitsche connects narrative theories of time in games to considerations of the spatial to argue that the two are best considered together.[74] Building off of narrative-focused work such as Juul's, Zagal and Mateas detail four "frames" of temporality: "real-world," "gameworld," "coordination," and "fictive" time frames (and not animation frames).[75] Alvarez Igarzábal responds to Zagal and Mateas, Juul, and others to synthesize game temporality scholarship with cognitive science research, generally focusing on the narrative-level conclusions of this synthesis. For example, he discusses the "hybrid narrator" of games (both retrospective and real-time at once) and "groundhog day effect" of living the same events over and over in games when replaying failed sections.[76] Finally, Wei et al. seek to establish a codified language to describe "how time and space are structured in game narratives."[77] These authors are all engaged with how the player constructs and experiences time relative to diegetic events, as well as the player's participation in meaningful interaction with such events.

The present chapter concerns a different question of temporality: that of the apparatus, not of the player's narrative interpretation of the game (to the extent that there is a narrative). Scholarship up to this point said very little on the extent to which the gaming apparatus envelopes the player in a particular kind of temporality. Among the works mentioned above, Alvarez Igarzábal alone acknowledges frames and framerate in games, but the topic receives relatively brief emphasis, and the workings of the game apparatus do not disrupt his decidedly narrative-focused approach to the topic. Tanenbaum and Bizzocchi (2009) touch on the

[74] "Mapping Time in Video Game."
[75] "Time in Video Games: A Survey and Analysis," 1.
[76] *Time and Space in Video Games*, pp. 115-155.
[77] "Time and Space in Digital Game Storytelling," 2.

apparatus's role in the temporality of games with their term "temporal resolution" as it pertains to sampling rate and lag in games such as *Rock Band*.[78] Christopher Hanson's more recent *Game Time* (2018) departs from purely narratological studies of game temporality by examining connections between games and other media and locating the medium-specificity of game time: "games are something that, while existing among a nexus of time-based media forms, are singular and thus can offer extraordinary and unparalleled experiences of temporality."[79] But Hanson does not consider the animation frame in his analysis, even as a link between games and other audio-visual media. What practices of play in esports reveal is that the gaming apparatus sets its own kind of temporality quite distinct from narrative relevance and from other critical conceptions of game time.

Though I do not intend to take one side of an old debate between narratology versus ludology (to me, games have both narratological and ludological meaning), this division does illuminate the difference I am trying to express between the kind of temporality that has heretofore been studied in games. Whatever chrono-narrative significance the game's events have for the player, a game like *Super Smash Bros. Melee* necessarily observes an uncompromising rate of 60 frames per second, and skilled players understand the game's temporality as such. Any full account of time in gaming must grapple with how such games slice up movement and time into discrete segments.

From here the chapter unpacks the opening vignette about the play dystopia of 20XX, and then it discusses the gaming apparatus in relation to Bergson's comments on the cinematic apparatus. The essay details multiple ways in which play is optimized in *Melee*, illustrating the

[78] Tanenbaum, Tess, and Jim Bizzocchi. "Rock Band: A Case Study in the Design of Embodied Interface Experience." *Proceedings of the 2009 ACM SIGGRAPH Symposium on Video Games*. New York, NY, USA: ACM, 2009. 127–134. *ACM Digital Library*. Web. 27 Apr. 2017. Sandbox '09.Taylor, Nicholas T. "Power Play: Digital Gaming Goes Pro." 2009. Dissertation. 129.

[79] Hanson, Christopher. *Game Time - Understanding Temporality in Video Games*. Indiana University Press. p 6.

transformation that the playfulness of play goes through in esports. The essay then analyzes "style" as one strategy for reencountering playfulness from within the context of esports but with potential applications elsewhere. 20XX, as an imaginary that references familiar motifs in pop culture, offers a way into the question at the heart of this essay: what does it mean for play to become so disciplined and regimented that it is no longer recognizable as play? In this essay I connect the mechanism of the gaming apparatus to privileged modes of play in esports to the widely persistent impulses to divide and rationalize time to ubiquitous platforms for optimizing one's time in the digital age. In doing so I offer "style" as a strategy not only for reencountering playfulness in games but with applications for resisting optimization generally.

20XX

The term "20XX" comes from the *Mega Man* series, first appearing in *Mega Man V* (1992). Any reference to year of setting in the first four *Mega Man* games is always to "200X," but by *V* that year became "20XX," some indefinite year in the twenty-first century when malfunctioning or malevolent robots threaten the safety of humankind. This fusion of 20 with XX produces both certainty and uncertainty: yes the AI takeover is coming this century, but no we cannot say when. As a temporal marker, 20XX hovers in the near-future and threatens to be closer than we would like to think. In the game series, Mega Man fulfills his role by thwarting this threat and saving humans from a dystopian robot apocalypse. This notation of Xs for digits continues into the spinoff *Mega Man X* series, the first of which features this opening message from Mega Man's fictional creator Dr. Light:

> "X" is the first of a new generation of robots which contain an innovative new feature – the ability to think, feel, and make their own decisions. However, this ability could be very dangerous. If "X" were to break the first rule of robotics, "A robot must never harm a human being", the results would be disastrous and I fear that no force on Earth could stop him.

[...]

"X" Possesses great risks as well as great possibilities. I can only hope for the best.

September 18, 20XX
T. Light

Dr. Light acknowledges the coincidence of utopian and dystopian potentials in groundbreaking new technologies: Mega Man X possesses "great possibilities" to do good, but as a powerful, perfected machine, he could instead do untold harm to humans if not programmed properly. Light's reference to Isaac Asimov's laws of robotics[80] reminds us of the persistence of such concerns about the dystopian potential in machine intelligence. Robots carry an apocalyptic threat in part because they are designed to be stronger, faster, longer-living, more objective, and less selfish than their human creators. In other words, by their nature as machine-optimized beings they threaten to eclipse their human creators and make obsolescent human faults, inconsistencies, and unpredictabilities – some of the very things that define human existence.[81]

As a gaming franchise, the *Mega Man* series is known for its "old school" difficulty. The games demand stage memorization if the player hopes to get to the "boss" at the end of each stage with health and/or lives to spare. The bosses themselves are punishingly difficult and require pattern recognition for players to succeed. In effect, there is a great deal of trying, failing, and trying again until the game has disciplined the player to play well – even, so to speak, to play robotically. As a game series with a dedicated speedrunning community (a topic discussed at greater length in this work's last chapter), *Mega Man* and *Mega Man X* are played ever more

[80] To paraphrase those laid out in his *I, Robot* are that 1. a robot cannot harm a human being, 2. a robot must obey orders that don't conflict with the first law, and 3. a robot must protect itself except when doing so conflicts with the first two laws.

[81] Sherry Turkle's argument in *Alone Together* presents another complexity of machine optimization: rather than apocalyptic possibilities, Turkle examines robots' much-hyped potential to simulate human intimacy more satisfactorily than humans can. Rather than a violent revolution, the threat of machine optimization that Turkle identifies in popular discourse is a continued estrangement of human relationships already distanced in part by networked communications. Turkle, Sherry. *Alone Together*. New York: Basic Books, 2011. Print.

"perfectly" through rote memorization, optimized pathing, AI manipulation, and frame-perfect play.

The associations of Asimov's rules of robotics and the series' "old school" difficulty alike envelop Hax's choice to set his ludic dystopia in the year 20XX. By making reference to *Mega Man* lore, Hax aligns a robot apocalypse with a metagame evolution of *Smash Bros. Melee* in which play ceases to resemble anything like play. We intuitively approach play as something creative and open to free choice, but the optimized play of esports compels the "right" choice above all others constantly. Each component of Toph's account of 20XX merits attention to discuss the dystopia's significance in full:

Everyone plays Fox. No other characters are viable! *Melee*'s cast of 26 characters, already whittled down to about eight "tournament viable" characters (plus a handful of other "mid-tiers" likely to show up in tournaments)[82] is further diluted down to a single viable character (Fox), implying that play has become so advanced that no skilled competitor using Fox could possibly lose to a lower character on the tier list.[83]

Fox enjoys top-tier status in competitive *Melee* for a few reasons that the community commonly provides: He has excellent "frame data" for moves such as his reflector ("shine"), jab, and uptilt; his recovery (ability to return to the stage once knocked off) is quite strong and gives him many options; he strings combinations of hits ("combos") against most of the cast adeptly;

[82] "Tier List." *SmashWiki*, https://www.ssbwiki.com/Tier_list. Accessed 29 July 2019.
The eight "tournament-viable" characters are generally accepted by the community as (in order): Fox, Falco, Marth, Sheik, Jigglypuff, Peach, Ice Climbers, and Captain Falcon. Other mid-tiers such as Pikachu, Samus, and Luigi frequently finish in the top 32 of major (national) tournaments, but until very recently (June 2019) no player had won a major with these characters.

[83] I should note that since 2013, when this account was given, *Melee*'s professional metagame shifted, and now a Jigglypuff player (Hungrybox) has been #1 in the world for more than a year. For a few reasons, 20XX is invoked less often in the context of tournament *Melee* than it used to be. This essay looks at *Melee* through the lens of 20XX because it is a useful rhetorical concept, not because *Melee* is actually close to realizing its dystopian potential. Fox is nonetheless still the top-rated character in the game.

he has a diverse arsenal of knock-out moves; and he is fast both on the ground and in the air.[84] In fact, Fox's blinding speed and excellent frame data give players the perception that his "skill ceiling" (how far the character can be pushed with players' increasingly advanced technical mastery of rapid button inputs) is limitless. No player controls any character perfectly, but it is especially obvious to players that no one plays Fox perfectly because there is always "tech" to work on and implement better. Because he still has room to be pushed farther and farther, Fox in particular gives players the impression that more training can produce better optimization. It is this general sense of potential that Hax taps into when he names Fox as the ultimate conduit for perfected play in the dystopian future of 20XX. Because fully optimized play is an impossibility, the 20XX stays fixed in the imaginary, but it nonetheless carries ideological relevance to the community.

Everyone capitalizes on everything perfectly. When Toph referenced Hax's idea of the 20XX in 2013, the *Melee* community was identifying an increasingly pervasive push towards optimization of play. What had once been a metagame focused on "reads" (predictions of opponent behavior) and "mindgames" (mixing up one's play as an attempt to make one's opponent commit errors) had by 2013 started seeing greater regimentation of standardized sequences and delineated decision trees. (More on both of these below.) Whereas reads and mindgames privilege outsmarting one's opponent, standard combos and decision trees simplify much of the game to a pursuit of perfected execution.

Hax's own history with the game leading up to 2013 exemplified this push towards optimization. Having used the "hype" (flashy and crowd-pleasing) Captain Falcon as his main character for years, Hax ultimately switched to Fox for that character's aforementioned strengths

[84] For a fuller discussion of this, please see Dave "Kira" Kim's video on the subject: SSBM Tutorials. *Are You a Fox Player? - Super Smash Bros Melee*. 2015. *YouTube*, https://www.youtube.com/watch?v=7GZ9rE9F7ZA.

and improved chances of high tournament placements. Hax pursued optimal execution of the character, achieving impressively high actions per minute (APM) through thoroughly disciplined technical execution.[85]

With players like Hax switching to Fox and gameplay generally tending toward optimization, the asymptotic limit point that these kinds of trends gesture towards is a fully optimized, perfected play. Though such play is for many reasons impossible to realize in a game like *Melee* (not least of which is the inability of humans to react within a single frame, or one-sixtieth of a second), players such as Hax look toward such realization with a certain (somewhat joking) trepidation. If the true outcome of fully optimized play is a predetermined result, then the game is no longer a test of skill and no longer settles who the better player is as of the moment of play. Skill-testing games (*agon*) level the playing field and show who is better; if such a game is replaced by a luck-testing game (*alea*), the results mean nothing to the competitors who wished to claim the status of being the best player at the tournament. Roger Caillois's distinction between *agon* and *alea* clarifies the folly of transforming a game of skill into a game of chance: "In contrast to *agon*, *alea* negates work, patience, experience, and qualifications. Professionalization, application, and training are eliminated."[86] To a professional (or aspiring-professional) player, the idea that all such training and professionalization would ultimately yield a game of chance would be self-defeating. Hence, players like Hax regard such "perfection" of play in *Melee* as a dystopian outcome.

Because [...] any advantage leads to victory, you R-P-S for port priority and that's the set.

[85] Hax's determined pursuit of this kind of highly technical, high APM play would eventually contribute to a debilitating hand injury (a calcified muscle in his forearm) that would raise awareness in the community of the consequences of repetitive, high-stress movement. Hax's hiatus from the game led him to get involved in the development of an arcade-style controller called the "B0XX" (pronounced "box," but note the reference to 20XX) that minimizes wrist stress. He later returned to the scene with this style of controller, sparking discussions of injury prevention, disability, and issues of restrictive rulesets that sometimes exclude ergonomic control interfaces.
[86] Caillois, Roger. *Man, Play, and Games*. University of Illinois Press, 2001. p. 17.

In tournament play, before a match begins, both players must plug their controllers into the GameCube console. This seemingly strategically neutral act actually influences certain gameplay interactions, such as character starting positions and priority of who grabs whom when two players attempt to grab each other simultaneously.[87] The agreed-upon method of establishing port priority (who gets to select their controller port first) is the game rock-paper-scissors.

In the play dystopia of 20XX, because all players execute perfect play and all top-level opponents are therefore evenly matched, the slightest positional or mechanical advantage leads to victory. With perfect execution a foregone conclusion, all that remains to determine who enjoys a positional advantage is the randomized selection of port priority: the rock-paper-scissors game that begins each tournament set. The punchline in Toph's retelling of 20XX is that competitive *Melee* is no longer about the pursuit of improved gameplay, strategy, or execution; once all of these have been perfected by top players, all that remains is a game of chance. The even playing field necessary for games of skill (*agon*) such as *Melee* is, in 20XX, reduced to a pea at the bottom of a stack of mattresses: a game of chance (*alea*) that establishes the infinitesimal advantage of starting positions.

What is achieved in the 20XX imaginary is the utter optimization of play, the realization of players' constant striving for better performance, better execution, better placings, and victory-focused outcomes. Professionalized play moves in this direction already, but in the imagined 20XX this trend is taken to its absolute extreme. Lost in 20XX are the characteristics that made play playful to begin with: free movement, unpredictability, contingency, self-

[87] One early reference for this is now-professional Mew2King's hometown.aol site (now archived) under the "Rules of Priority" subheading: *My Super Hardcore Very In-Depth Video Game Site*. 18 Mar. 2007, http://web.archive.org/web/20070318161704/http://hometown.aol.com/oovideogamegodoo/myhomepage/profile.html.

expression, creative choices, and style.[88] The last word, style, will require some explication towards the end of this essay. But first, to engage the stakes of digital optimization, I turn to Henri Bergson's writings on time and movement, drawing on his discussions of the cinematic apparatus to make a critical comment on the gaming apparatus. I make this move for two reasons: First, Bergson's insights on the cinematic apparatus's dissection of movement into discrete images apply to today's cinema, television, and gaming (particularly set-framerate games on consoles). All of these media divide time into rationalized framerates that convey movement. Secondly, Bergson's identification of 19th century habits of thinking – namely that time can be rationally understood as having a discrete rather than continuous quality – apply just as well to contemporary thought and, if anything, have only become more naturalized since his time of writing.[89] We live in an era of microtemporal divisions: ubiquitous computers with processing speeds in megahertz, GPS technologies triangulating location from differences of a fraction of a second to satellites, personal calendars on smartphones that divide one's day into meetings and conference calls and commutes and quality time at home, etc. Bergson's theories of time inform this essay's approach to studying the gaming apparatus, especially regarding optimization and frame-perfect timing in games.

[88] Huizinga's first quality of play is that it is "free" (8); he also stresses that it is "superfluous," "voluntary," and that the joy of play is in its freedom (7-8). Caillois, for his part, also lists "free" first among his descriptors of play, adding that play is "uncertain," "unproductive," and marked by a "free unreality" (9-10). Salen and Zimmerman's general definition of play ("free movement within a more rigid structure") likewise prioritizes play's freedom first and foremost. While the "structure" in this definition may set boundaries around types of play behaviors, Salen and Zimmerman stress that these boundaries paradoxically create play's essential freedom (of movement) (304). Suits's *Grasshopper* defines playing a game as "the voluntary attempt to overcome unnecessary obstacles," with the sense of "voluntary" being likewise free (41). Wark responds to several of the above writers in discussing play's freedom and video games' colonization of analog space and continuous movement. Moreover, Wark expands on Suits's discussion of the trifler to identify a type of play in games such as *The Sims* to make a play of stylization (40).

[89] As Alvarez Igarzábal illustrates in *Time and Space in Video Games*, existing research in cognitive science asserts that "our perception of time is divided into discrete building blocks" of about 30ms (41). Just as one treats space as continuous even if quantum mechanics is said to theorize the spatial as discrete, I do not take Alvarez Igarzábal's discussion to be a refutation of Bergson's writings on continuous time. Even if there are "building blocks" imperceptible to us that structure our temporal experiences, Bergson's analysis of interpenetrating continuities of time perception nonetheless ring true.

Media Temporality and the Gaming Apparatus

On a physical playing field for a traditional sport such as soccer or basketball, players have complete freedom of movement within that space. One has total control over the arc one's leg sweeps through to kick the soccer ball; one may pass a basketball at whatever angle through the air or into the court at whatever speed and rotation one can execute. Players experience the full continuousness of movement that Henri Bergson describes so well across his critical writings, *Matter and Memory* in particular. Bergson's project, in part, was to challenge the endless subdivisions of time and space that dominated Western thought by the 19th century, especially in industrial settings. This project only became more urgent as his work continued into the early 20th century. The rationalization of time that Bergson responded to was a recent intensification of a change that began centuries before, with a shift in timekeeping practices away from charting the movement of bodies (the length of a day, a year, the phases of the moon) toward clock time (homogeneous seconds marking time from one midnight to the next instead of one sunrise to the next).[90] This change led to a highly regimented industrial workday and, as the latest and most extreme realization of rationalized time, the cinematic apparatus chopping up movement into 24 frames per second.

At present we likely find the constant rationalization of time to be a perfectly natural thing: smartphones synchronize their time with cell towers; we calculate time zone differences without a blink; we gauge our lag to a server in milliseconds (ping); we shop for screens that display in 60 or 120 (or more) hertz. In such a context, time is divided neatly into 3600 identical seconds per hour every day of our lives because our communication infrastructure, our labor practices, and our most used household technologies are built around this temporal paradigm. As

[90] Scholarship on this topic includes Jacques Le Goff's *Time, work & culture in the Middle Ages*; Gerhard Dohrn-van Rossum's *History of the hour: clocks and modern temporal orders*; E.P. Thompson's "Time, Work-Discipline, and Industrial Capitalism," and Walter Benjamin's *Illuminations*.

Wark[91] and others have argued, developments in successive information technologies have encircled us again and again and connected us along spatio-temporal lines – one of which being a regimented standard of timekeeping. The commonplace acceptance of this regimented form of temporality reveals a further extension of the hyper-rationalization of time that began centuries earlier. Bergson's critique of this kind of temporal subdivision becomes all the more poignant precisely because we are so predisposed to take the hyper-rationalization of time to be a natural thing. Engaging Bergson's concept of duration helps us identify what is at stake in our present temporal paradigm – one that presumes time is infinitely divisible, discrete, and homogeneous.

In Bergson's writings, temporal experience is quite the opposite of what we commonly presume it to be: not discrete but continuous; not removed from the past but swelling with a dense accumulation of prior experiences; not a succession of distinct steps but a heterogeneous mix of interpenetrating mental states. Bergson develops his concept of "duration" across his writings to express this kind of temporality:

> Duration is the continuous progress of the past which gnaws into the future and which swells as it advances. And as the past grows without ceasing, so also there is no limit to its preservation.[92]
>
> By changing, [duration] prevents any state, although superficially identical with another, from ever replicating it in its very depth. That is why our duration is irreversible.[93]

Like the common phrase "no one ever sets foot in the same river twice," these quotations from Bergson argue that no two moments can be identical because an individual's accumulated past changes from one moment to the next. In contrast to the rational division of heterogeneous time, Bergson's emphasis is on the emotional swells of subjective experience. Such experience is in constant flux, and resemblances between two similar moments are merely "superficial." This

[91] *Gamer Theory* (2007), 51-75.
[92] *Creative Evolution*, 7.
[93] Ibid. 8

sense of time clearly runs contrary to the optimized play that an esports player tries again and again to perform and repeat. If one can repeat a frame-perfect technique to one sixtieth of a second, the Bergsonian interpretation would be that those two moments are indeed superficially similar, but they are experientially distinct and can never be the same.

Developments in cinematic technologies would inform Bergson's work on temporality, and the cinema would offer him the perfect example of endless temporal divisions of heterogeneous experience. His major works from *Time and Free Will* (1889) and *Matter and Memory* (1896) to *Creative Evolution* (1911) would overlap with the advent of cinema, including the Lumières' earliest work and Edison's Black Maria in the last decade of the nineteenth century. The long-exposure photographic portrait, the instantaneous snapshot, and early time-motion studies such as those of Muybridge and Marey had yielded briefer and briefer instants to be frozen into the photographic image; by the time cinema arrived in the form of the cinematograph and kinetoscope, these antecedent photographic technologies had offered to break the continuousness of movement down into discrete, digestible any-instant-whatevers.[94] Muybridge in particular has been recognized as a visionary who (among other things) solved the perceptual problem of how a horse's legs move at full gallop. At the time of Bergson's earliest writing, the instantaneous snapshot seemed to offer a more incisive perception of time through the ("objective") operation of a mechanical apparatus. So as cinematographic technologies took on their earliest embodiments and reproduced motion captured at 20 (or so) frames per second, Bergson's engagement with the breakdown of temporal experience into discrete phases became all the more urgent. Bergson would address cinematographic technologies directly in *Creative*

[94] This term comes out of Deleuze's *Cinema 1: The Movement-Image* to describe the arbitrariness of the sequence of images produced by the cinematic apparatus. Instead of generating images based on the timing of poses, the cinematic apparatus divides up movement into arbitrary images according to a particular framerate. The cinema does not specify posed images but instead slices up ongoing movement.

Evolution and observe that "the *mechanism of our ordinary knowledge is of a cinematographical kind*" (emphasis in the original).[95] Bergson would not necessarily have used this phrasing in *Time and Free Will*, but along had come the cinematograph to materialize the issues of modern thinking he had been engaged with from the beginning.

Bergson's analysis of the cinematic apparatus provides a useful starting point and template for game temporality. The camera divides time into regular, homogeneous intervals (the standard being 24 frames per second); when we view a film, we see those frames played back at the speed at which they were captured, but instead of perceiving them as a sequence of still images, the mind animates those stills with inferred movement. Such is the illusion of cinema: the movement that connects the stills we see is not unfolding before us, yet we perceive it nonetheless. Though audiences appear to be passive receivers of televisual media, they are nonetheless actively engaged in the reconstruction of fluid movement.[96] In an animated work, the movement on offer is illusory not only because it is assembled from stills but also because it has no original referent (unlike live action film). Animation fabricates movement out of independently created still images, yet we nonetheless perceive movement in the finished product. Games, which are almost always animated from the ground up,[97] not only reproduce the kind of illusory movement familiar to the cinema through the use of frames, but they also extend a critical step further: the gaming apparatus envelops player action back into discrete windows of

[95] *Creative Evolution*, 332.

[96] Beyond the fact that viewers are actively engaged in reconstructing movement in the images they see, I should clarify audience experiences are far from "passive." Espen Aarseth's key term in his *Cybertext*, "ergodic," stresses the "nontrivial" effort required of users of new media such as game players. This term acknowledges that effort is required of, for example, readers to turn each page, but Aarseth suggests that such efforts are merely trivial. Studies of participatory culture from such scholars as Henry Jenkins argue instead that engagement with all kinds of media (not just new media) brings with it a host of participatory behaviors (affiliations, expressions, collaborative problem solving, and circulations are some of the terms Jenkins uses to describe participatory behaviors in his *Confronting the Challenges of Participatory Culture*). All this is to characterize some of the discourse around what "passive" media consumption means and question the extent to which that term can apply even to traditional media forms.

[97] With the obvious exception of motion capture, from *Prince of Persia* (1989) to more modern AAA titles (*L.A. Noire* (2011), *Call of Duty: Advanced Warfare* (2014)) that capture well-known actors and reproduce their likenesses. Motion capture retains the indexicality of film, but, being digitized, is a step removed from live action.

time. Games computationally generate, sequence, and display frames in order to facilitate the cybernetic interaction of player and apparatus.

For an illustration, return to *Super Smash Bros. Melee*. In the cybernetic feedback of machine to player and back, the GameCube updates its status sixty times per second, computing new information before sending each update to the television, which in turn displays the game state in a sequence of frames; the player perceives motion through this rapid succession of still images and interacts with the game by sending inputs back to the console through the controller. When the inputs are received, the console updates the game state accordingly, and the loop of interaction between player and apparatus is closed as the player continues to operate the machine. Just as animation frames are discrete images displayed for homogeneous windows of time, player inputs necessarily operate within discrete actionable windows.[98] The player attempts to, say, jump-cancel out of Fox's reflector (see set of figures below): a "frame-perfect" jump-cancel would happen precisely on the fourth frame. To be frame-perfect is to time techniques in set-framerate games such as *Super Smash Bros. Melee* to within a one-frame window (more on this below). To continue this example, acting too early would have no in-game effect and leave Fox stuck in his reflector; acting too late, on the other hand, would have the effect of jumping out of the reflector, but it would be sub-optimally timed (which in some cases can be a costly mistake).

[98] In a personal correspondence I had with Dan Salvato, a game developer and *Melee* modder, Salvato explained the relationship between controller and system: "The controller doesn't send an interrupt, it's the system that decides the controller polling rate, and when to grab the latest inputs. In the case of Melee, the game creates a scheduled interrupt function to happen once per frame. When the interrupt occurs, the latest controller inputs are copied from memory to the game's input buffer. (This interrupt does not do the actual controller polling, that is handled by hardware and not game code.) So, creating a scheduled interrupt was a programming choice and not the nature of the system." Consequently, player actions must take place within rationalized intervals of time to be legible to the game.

Figures 1-4: *Armada performing a jump-cancel as Fox. While the reflector attack ("shine") is still active, Armada cancels out of it by jumping, shortening the move to five frames (not all are pictured).*[99]

It is important to note that the gaming apparatus is closed where the cinematic apparatus is open: for games to count as interactive, players must actively participate in the temporal paradigm of the machine (whether they acknowledge that temporality or not), but the cinema does not expect the same of its viewers. From the moment one begins playing a digital game, one enters into an interrelation between machine and user. Competitive gaming, in its attentiveness to frame data and frame-perfect play, illustrates that for games all players are implicated into a discrete experience of time even when their play seems smooth and continuous.[100] That is, player inputs can only be read discreetly, and player actions count only to the extent that they can be interpreted between discrete windows.[101] Taking an apparatus-focused approach to game temporality serves to account for the active role of the player in bringing about a dynamic game state and the player's direct engagement with how games keep time.

Bergson's perspectives also illuminate some of the key distinctions between physical and

[99] VGBootCamp. *GENESIS 5 SSBM - [A]Rmada (Fox) VS TSM RB | Leffen (Fox) - Smash Melee LSF*. 2018. *YouTube*, https://www.youtube.com/watch?v=tt1xGQ7E7OQ.

[100] For the moment my comment is specific to set-framerate games, but there are variable-framerate games such as *League of Legends* that don't compel their players to memorize frame data. They are, nonetheless, discrete temporalities unto themselves. For simplicity's sake, I focus on set-framerate games.

[101] As cinema viewers know from experience, and as Marc Wittmann describes in his *Felt Time: The Psychology of How We Perceive Time*, the cinema gives the illusion of movement only if its frames succeed each other quickly enough; the threshold for the human eye is, as Wittmann states, about 20 frames per second (fps) (p. 29). The cinematic standard is 24 fps, NTSC televisions flicker at 60 fps - PAL televisions at 50 fps. To play by the frame is to peel back the apparent smoothness of animation to perceive the computational structure underneath and try to interact with that which we can't discreetly see.

digital play – sports and esports. Sports privilege continuous movement, and while any competitive sport must quantify something (scores, points, goals, etc.), at base the traditional sports are about bodies moving through space rather than the exchange of data.[102] A soccer ball's movement has everything to do with the way one makes contact with it (a header, a bicycle kick, illegal use of hands, etc.); a move in a turn-based strategy game (such as *Pokémon*) has nothing to do with whether one touches the button with one's index finger or nose. In terms of temporality, in some sports the officials keep the time (basketball, American football); in others timekeeping does not necessarily bound play (baseball, tennis). But, and this should go without saying, in none of the traditional sports does an apparatus dictate the terms of the game's temporality. Rather, timekeeping devices are tools used by officiators, who can start, stop, set, pause, reverse, and advance the clock at their discretion.[103]

When comparing esports to traditional sports, a pessimistic view immediately suggests that we lose two critical, human-centric qualities of sports when going digital: the infinite degrees of discretion players have over the movement of their physical bodies and mastery over the clock. Digital games threaten to box in play, confining it to discrete windows and limited possibilities for interaction; meanwhile, games dictate not only the progression of the clock but the very terms of interactability as in the apparatus's frame rate. In this light, we may wonder whether play in video games is free in a meaningful sense of the word (see footnote 10). In traditional sports, with limitless possibilities for player discretion, freedom seems definitional to play; in esports, the more play tends toward optimization, the less free it seems. Optimization exists in traditional sports too, of course, but the discrete temporality of games reveals that esports are perfectible to the frame. We might say that Wayne Gretzky, Serena Williams, and

[102] Wark discusses the distinctions between analog and digital (and the takeover of the former by the latter) in *Gamer Theory* (2007), 76-100.
[103] Or, in the case of games such as chess, sometimes the players themselves start and stop the clock.

Michael Jordan are excellent players, or the greatest of all time, but discourses around such players are not liable to throw the word "optimal" around. Yet that is the descriptor many esports players aspire to from moment to moment. Digital games create opportunities for optimal play that we do not necessarily find in traditional sports because video games rationalize time and movement. Bergson's focus on the continuousness of movement in its irreducibility to discrete instances of stasis offers one explanation for why we do not speak of traditional athletes as "optimal." Their movements are unique and not replicable (in Bergson's sense of the word), quite distinct from the repeatable inputs of optimal players of digital games.

Pursuit of the Optimal

At "Battle of the Five Gods," a 2016 *Melee* invitational tournament in which the original five "gods"[104] of the game (Armada, Hungrybox, Mang0, Mew2King, and PPMD) played against a number of talented challengers, four of the five "gods" were interviewed and asked to describe each other's style of play. Two responses provide a productive contrast:

> D1: What do you guys feel about Armada's playstyle? What do you think is, like, unique about Armada's playstyle?
> MEW2KING: Optimal.
> D1: One word. I mean, that's a pretty– that's a pretty good word!
> MANG0: Uh, next question! Next, next question.
> [All laugh]

> PPMD: I think the most unique thing about Mang0 is we only know, and we only believe, whatever he says about himself. So, Mang0, would you like to tell us who you are? Cuz none of us know!
> [Laughter]
> MANG0: I'm the sickest *Melee* player to ever touch a controller. Without a doubt. And I

[104] For several years of *Melee* history, five top players were commonly recognized as being head and shoulders above all other players, and in tournament, those top five generally did not lose to anyone but each other (Armada, Hungrybox, Mang0, Mew2King, PPMD). The community referred to these players as "the five gods" of *Melee*, a term which persisted even after other players (Leffen and Plup) notched at least one win against all of them in tournament matches.

might not be the most optimal, or the smartest, but when I get going? It's a sight, it's poetry, it's– it's beautiful.[105]

Among these best-of-the-best players who know and play the game at a proficiency beyond anyone else, there could be only one answer to describing Armada's play: optimal. As Mang0 knew in his half-joking suggestion to move on, and as the other players confirmed in their laughter, nothing further needed to be said. In Mang0's own self-description, he drew a distinction between his "sickness" (or impressively stylized play, discussed below) and Armada-style optimization: "I may not be the most optimal." Mang0's play is ineffable; PPMD, with his reputation in the community as a preeminent thinker and theory-crafter, passed on the opportunity to describe it, in part for humor but also in part to suggest that there was no way for him to put Mang0's playstyle in words. For Armada, however, his optimization was so self-evident as to require no more than a single word.

Such is the naked logic of optimization: when the optimal strategy presents itself, it is no longer open to question or review. All parties adopt that strategy until circumstances change or new techniques or technologies become available. In this view, to be sub-optimal is to be inferior, and in competitive gaming (as in business or warfare), who can abide being inferior? I will therefore define the optimal as the act that produces a state of maximum efficacy. In the context of gaming, the optimal play is the one guaranteed to secure victory.

A thread on the SSBM (*Super Smash Bros. Melee*) subreddit – a community within Reddit dedicated to conversations, discoveries, and reports on and around *Melee* – illustrates what optimization looks like to *Melee* players.[106] One user, poi830, posted a thread in which they

[105] Skrai [Aranfara]. *All Five Gods Interviews Edit [Re-Upload] - YouTube*. https://www.youtube.com/watch?v=j5Zs6MIdi7M. Accessed 29 July 2019.

[106] There are many such discussions about optimal strategies, flowchart responses to opponent options, etc. on this subreddit as well as other *Smash* communities such as Smash Boards. I chose this example because this is both a clear example of optimization and the thread offered images that help convey what optimization looks like.

picked apart the options available to Marth and Fox in an "edgeguard" scenario. They posted a series of images to illustrate the "decision tree" available to Marth while edgeguarding Fox, and I have assembled those images into one graphic:

Figures 5-13: *Fox's options and Marth's responses.*[107]

Melee is a "platform fighter," which means that players try to knock each other out by forcing each other off the stage. In traditional fighters, players attempt to reduce their opponents' health down to zero points; in *Melee*, damage counts *up from*, rather than *down to*, zero. As damage ("percent" in *Melee*) accumulates, a character is flung farther and farther away from the stage by the same attack. When a player is knocked off the stage and attempting to recover, their opponent tries to prevent them from reaching the stage again – this is called an "edgeguard."

In the above scenario, Marth is edgeguarding a recovering Fox. poi830's post details the many recovery options available to Fox: use illusion above the stage, at Marth, or towards the

[107] poi830. "Edgeguarding Fox as Marth." Reddit. 12 August 2015. Online. 15 September 2017.

edge; use firefox above the stage, even with the edge, or below the stage (with different angles of firefox possible at each of these types of positions). Each option that Fox chooses has a respective counter-option available to Marth. Another user, MENDoombunny, created the following flowchart to detail these decisions. MENDoombunny labels it a "dirty" flowchart because it "could be made much better," as in more aesthetically pleasing, but at core the diagram visualizes the post's information faithfully. Such a spelled-out form of all of both players' available options is called a "decision tree."

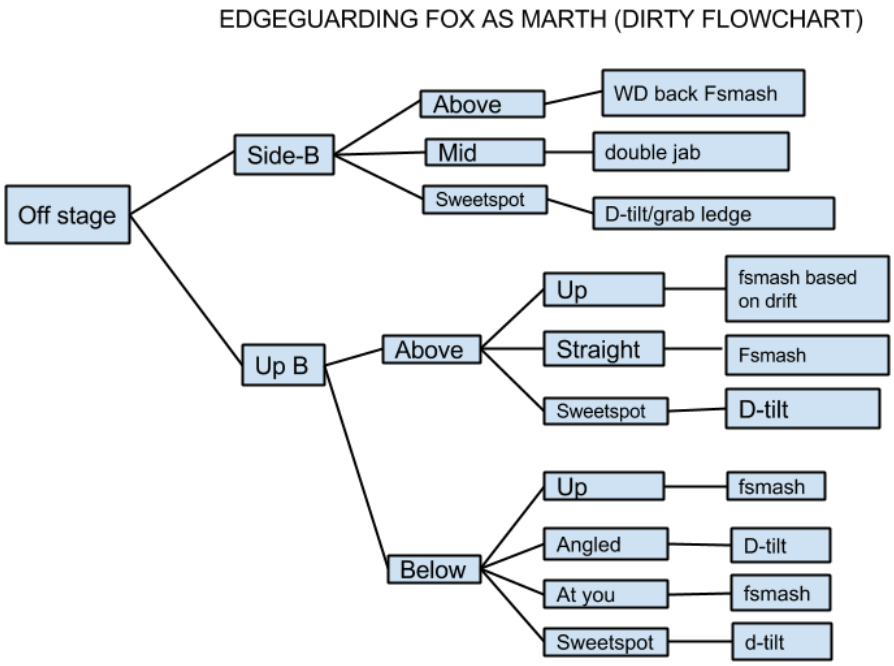


Figure 14: *A "dirty flowchart"*[108]

Those who study chess eventually encounter chess puzzles: "white mates in ___ moves." A decision tree, when executed properly, plays out like such a chess puzzle. No matter what the

[108] *MENDoombunny. "Edgeguarding Fox as Marth." Reddit. 12 August 2015. Online. 15 September 2017.*

opponent's response, the player in control of the decision tree (Marth in this instance) can force their opponent into a bad position or even KO them. There is a kind of helplessness for players in Fox's situation when being edgeguarded by a competent Marth: "I am dead unless my opponent messes up." Once one finds oneself in such a position, the gears of inevitability start grinding. A good player does not drop free edgeguards, and a player like Armada, who has a reputation for optimal play even among the "gods" of *Melee*, will remorselessly take the stock as sure as the sun will rise tomorrow.

Studies of movement for the sake of optimization have a history in visual culture. Frank Gilbreth undertook motion studies both to aid in optimizing how workers perform their tasks productively and to reduce the risk of workplace injury. On the left in the figure below is a motion efficiency study taken in front of a grid intended to quantify length of movement as the worker performs their task. In this kind of study, workers wore one or more light sources while being photographed through long exposure. The result traced the movement of the light source on film as an indexical quantification of how that worker moved in their labor.

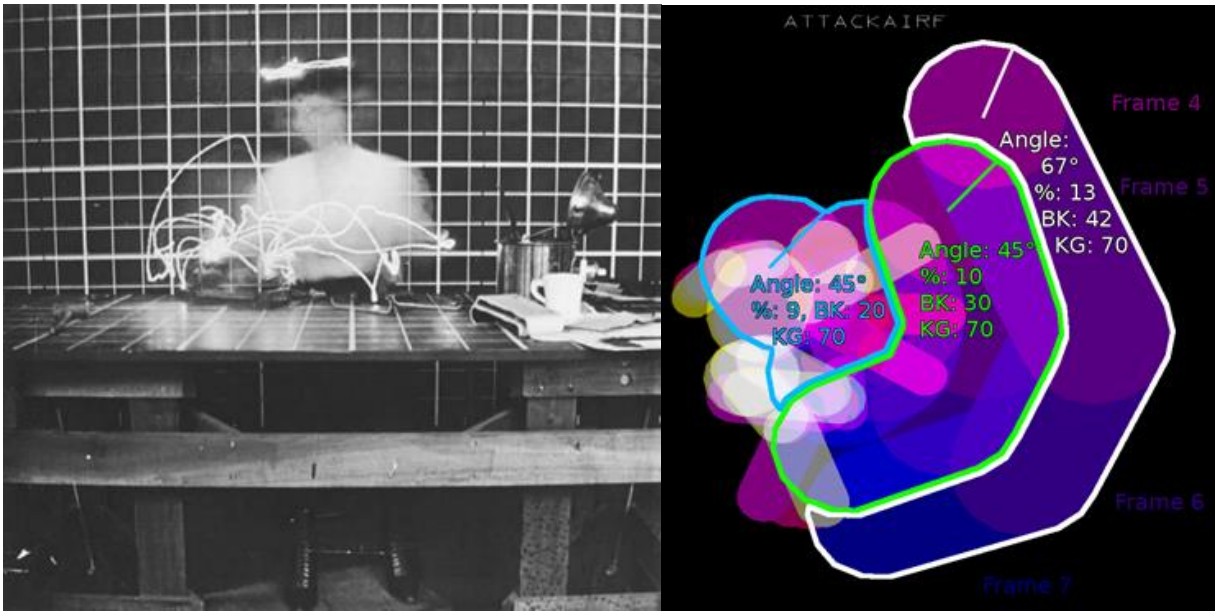


***Figure 15**: Time-lapse motion efficiency study of someone at work.*[109] ***Figure 16**: Image from "Kadano's perfect Marth class."*[110]

On the right is a forum post from *Melee* player Kadano in which he detailed a great deal of quantified information computed by the game but not made explicit to the player. The right side of this image shows sweeping semicircles; the left is a figural representation of the *Melee* character Marth's hurtbox (or where on the character model Marth can be hurt). The move documented in the image is Marth's "forward air," an aerial attack in which Marth sweeps a sword in front of him, swinging from above and in front of his head to below his feet. Kadano color-codes this image to show where the active frames start (frame 4 in fuchsia) to where the active frames end (frame 7 in blue). In effect, the player initiates Marth's forward air on frame 1, on frame 4 the hitbox appears, and the move stays active until frame 7, moving from top to bottom of the arc. Kadano inscribes the image with additional data such as the damage the move does, how strongly it knocks the opponent back, and the angle in which it does so. The image also clarifies which parts of the move do different amounts of damage and knockback. In going into such fine detail about how the move works, Kadano clarifies to players the game's rational structure. Kadano's "perfect Marth class" illuminates in-game movement the same way that Gilbreth's time motion studies illuminate the movement of a laborer. Both rationalize and quantify the movement that may not otherwise be clear to even the experienced observer. Resources like Kadano's guides help players achieve greater proficiency and optimization with their characters through encyclopedic understanding of how the game functions mechanically.

Among dedicated players and aficionados of the game (the grinders of the *Melee*

[109] Gilbreth, Frank. *Motion Efficiency Study*. c 1914. National Museum of American History.
[110] Schmid, David. "Data - Kadano's Perfect Marth Class -- Advanced Frame Data Application." *Smashboards*, https://smashboards.com/threads/kadanos-perfect-marth-class-advanced-frame-data-application.337035/. Accessed 29 July 2019.

community constantly entering tournaments and trying to outperform their peers), their proficiency moves them toward more and more effective playstyles on a path of gradual optimization. Professional players like Armada experience this same trend of improvement, but their play bears the added weight of economic profitability on top of garden-variety play optimization. There is an extra layer of seriousness and inevitability when one approaches a game as a job: one option is right, and in such a context not choosing the right option is necessarily a lapse in professional judgment.

By contrast, in rhapsodizing about his own "sick"ness, Mang0 makes *Melee* sound like a gamer's game in the way that jazz is often spoken of as the musician's music: among people who understand and live the complexity of sophisticated play, *Melee* is as deep, as complex, as freeform, and as impossible to master as any game. Mang0 encourages others to see the poetry he describes in his playstyle, but not all professional *Melee* players describe their own playstyles in the same terms. Even among the top players of the game, there is a clear division regarding the professionalism of play: while either Mang0 or Armada could potentially win any tournament they enter (unlike the vast majority of *Melee* players who attend "majors" and "supermajors"),[111] their commitments to the game fundamentally differ. Armada treats the game like a job, whereas Mang0 "never want[s] it to become a job."[112]

Frame-Perfection

The previous section detailed some of the resources for optimal play as well as discourses around *Melee* about what it means to be an optimal player (including ideologies and imaginaries

[111] The distinction between "major" and "supermajor" in the Smash community is often up for discussion, but in general the "supermajors" are the three or four tournaments per year (typically including EVO and The Big House) that attract the best and greatest number of competitors. Majors are any other tournament that attracts talented players from outside of the location's regional player base. Both tournament types tend to pay out in the thousands for first place.
[112] Personal interview.

of optimization). This section examines frame-perfect play more specifically. Frame-perfect play is optimized to the frame; it is therefore the most temporally precise form of optimization. I should be clear that, generally speaking, the optimal play may not always need to be executed on the first possible frame: some decisions in moment-to-moment gameplay are more forgiving than a one-frame window. Some moves (such as Falco's reflector) put the opponent into extended hitstun and the player has half a second or, to use the common lingo, "all day" to punish a defenseless opponent. But some techniques can only be executed within a one-frame window, and often the best play is indeed the frame-perfect one.

Figures 17-19: *Three consecutive frames of PewPewU's pivot F-smash against Hungrybox at Apex 2015.* ***Figure 20:*** *PewPewU's F-smash connecting with Hungrybox, ending game one in a match PewPewU went on to win.*[113]

The above images show a "pivot f-smash" performed by PewPewU's Marth on Hungrybox's Jigglypuff at Apex 2015. A pivot is a frame-perfect technique that requires a little unpacking of some other *Melee* techniques and terminology. In *Melee*, players can move their characters from standstill to run, and for all characters there is a special state between standstill

[113] *Apex 2015 - PewPewU (Marth) Vs. Hungrybox (Jigglypuff) - Winners Round 2 - SSBM - YouTube*. https://www.youtube.com/watch?v=tDxvY_MVctI. Accessed 30 July 2019.

and run called “dash.” The number of frames in dash vary from character to character, but while in dash, any character can switch from dashing in one direction to dashing in the other. As long as the player keeps switching rapidly from one direction to the other (“dash-dancing”), their character stays in dash without transitioning to a fully committed run.[114] During the dash-dance, there is a one-frame window in which the character appears to be standing still but is in fact momentarily in between a dash in one direction and the next dash in the other:

Figures 21-23: *Three consecutive frames of PewPewU’s Marth dashing to the right, pivoting, and dashing to the left, respectively.*[115]

This single frame is the moment of pivoting from one state to the other, and it so happens that a player can perform practically any standing attack during this window. Certain standing attacks – a grab, jab, special move, or “smash attack” (a hard-hitting move designed to deliver a knockout blow to damaged characters) – cannot otherwise be performed during a dash or run. One might opt to pivot-forward smash (referred to as an “F-smash”) in situations when run up –> stop momentum –> F-smash would be too slow. PewPewU’s Marth pivot-F-smashed Hungrybox’s Jigglypuff in the example above because it was his most effective option to quickly punish

[114] There are some good reasons to go to the trouble of all this footwork. Not only does dash-dancing make one’s character harder to hit, but also one’s movements become harder to react to or predict. At any moment, a dash-dancing character can rush at an opponent, who has a harder time reacting to a commitment from dash-dance than from standstill.

[115] *Apex 2015 - PewPewU (Marth) Vs. Hungrybox (Jigglypuff) - Winners Round 2 - SSBM - YouTube*. https://www.youtube.com/watch?v=tDxvY_MVctI. Accessed 30 July 2019.

Hungrybox's missed grab.

The pivot is a relatively clear frame-perfect technique to talk about because a missed pivot is obvious: instead of jabbing a player does a dash attack, or instead of pivoting in time they enter run animation, or instead of standing-grab they running-grab (two different moves with different animations). For other frame-perfect techniques, it is possible to flub them by executing them later than the first available frame; as such those techniques are harder to discern by the naked eye whether done correctly or not. Frame-perfect play can be a difficult thing to pin down or communicate; nonetheless its performance and pursuit form an essential part of the *Melee* competitive scene and the dystopian imaginary of the 20XX play apocalypse. To perform frame-perfect techniques inconsistently is human; machinelike certainty of frame-perfect play suggests a kind of non-play, or optimal execution without playfulness or contingency or freedom – the very characteristics that make play appealingly human-centric to begin with. If play is in jeopardy of being optimized with machine-like proficiency and perfected to the frame, what options are there for recovering the playfulness of play? Style offers one strategy.

Style

McKenzie Wark's *Gamer Theory* poetically weaves a thread around digital games as meaningful texts, outlets of escapism, global capital, and microcosms of twenty-first century identity. One particular thread, Wark's discussion of the topological present, engages the totalizing nature of networked communication: the topological network connects all points to each other, placing a numerical relationship between any two things. In the topical (a place surrounded by unknown) or the topographic (a "continuous and homogenous plane" on which the topics become connected),[116] there is room for the unknown, places not yet discovered and relationships not yet formed. Unlike these, the topological line extends ceaselessly to all things,

[116] *Gamer Theory*, 52.

it envelopes all, and brings everything ostensibly qualitative into quantified relationships. In our topological context (of which Wark interprets games as the exemplary medium), whatever might remain unknown is that which has no value to the network.

What does it look like when the topological line connects digital games to optimized play to professionalism? One cannot help but read Wark's analysis of the topological with a persistent doubt: surely something escapes quantifiable relationship to the rest; surely there are qualities as yet ineffable to the ceaseless tracing of the topological line. One position that Wark considers on this matter is the trifler, a figure from Suits who plays by the rules but lacks a "lusory attitude," or in other words a will to win.[117] To Wark, a trifler in a game like *The Sims* "transforms [*The Sims*] from a world of number back to a world of meaning."[118] And yet Wark points out that this kind of transformation has limits: games, to Wark, do not give limitless freedom but "a perfect unfreedom, a consistent set of constraints." Wark's analysis predates much of the recent growth in esports culture, but perhaps if *Gamer Theory* were published today, it would account for the encroachment of digital capital through the video game's casing and disc (and downloaded files) and into the play itself: optimized play among professional esports players. But is there not, even in esports, an ineffable quality to play – some expression of contingency, something undeniably human about the play act, which remains free even in a context of professionally optimized gaming and the deterministic play dystopia of the 20XX?

On July 17th, 2011 in Antioch, California, Genesis 2 – a *Smash Bros.* major tournament – had reached top 8. Spectators cheered and shouted as the tournament approached its end and everyone would find out whether Armada and Mang0 would meet in the finals again, as they had

[117] Suits, *The Grasshopper: Games, Life, and Utopia*.
[118] *Gamer Theory*, 40.

at the first Genesis.[119] Crowd favorite and California native Mang0 had been sent to the losers bracket but only had to beat one more player to reach grand finals: Tony "Taj" Jackson, an Arizona player on his best tournament run to date.

The events of the match exemplify the stylistic quality of Mang0's play and his self-described poetry. Over the course of the match, Mang0's movement sped up and became more unpredictable and fluid. After losing the first stock in game one against Taj, Mang0 seized control of the match, taking the next four stocks and winning the first game comfortably. As Mang0 rode this momentum from game one into an even faster speed of play, spectators can be heard on the recording crying out "Oh shit!" eleven seconds into game two. In a blazing sequence of button inputs fifty seconds into the match, Mang0's play elicited screams from the crowd and the kind of oohs normally reserved for fireworks:

Figures 24-29: *Mang0 jumps off the stage, turnaround-shines (1), double jumps, fastfalls back to the stage, wavelands back off the stage (2), double jump drills above the edge (3), fastfalls back to the stage, L-cancels, sidesteps, shines (4), jump cancel-wavedashes off the stage, shines (5), double jump cancels, wavelands onto the platform, and falls through to hit Taj with a back air*

[119] These two players would meet again in the grand finals of Genesis 3 in 2016 and Genesis 4 in 2017, making the tournament series exceptional among all *Smash* majors. No other major (or supermajor) tournament would see the same players in grand finals four consecutive times.

(6). Total time: 3.4 seconds.[120]

After Taj lost a second stock without having taken one of Mang0's, ad-hoc commentator HomeMadeWaffles[121] predicted that Taj would lose the match 3-0, and another spectator commented that Mang0 looked "untouchable right now; everything is on point." After a few chants of "Swag! Swag! Swag!" to egg Mang0 on to embarrass Taj by beating him with poor move choices and unpredictable options, Mang0 knocked Taj off stage with a back air, putting Taj in hit-stun and creating an opportunity to do any knockout move Mang0 might choose; instead of knocking Taj out, Mang0 opted to shoot a single laser, an attack with no knockback, no KO potential, and minimal damage:

Figure 30: *Mang0 shooting a laser at offstage Taj*

This play drew additional screams from the crowd, and Mang0 took Taj's stock a few seconds later. "Mang0's playing fucking amazing. I really don't see Taj beating him." Moments after that, Mang0 took Taj's last stock at an unexpectedly low percent and beat Taj without

[120] *Genesis 2: SLF, Mango vs Taj - YouTube*. https://www.youtube.com/watch?time_continue=9&v=Omi9MyweC_I. Accessed 30 July 2019.

[121] At this time in *Melee* history, "commentating" was neither an official nor a paid position. Rather, fellow players such as Brandon "HomeMadeWaffles" Collier would pick up the mic and narrate comments for a video that would be uploaded somewhere later, not as a live-stream. As such, commentary of this era was prone to crassness of both quality and vocabulary. HomeMadeWaffles would later become a more polished and official on-stream commentator.

having lost a stock (known as a "four stock" victory). HomeMadeWaffles's final comment on the game have since taken a permanent place in *Smash.* lore: "Unplug your controller, dog. Unplug your controller!" Taj, in turn, did: he left the stage early when down 2-0 in a best of five set, but his defeat had become a foregone conclusion to everyone in attendance. Amid Taj's departure, the crowd cheered "Mang0, Mang0, Mang0" as Mang0 was set to rematch Armada in grand finals.

On the biggest stage, at one of the biggest tournaments in *Melee* history, with thousands of dollars on the line (almost $3400 for first and a little over $900 for third place), Mang0 opted not for optimization, not for guaranteed KOs, and not for easy money, but for the spectacle of unpredictable, stylized play. The single frame above of Mang0 shooting a laser at a defenseless Taj summarizes both the results and tone of the match: Mang0 was so much better on that day specifically and as a player generally that he did not need to press every advantage. There was no need to fall back on bread-and-butter KOs and statistically favorable strategies. Instead, Mang0 dazzled the crowd with fast, fluid movement and a surprising range of suboptimal move selections, leaving Taj so thoroughly defeated that he gave up early. Mang0 played with style.

In *Melee,* style is used as both a noun and a verb. The noun is as it sounds: a playstyle is a set of traits and tendencies that distinguish one player from another. One might have a defensive or aggressive style; one might rely heavily on reads or reactions; one might optimize combos and decision trees; or one might more actively play off of an opponent's psychology and bad habits. As a verb, to "style on" takes on a more particular significance than the noun: <u>styling on</u> means to select unexpected options with which to beat one's opponents. In this respect, styling on is the opposite of optimization. What is important to optimal play is certainty of outcome, whereas what is definitional to styling on is its uncertainty, its surprise, its flaunting of the optimal. Like

Wark's take on the trifler, style transforms numbers back into meaning. To extend the implications of styling further, the act quite directly opposes optimization and gestures beyond quantified rationality in a way immediately legible to the esports fan.

It is in this sense of style that one can recover the contingency and humanistic flaw that otherwise seems lost in the deterministic optimization of professionalized play. The 20XX's dystopian certainty of outcome based on players' starting positions found traction with the *Melee* community as an endpoint of play, but this imaginary is only a reduction, an oversimplification that cannot fully be realized. Stylistic play reminds us that, as certain as optimized outcomes might seem, optimization cannot fully squeeze out the human condition – only present it with a new set of circumstances to adapt to.

The set of circumstances the developed world currently finds itself adapting to include ubiquitous technologies that prompt us to optimize our lives. Phone applications such as Sleeptracker and Freedom regulate their users with the promise of a more optimal self: one who sleeps better or eats less or accomplishes more with their time. Likewise, the rhetoric of the autonomous car asserts that cars are statistically safer under the control of programmed drivers, which in turn enable their drivers to be productive during their commutes. Exercise machines like the Peloton collect our data and connect us to instructors to pressure us to stay fit. As Natasha Schull has discussed, even wearable technologies and utensils collect our data to prompt us to regulate our "bites, sips, steps and minutes of sleep."[122] In short, a wealth of technologies encourage us toward quantifiably superior outcomes by limiting our freedom, our openness to contingency, and the creativity with which we govern our lives.

Style's significance rests not so much in the elite player's ability to produce it but as a

[122] Schüll, Natasha Dow. "Data for Life: Wearable Technology and the Design of Self-Care." *BioSocieties*, vol. 11, no. 3, Sept. 2016, pp. 317–33.

reminder to all of us that we are imperfect actors in an increasingly quantified and mapped-out arena. Unlike the algorithms that regulate our work, our sleep, our eating, our exercise, and even our play, we do not think and act instantaneously. Rather, there are always disjunctions in the network, and that although the topological (a la Wark) threatens to envelop all persons and all points and all data, it never truly can. Stylistic play, which we can encounter even in certain corners of professional gaming, offers one strategy for getting out of the optimal – a way for the ineffable, the contingent, the quintessentially human to break through nonetheless.

2. Approximate Precision: Complicating the Frame and Liveness

The previous chapter examined the temporality of frame-perfect play to illustrate that the financial stakes of competitive video games have encouraged professionalization and optimization while undermining the playfulness of play. This chapter expands on these considerations to examine networked competitive gaming. The stakes remain high online – and professionalization and optimization exert the same influence – but many temporal issues arise when gaming over a network that must be accounted for. Networked gaming offers a sense of liveness and a level playing field for competition, and live-streaming extends this pretense of liveness to an audience, but close examination of temporal considerations of networked gaming yield a reality of spatiotemporal isolation. I offer three vignettes to illuminate the common imaginary of liveness at a distance. Then the chapter examines two modes of temporal negotiation in gaming, followed by a discussion of live-streaming as a technology that further complicates any sense of liveness we might have in networked games. The through line in this discussion concerns the ideological promises of "live" technologies online: the belief in an adequately leveled playing field for competition based on a shared temporality, and the commodified intimacy of live streaming. The chapter considers whether temporal inconsistencies open up spaces for playfulness or whether such inconsistencies are paved over by the same push for optimization and professionalization discussed previously.

Snapshots of Ideological Liveness

> Spoiler alert! Orson Scott Card's sci-fi novel *Ender's Game* is a favorite with military simulation types, and no wonder. It's a novel about training children to fight some alien enemy, and the story of one child in particular, brutalized by boot camp, then set to playing endless simulated wars on computer games against the aliens. Only it turns out it was no simulation: what the child thinks was the training exercise was the war. And it is the war. The *form* of the digital game, irrespective of content, is now the form of everyday life itself. (95)

In her book on perception at a distance, *Telesthesia* (2012), McKenzie Wark considers the topology of networked communication: vectoral power, the "antipodality" of distant places, and the redefinition of the world as "game space" (in which all things have quantitative, fungible value). In the work's essay on gaming, "Game and Play in Everyday Life," Wark forwards some of her previous concepts from *Gamer Theory* as she develops arguments about the network. But in *Ender's Game* (1985), she happens to choose an example of communication that surpasses the limitations of networked perception at a distance. Interstellar communication in *Ender's Game* is not limited by the speed of light; rather, it is instantaneous:

> "I can't explain the philotic physics to you. Half of it nobody understands anyway. What matters is we built the ansible. The official name is Philotic Parallax Instantaneous Communicator, but somebody dredged up the name *ansible* out of an old book somewhere and it caught on. Not that most people even know the machine exists."
>
> "That means that ships could talk to each other even when they're across the solar system," said Ender.
>
> "It means," said Graff, "that ships could talk to each other even when they're across the galaxy." (175)

As a narrative device, the ansible overcomes problems of communication at a distance to make both the storyline of the novel and its particulars of its simulation possible. As such, the ansible offers a kind of perfect telesthesia: perception is immediate and synchronous, no matter the distance. But it is not, strictly speaking, a technology of the network as we know it today.

A second snapshot: the virtual reality / massively multiplayer fantasy *Ready Player One* (2018), based on the book of the same name. The Oasis, the film's immersive, persistent multiplayer game, connects players everywhere together in an escapist space of mutable avatars, online/offline economies, leisure, idle fixations, and collective action. The Oasis's totally immersive audio, visual, and (for some) haptic feedback offer simultaneously great promises of wish-fulfillment and an unfiltered nostalgia for '70s and '80s nerd culture. But amid the

synchronous dancing, racing, fighting, hacking, spying, and peer-to-peer communication, what never breaks the immersion is lag. There is no miscoordination, no spikes in ping, no buffering, no visual hiccups, no packet loss – no temporal consideration of any kind that would necessarily challenge the shared experience of a shared time on a shared network. The Oasis delivers both perception and action at a distance, synchronously with all other players: no matter one's bodily location, everyone experiences an unqualified unity of time and space.[123]

A final snapshot: Patrick Porter's *The Global Village Myth: Distance, War, and the Limits of Power*, in which Porter challenges the "globalist" position that post-9/11, international terrorism is a borderless war of perpetual threats of violence at a distance. Porter critiques both the conviction that organizations such as Al Qaeda have this power and that the US can do the same without incurring great financial cost. That is, wars such as those in Iraq and Afghanistan are prohibitively expensive, and despite technological advances they remain so. In a chapter on cyber and drone warfare, Porter examines the frequent comparisons between modern warfare and the videogame in national defense discourse. For example, Porter quotes former Secretary of Defense Robert Gates: "For too many people [...] war has become a kind of videogame or action movie: bloodless, painless and odorless" (194). And while Porter does not make an extended comparison between the drone and the videogame, his discussion of the limitations of drones could pass for a forum post on an MMO or strategy game:

> Drones are slow and vulnerable, and relatively easy to shoot down compared to manned jet fighters. They cannot compete in air-to-air combat against the greater speed, mobility, and sensors of modern fighter planes. (210)

Indeed, if taken as a forum post, we can imagine the post's top comment: "*You* try fighting air-

[123] This is not to say that the spatial is of no consequence. Conflicts in the film occur both online and off, including the in-Oasis race and the escape from the IOI building. In-game and real-world space are of course considerations for both of these conflicts. But what I am arguing is that real-world space is not a consideration for in-game conflicts in *Ready Player One* when, practically speaking, such spatial relationships have a fundamental bearing on our everyday experience of networked communication.

to-air with 200ms of ping."[124] A Predator missile strike, silent by virtue of breaking the sound barrier, is well suited for assassinating a possibly unarmed person out of combat and moving at walking speed (and for killing or maiming others in the blast radius). And, as Gregoire Chamayou notes, through the depersonalized, algorithmic work of selecting targets, as well as the discursive work of classifying all "military-age males in a strike zone as combatants," the US drone program can congratulate itself for its success on such warped terms.[125] But for fast-moving aircraft, aware of the drone and capable of evasive maneuvers and split-second decisions, the drone is pitifully outmatched. This realization would be familiar to anyone who has accidentally connected to an Oceania server from North America[126] or vice-versa.[127] Success in online gaming is dependent on minimal reaction speeds, which simply are not possible when communicating from the other side of the world. Drones as we know them today are a far cry from the synchronous proxy fighting of *Ender's Game*, although one might at first imagine them to be flown in real-time.

Between these three snapshots—*Ender's Game*, *Ready Player One*, and *The Global Village Myth*'s treatment of the drone—questions of synchronization across distances are either brought into focus or dismissed altogether. *Ender's Game*, as a science fiction text grappling

[124] As will be discussed more fully below, ping is a measurement of the time it takes for a signal to travel back and forth between two points. 200ms, or two tenths of a second, is the kind of ping one would experience with a signal traveling to the other side of the globe. It is more than long enough to be palpable to players and is generally considered to be too high for competitive online play, especially when better domestic options are available.
[125] Chamayou, Gregoire. *A Theory of the* Drone. The New Press, 2015. Pp 140-145, quoting Becker, Jo, and Scott Shane. "Secret 'Kill List' Tests Obama's Principles." *The New York Times*, 29 May 2012. *NYTimes.com*.
[126] The most popular online games tend to operate multiple servers around the globe to facilitate global player bases as well as the potential for international play. Players often can select server preference from options menus, and sometimes (via happenstance or error) players connect unexpectedly to a foreign server and experience a significant bump in ping.
[127] McKenzie Wark in *Telesthesia* terms this kind of geographic networked relationship "antipodality." She defines the term as "The experience of being neither here nor there. An antipode is the other foot. It presupposed a pair of poles and a relation between them. Antipodality is the tendency for this relation between poles to become unanchored from particular places and to become a general condition" (205). Just as Australia is commonly joked about as being a place where everything is upside-down, where day is night, where the seasons are out of whack, Australia is a networked elsewhere, which Wark (an Australian) interprets as symptomatic of a wider status online.

with an interstellar setting, acknowledges the limitations of lightspeed signal by articulating a faster-than-light communication system; *Ready Player One* presumes a synchronization of massively multiplayer games without considering the limitations of networked communication; and as Porter describes but does not interrogate, the drone loses to air-to-air fighters in part because of the latency between an unpiloted aircraft in Yemen and the remote pilot seated in Nevada. Together, these examples speak to both the appearance of instantaneity in lightspeed communication and the inherent lag of action at a distance. Instead of instantaneity and seamless live experiences, networked communications technologies offer heterogeneous experiences of time – or, in the words of Robert Hassan, "connected asynchronicity."[128] Like the drone exerting deadly force in another country from the comfort of one's own, the networked game necessarily observes lag along the connection from one player to the server, and in turn from the server to all other players. Again, there is action at a nontrivial distance: one's ping in a video game is a metric for how great that distance and its resultant lag are. The difference is that, as simulations, online games employ unique techniques for smoothing out observed lag and making play experiences seem synchronous. Game states can be reversed, corrected, or recalibrated after the fact, unlike a video feed from a drone. In this regard, games have a limited ability to make the field of battle seem sufficiently level for fair competition. This levelness is doubly absent from the political and technological reality of the drone, which promises an uneven delivery of force to an opponent who can be harmed but not harm another, and through a networked technology that nonetheless cannot quite perform synchronous action. Online games are not the Oasis, and the drone is not the ansible, yet there is an inherent appeal to the imaginary of transcendent liveness for all of these technologies.

[128] Hassan, Robert, and Ronald E. Purser. *24/7: Time and Temporality in the Network Society*. Stanford Business Books, 2007. p 51. I return to this term below.

The previous chapter showed the pursuit of the *agon* of competitive video games through temporal mastery of frame-perfect play. In this chapter the *agon* remains but instead of frame-perfect play it considers how networked competitive games attempt to standardize their temporality in the interest of fair competition. In Caillois' categorization of *agon*, *alea*, *mimicry*, and *ilinx*, *agon* can only exist if the playing field between competitors is even. Networked multiplayer assures its players of an even playing field, but this common presumption requires unpacking. Moreover, the pursuit of optimal play in esports makes players hyper-aware of imbalance and inconsistencies, calling into question the imaginary of transcendent liveness described above. The persistent question of how to recover the playfulness of play from competitive gaming remains when playing online: does authoritative time in competitive games, no matter how flawed in execution, challenge the playfulness of play? Or is there new potential for playfulness in temporal uncertainty?

This chapter analyzes the temporal heterogeneity of networked communication through online gaming and its spectatorship. Networked games adopt different strategies for resolving temporal discrepancies and establishing authoritative time. The first strategy is frame buffers, or an agreed-upon delay that both players observe, which gives time for both clients to communicate before the game advances to the next frame. Frame buffers maintain an ostensibly shared temporality in peer-to-peer gaming, but they tend not to work at great distances. The Dolphin emulator's "netplay" option for *Super Smash Bros. Melee* serves as a primary example of this mode of connection. The second and more common type of temporal resolution is authoritative server time. In a game such as *Rocket League*, what may seem like peer-to-peer connection is more accurately understood as "peer-server-peer": all player actions are sent to a central server, which computes the game state and resolves with authority any discrepancies that

might appear on the client's side. These two fundamentally different strategies offer contrasting perspectives on the same problem of delayed communication between points in a network. Frame buffers suggest a distributed communication network, whereas server time is centralized, to use the terminology of Paul Baran.[129] Structurally, server time confers authority on the owner of the server to resolve temporal ambiguity while frame buffers suggest a more democratized model for networked communication. These two paradigms also function differently: there is no retroactive correction in games with frame buffers that one observes in server time, but the server does not delay action in the way frame buffers do. However networked multiplayer is set up, some kind of authoritative time must be established and enforced for games to be fair contests of skill, and this is especially important for competitive games. Whatever cracks there may be in the façade of fair competition at a distance, online games cover over the imperfections by appealing to an ideology of liveness.

Such an ideology is nearly palpable on live-streaming platforms such as Twitch. Twitch complicates the already heterogeneous temporalities of online gaming while nevertheless assuring audiences of a "live" experience. It promises certain experiences to its streamers and viewers: 1) it broadcasts personal gaming sessions as well as tournaments; 2) it facilitates conversations (streamers with viewers as well as viewers with other viewers); 3) it disseminates news to an audience; and 4) it enables certain forms of gameplay, such as that of Twitch Plays Pokémon. In all of these configurations of game, communication, interaction, and connection, streaming platforms such as Twitch suggest a liveness that, under scrutiny, falls short of synchronization. Instead, online gaming and especially live broadcasts of online gaming demonstrate a heterogeneity of temporalities between the streamer, their

[129] Baran, P. "On Distributed Communications Networks." *IEEE Transactions on Communications Systems*, vol. 12, no. 1, Mar. 1964, pp. 1–9. IEEE Xplore, doi:10.1109/TCOM.1964.1088883.

teammate(s)/opponent(s), Twitch's servers, the viewers, the chat log, and any later viewers of the "video on demand" (VOD).

Latencies of only a few milliseconds can be felt acutely[130] when users are accustomed to acting within windows of only one sixtieth of a second. What online gaming reveals about networked communication is that appearances of and desires for perfect synchrony give way to a heterogeneity of temporalities. Temporal experiences online are fractured even as they appear as unities: live chat, live-streaming, multiplayer gaming, video conferencing, camming, telesurgery, teledildontics, and collaboratively created online documents—all of these technologies suggest a liveness that is, in fact, never quite achieved when accounting for lag. Even when the appearance of liveness coheres—when all users believe their experience to be unfolding synchronously—critical attention to networked temporality underscores the fractures of milliseconds that intercede between users, betraying the presumption of proximity as more ideological belief than actuality.

In calling attention to this kind of fracturing of time, the chapter responds to both the commonly expressed sentiment that "the world is getting smaller" and the critical concept of the "global village" as originally phrased by Marshall McLuhan, as well as recent scholarship on game temporality. I argue that assurances of live-streaming's "liveness" are more ideological than actual, and the chapter articulates some of the limitations of that sense of liveness by invoking television scholar Jane Feuer's discussion of liveness in relation to television. Broadcast media set up expectations of liveness in many of the same ways that live-streaming does; Feuer's argument about TV's ideology of liveness helps call attention to the ways in which

[130] As Alvarez Igarzábal has described in *Time and Space in Video Games: A Cognitive-Formalist Approach*, the threshold for perceived simultaneity in multimodal (audiovisual) stimuli is about 100ms; referencing Mick West's 2008 Gamasutra article, Alvarez Igarzábal demonstrates that many games already require about 50ms of delay between input and output. Accordingly, additional delay through networked gaming has about 50ms of slack before becoming prohibitively noticeable.

live-streaming evinces related ideologies. Attentiveness to the physical reality of networked communication mitigates the ideological positions of liveness, proximity, intimacy, synchronicity, and unity wrapped up in discourses of networked communication. The chapter offers a corrective to the breathless and uncritical sense that communication at a distance is a new form of co-presence, that telecommunications inherently bridge distances, and that online fora connect many users to a shared simultaneous event. Game studies scholarship has made little note of temporal asynchronicity in online games, and this oversight is especially limiting when examining esports, which are often connected online and require temporal precision. When one identifies such temporal imprecisions in esports, rather than taking the liveness of online gaming at face value, one can instead address the ideologies of liveness that attempt to paper over such inconsistencies.

Reaction-Based Play and the Use of Frame Buffers

In order to discuss the inflection of networked communication on reaction-based gameplay, I begin with an especially simple example of such gameplay offline. *Shenmue*'s (1999) release for the Sega Dreamcast has come to be regarded as both a swan song for Sega's hardware manufacturing days and the advent of the Quick Time Event, or QTE. QTEs have since been used across the medium, from *Indigo Prophecy* (2005) to the *God of War* (2005) series to *The Wolf Among Us* (2013) and *Beyond: Two Souls* (2013). QTEs were embedded in *Shenmue*'s gameplay in chase and fight sequences, and players could also play a QTE minigame at the You Arcade (**Figure 1**).

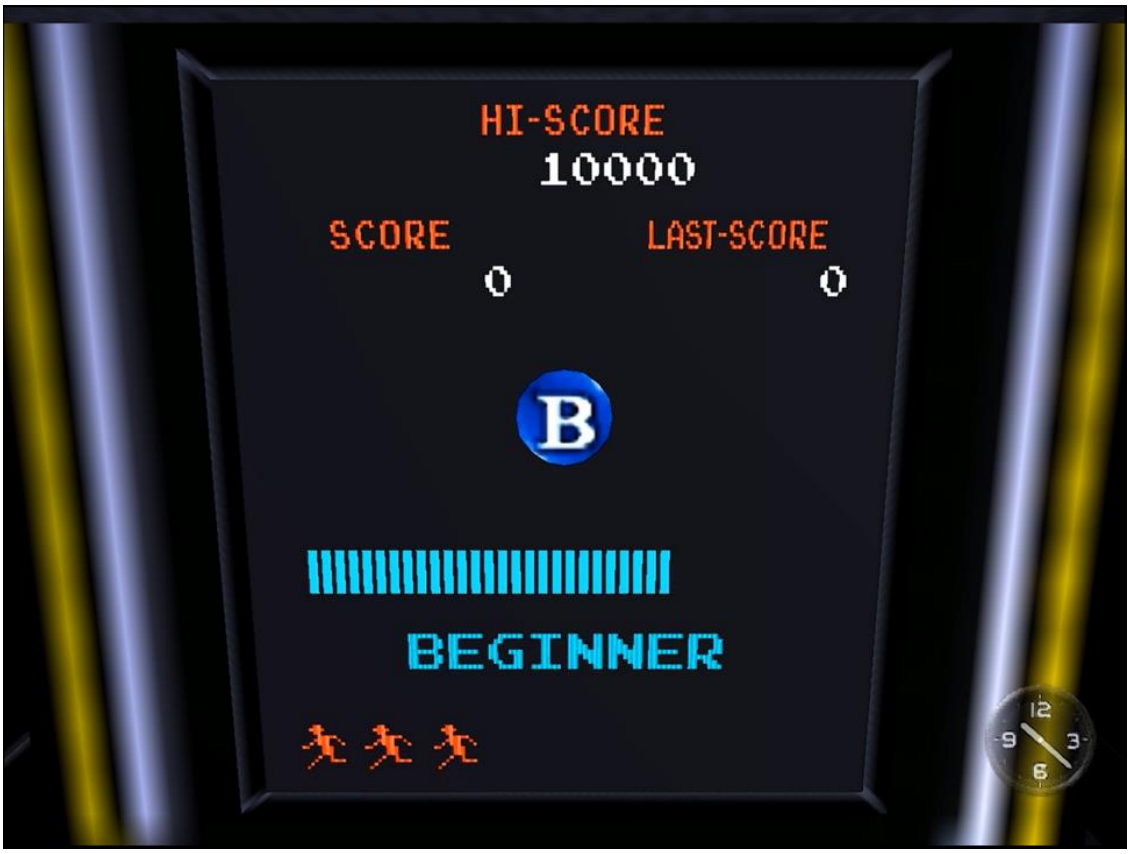


Figure 1: *Still of the QTE arcade game from* Shenmue*'s YOU Arcade.*[131]

This nakedly simple minigame in *Shenmue I*, unlike the other classics in the YOU Arcade (punning "Yu" Suzuki) such as *Hang-On* (1985) and *Space Harrier* (1985), makes no attempt to pin a storyline to the action or offer narrative sense to the player's inputs. There is a button to press and a timer; the player must simply react in time by making the correct input.

As discussed in the previous chapter, the television apparatus has a temporal influence on gameplay. The CRTs for which the Dreamcast was designed respond with lower latency to player inputs than the HDTVs that the game can play on. *Shenmue II* never had an official Dreamcast release in the US but was instead ported to the original Xbox (2001);[132] later it was selected for backwards compatibility with the HDTV-ready Xbox 360. Accordingly, *Shenmue II*

[131] StrikerTC1. Shenmue - YOU ARCADE. YouTube, https://www.youtube.com/watch?v=Ltq_YoALbbs. Accessed 17 Apr. 2019.
[132] One could import a PAL copy of the game, which also required additional compatibility measures.

players on the 360 are likely to notice temporal discrepancies between that port and the Dreamcast release(s) of the series,[133] as I did when revisiting *Shenmue II* on 360 some years after its release. Particularly frustrating was an extended QTE sequence of balancing Ryo on a board by pressing left, right, up, or down on the control pad for several consecutive multi-step QTEs as Ryo ascended a building in Kowloon. The already tight timing of this QTE sequence was noticeably contracted when factoring in the additional delay of the HDTV's upscaling: the timing window from moment of computation to player input was the same as it had been for the original Xbox, but now with the delay between image generation and display, the window of reaction was almost impossibly brief. Moving from CRT to HDTV in effect alters gameplay by reducing the reaction widow for the game's Quick Time Events, making the player more likely to fail when playing on an Xbox 360 connected to an HDTV. This example should illustrate two points: that the apparatus matters when accounting for how a game can be played, and that little latencies can have significant gameplay consequences.

In a competitive multiplayer game, players must react to each other's actions as quickly as possible[134] in order to gain or press an advantage. Moments in such games, similar to the QTE example above, test reaction speeds and heavily reward quick responses. Because the illusion of liveness online is dependent upon a papering-over of microtemporal latencies, it behooves us to consider in-depth a moment of gameplay that tests the limits of human reaction times. The "tech chase" in *Super Smash Bros. Melee* (2001) exemplifies such a scenario. In *Melee*, some moves knock an opposing character to the ground, where they are especially vulnerable to a follow-up attack. When that character strikes the floor, its player can "tech" the knockdown by pressing a

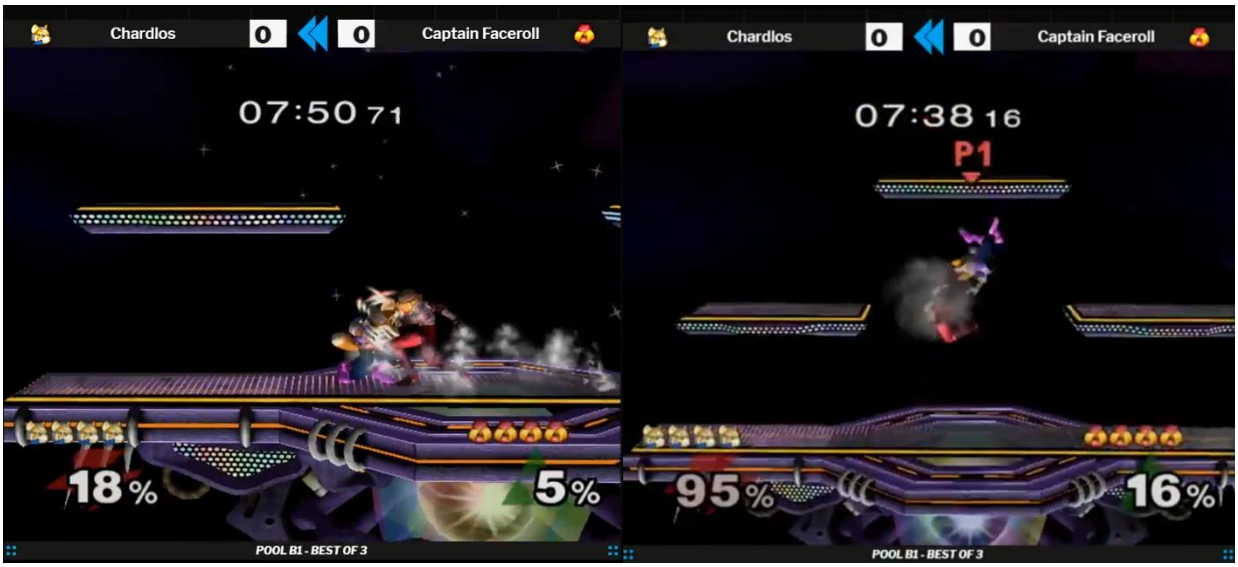
[133] And the series would again be ported to HD consoles such as the PS4 and Xbox One in 2018.
[134] In principle, the faster to react, the better the outcome. That said, there are move selections an opponent could commit to with a long start-up in which they cannot be hurt, followed by a window in which they can (for example, most *Melee* characters' "get up from the ledge" option when they are at 100% or more is so easy to react to that the optimal play is to wait a few frames before punishing it).

shoulder button (which is the same button for shield and roll). Teching allows the character to get onto its feet quickly without lying vulnerably on the floor: teching left or right essentially rolls to the left or right, and teching in place stands the character upright after a brief animation. A tech chase is a scenario in which one player knocks down the second player, who chooses one of four options: tech left, tech in place, tech right, or miss the tech. With fast reaction speeds, the tech-chaser can respond to the opponent's options re-grab them, adding up damage with each successful chase. In the example below, Sheik (played by the reputed tech-chaser Captain Faceroll) forces Fox (played by Chardlos) into a tech chase. The Fox opts to tech right, but the Sheik reacts in time and re-grabs the Fox.

Figures 2-5: *In this sequence, 1) a Sheik grabs Fox, 2) down-throws the Fox, who 3) techs to the right and 4) is re-grabbed by the Sheik.*[135]

In this sequence of *Melee* gameplay, similar to the *Shenmue* example, the task for the Sheik player is to watch the screen closely, recognize which option the opponent has selected as early as possible, and make the right input (or sequence of inputs) in time to re-grab and keep the tech chase going. Highly effective reaction-based players like Captain Faceroll can sustain a sequence of tech chases that take an opponent from no damage to a KO (or put that opponent in KO-able range), as Faceroll does in this match (figures 6-7):

[135] SAK Gaming. Runback 2018 Pools - Chardlos (Fox) vs Captain Faceroll (Sheik). YouTube, https://www.youtube.com/watch?v=ICq7jFHRBxg. Accessed 17 Apr. 2019.



Figures 6-7: *During this tech chase, Sheik 1) grabs the Fox at 18% and builds up to 2) 95% damage, which puts the Fox within KO range. (Confusingly, percent in* Melee *does not function like a fighting game in which a health bar depletes, nor does reaching 100% ensure that the next move will KO.) NB: The Sheik's percent happens to go up as a result of intentionally taking damage from the Fox's "get-up attack" during the sequence, not because the tech chase was dropped at any point.*

Melee was not designed for online gameplay, nor was it even intended as a high-stakes tournament game, let alone one that would enjoy a dedicated player base for the better part of two decades. But eventually enterprising modders would create the Dolphin emulator, which would enable web-based netplay, a multiplayer setting in which players could connect to peers remotely and enjoy an experience similar to, but distinct from, in-person play. As a game played competitively both online and off,[136] *Melee* illustrates that the slightest latency, even that of a few milliseconds, can significantly alter the dominant strategies in a metagame. The more pronounced the latency, the greater the difference is between online and offline play. Tech-

[136] Unlike other esports, there are no online tournaments to speak of for *Melee*. The game is still played competitively online, and there is an online ladder, but the stakes are minimal.

chasing, as in the example above, becomes significantly harder even at relatively low pings of 50ms.

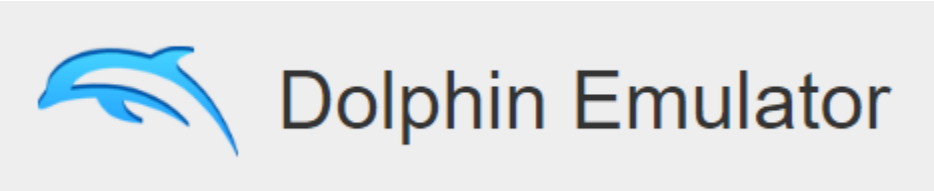


Figure 8: *Dolphin logo. "Dolphin" was selected for its history as Nintendo's codename for the GameCube during development.*[137]

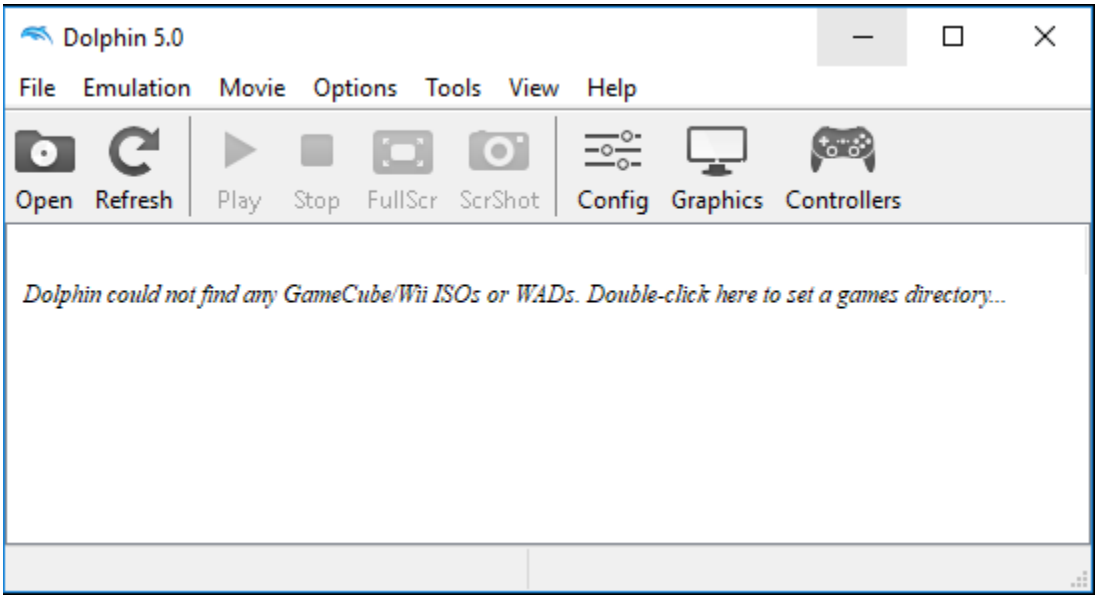


Figure 9: *Screenshot of Dolphin interface*

[137] "Dolphin Emulator." Dolphin Emulator, https://dolphin-emu.org/. Accessed 17 Apr. 2019.

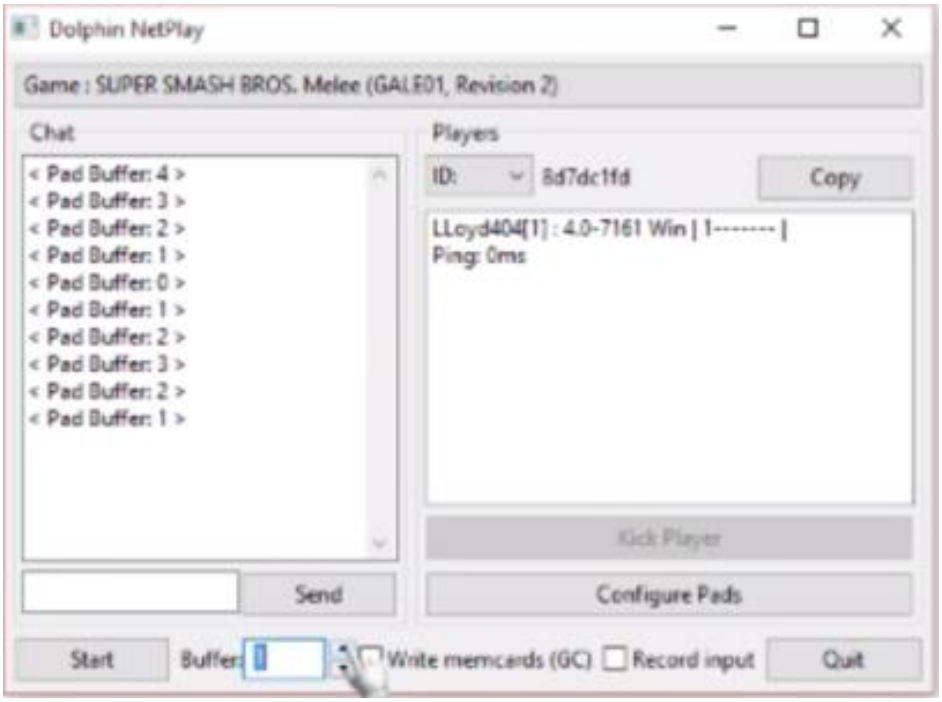


Figure 10: *Setting the buffer in Dolphin netplay*[138]

In certain ways, Dolphin's type of online mode is the simplest kind of online multiplayer video games can offer. The Dolphin team does not maintain servers for gameplay and the software does not make money – in fact, Dolphin is an open-source emulator in keeping with the democratizing spirit of open-source programming generally.[139] Rather than making use of a server infrastructure to centralize play over the network, netplay relies on a distributed mode of connection: peer-to-peer. One player elects to "host" and one or more players connect to the hosted game. But hosting a game does not confer the privilege of setting authoritative time on the host's side (and bending other players' clients to that temporality). Rather, netplay is set up to provide a shared temporality between all connected players.

To unpack the distinction I am trying to make between authoritative server time and shared temporality, take the first scenario: the host's computer sets authoritative time. In this scenario,

[138] DrewTV. *Smash Ladder/ Dolphin Melee Netplay Setup Tutorial Guide (Windows). YouTube*, https://www.youtube.com/watch?v=yP6nt6eFJmI. Accessed 17 Apr. 2019.
[139] A Github page for Dolphin contributors can be found here: https://github.com/dolphin-emu/dolphin/graphs/contributors

suppose a ping (the time for a signal to go out to and come back from its point of connection) of 50ms. When emulating a game that runs at 60 frames per second, 50ms translates to about 3 frames. In this scenario, if the host had authoritative time then that computer would receive signals from the other player's computer about 1.5 frames later than the other player had intended them. The other player would only see the results of those inputs 3 frames later than expected. But in those 3 frames of lag from input to output, what would the other player's computer be doing? The host would detect nothing strange because that person would be experiencing the game as if both players were present in person. But the other player's computer would have to do one of two things: 1) display the outputs according to what that player was entering and then constantly correct the game state based on the host's authoritative game state; or 2) receive the host's signal wholesale and not display any inputs until they have gone out to and come back from the host.

Both of these assume that this scenario would not simply "desync," a word to describe when the two players' computers show demonstrably different game states.[140] But short of a desync, both of the above scenarios (constant correction or a one-sided lag of 3 frames) clearly advantage the host. In a game such as *Super Smash Bros. Melee*, every frame counts when performing reaction-based tech-chases as in the Captain Faceroll example above. If one player were to have a 3 frame advantage over the other – including functionally exclusive access to techniques such as tech-chasing – that advantage would be insurmountable at most skill levels of competitive *Melee*. The other problem in either of these scenarios is that instead of transmitting simply the inputs from the two computers to each other, the host receives inputs from the other player and then sends the entire game state. This is a significant increase in volume of data being

[140] A desync may go unnoticed in *Melee* netplay until one's opponent jumps off the stage unexpectedly or stops moving when they should be or otherwise appears to be acting bizarrely. A desync is something more felt than seen and is not something easily represented visually.

transmitted and would make the emulator much more taxing to run on less powerful rigs.

Rather than either of these hypothetical scenarios of authoritative time, Dolphin netplay makes use of frame buffers for networked multiplayer. A frame buffer is an intentional delay in frames that all connected computers share in a networked game. In netplay, if the host sets a frame buffer of 3, then the host and all other connected players experience 3 additional frames[141] of lag between when an input happens and when the output is displayed.[142] This delay between action and observation allows sufficient time for all machines to exchange data before the gameplay advances. Note that a 3 frame buffer does not mean that the action proceeds at one-third speed; rather, while the computers are exchanging data for frame number N, they are displaying frames N-3, N-2, and N-1 at the typical rate. A 3 frame delay would account for 50ms of ping as in the previous scenario, but instead of the host having to send the whole game state, both machines simply have to send their inputs (a much smaller transfer of data). And instead of the host having a 3 frame advantage, neither player has a temporal advantage as a result of their choice to host or not.

In games, human reaction always lags behind that which is displayed. Players can only experience what has just happened in the game, not what is happening at this very moment. As the frame buffer increases, the delay a person experiences becomes greater and greater. So for someone whose reaction speeds average about 250ms, it takes them about 15 frames at 60 frames per second to react to their opponent's decisions. When playing *Melee* on a 3 frame buffer, that

[141] As noted above, Mick West's detailing of "Programming Responsiveness" illustrates that games like *Melee* already take about three frames for player input to become screen output; hence the "additional" when discussing online latency.

[142] For simplicity, I am using an older version of Dolphin for my numbers. In netplay on Anther's Ladder, the main hub of matchmaking for online *Melee,* the game used to be played on its "1.02" version, the "Player's Choice" iteration released by Nintendo. When that was still the preferred version (2014-2015), the frame buffer had a 1-to-1 correspondence to the duration of a single animation frame. More recently, a fan modification known as *Faster Melee* has become the preferred version online, and netplay's frame buffer has become more granular (equivalent to about 4ms rather than 16ms each). For ease of the 1-to-1 relationship, I will be discussing the "1.02" era of *Melee* netplay, but the general principles of my analysis would still apply to any version.

person's average reactions take 18 frames instead of 15. This 20% jump in delay makes certain techniques (such as tech-chasing) more unreliable and harder to execute – if not impossible. These quantitative considerations of frame counts and milliseconds are important because they illustrate qualitative changes to play when a game such as *Melee* moves from in-person play to networked multiplayer. A metagame shift takes place in online *Melee* with even a few buffered frames.

Gameplay Shift: Reads and Reactions

A stylistic decision that commonly presents itself in *Melee* is that between reaction-based and read-based responses to one's opponent's play. A "read" is a prediction based on past experience and the opponent's prevalent tendencies. Consider the example from chapter 1 of Fox trying to recover back to the stage:

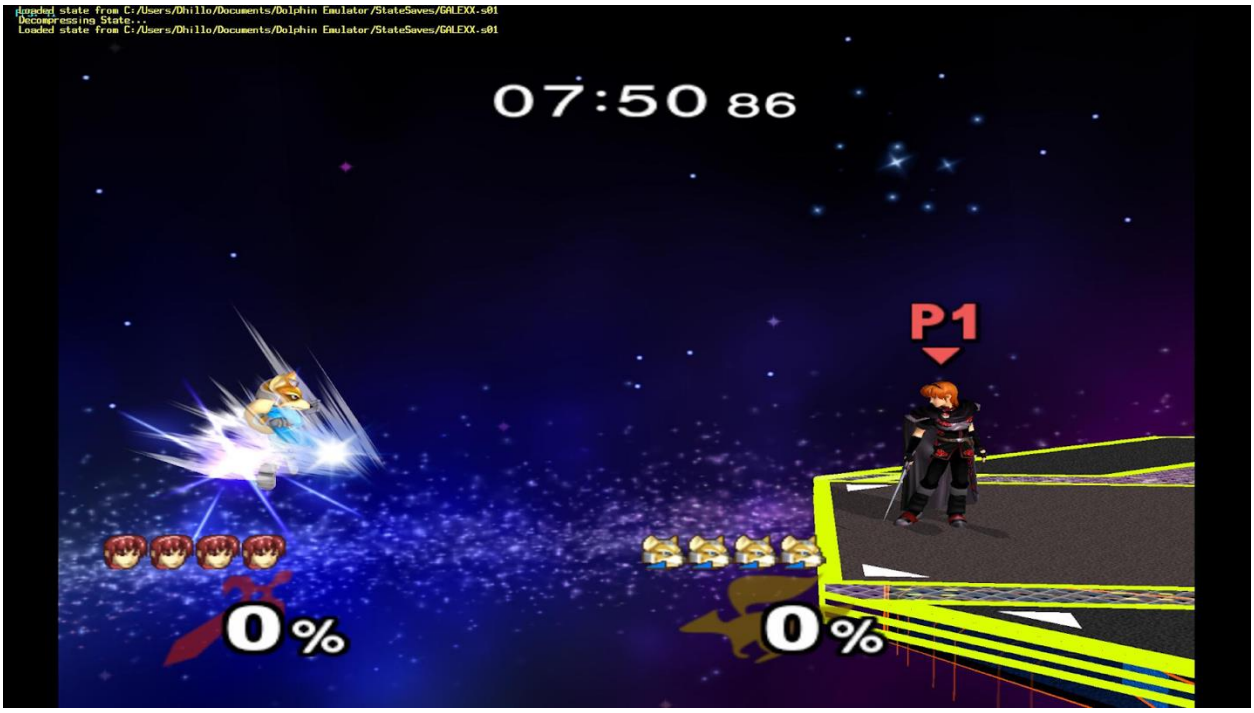


Figure 11: *Marth edgeguarding Fox*

In **Figure 11**, Fox is initiating his "side-B" recovery (a move executed by pressing "B" and moving the joystick to the right or left at the same time, also known as Fox's "illusion"). The

thread that this image comes from, "Edgeguarding Fox as Marth," describes how to react to all of Fox's options: in this case, Marth can tap A to jab and disrupt this Fox's recovery. This is a simple reaction that, when executed as part of a game plan that accounts for all of Fox's options, functions as part of a flowchart for how to beat Fox systematically from this position. However, Marth could "read" this recovery by predicting the Fox player's choice. (Typically a player would make this kind of read if the Fox had chosen this same recovery the last few times they were in this situation.) Instead of jabbing on reaction, Marth could let loose a stronger attack, initiated before the Marth player has even perceived the Fox's side-B move choice. This is, to repeat, a stylistic choice: if the Marth is a systematic player who pursues total optimization, they will tend to play by reaction in this spot and stick to the flowchart game plan. If instead the Marth favors playing the person rather than the matchup,[143] there is a greater chance they will go for the read and commit to a punishing attack that makes a statement. But that player also risks whiffing their attack entirely if the Fox changes up their recovery. In netplay, as the frame buffer increases, it becomes harder to react to the opponent's choices. As the frame buffer approaches 5, certain elements of even the "Edgeguarding Fox as Marth" flowchart become prohibitively difficult for players to react to. When, for example, Fox uses his side-B straight at Marth, the Marth player may not be able to jab on reaction with a frame buffer of 5. As such, players start to rely more on reads than they otherwise would because the temporal change rewards reads and inhibits reactions more than in offline *Melee*. This is a metagame shift produced by network latency: *Melee* simply plays differently online, despite any appearances of liveness for *Melee*'s couch multiplayer at a distance.

[143] "Playing the person," like "read," is a phrase familiar to other games in which one can attempt to read one's opponent, such as Poker. The phrase is often used in discourse around *Melee* regarding reads. And playing the person successfully offers certain advantages of psychological warfare: "getting in someone's head" and unsettling them by showing them that their habits are predictable.

Online, the risk-reward balance shifts. In the discourse of *Melee* (and other competitive games), "risk-reward" is shorthand for "How much does this decision risk if I commit to it, and how great is the reward if I succeed?" Sometimes riskier decisions offer the greatest rewards. A *StarCraft II* player may decide to invest all their resources early in the game on an aggressive line of attack; if they succeed by catching the opponent off-guard, they could potentially win the game in the opening few minutes. But if they fail, and the opponent is prepared for a rush, the opponent's counterattack may be just as decisive. In *Melee* the same principle applies, but the timescale is contracted. A high-risk, high-reward option such as a "smash attack" in neutral[144] may open up an advantage or KO an opponent out of nowhere, but whiffing leaves the player vulnerable for many frames before they can raise their shield or dash away. In the context of netplay's frame buffer, the opportunity for executing a reaction-based counterattack gets shorter and shorter as the frame buffer increases. Committing to a smash attack when the frame buffer is high offers the same potential rewards, but the risks get minimized as the window for reaction-based counterattack shrinks.

Subjectively, the experience of playing under a greater and greater frame buffer starts to feel like playing further and further into the future. Under offline circumstances, when I try to read my opponent, I am anticipating where they are going. As the frame buffer increases toward 5 (heaven forbid it goes higher than even that), I am instead anticipating the moment after next. The guesswork extends further into the future, trying to call out options well before they happen, and missing often, but not getting punished for whiffs as commonly as I would offline. This experience of playing further into the future de-naturalizes the feeling of playing *Melee* offline. That is, by thinking a few more frames into the future, one realizes that one was already doing so

[144] A "smash attack" is typically a given character's heaviest attack. It often has a longer start-up animation than most other attacks, and it also typically has the longest vulnerability after it is executed. "Neutral" here refers to a state of affairs in which both characters are on equal footing and neither can immediately press an advantage.

to begin with. A read is not an interaction in the moment as the moment unfolds; a read is an anticipation of the next moment before one can even have perceived it. And as the game state unfolds, one sees whether the read was successful or not only in retrospect. This sensation of extending one's play further into the future testifies to the experiential change of taking *Melee* from offline to online. It is an odd feeling (even if one cannot always put one's finger on it) that marks netplay as not quite as good as the real thing. However close to offline *Melee* netplay might at times feel, total liveness ultimately does not cohere for the competitive *Melee* player.

The intent of doing multiplayer with frame buffers—to create a shared temporality between players in different locations—has only limited efficacy. This multiplayer paradigm offers the closest experience to in-person "couch" multiplayer, and in comparison to server time as discussed below, frame buffered multiplayer achieves better synchronization between two players. But significant temporal fractures remain. The first is limitation of geographic scope: 50ms of ping in most games is more than acceptable, but in *Melee* 50ms is on the upper end of tolerability. As such, netplay is only regionally applicable as a multiplayer setting for *Melee*, and cross-country distances become unsupportable. The second limitation is that even at the lowest frame buffers, the gameplay of *Melee* begins to shift. Techniques that work in person become discernibly more difficult to execute with a single buffered frame, and this shift becomes even more pronounced at higher latencies. *Melee* as a game changes because its metagame changes: the way the game is played, including the types of tactics that are rewarded and punished, necessarily shifts in the temporal distortion of networked multiplayer and frame buffers. Because the delay is mutual, the game is in some sense experienced synchronously, but only in a way that alters the game in an attempt to account for spatio-temporal discrepancies between players in separate locations. The play itself is already inflected with irreconcilable discrepancies before it

reaches players, even if play carries on thereafter as if conducted synchronously.

As we examine more closely spatiotemporal precision in online gaming, we should acknowledge the geopolitical stakes of such questions. Existing work in game studies such as Huntemann & Aslilnger's *Gaming Globally*, Penix-Tadsen's *Video Games and the Global South*, and Dyer-Witheford & de Peuter's *Games of Empire* examine the systems of power that give rise to both the transnational corporate empires of play that produce games of military masculinity and the disempowered position of the overlooked play in the Global South. On the surface, the aforementioned region-specificity of *Melee* netplay would appear to be yet another technology that makes it harder to play in the Global South. However, the distributed model of peer-to-peer connection in netplay actually facilitates (at least in principle) remote play with low latency between players in the Global South. That is, because netplay uses essentially direct connections between players in, for example, Ecuador, these players are not dependent upon transnational tech firms to build servers (as will be discussed in further detail below) in South America. As long as there are two players in a single region who can find each other, systems such as netplay can facilitate low-latency multiplayer in the egalitarian spirit of the distributed network model.

Competitive games like *Melee* call to our attention more systemic issues of liveness online generally – all technologies of telesthesia are inflected by lag, not just games. In his recent *Game Time* (2018), Christopher Hanson argues that games exemplify "copresence," a term that he adapts from performance studies to mean that audiences are present to the creation of the art object as it happens – as in theater but not in print media, for example (36). The player is copresent with the game as it unfolds, Hanson argues, emphasizing a shared temporality of player and game as art object. Hanson applies this beyond single-player and couch multiplayer experiences to online games such as *World of Warcraft*, which facilitate copresence "through the

behavior of [player] avatars, observing their actions, strategies, movements, and general gameplay and correlating them to other players" (39). But Hanson seems to take the apparent simultaneity of (massively) multiplayer online games at face value. Wherever on Earth the players are or the server is, games are presented as offering unqualified copresence. The only mention of lag in this chapter occurs in a footnote about sending messages back and forth with especially long-distance communication such as interplanetary rovers: "But even in these cases, there is a direct (albeit delayed) connection between the user's temporality and the distant rover. That is, the rover will still move and respond in real time to the user, just after the lag of the time it takes for communication to traverse the distance in between" (54n15). Hanson happens to give an ideal application of *Ender's Game*'s ansible, an imagined technology for solving irreconcilable problems of communicating at a distance, by suggesting that telepresence (or "presence within a virtual or distant environment" (41)) applies in all cases, no matter the lag. The present chapter has thus far argued for an intervention into our sense of simultaneity (or copresence or telepresence) in both scholarship and in common intuitive senses of liveness in networked communications. It is not enough to take at face value that communications technologies such as online gaming place us together as if in the same room experiencing the same play we would offline. Such sentiments are first of all imprecise and secondly a product of unexamined ideological assumptions about the intimacy of "live" technologies. The sensation of simultaneity online sometimes coheres and sometimes does not; it needs qualification in terms of the insurmountable realities of communication at a distance, and its ideological precepts require attention.

Something to note before moving to server time: no matter whether the paradigm is frame buffers or servers, players are bound to be gaming on different operating systems, different

models of monitors, different graphics cards, different processors, and/or different input devices. All of these hardware differences have their own capacities for latency. Altogether these hardware differences may only amount to single-digit milliseconds' worth of lag, but temporal differences arise all the same. Even on local area networks (LANs) of players in the same room connected by a few feet of Ethernet cable, networked gaming experiences are asynchronous.

Authoritative Server Time

In games as diverse as *World of Warcraft*, *Counter-Strike*, *Call of Duty*, and *League of Legends*, temporal discrepancies between what individual clients see are resolved by the server. Authoritative server time is a more centralized solution to the problem of connection at a distance, and as an approach for smoothing out asynchronicity it constructs liveness differently from frame buffers. As such, also creates its own cracks in the façade of liveness as an ideological experience in networked communication. This section draws on *Rocket League* to contrast with the frame buffer paradigm in part because *Rocket League* makes certain interventions of server time quite legible to players through the arc of the ball traced across the player's screen (see figure below). *Rocket League* is an online multiplayer game in which teams of players control rocket-powered cars to strike a ball into a goal.[145] This simple game concept lends itself well to analysis of time and lag because the indicators of lag (especially discrepancies regarding the ball's location) are made quite clear by the game's interaction between client and server. Moreover, *Rocket League* is an esport that sees a tournament circuit with sponsored teams (such as G2, Splyce, and Cloud 9) in payouts of tens of thousands of dollars. In comparison to *League of Legends* or *DotA 2*, this is a small-scale scene, but people do nonetheless make a living playing *Rocket League* well, and there is a great depth of resources for improving one's play, even if the discourse around the game makes little use of the term "optimization." The

[145] It can also be played offline via split screen, and it can be played 1v1, but most games have 2-3 players per team.

game therefore offers some productive points of contrast with *Melee* while engaging new aspects of network temporality.

Figure 12: Rocket League *game capture with orange trace on a ball having recently been hit by a player on the orange team*

In *Rocket League*, unlike in netplay, ping signifies the amount of time it takes for a signal to reach a server rather than a peer. At any point in a match, a player may bring up the score page (see **Figure 13**), which displays the teams' scores, players' goals/assists/saves/shots, and color-coded in green/yellow/red, players' pings (in milliseconds). Each player's ping must be measured separately, since each is connecting from a different location (except in the case of two players playing split-screen from one location), and no one can have a ping of 0 (which in *Melee* netplay would signify host status, but in this game would mean that a player is an AI). My ping in **Figure 13** is coded yellow, and it is only 11ms away from being coded in red (200+ms). To be clear, the color coding system that *Rocket League* uses for marking ping is somewhat arbitrary and should not be taken to mean that there are vast differences between 99 and 101ms (green to

yellow) or 199 and 201ms (yellow to red).

Figure 13: *Screen grab of gameplay from North America on an Oceania server. My ping (at the top) is 189ms, unlike those of the geographically closer players between 28ms and 72ms.*

In this game, "good" ping is generally less than 100ms, so the standards for acceptable latency are much more forgiving than in *Melee* netplay. Even pings between 100-150ms are functional, but players at that amount of latency have a noticeable disadvantage. These kinds of pings in *Melee* netplay would be fundamentally unacceptable for competitive play.

Many esports titles such as *Counter-Strike* are variable-framerate games. In such games, players are not universally experiencing the game at a specific framerate such as 60 frames per second (fps). Instead, the framerate that a player observes is a function of hardware capability and user settings, and that framerate is prone to change on the fly as the system is taxed to varying degrees over the course of the match. As such, there are no frame-perfect techniques in these games. Yet time is nonetheless hyper-rationalized and broken into sometimes hundreds of

frames per second,[146] and temporal discrepancies over the network have to be resolved in some way. *Rocket League* could have been designed as a variable-framerate game, but Psyonix, the game's developer, opted for a temporal system that in some ways resembles fixed-framerate console games like *Melee*.

As lead gameplay engineer Jared Cone for Psyonix explained at the 2018 Game Developer Conference,[147] *Rocket League* has a "fixed tick rate" of 120hz. That is, the server and the client both simulate the physics of *Rocket League* at 120 frames per second. Because, as Cone emphasizes, the physics in the game is deterministic, and because Psyonix engineered what Cone terms a "downstream throttle" model of input buffering, the client and server do not suffer desynchronization even when a player's connection lags. Put more simply, there is fully consistent coordination between server and client to run the game at the same time in the same way. Unlike in variable-framerate games such as *Counter-Strike*, maximizing one's PC to render *Rocket League* well in excess of 120 frames per second has little potential benefit.[148] On a Reddit "AMA" ("ask me anything") through the /r/rocketleague subreddit, Cone responded to questions from players, including some on how the game handles network play:

> Q: **[...] How do you resolve the car-ball collisions in high latency conditions when multiple cars are influencing the ball movement velocity within a short timespan?**
> A: *From Jared Cone, our lead gameplay programmer who did all of the network simulation work:*
> *Server: There is nothing to resolve, the server is authoritatively running the simulation*

[146] In general, the better the machine, the more frames per second it can compute, the faster the player can react. When one player's low-end machine chugs along to produce 20 frames per second and another's averages 200, not only is the former at a disadvantage for the distracting "slideshow" quality of a video that does not quite create the illusion of movement, but they are also often as much as 4 or 5 hundredths of a second off in their ability to react. This confers a significant advantage to the second player, much as a *Melee* player would have with 3 fewer frames of latency.

[147] Cone, Jared. It IS Rocket Science!: The Physics and Networking of Rocket League. Game Developers Conference 2018, San Francisco.

[148] A faster processor is still desirable, as is a monitor with a faster refresh rate, but because there is nothing new to render in between each 120hz tick, the returns on a state-of-the-art PC are significantly less than they would be for another game like *Counter-Strike*.

using the clients' inputs.
Clients: When clients receive a physics state update from the server, they look back in time to see if the state is different from what they thought it was. If it is different, they rewind their entire physics state back in time and apply the correction. Then they fast-forward the physics state back to the client's present time.
So the position of the ball that clients see is not where the server says it is, it's where the clients predict it will be by the time their input reaches the server. This is how the server is able to be completely authoritative and doesn't have to resolve anything – the clients are basically "leading the shot" without even knowing it.[149]

To break this response down, Cone states that the server acts as the sole authority on what the game state is, whereas the client is constantly predicting where the ball is going. Often in *Rocket League*, the ball is sailing through the air or rolling over the pitch, untouched for a second or two. During this time, the client is predicting the ball state with complete accuracy (because, as Cone states, the physics engine is deterministic), and when it receives a game state update from the server, there is nothing to correct. However, when the ball comes into contact with a car, the ball could be struck at a low or high angle, at low or high speed, off to either side or straight on. The player has a great deal of flexibility of how to manipulate the car to strike the ball as desired by slight adjustments of the joystick, and this is often done just before the ball hits the car. The car may, in fact, still be accelerating, twisting, rolling, and/or flipping up to the moment it hits the ball; in short, the game cannot know exactly how the ball will be struck until it is struck.

When this happens, the signal is sent to the server, which is running the authoritative simulation, and in turn the server sends the signal to all clients. Here each player's ping has an effect on their temporal experience. Players at very low latencies (under 10ms) will almost never perceive any correction from the server. Such corrections happen, but only in the split-second immediately after the ball is struck. On the other hand, players at high latencies (100ms and over) will frequently notice corrections from the server as the ball's predicted trajectory may in

[149] https://www.reddit.com/r/RocketLeague/comments/3rfeln/psyonix_ama_questions_and_answers_here/

fact be in the opposite direction from the actual trajectory, or the trace of the ball may be the wrong color (see figures below). The process of rewinding "the entire physics state" that Cone describes is the "downstream throttling" emphasized in his GDC talk. Discrepancies inevitably happen over networked play, but because the server enforces complete authority over the simulation, players can experience a sense of simultaneity that generally coheres. This authority, as Cone notes, also prevents the most common types of cheating in online games.

Figure 14: *A client prediction of where the ball is going.* ***Figure 15:*** *A replay of exactly where the ball went. In the left image, the trace on the ball is orange and then turns blue once the server has confirmed that a player on the blue team hit the ball. On the right, the full ark is blue because the client is sure of the last player to touch the ball throughout the replay.*

The colored trace of the ball deserves deeper analysis due to way it visualizes client-server temporal relationship. In *Rocket League*, following any goal, players can choose to see a replay of it (or to skip the replay).[150] In this replay, there is no guesswork from the client's physics engine: all the inputs are already known. Consequently, the replay clarifies the nature of goals that occur immediately following a complex interaction, which may leave players asking "What happened?" especially at high latencies. This replay makes legible the influence that networked connection has on the experience of playing *Rocket League*: any player might see a quite different split-second just before the goal, when their client is making its best guess about

[150] Players can also save a replay of the full game at the end of any match. This replay is, in effect, the server's authoritative account of the match, and not the player's perspective in the moment.

the ball's position, but the server corrects any errors and, through the replay, reveals the authoritative history of the match. When we combine the replay feature with the colorful trace of the ball, we can visibly recognize the discrepancies between the arc and shape the ball traces across the scene during the match as opposed to during the replay. The negotiation that Jared Cone describes between client and server is naturally meant to smooth out the experience for the player, giving them as accurate a game state as possible given the moment-to-moment experience of online gaming. But that negotiation also reveals itself under scrutiny, especially under conditions of high latency.

To contrast server time with peer-to-peer netplay, the two have somewhat different feels because they evoke liveness in different ways. In *Rocket League*, players can queue up for online matches and then hit the training mode to practice until the match starts. When the game successfully evokes liveness, the feel of the car during practice is virtually indiscernible from the feeling during a match. The car should drive the same, hit the ball the same, maneuver the same, and boost the same. What begins to change at higher levels of latency is that the environment seems to react slowly to the player: for example, when the player picks up boost (a finite resource that accelerates cars and enables short-distance flight), if latency is high, the player might not receive visual confirmation that the boost on the field has been picked up until the player is already passed it. Demolitions (when one player's car strikes an opponent's at high speed and explodes it to nothingness) take a moment to register at high latencies as the client lags behind the server's confirmation of events. But when one's car is not interacting with the environment or other players, it feels the same as it would offline.

Netplay, on the other hand, feels slightly different even at 1-3 frame buffers. Everything is unfolding just a little bit later than it should be. The muscle memory is the same—executing a

pivot-grab (as in chapter 1) entails the same set of inputs at the same speed online or offline—but visual confirmation is always a hair late. As the buffer rises, the effect becomes more and more pronounced, whereas in *Rocket League*, noninteractive moments of play feels the same at any latency.

Conceptually, peer-to-peer would seem to be a more democratizing mode of networked connection. There is no centralized authority to reckon with (or pay), no server to blame for latency, no player conduct codes to adhere to under penalty of permanent banning. Moreover, peer-to-peer frame buffering is a more mutual style of temporal resolution: both players enter into an agreed-upon delay in order to compete on an even playing field. But both peer-to-peer frame buffering and authoritative server time are ultimately tricks for evoking liveness when in-person play is impossible. They make one's teammate or opponent feel immediately present even when that person may be across state or country borders, yet that immediacy is fraught to begin with. There is no ansible as in *Ender's Game*, no trick for creating lagless immediacy across the network. There are instead irreconcilable physical differences that make their presence known in technical hiccups, server corrections, metagame shifts, and inflated reaction speeds.

Connected Asynchronicity

Robert Hassan and Ronald E. Purser's *24/7: Time and Temporality in the Network Society* addresses issues around time in digital communication. Hassan's own contribution to the collection, "Network Time," advances a term to describe the experience of sharing communication online: "connected asynchronicity."

> Real time and its social-theory meanings of "instantaneity" or "no time" need to be brought into proper technological and ontological perspective. Real time may be viewed, therefore, as the final goal of machine/human interaction, the very end of the temporal continuum that would stretch from "no time" to the speed of light. (50-51)
> Connected asynchronicity is a central feature of the network society and network time—[...] the numberless asynchronous spaces of the network society, created and inhabited by

> people and ICTs [Information and Communication Technologies] in interaction, *undermine* and *displace* the time of the clock. (51, emphasis in the original)

Hassan's argument turns here to the destabilization of clock time through the network's inherent mode of asynchronous communication; I respond to this part of Hassan's argument in chapter 3, but "connected asynchronicity" should be unpacked. Hassan suggests that communication online is undeniably shared (it is "connected"), but as shared as the experience seems, it is not strictly simultaneous. At base, much of networked communication is asynchronous before even accounting for lag: when reading a webpage or sharing a video or looking at cat pictures, we participate in shared culture, but we do so independently and not, as in television, by appointment. More to Hassan's point, though:

> the combination of the Internet, with its technical capacities, and our own human capabilities ensures that this is an inherently *asynchronous* space. Nothing occurs instantaneously, or in real time. There exists instead an open-ended continuum within the network, measured (if we need to measure it) from picoseconds upward. (50, emphasis in original)

Whether we are sending emails or chats, updating social media, streaming video, teleconferencing, measuring server ping, or setting a frame buffer, we come to terms with connected asynchronicity in online communication.

Both frame buffers in Netplay and authoritative server time in *Rocket League* attempt to smooth over the network's inherent quality of connected asynchronicity. When those strategies succeed, the experience feels acceptably lagless, and a sense of liveness with other players pervades. But the realities of networked communication at a distance inevitably break the illusion of synchronicity. Cinema is a technology that presents action through the illusion of movement; television is a technology that presents events through the illusion of liveness; the online video game is a technology that presents shared presence through the illusion of

synchronicity. To understand what time means in games, one has to account for the apparatuses involved: console/computer, screen, network, and server. Any temporal understanding of a cinema, television, or game object, with its specifics of narrative duration, is enriched by an account of the technological apparatus that produced such narratological temporalities. What the machine does to produce an object is in some ways a more fundamental question than what textual significance that object has; it behooves media scholars to treat the apparatus as such. In taking this position, I am following a platform studies approach to the question of media temporality. As Bogost and Montfort argue in *Racing the Beam*, "A computational platform is not an alien machine, but a cultural artifact that is shaped by values and forces and which expresses views about the world" (148). The hyper-rational temporality of the gaming apparatus produces frame-perfect play, frame buffers in online multiplayer, and server corrections to client-side misjudgments that occurred milliseconds ago. To investigate the apparatus is to come to terms with the values built into it and to deepen one's understanding of how that apparatus (or platform) generates meaning.

Just as in the context of optimized, frame-perfect play, perhaps in authoritative server time there is a potential for playfulness to emerge despite the machine's regulation of the apparatus. In this vein, we could take Peter Krapp's approach of "Gaming the Glitch," in which the degradation of the digital object (in this case the temporal experience of laggy play) opens up an object to new contingencies.[151] Inasmuch as players can interfere with their own latencies in order to grief, cheat, or troll each other, there is some degree of playful contingency in such temporal disruption. "Lag switching," or intentional interference with the fidelity of one's connection to throw opponents off, is much bemoaned in online games such as *Super Smash Bros. Ultimate* (not to be confused with *Melee*), which depends on Nintendo's currently tenuous

[151] Krapp, Peter. *Noise Channels: Glitch and Error in Digital Culture*. University of Minnesota Press, 2011.

internet infrastructure. Unlike in *Rocket League*, which uses resilient means of preventing cheating, *Ultimate* slows down the game to allow laggy players to stay in a match; consequently, lag switching becomes one means of cheating in such games. This is, in a sense, an emergent form of play, but I would contrast this with "style" from the previous chapter in the same way that Suits contrasts the trifler and the cheater. The former denies that games ought to be played with an intent to win, whereas the latter denies that games ought to be played as fair contests. In effect, do not see much room for emergent, creative play to arise from temporal disruption.

The next section considers immediacy, intimacy, and liveness through Twitch, a platform for live-streaming video game play (as well as art/music creation, board games, and "IRL" or "in real life" streams). Streaming raises additional complications for connected asynchronicity in online technologies. The same heterogeneous temporalities of online play are present in streaming, but by broadcasting play to an audience, the streamer multiplies the temporal perspectives involved. Simultaneously, streaming makes its own appeals to liveness that are distinct from those of multiplayer gaming by itself. The next section builds upon the concepts introduced by the previous one to broaden the question of liveness online and the experience of intimacy through networked communication.

Liveness and Intimacy on Twitch

I have passed the four year mark as a Twitch subscriber to Mang0, a professional *Super Smash Bros. Melee* player sponsored by Cloud 9. Mang0 enjoys the greatest number of subscribers in the *Smash* community (currently at around 10,000 subscribers) and, as discussed in chapter 1, cultivates a big personality, drinks heavily, wears his American pride on his chest, and entertains his viewers both through proficiency of play and indefatigable humor. During the years I have subscribed to him, I have played a friendly set with him through netplay while he

was streaming, I played in-person tackle football with him and his friends and several other subscribers,[152] and I sat with him for a 20 minute in-person interview for this project. My experiences with Mang0 serve as an (extreme) example of a general principle of liveness and intimacy enabled through live-streaming. That is, live-streaming services entice viewers to grow familiar with streamers to the point of being privy to certain details of their personal life, they spend dozens or hundreds of hours with those streamers, and a sense of qualified intimacy arises from connections between viewers and streamers—even the most popular streamers.

In her book *Watch Me Play*, T. L. Taylor raises the topic of intimacy between viewers and streamers, noting that the domestic setting of live-streaming (a living room, a bedroom, etc.) invites the viewer into a personal space broadcasted to perhaps thousands of viewers—mostly strangers. Taylor notes that "While at its heart live streaming is about broadcasting gameplay, a powerful component of the success of variety streams is linked to the relational" (88). The "variety" streams, in Taylor's distinction, are streams run by people who play various games that may have some characteristic in common or may simply be selected by the momentary whimsy of the streamer. Unlike a professional *League of Legends* player streaming that game exclusively, variety streamers, as Taylor argues, must have some kind of appeal that extends beyond a specific game's content. And something of that appeal is "relational": viewers see bits of the streamer's personal life, interact with the streamer through praise or hype or channel-specific emotes (pictographic signs unlocked by subscribing to a channel), and are emboldened by the knowledge that they themselves are helping to support the content. These viewers become subscribers and stay subscribers in part because there is a kind of relationship formed in this transaction. Taylor goes on to note that according to her interviewees, "what shifts viewers from

[152] He refers to his semi-regular American football pick-up games as the Mang0 International League of Football, or "MILF."

audience to something else, be it community or family, are gestures of reciprocity, familiarity, or intimacy" (91). The streamer creates something that entertains while inviting the viewer to feel familiar and even intimate with them, and the engaged viewer typically gives something back—often money to support the streamer's efforts. Taylor focuses on the anthropological question of shared community; my emphasis in this section is the mediated appeal of intimacy through the live-streaming platform and its relation to Jane Feuer's analysis of liveness on television. Feuer's argument, although written 40 years ago about a different medium, advances a concept of liveness still very much useful to the present analysis because the temporality of liveness in streaming is central to the experience of the online consumption of gaming today. Being "live" both in television and "live"-streaming is an ideological construct that falls short of co-presence with the person at the other end of the network, but both media succeed in part because of the outward appearance of liveness. Under scrutiny, the promised liveness of Twitch, in its many uses, gives way to a heterogeneity of temporalities.

Twitch can be as simple as one person broadcasting an offline game to an audience of one (one-to-one), it can be as television-like as a major esports broadcast (one-to-many, while the chat potentially interacts as many-to-many),[153] and it can be as chaotic as tens of thousands controlling the streamed game through chat commands entered one line at a time (many-to-many). Each of these evokes liveness and copresence in different ways, and each bridges different fractures of time in the process. Each are also sites of play in different senses: not only is the streamer playing a game for their audience, but Twitch chat also engages in what Ford et al. refer to as "crowdspeek," a streaming-specific mode of chat communication that "support[s] a playful form of participation more akin to chanting, clapping, or doing 'the wave' in a large

[153] Or in the case of Twitch Plays Pokémon, none-to-many(-to-many).

sports arena."[154] The image below allows us to explore some of the different temporalities produced by Twitch as a platform:

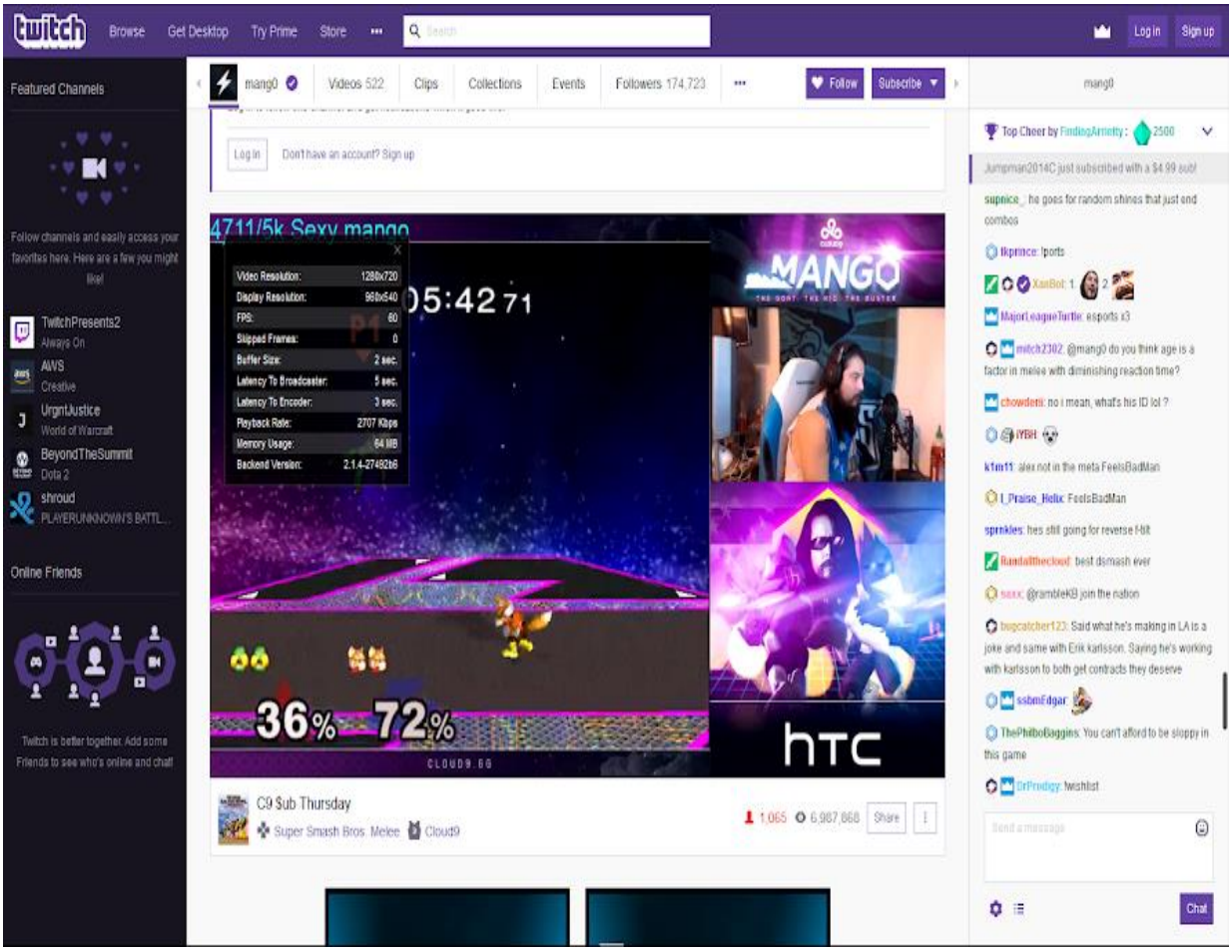


Figure 16: *A browser window including Mang0's stream, its title, the chat, and other information.*

Within this browser window, there are two main spaces to focus on: the content of the stream (everything in the rectangle at left-center) and the chat (everything in the vertical column to the far right). The chat has a text box at the bottom, where the user can type messages, and a log of recently sent messages from all users—most recent at the bottom. Typed messages show

[154] Ford, Colin, et al. "Chat Speed OP PogChamp: Practices of Coherence in Massive Twitch Chat." *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems*, Association for Computing Machinery, 2017, pp. 858–871. *ACM Digital Library*, doi:10.1145/3027063.3052765.

up in the log immediately after being sent, pushing older messages up and beyond the edges of the box. The stream content includes the face cam (in this case, Mang0 seated on a blue and white Cloud 9 chair, wearing a stars-and-stripes tank top), the game capture (a scene of *Melee* on the stage Final Destination between Mang0 as Sheik and his friend Alex19 as Fox), the overlay that takes up most of the rest of the stream with identifying/personalizing information (Mang0's name and nicknames, an artistic image of Mang0's head floating behind his two main characters in *Melee*, an advertisement for HTC, a banner for his team Cloud 9, and a subscriber counter at the top—4711), and a window I made visible for this screenshot: the video statistics, which when selected in the options menu appears in dark grey with white characters on top of the game capture. Mang0 is shown here playing Alex19 through Dolphin's netplay. This moment puts the previous section's discussion of frame buffers on netplay into a cultural/temporal context.

With netplay embedded in this particular stream, the heterogeneous temporalities of streaming are comparatively more complex as we broaden our perspective on networked communication. The video statistics estimate that the latency to broadcaster is 5 seconds, and the buffer size is 2 seconds. In other words, Mang0 records his play as he plays, this video is sent to Twitch, which then makes the stream viewable to users; end-to-end, this process takes about 5 seconds. Within this, users experience a 2 second buffer, which is the amount of video that Twitch automatically saves up in a user's local memory before that user sees it unfold; this buffer smooths out hiccups in the connection so that even when there are small network mishaps, they should go unnoticed. On the other end, the capture from *Melee* netplay is, as discussed before, taking place under a frame buffer. Mang0 and Alex both live in the same city (Norwalk, CA), and presumably their frame buffer sits at about 1. At the same time, the chat scrolls along as the gameplay unfolds. One user types "!ports", causing the automated chat bot to state which

players are using which ports (and therefore which characters); another user chats "best dsmash ever," a comment on the events of this match as it is happening. However, there is a disjoint in the feedback between user and streamer. Everyone sees chat messages a fraction of a second after they are typed (presumably based on however many milliseconds any given user's ping is with respect to the Twitch server Mang0 is streaming from). But any oral or visual response Mang0 might give to this user would be packaged with the rest of the stream: after the buffer, it takes about five seconds to get from Mang0 to users.

Despite the name of live-streaming, any sense of coherent shared experience between streamer and audience is deeply fractured. Within this one stream, we can observe a heterogeneity of temporalities: from Alex19 to Mang0 as they share a frame buffer in *Melee* netplay, from Mang0's computer to the Twitch server, from the Twitch server to all viewers (who then buffer the incoming video signal), and from one chat member to the rest as they pose questions, react to events, and share emotes.[155] This example illustrates the complexly asynchronous experience of viewing someone stream an online game. And this characteristic of networked technologies is not unique to live streaming. If we constantly experience asynchronous connection, why do say we are communicating "in real time," why does customer service have a "live chat" option, why do news outlets offer "live" updates, and why do we refer to live-streaming as, well, "live"? Twitch, for example, invokes liveness, it advertises liveness, and it often makes the feeling of liveness cohere in spite of all the technical limitations keeping streamer and viewer temporally isolated. Jane Feuer's discussion of television liveness offers some illumination as to how liveness can ideologically cohere in spite of itself.

In her essay in *Regarding Television*, "The Concept of Live Television," Feuer identifies

[155] In the image, these include two Mang0 subscriber-specific emotes—Mang0's "PogChamp" surprise reaction and his stars-and-stripes Fox head—an Alex19 subscribe-specific emote of his face, and a universal surprise emote.

both the segmentation that makes up televisual "flow" (as in Raymond Williams[156]) and the fragmentation of American identity to demonstrate how a national television program, *Good Morning America*, mends both into unity through the ideological position of "liveness." Feuer reads the show's host, David Hartman, as a paternal figure whose responsibility it is to bring remote locations into a network "family"—this, to Feuer, is a national project to make national unity cohere.

> David's function—aside from participating in the segments—is to remind the viewer both what time it is (and thus of the "live" nature of the broadcast) and of what will occur in future segments within a clearly designated future time. The show is obsessed with its own liveness, as symbolized by the logo with the time and upcoming segment in a box. David acts as custodian of flow and regularity, the personification of a force which creates unity out of fragmentation. (17)

In this fatherly role, Hartman brings together reporters in other cities into the national family; he upholds the spatio-temporal stability of the national broadcast, attesting to this broadcast's liveness before the viewer's eyes. Feuer goes on:

> It does not take a psychoanalytic reading to see that members of the show's family are meant as an ideal family for us, an idealized bourgeois nuclear family with a daddy and (various) mommies, brothers and sisters, fragmented by space but together in time through the power of the television image itself. It is a family similar to many American families in its fragmentation, its mobility, its alienation, yet the *Good Morning, America* family is unified as a direct (it is implied) consequence of television technology. That is to say, television brings families together and keeps them together. (19-20)

Feuer's focus on the family is a familiar topic in television studies: as others such as Lynn Spigel have shown, since the post-WWII period the imagined audience of television has traditionally been the family.[157] Feuer reads *Good Morning America* as a program that makes sense of both the journalistic team and the network system of one of connected family, staying bonded through

[156] Williams, Raymond. Television; Technology and Cultural Form. Fontana, 1974.

[157] Spigel, Lynn. *Make Room for TV: Television and the Family Ideal in Postwar America*. University of Chicago Press, 1992.

telesthetic communication. These reporters are not literal family members, but they are presented as a figurative family in relation to their fatherly anchor by the seeming-liveness of television. They are in synch and relationally bonded. As Feuer concludes, "Television, in its liveness, its immediacy, its reality, can create families where none exist" (20).

If we apply Feuer's construction to live-streaming, what can that medium create "where none exist[s]"? Perhaps streamers such as Mang0 occupy a similar position to Hartman's in *Good Morning America*, but a critical viewing of any successful streamer will likely not shout "father figure" to the viewer. Top Twitch names like Ninja, Shroud, or Imaqtpie will, like Mang0, seem more like adolescent dudes in the living room than authoritative (if warm) Hartman-esque father figures, and the viewing experience produces something other than national unity or family. The next section explores the question of what live-streaming produces where none exists through three examples that highlight the breakdown of liveness in the medium of livestreaming. These examples make noticeable the platform's shortcomings to deliver immediate experience of the stream: Adrive's "wonder trade" giveaway, Luis Scott Vargas's 10 minute stream delay, and the first playthrough of *Pokémon Red* on Twitch Plays Pokémon. In all of them, the appearance of liveness in live-streaming comes unraveled; it is in this breakdown that we can better acknowledge the ideological underpinnings in the medium that create a sense of liveness.

Playing with Delay: Connected Asynchronicity

In the *Pokémon* series, players have always had the ability to trade with peers. Since *Pokémon X* and *Y* (2013), players have also been able to use a "Wonder Trade" feature using Wi-Fi. In Wonder Trade, players offer a Pokémon up for trade not knowing who they will trade with or what they will receive. Each player is then connected with someone else they may never have

met who is doing the same thing. When the trade goes through, both players receive an unexpected Pokémon in return for the one they offered. This random trade feature offers some whimsy and a chance to receive version-exclusive Pokémon players might not otherwise encounter in their own game; moreover, it provides an opportunity to be generous with competitively-bred Pokémon that may hold sought-after items.[158] During a marathon streaming session with friends and colleagues in November 2017, *Pokémon* streamer Adrive coordinated a Wonder Trade on-stream, encouraging his viewers to enter Wonder Trade at the same time.

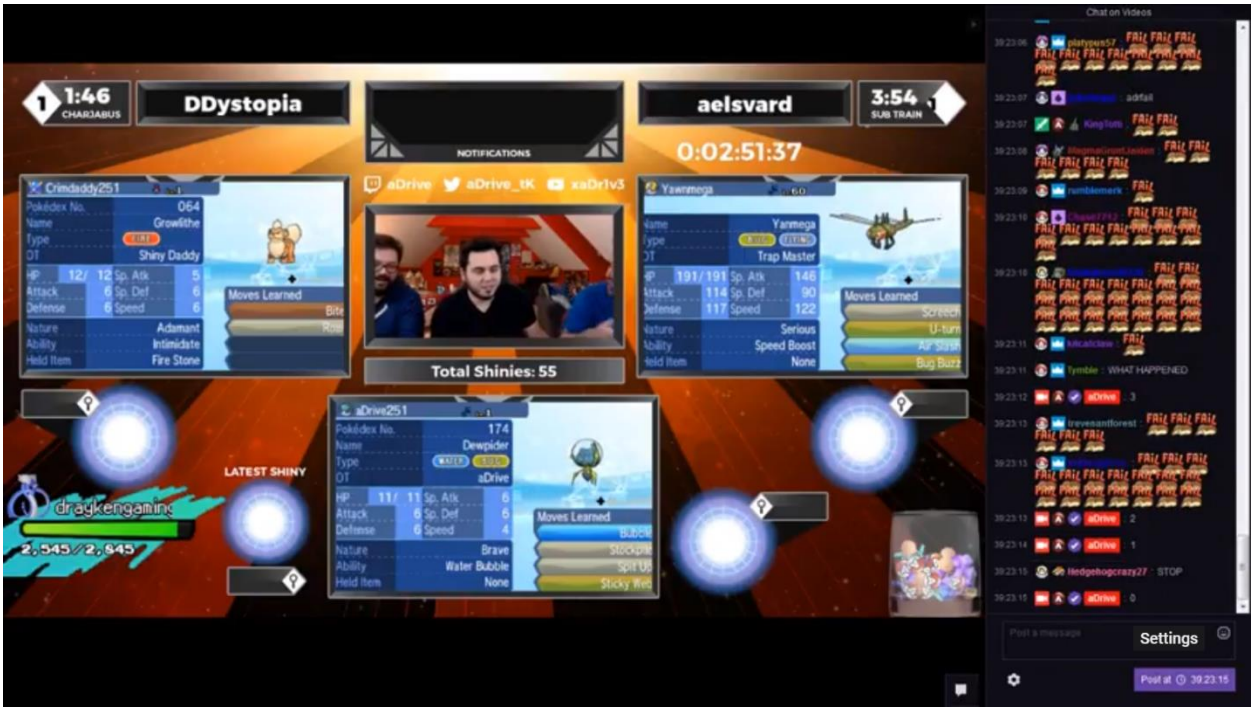


Figure 17: *A VOD screengrab of Adrive's Wonder Trade giveaway.*

Adrive and his co-streamers enter Wonder Trade and instruct viewers to get their own Pokémon ready to trade. To accomplish this mass trade simultaneously, Adrive counts down not in the streamed video but in the chat. On the right hand of the image, with Adrive's name highlighted in red, he enters separately the messages "3," "2," "1," and "0" to coordinate the many viewers

[158] One practice is to breed desirable Pokémon and wonder trade them all away on Christmas, when many new players start the game for the first time and try out Wonder Trade just to see what it does.

all seeking to trade together.

Figure 18: *A VOD of Adrive's stream at the moment of trading.*

Here Adrive's screen (center bottom) has changed from the previous image's stats page of the Dewpider he offers, while his two co-streamers' screens have gone black (upper left and right) as they have just now put their Pokémon up for trade. This is the moment that the three streamers have all begun the Wonder Trade process. Note the countdown timer in white toward the top of the image under aelsvard's name: in the previous image it was 2:51:37, but here it is 2:51:20.[159] 17 seconds have elapsed since Adrive entered the chat countdown. If he had merely counted down on stream, viewers would have entered Wonder Trade too late to have a chance to trade with the streamers (although viewers would still be trading with each other).

Like any live-streamer, Adrive offers his viewers a shared experience of playing his chosen game in their company and interacting with them as they pose questions and make

[159] This number should be taken with a grain of salt: I did not capture this trade video while the stream was happening, but instead viewed it as a Video on Demand (VOD), in which Twitch replays the chat at roughly the time it would have been happening from the typical viewer's perspective. So a 17 second is inexact but probably within 1-2 seconds of what viewers would have experienced as the trade happened.

observations. But when he wants some degree of synchronization, as in a simultaneous mass-Wonder Trade, he knows better than to count down verbally, instead using chat as a communications medium with significantly lower latency. Here the fracturing of liveness is especially visible: the presumption of liveness on Twitch as a shared medium no longer coheres, and instead viewers become acutely aware of their temporal removal from the events onscreen.

This kind of accounting for the pragmatic logistics of latency compares poorly to the seamlessness of the imagined online experience as in *Ready Player One*'s Oasis. Imagine the characters in that work discussing the server location before trying to queue up for their race, or signal fidelity when attempting to connect via Wi-Fi, or another user's bad ping that adversely affects accuracy during combat. Intuitively, we expect connection to be instantaneous and synchronous with our peers, and it makes intuitive sense to simply press "trade" at the same moment that Adrive does on his 3DS, but that is not how the connected asynchronicity of actual online communication works. When we fail to account for the temporal heterogeneity of networked communication, we arrive at the wrong time and miss our connection.

Luis Scott Vargas (LSV), a professional *Magic: The Gathering* player and game designer, participated in a special scheduled event in November of 2017, the *Magic Online* Championship Series (MOCS). *Magic* is a game with hidden information, including the contents of one's hand. As such, streamers sometimes have to be aware of "ghosting," in which viewers take advantage of the stream to see information they otherwise could not access (in other games such as *Counter-Strike*, this is known as "stream sniping"). As such, LSV opted to put his stream on a ten minute delay, as indicated in the stream title: "MOCS Sealed (with 10-minute delay) plus Iconic Masters drafts."

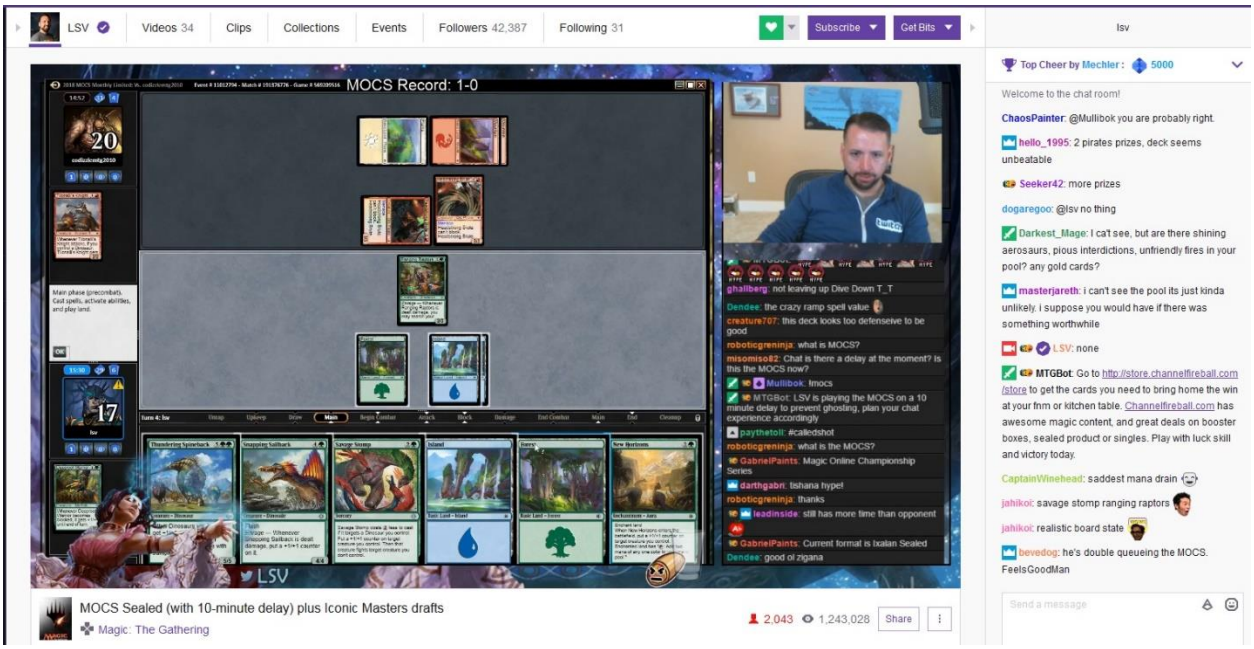


Figure 19: *LSV's stream during a MOCS tournament game with a 10 minute stream delay.*

LSV does not usually stream with such a delay, but for this high-stakes event with a coveted prize (a spot in the Magic Online Championship invitational, which would offer $40,000 for first place), he imposed the delay so as not to put himself at a disadvantage. Any competitor trying to ghost LSV would have to sacrifice a prohibitive amount of their 25-minute game clock just to learn about some cards that LSV might have in hand, giving themselves away as a ghoster immediately.

When LSV suffered an early loss and was put almost entirely out of contention, he stopped the delay and restarted the stream:

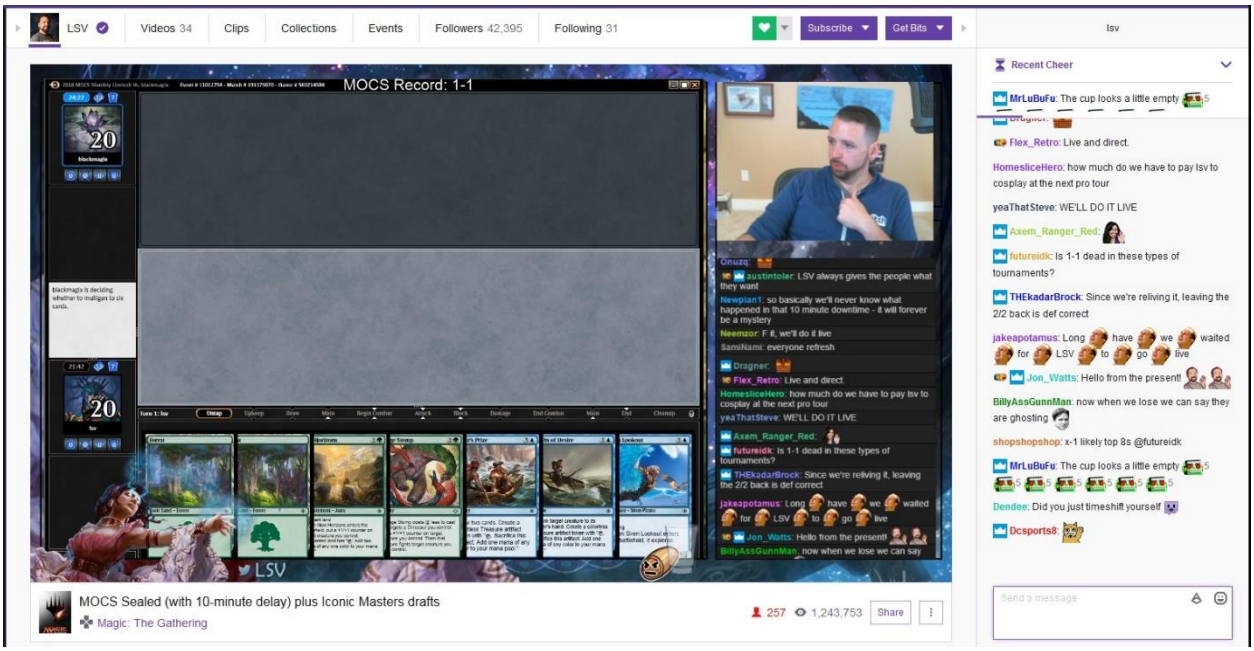


Figure 20: *LSV's stream without 10 minute additional delay.*

Freed to chat with LSV as he plays, users made comments such as "WE'LL DO IT LIVE," "Long 🤔 have 🤔 we 🤔 waited 🤔 for 🤔 LSV 🤔 to 🤔 go 🤔 live," and "Hello from the present!"[160]

[160] The memetic character of Twitch chat is on full display in moments of release, as it is here when the chat is liberated to speak directly to LSV as he plays the game they are watching. These messages riff on the infamous Bill O'Reilly "We'll do it live!" leaked tape and the "Jebaited" Twitch meme that rhymes "Jebaited" with "waited" and (usually) other words like "anticipated," "exterminated," etc.

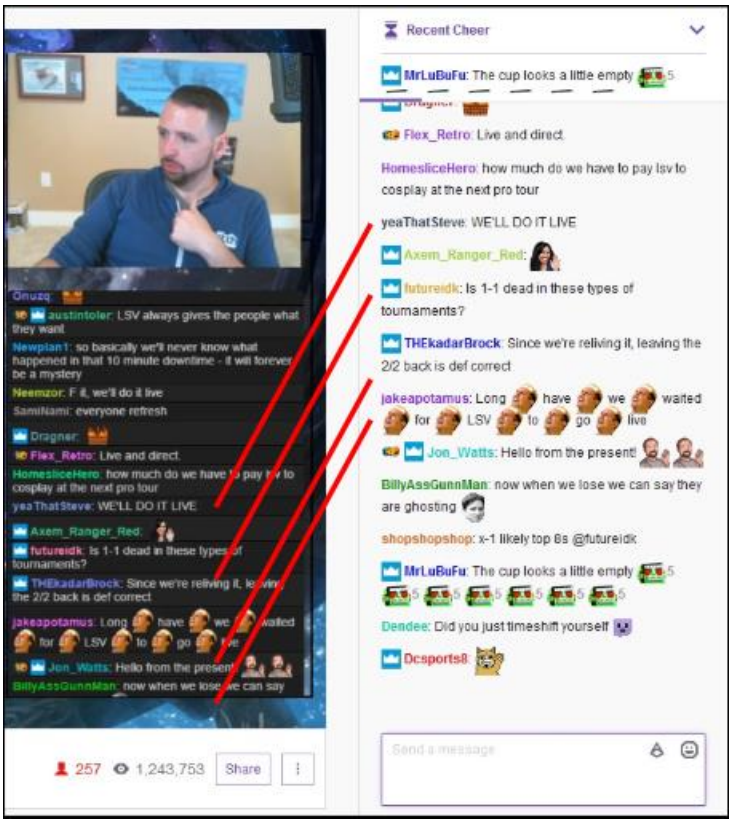


Figure 21: *Visualization of lag between chat experience and LSV's broadcast of the chat through Twitch.*

The red lines drawn above connect the in-browser chat (right) with LSV's version of the same chat (left), which appears to lag behind the former because of the aforementioned delay to broadcaster. Since the delay is now only a few seconds and not the previous ten minutes, the stream in effect visualizes the temporal difference between the streamer's and the viewers' experiences. In contrast, the left and right chat logs in the image of LSV playing under a ten minute delay have no visible connection. Long had the chat waited to see whether LSV would respond to their comments, and long had they waited for LSV to finally decide to "go live." But even this "liveness" has limitations, specifically the visualized lag between in-browser chat and LSV's streamed chat log. Despite this inescapable lag, there is a palpably greater degree of connection between streamer and audience. Chat's excitement at the new temporal relationship they have with LSV evokes a puppy to its owner. Now that the streamer is more closely

copresent with his audience, the chat has gotten itself excited in its direct addresses to LSV. Live-streaming, in its liveness, its immediacy, its reality, creates some kind of relationship between streamer and viewer. Perhaps "family" is not the right model, as convincingly as Feuer argues it applies to television. The nuclear, patriarchal family with David Hartman is a hierarchical relationship with verticality. It suits the one-to-many model of broadcasting but perhaps does not fit the many-to-many nature of live-streaming. Instead of a vertical relationship between television viewer and father figure, live-streaming suggests a horizontalized relationship: a cooler older sibling, a peer one wishes one had offline, or a crush one would like to spend more time with. Similarly to television, the streamer is still sending out video, but that person interacts with the audience, and that interaction is part of the draw for the medium. Adrive's Wondertrade elicits participation from and between his audience; LSV's removal of his stream's ten-minute delay invited users to interact with him via chat as he plays. Even a streamer with a hands-off approach can encourage meaningful interaction among audience members.

As a final example of how certain applications of Twitch draw attention to the platform's heterogeneous temporalities, some streams use viewer chat messages to control onscreen characters: most notably, Twitch Plays *Pokémon* (TPP).[161] The first run of TPP, a playthrough of *Pokémon Red* that began in February of 2014, was a social experiment that caught international attention and the collaboration of more than a million players.[162] The original concept was to emulate *Pokémon Red* but instead of a single player controlling the action, viewers on Twitch entered commands (up, down, left, right, A, B, or start) which would then be interpreted by a

[161] Some other games designed for Twitch integration using a similar principle include *Cluster Truck*, *Marbles on Stream*, and *Twitch Sings*.
[162] Rice, Carolyn. "Twitch Plays Pokemon Completes Game." *BBC News*, 3 Mar. 2014. *www.bbc.com*, https://www.bbc.com/news/technology-26417482.

program on the Streamer's[163] computer and fed into the game to control the player character. This control scheme was designed for chaotic collaboration (and allowed for the potential to troll by spamming "start"); as the viewer count climbed up into 5- and 6-digits concurrently, and as the game gained media attention, players had to confront the delay between chatted message and action (see image below). The stream included a quickly scrolling log of text commands interpreted by the game as controls:

Figure 22: *Icymate's Twitch Plays Pokémon capture*[164]

In the image above, the recorded chat (right) is moving far enough ahead of the streamed chat commands (center) that there is no overlap between the two; unlike the example of LSV's ten minute stream delay, though, this lack of overlap has to do with the volume of chat messages going by per second in a stream with only a few seconds' delay. But the discrepancy is just as

[163] The Streamer is an unnamed, anonymous person who has never personally appeared on the stream, hence the capital S.
[164] https://www.youtube.com/watch?v=ZI03x4NIB9E

pronounced: commands sent via chat message were always blind (except in "democracy" mode). Players could not possibly know when and how their messages would impact the game. The results of each input would only become visible several seconds after entered, so an "A" could translate to an attack, or advance dialogue, or toss an item, or do nothing. Much of the community embraced this chaotic delay as definitional to the experience.

Part of the spectacle that was the original *Pokémon Red* playthrough of Twitch Plays Pokémon was the overnight creation of a dedicated viewer/player base. Community members created memes, they made nicknames for party Pokémon (which had nonsense names in game such as "aaabaaajss" due to the chaotic mode of inputs), and they influenced Twitch beyond this channel. For example, Twitch made "PraiseIt" a universal emote for the Helix Fossil, an in-game item that the player character often attempted (and failed) to use during battle, and the community in turn treated the item as a religious idol to explain why this character was consulting it so often. Players of TPP shared an experience and found community belonging in ways that no one could have predicted. This type of intimate community formation is distinct from, but related to, viewer participation in LSV or Adrive's streams. In each there is a "live" experience shared by many people, and in each there are unique relational exchanges between users.

These three examples demonstrate a range of modes of play. In TPP, the lag between input and output, as well as the sheer volume of commands being sent from a massive number of players, makes play unpredictable. A given input is a roll of the dice: pressing "A" during a battle may result on any of four different moves, or an item selected for use, or an attempt to run away. Whatever of *agon* there is in *Pokémon Red* is transmuted into *alea*, a game of chance (and

in the aforementioned community discourse, a degree of *mimicry*, as a game of imagination).[165] In many ways, TPP is exemplary of playfulness: open to (and welcoming of) contingency, free, unproductive – TPP may even be considered creative in the sense that art influenced by random number generation is creative. Adrive's Wondertrade exchange is perhaps more structured than TPP but still a mode of play that brings a community together. There is still great contingency in receiving an unknown Pokémon from a potential generous or mischievous anonymous trade partner. Players seeking some degree of optimization may be satisfied at receiving an anonymous donor's "IV bred" Pokémon, or one that has been produced in search of an optimized level 1 Pokémon,[166] but there seems to be no potential for optimization in TPP. The example that best illustrates optimization is LSV's MOCS stream with the 10 minute delay. Not only is this delay indicative of LSV's seriousness about his performance in the MOCS qualifier, but it also greatly hampers community participation from his fans. The excitement that viewers express when the delay is lifted signals a more playful potential for participation that had previously been absent during the 10 minute delay. When the delay is lifted, the ability to interact returns, and viewers leap at the chance to make puns and memetic cultural references.

Liveness, Synchronicity, and Ideology

> In the mechanical age now receding, many actions could be taken without too much concern. Slow movement insured that the reactions were delayed for considerable periods of time. Today the action and the reaction occur almost at the same time. We actually live mythically and integrally, as it were, but we continue to think in the old, fragmented space and time patterns of the pre-electric age.[167]

[165] Caillois, Roger. *Man, Play, and Games*. University of Illinois Press, 2001.

[166] Pokémon breeding is a time consuming process that involves catching the right species, teaching it "egg moves" by mating one species with another, giving the Pokémon the right nature (of which there are dozens), and breeding it for optimal individual values (IVs) – often this means a perfect 31 (out of 32 possibilities) in five stats. End-to-end this may take hours, depending on the species. The process typically produces scores of not-quite-ideal Pokémon, which players either throw away or donate through features such as Wondertrade.

[167] McLuhan, Marshall. *Understanding Media; the Extensions of Man*. [1st ed.], McGraw-Hill, 1964. p 4.

Marshall McLuhan's enduring description of the electric age of communication as a "global village" has to do with the immediacy of electronic communication. When the latency between action and reaction is reduced, when the speed of communication accelerates, it is as if the world has gotten smaller—as if it has become a global village (5). This argument suggests that distance is conquerable by speed, that space itself can be reduced through rapidly moving communication. This chapter has argued that even at light speed, distances are ultimately unconquerable by telesthesia. Little delays in communication persist, and while competitive gaming may seem like an unlikely place to detect such delays, this area of networked communication heightens the significance of a few milliseconds and makes the effects of micro-temporal discrepancies crystal-clear. Moreover, the chapter has shown that there is a type of authority invested in the server: control over what the server recognizes as temporally correct is control over the observation of time in the medium. The synchronous experience of technologies of telesthesia, which we tend to accept at face value, is neither flawlessly executed nor ideologically neutral. Finally, temporal discrepancies seem to introduce chaos into the question of optimization, but that chaos is corralled by the server or compensated for in a buffer, and the push for optimization hardly gets replaced by a free exercise of unfettered playfulness. Electronic communication, to McLuhan, is an "almost" simultaneous action/reaction pair; while this "almost" may have once seemed a negligible discrepancy, Robert Hassan's term "connected asynchronicity" helps to draw attention to this small-scale gap.

A one-to-many technology of the mid-20th century, television extended the lines of telesthesia, and as McKenzie Wark argues, completes the topographical while gesturing toward the topological line.

> The key genres for working out the subsumption of the topographic into the topological are the situation comedy and the game show. On a game show, anyone can be taken out

> of everyday life and brought into the magic circle of television; on a sitcom, television can extend itself to the everyday life familiar to the *average viewer*, anywhere. Sitcom and game show announce the coming of a topology in which all of space might be doubled simultaneously, without lag, by lines of image, lines of sound, which as yet still broadcast out of central nodes. (57)

Wark interprets the topological as the proliferation of lines of connection and communication that, rather than mapping out a topographical space, put all points into quantitative relation to all other points. While lines of communication necessarily have lag, to Wark early topological forms gesture toward lagless communication, a smooth and simultaneous fungibility of quantifiable data that recalls Card's Ansible and the Oasis of *Ready Player One*. In other words, it holds an abstract, ideal significance regardless of practical limitations. Perhaps live-streaming—the digital, many-to-many response to conventional broadcasting—extends the topological toward completion, but in a way distinct from the lagless communication Wark interprets the sitcom and game show to suggest. Certainly, live-streaming makes its own claims to an appearance of liveness. We might modify Feuer's comment on television to make this claim: Live-streaming, in its liveness, its immediacy, its reality, can create intimacy where none exists.

Adrive's Wondertrade invites viewers to trade with each other and with Adrive (and his friends) as peers: everyone is on the same level and playing the same game together. LSV brings his chat into the (almost) present to encourage interaction. Both stream from inside their home, encouraging viewers to see them in a domestic rather than professional or otherwise sterilized setting. Some streamers employ a green screen so that only their persons (and maybe the chairs they sit in) appear on screen, but even so the presumption remains that they stream from their homes. TPP serves as a unique example in that the Streamer remains anonymous and unnamed,

yet the participatory culture[168] around TPP found intimacy through shared experience and a community phenomenon of in-jokes and on-the-fly lore. Unlike the one-to-many, hierarchical model of broadcast television, live-streaming in many ways democratizes televisual production through a many-to-many, horizontalized model. This is not to say that the live-streamer is powerless or that the streamer and viewer are necessarily in the same financial position. But compared to traditional broadcasting models, there is a fundamental shift in terms of viewer agency, participation, and influence at the level of the individual.

Returning to T. L. Taylor's point about the feelings of intimacy reported by streamers toward their audience, this intimacy is something that the medium of live-streaming offers and, to an extent, commodifies. In purchasing a Twitch subscription, one buys a subscriber icon and a set of emotes that demonstrate belonging, one buys a greater chance to be acknowledged personally by the streamer, and one buys the knowledge that they are a personal supporter of that streamer's economic success. This appeal of intimacy goes in both directions: by getting to know their audience members, the streamer learns how to best reach that audience and craft their streamer persona, and the subscriber gains a greater degree of access to the streamer, the person to whom they've decided to devote time and (potentially) money. The appeal of intimacy applies to both the setting of Twitch as a platform for broadcasting gameplay as well as to camming, the live-streaming practice of sex work for a paying audience. Both cases sell intimacy, familiarity, and immediacy through their appeal to liveness. It is because viewers feel co-present with the streamer that they buy subscriptions en masse. Anyone can watch a let's play or a pornographic scene from a streaming video platform, but people find a unique experience of intimacy and interaction through live-streaming.

[168] Jenkins, Henry. Confronting the Challenges of Participatory Culture: Media Education for the 21st Century. MIT Press, 2009.

Playing to an Audience

Taylor concludes *Watch Me Play* with this response to scholarly criticism of the absence or loss of play's purity in the context of professional streamers' and esports players' commoditization of play:

> The work of play is often deeply transformative. It can be filled with difficult pleasures, enjoyable instrumentality, and complex negotiations between system, self, and others. It can modulate in complicated ways between freedom and constraint, self-direction and obligation to oneself or a community. And indeed when gamers do identify the pleasures of play as slipping away, feel that things have become too straining, or decide to convert back into hobbyists, it is typically tied to a range of factors all coming to a head, not a discrete designation based on a single property of idealized play.[169]

Taylor suggests that if we lament a loss of play's purity when professional players live-stream their play experiences, our mistake is in assuming the existence of an idealized play to begin with. Play, to Taylor, is "deeply transformative" no matter the context (and even in the most instrumental of contexts), and just because play does not now look the same as it looked in an earlier setting, that does not necessarily make play less pure. The argument, along with the work's anthropological approach, is phrased through the experiences of people in the community who "identify the pleasures of play as slipping away" and "feel things have become too straining." In this perspective, what is pleasurable or relaxing about gaming is what people find to be pleasurable or relaxing. Not only is this assessment of the playfulness of play not "based on a single property of idealized play," it is not based on abstract properties of play at all.

If we expect certain things of play—creativity, a capacity for unexpected response to contingency, and freedom—we may find the play on offer in the live-streaming platform Twitch to be lacking. Streamers have overwhelming incentives to play faddish games, embellish their

[169] Taylor, T. L. *Watch Me Play: Twitch and the Rise of Game Live Streaming*. Princeton University Press, 2019. p 261.

personalities, take strategic lines that appeal to their viewers, play under constraints of a donor's suggestion, and/or play under the pressure to perform well or risk losing their audience. In all of these respects (and in more than there is space to list), playing to an audience becomes a calculation of how to keep that audience engaged and committed to offering financial support. Play has the potential, as Taylor asserts, to be deeply transformative in this context, and in some ways clowning around on stream is a much more freeform kind of play than in a tournament context, but when play is done for money it is necessarily negotiated – for better or worse. Key to the engagement that live streamers produce is a sustained sense of liveness: interacting with members of the chat, creating community, opening up intimate domestic spaces, and getting to know viewers on a personal level. Professionalized behaviors do not obliterate the freedom, contingency, or creativity of play altogether, but they do constrain play in an attempt to package and sell it.

This chapter has searched for faults and seams in the presumption of liveness in online media. Taking games as an example helps to identify such faults through microtemporal delays of fractions of a second. Because players of competitive games are especially attuned to frame-perfect timings and brief windows of reaction, they are especially capable of noticing the difference between in-person play and cross-country networked gaming. Networked communication in general offers an experience of liveness that sometimes coheres (in games as well as other media) and sometimes does not. Across communication forms, we can perceive the connected asynchronicity of online experience. The experience of live-streaming further complicates the heterogeneous temporalities of gaming over a network, and yet it too presents itself as "live." In examining why such communication forms assure their users of liveness, this chapter has examined the ideological presuppositions of what it means to be "live" in multiple

media forms. With respect to this work's larger project, networked communication transforms play, but not necessarily in a way that alleviates play from professionalization or optimization. In fact, live-streaming comes to us as another strategy for monetizing play. It may open up new and experimental play forms like TPP, but it offers little to recover the playfulness of play from esports broadly.

Networked communication transforms play in myriad ways: it sets metagame-shifting frame buffers, it defers temporal authority to a remote server, and it commodifies play to an audience, all while constructing appeals to liveness that imperfectly smooth over the network's inevitable lag. As much as we might aspire to the collective synchronicity and fidelitous immersion of *Ready Player One*'s Oasis, and as much we might yearn for a technological solution to lightspeed limitations as in *Ender's Game*'s ansible, we find networked play today to be more like the drone: irreconcilably remote and fumbling in temporal abjection, a not-quite-living reminder that the network is far from a synchronous unity.

3. Backtrack, Pause, Rewind, Reset: Queering Chrononormativity in Gaming

I weigh a gameplay decision as if I have all the time in the world. There is no timer, one option or another does not promise to make playing the game easier, and if I choose to reverse my decision, I can do so immediately using in-game mechanics. I am playing *Life Is Strange* (2015), a story-based game in which a defining mechanic is the ability to reverse time and (in most cases) unmake decisions after having seen their consequences. *Life Is Strange* unwinds the linearity of time to enable the player to follow different branching paths, double back, rethink, accept inevitable failures and remake its story. Among the player's many decisions of narrative development and characterization is the way in which main character, Max, responds in moments of sexual tension with her closest friend Chloe.

This chapter, too, doubles back on the linearity of time presented in chapters 1 and 2. Thus far I have focused on hyper-rational temporalities in set-framerate games, frame-perfect timing, frame buffers, and authoritative server time. This chapter turns the question of rationalized, normative time around to explore its opposites in gaming. In doing so, the chapter suggests its own strategy for recovering the playfulness of play from the present's temporally rationalized and normative state of gaming.

In both its mechanical manipulation of time and its diegetic flirtations with outedness, *Life Is Strange* invites its player to explore non-normativity. The game exemplifies one form of queer temporality, a contrary position to "chrononormativity" (a term I adopt from Elizabeth Freeman, 2010). Freeman's term describes the major milestones of a normative life (graduate, get married, buy a house, etc.) as well as normative temporal cycles (the 9-to-5 workday, etc.). To explore Freeman's concept in the context of video games, this chapter locates the clearest example of gaming's chrononormativity in esports, where financial stakes and standardized play

lead to a strict observation of regulated time. After identifying this manifestation of the medium's chrononormativity, the chapter discusses a set of queered corollaries to normative time in gaming, followed by an analysis of *Life Is Strange* as a game that queers time and offers rich possibilities for interpreting queerness in its narrative. As built up in the previous two chapters, the chrononormativity of esports throws the queered temporality of *Life Is Strange* into relief. While many games feature time manipulation, *Life Is Strange* focuses on decision-making rather than adept performance, which emphasizes interpersonal relationship management and opens up critical discussions of queer failure. What queer theory generally and Freeman's work in particular offer for analyses of time in games is alterity through play: play beyond norms, creative play, play for its own sake, and play for the sake of being different. While esports does not encompass the whole of gaming, esports exemplifies larger trends in the commoditization of play, whether that be from an elite pro or a famous Twitch streamer. Juxtaposing normative and queered temporal practices of play helps to identify the extent to which play can be standardized and to recognize the value of non-standard play.

Chrononormativity

Go to grade school, go to high school, go to college, get married, buy a house, have kids, get promoted, save for retirement, see the kids get happily married, retire after 40 years with a single company, live out one's golden years, and die. The middle class Westerner's life most normatively lived serves as the basis for Elizabeth Freeman's (2010) term "chrononormativity" in her work *Time Binds*. To Freeman, the term signifies "the interlocking temporal schemes necessary for genealogies of descent and for the mundane workings of domestic life" (xxii). Freeman later adds that "Chrononormativity is a mode of implantation, a technique by which institutional forces come to seem like somatic facts. Schedules, calendars, time zones, and even

wristwatches inculcate what the sociologist Evitar Zerubavel calls 'hidden rhythms,' forms of temporal experience that seem natural to those whom they privilege" (3).[170] Conventions of timekeeping both at the scale of the day and the lifetime therefore establish and naturalize norms as if technologies such as the calendar were innate phenomena. Freeman undercuts this sense of order by identifying its cultural constructions and establishment of temporal norms. As other scholars such as Jacques Le Goff in *Time, Work & Culture in the Middle-Ages* (1980), Gerhard Dohrn-van Rossum in *The History of the Hour* (1996) and Mary-Anne Doane in *The Emergence of Cinematic Time* (2002) have noted, when timekeeping practices shift, they routinely advantage those who stand to gain capital from stricter and more universal adherence to normalized, synchronized clock time. Le Goff's example of textile manufacturers at the advent of clock time, for example, illustrates the economic stakes of the establishment and enforcement of temporal standardization: textile owners profited greatly from timekeeping practices that milked more productivity out of their employees. Freeman's work builds on this kind of argument to include not only the accumulation of capital but the reproduction of a working population that will sustain such an end.

Bliss Cua Lim's *Translating Time* (2009), in particular, parallels Freeman's work in identifying normalized timekeeping practices of colonial origin versus a colonized, "backwards" time—a temporality out of sync with modernity, progress and capital. This rationalization of colonialism provides its own invitation to colonize and bring the colonial other into the present, so to speak. Freeman similarly identifies normative temporal practices as standardizing the social order by privileging heteronormative (rather than colonial) structures of power. The two works share the insight that temporal standardization serves to naturalize existing power structures and

[170] As Halberstam, whom Freeman also cites, argues in *In a Queer Time and Place* (2005), unlike these kinds of normative schedules, queer time is "about the potentiality of a life unscripted by the conventions of family, inheritance, and child rearing" (2).

consequently force a sociocultural other into a peripheral temporal position. Such a position is somewhere out of step with "the rest of us," as if from another century or unmentionable in the course of forward-moving historical progression. Hence the figure of the "good queer" who embraces chrononormativity through homonormativity: settling down in a monogamous pairing, adopting children, being productive members of society, and saving for a well-earned retirement (think Cam and Mitch from ABC's *Modern Family*). Or, similarly, the "immigrant success story" of someone who succeeds by fully assimilating into Western culture and leaping into the normative flow of time from whichever "backwards" country they came.[171]

To extend Freeman's argument to popular media forms, one clear example of chrononormative media expression is illustrated in Lynn Spigel's essay "Women's Work" (2000). Spigel argues convincingly that "The gendered divisions of domestic labor and the complex relations of power entailed by it were thus shown to organize the experience of watching television" (93). Spigel analyzes programming, magazine advertisements, and network documents to illustrate how daytime television historically identified and targeted women during their domestic labors. Traditional gendered divisions of labor placed women in the home during the day, and so programming catered to this audience and brought in advertisers seeking to attract its purchasing power.[172] The routine cycle of daytime television during the workday and primetime television at night creates a temporal inflection in popular media that serves the interests of the heteronormative household. In other words, this daily cycle of television programming exemplifies Freeman's concept of chrononormativity.

Chrononormativity in Post-Fordist Digital Labors

[171] My point here is certainly not to belittle the accomplishments of those who find financial success in spite of institutional and cultural biases but rather to point out that praise for such individuals stems in part from a recognition of their willingness to join normative temporal paradigms.

[172] I use the past tense here because Spigel's sources are historical, not to suggest that these advertising and programming tendencies are completely in the past.

It might be tempting to suggest that the dissolution of the 9-5 workday into the splintered labor time of the post-fordist economy challenges or destroys the old status quo, upending the putatively strict distinction between work and leisure and even, perhaps, queering time somehow. But such a conclusion would mistake the precarious, moment-to-moment labor of the post-fordist economy as an emancipating flexibility that moves labor beyond the confines of the 9-5 job. Only on the face of post-fordist labor is flexibility a feature and not a bug of networked employment. Patrick Jagoda observes in his *Network Aesthetics* (2016) that "In an early twenty-first century world saturated increasingly by always-on computing, pervasive social media, and persistent virtual worlds, connection is less an imperative than it is the infrastructural basis of everyday life" (1). Connection is, to Jagoda, a foregone conclusion of contemporary experience, a principal assumption of the nature of labor. There is nothing especially liberating in the move from Fordist to post-fordist labor; if anything, post-fordism extracts more labor out of those on the network by keeping them constantly tethered to their work. Moreover, as Tiziana Terranova notes in her *Network Culture* (2004), while post-fordist digital labor is characterized by flexibility and increased opportunities for freelancing, "The Internet does not automatically turn every user into an active producer, and every worker into a creative subject" (75). We would do well not to assume that Internet platforms that lower barriers to production do so to an equal extent (and with equal results) for all users. Even when such platforms do enable more people to produce content, new issues arise out of new labor practices. One platform relevant to gaming and worth examining further is livestreaming, the practice of producing live video for a viewing audience, particularly of videogame play through Twitch.tv.

The 9-5 workday's regimented media schedule (television) sets a historical precedent analogous to the post-fordist economy's momentary media schedule (for example,

livestreaming). Just as television takes cues in form and content from predominant economic and social structures, thus adopting a temporality synchronized with the 9-5 workday, so too does livestreaming take its cues in form and content from predominant economic and social structures. Live-streamers on Twitch.tv encounter flexibility in setting their own working hours but also great precarity: with neither salary nor benefits, live-streamers who endure a medical or family emergency face immediate consequences for any resulting absence. Twitch streamers make money off of subscribers, viewers who support them at a starting rate of $5 per month (about half of which goes to the streamer themselves). But even the most successful streamers with thousands of monthly subscribers face high rates of attrition for every break they take. The appealing flexibility of livestreaming thus brings with it the inflexibility of constant connection and a baseline obligatory frequency of streaming even just to maintain (if not grow) an audience. Precarity, constant connection, and a sense of round-the-clock labor characterize the post-fordist gig economy; like Uber drivers and online freelance writers, Twitch streamers grapple with an unforgiving yet supposedly liberating industry. This is all to illustrate that flexibility of working hours alters, but does not escape from, normative timekeeping practices. In tracking chrononormativity's presence in gaming, the clearest and most immediately fruitful signals emerge when "following the money." To Freeman, chrononormativity standardizes timekeeping practices for the sake of productivity (and re-productivity). At the intersection of gaming, critical timing/ timekeeping, and money, one finds esports.

Now that tournaments for games such as *League of Legends* (2009) and *DotA 2* (2013) pay out in the millions of dollars per team, and a class of professional gamers makes a living at games as diverse as *Counter-Strike: Global Offensive* (2012), *Super Smash Bros. Melee* (2001) and *Rocket League* (2015), competitive gaming is a significantly more viable career in the West

than it was just ten years ago, when T.L. Taylor was doing field research for her now indispensable *Raising the Stakes* (2012). The stakes, so to speak, have been on the rise as the esports industry has swelled financially. Play's tendency toward optimization at higher and higher levels of competition crescendos in this context of high-stakes performance, and as play becomes standardized within any given gaming community, so too do players become professionalized, observing social and temporal standards within their industry. Such social standards include a cleaning-up of language, as commentators in particular tend to embrace a family-friendlier vocabulary across many esports, especially for high-profile events. Likewise, players who sign on to sponsorships themselves typically agree to certain behavioral guidelines that protect sponsors' interests and images. Temporal standardization within esports merits close attention as something that optimizes and professionalizes play.

As Boluk and LeMieux (2017) discuss at length in their analysis of eleven seconds of play in *DotA 2*, success in professional gaming often depends on twitch reactions and the microtemporalities of fractions of a second. An eleven second window in a single game in a best of three match in a tournament such as Valve's The International 2012 can "turn the tide" and make a six- or seven-figure difference in team compensation. In Boluk and LeMieux's analysis, a critical half-second window within that fateful game between Na'Vi and Invictus Gaming made the difference in the game and the match, setting the victor on a short path to the grand finals. When so much financial pressure rests on a momentary window of play at such a visible venue as The International, no wonder that professional and aspiring professional gamers spend hundreds of hours practicing their techniques, timings, tactics, and team play. Multiple temporal cycles are at work in competitive play for a game such as *DotA 2*:

- Tournament seasons and schedules (yearly)
- Regular practice regimens (daily and weekly)

- Intra-tournament schedules (a certain number of hours per round)
- Timekeeping at the level of the course of the game (drafting, the game clock, creep spawns, environmental "jungle" enemies—mostly at specific minute marks)
- Player-specific timers such as cooldowns and respawns (by minutes and seconds)
- Critical timings of player and team tactics (fractions of a second)

At each of these temporal levels, esports habituate their players (and spectators) to multiple overlapping ludic rhythms. Internalizing them and acting according to their parameters is critical for successful play and, at high levels of skill, financial payoff. The higher the financial stakes and the greater the competition amongst competitors, the more esports players are compelled to conduct themselves according to standardized timekeeping practices in and around esports culture. Such is the nature of competition and economic incentive.

The last two temporal layers mentioned above (player-specific and critical tactical timings) best exemplify rhythms at the level of play itself. The most normative forms of play from a socioeconomic perspective are those reinforced by financial incentives, which are laid out the most clearly in esports. Immediate decision-making, twitch reactions, tight timings, microtemporal awareness, and frame-perfect performance characterize competitive play behaviors in fighting games, first-person shooters, MOBAs and real time strategy games.[173] And because successful esports are widely broadcasted to their audiences, professional play has a significant influence on each game's low- and mid-level metagames, the prevailing strategies and habits of play at those levels of skill. Players at lower levels learn tactics and acquire the motivation to perfect technical skills in part from esports broadcasts. Watching high-level play with a critical eye develops one's understanding of the game and how it can best be played. For example, character picks and bans in MOBAs lay bare the broad strategies top teams employ to

[173] One notable exception among esports would be the turn-based trading card game genre, which includes *Hearthstone* (2014) and *Magic: The Gathering Online* (2002). Both of these bound play within time limits, but neither demands of its players anything like frame-perfect timing.

create synergies and anticipate opponents' preferences. Viewers who witness which characters the top players pick and ban (and listen to the commentators' analysis of such decisions) develop their critical understanding of how the game can best be played. This is all to say that because successful esports have a broad player base, many of whom consume broadcasts of professional-level tournaments, such games are by nature more prone to standardization than noncompetitive games (or even competitive games without structures for organized play).

Thus far I have considered economic rather than cultural factors that make certain forms of play "normative." This would be sufficient enough cause to invoke queer theory in its sense of deviating from norms and celebrating alterity. But it is also worthwhile to identify the predominant gendering of esports and their contextual media forms (such as Twitch) as receptive to a queer theory analysis. On Twitch's "twitchadvertising.tv" page, one statistic that the company most prominently displays is that "75% of Twitch users are male with 73% in the age between 18-49" ("Audience," 2017). This statistic likely confirms what one takes away from casual observations of discursive practices on Twitch, which are in layman's terms the "dudespeak" of young men who see their interlocutors as other young men. But to emphasize the second half of the statistic—the age bracket of Twitch users—this demographic of males aged 18-49 is a reputably sought-after plum of the advertising business. The conventional wisdom for this is that men of this group not only have disposable income, and they also are at a critical age to form long-term brand loyalties, yet they are nonetheless often difficult to reach *en masse.* Thus traditional modes of address in preexisting advertising forms filter through to Twitch, and expectations of who has money (and therefore who is worth catering to) would seem to guide advertising interest and, consequently, Twitch's commitments to viewer cultivation. Socioeconomic norms become advertising conventions, which in turn incentivize certain

community formations. And because the process starts with heteronormative economic principles (young professional men being a sought-after demographic), the end result is a medium necessarily marked by heteronormative presumptions.

To move from the predominant medium for esports broadcasts (Twitch) to the content of the broadcasts themselves, I would like to look at one recurring event that takes place within one particular community: "The Smash Sisters," an all-female-identified crew battle[174] within the *Super Smash Bros. Melee* and *Super Smash Bros. for Wii U* communities. As the exception that proves the gender-normative rule, the event provides a venue for female-identifying smashers to make connections, play friendly matches, and compete with each other in crew battles, roughly divided according to region (Smash Sisters Facebook Page, 2017). The very presence of Smash Sisters side events at major tournaments testifies to the fact that competitive *Melee* is hegemonically masculine. Indeed, the "Melee It on Me" top 100 ranked players (the community consensus for player rankings in *Melee*) only just recently ranked someone other than a cisgender man this year.[175] Moreover, essentially all of the most familiar commentators are also male.[176] One of the more infamous lines from the community's documentary, *The Smash Brothers* (2013), comes from longtime competitive player Kashan "Chillindude" Khan: "I really like the fact that [*Melee*] brings together people from, from every walk of life, really, you know, it– except girls. But, you know, we're working on that, too [laughs]" (Beauchamp, 2013). Whoever the "we" is in "we're working on that," the Smash Sisters could not have arisen except through

[174] In competitive *Smash Bros.*, a "crew battle" is a team-based competition between two groups of smashers, typically divided by the regions they come from. Crew battles are conducted in relay format, and one team member keeps playing until they are knocked out four times. As such, a single team member can plausibly defeat the entire other crew (although this rarely happens in major tournaments). Smash Sisters crews typically include East and West Coast teams, and they are usually close battles rather than runaways.

[175] Magi, a trans woman, was ranked at 97 in January of 2019 for the end of 2018 rankings. She would go on to upset Mang0 in the winner's bracket at Genesis 5.

[176] To name some of the most popular figures in no particular order: Toph, Scar, D1, HomeMadeWaffles, Phil, Lovage, Prog, Vish, Blur, DJ Nintendo, Fendrick Lamar, TKBreezy, Wobbles, EE, Fauster and Mike Haggar.

the efforts of female-identifying *Melee* players themselves, namely Lilian "Milktea" Chen and Emily "emilywaves" Sun. A charitable interpretation of Chillindude's quotation is that he and the community are well-intentioned and at least self-aware enough to know that women are dramatically underrepresented among competitive *Melee* players, but certain obstacles nonetheless persist. Milktea and emilywave's chosen name for the event, "The Smash Sisters," draws attention to the gender difference between their event and the hegemonically masculine series, as well as the competitive community, which includes the aforementioned documentary that makes literal "Brothers" of its seven highlighted (male) players.

When a community such as *Smash Bros.* focuses overwhelmingly on male players, male commentators and male-centered media made for the consumption of a presumptively male audience, such an environment predictably gives rise to certain conservative expectations of gendered performance. These games are (typically) hegemonically masculine in such a way that access to the occupation of pro gamer is taken to be male territory, commonly for not only chauvinistic but also heteronormative reasons. Reactionary elements in gaming appear to stir online discourse in brigades, and pseudo-intellectual, chauvinistic arguments in favor of biological essentialism float to the surface. One such argument: men naturally have the competitive drive that makes them well suited for the workforce and gaming – or in the case of esports, both. As such, the working rhythms of competitive players are circumscribed with heteronormative presumptions of who belongs to the professional class of gamers. If television was the medium that most clearly expressed chrononormativity in fordist times, esports is the most chrononormative type of play, and gaming is at least a clear illustration (if not indeed the clearest) of chrononormativity in post-fordist times.

Existing scholarship outside of esports has already outlined some ways in which play can

become standardized. Mia Consalvo's *Cheating* (2007) explores her concept of gaming capital by examining the paratextual "flood" of "[r]eviews [...], ads, cheat code releases, G4 TV specials, walkthroughs, discussion board topics on GameFAQs.com," etc. (8). These paratexts serve to "upgrade your game experience" by teaching you the right way to play even before you pick up the controller. Also, in *Playing with Videogames* (2008), James Newman describes play in speedrunning as "the search for perfection" (131) and highlights the "high degree of community participation and a manifest collective knowledge that underpins and supports speedrunners" (130). To both Consalvo and Newman, sources of information surrounding the games we play (whether casually or competitively for time) lead us to greater competency, sometimes setting a standard against which to compare our own play. In the case of esports, normative play practices like those described by Consalvo and Newman are established not only through competitive communities themselves but also from the media that surround and extend the games.

Queer Temporalities in Games: *Life is Strange*

In the spirit of queering normativity, queer temporalities in gaming would be marked by contradistinctions from normative play.[177] Therefore, to embrace queer temporalities of play is to backtrack, pause, rewind, reset, reconsider, mull over, reject actionable windows, and accept failure and frame-imperfect timing. Such play drops the pretense of high-stakes urgency; it unwinds the strict sequentialism of competitive game clocks and frame data; it carefully considers decisions and their consequences; it picks apart the game as an object of critical consideration rather than an apparatus for perfectible performance. The classic preoccupations of

[177] In some cases, the queered temporalities of play I describe run counter to the game's apparent designs; in other cases, games such as *Life Is Strange* specifically enable one to play with these kinds of temporalities. The concept of non-normative play has a scholarly precedent in works such as Aarseth's "I Fought the Law" (2014), which considers "innovative, subversive and transgressive play" as something with definitional importance to play itself (182).

the "serious gamer," such as overclocking graphics cards and reducing latency through manipulation of hardware settings, become moot in queer temporalities of play. Such play is deeply unmarketable: Who wants to pay to watch someone think really hard about a decision in a noncompetitive game? What "let's play" YouTube personality is going to attract an audience by backtracking to review old areas or repeatedly loading previous save files? What kind of paying subscriber would sponsor a Twitch streamer for mulling over the consequences of a decision in an obscure single-player game?[178] The proven marketable skills in gaming include offerings such as high-performance play, a big and outrageous personality, the tendency to utter immediate and thoughtless outbursts—the usual in the world of professional streaming, including esports.

Some recent scholarship has already raised the topic of queered temporality in gaming. Claudia Lo's "Everything Is Wiped Away: Queer Temporality in *Queers in Love at the End of the World*" (2017) discusses time in Anthropy's game (2013) through the briefness of having only ten seconds to act before the apocalypse arrives. Time is in this sense queered because of the looming catastrophe that characterizes the player character's relationship with their queer lover. Bonnie Ruberg's "Permalife: Video games and the queerness of living" (2017) builds on Lo's work by analyzing the constant restarting that the player of *Queers in Love at the End of the World* must do to experience more than just ten seconds in the game. Permalife in Anthropy's game, as Ruberg argues, paradoxically arises from the impending apocalypse through the player's persistent restarting. To Ruberg, the game offers a "hopeful vision of queer living through a kind of queer micro-world building" (169) in spite of the apocalyptic backdrop and extreme briefness of remaining time. They later raise the topic of Freeman's work on time: "Video games, both as individual genres and as a medium, have their own chrononormativity.

[178] Of course, people can and do get paid for a surprising variety of things through Twitch subscriptions and YouTube ad revenue. That said, there is no comparison between the profitability of high-performance play and that of the kinds of low-stakes backtracking described above.

Permalife, by contrast, does not follow this chrononormative arc. Instead, it operates in the possibility spaces of queer temporality" (170-171). Another essay to cite Freeman, and the most recent work on queer temporality in gaming, is Gaspard Pelurson's "Flânerie in the dark woods: Shattering innocence and queering time in *The Path*" (2018). After conducting a literature review of queer theory scholarship that addresses time, Pelurson describes "non-linear or timeless stories" (4) as those most productively queerable. Pelurson then analyzes *The Path* (2009) as demonstrating queered temporality in its unrushed pacing and nonlinear structure.

This essay draws different conclusions about chrononormativity in gaming from the above works in part by locating normative timekeeping practices in esports. Rather than taking Pelurson's view that nonlinearity in and of itself opens certain games up for interpretations of queered time, I emphasize the active unwinding of time through reversal, etc. that runs so contrary to play for the sake of productivity, efficiency, and profitability.[179] While this kind of temporally queered play can apply to any game (one can reset *Mario Kart 8* just as easily as *Undertale*), I would like to take *Life Is Strange* (2015) as an object of analysis for two reasons: its central mechanic has to do with reversing time, and it addresses queerness both directly and indirectly. Certainly, *Life Is Strange* is not the first game to make time manipulation into a mechanic: *Prince of Persia: Sands of Time* (2003), *Braid* (2008), *Ratchet & Clank Future: A Crack in Time* (2009), among others, have previously done time manipulation. Nor is *Life Is Strange* exceptional for featuring time travel as a narrative move: *BioShock: Infinite* (2013), *The Legend of Zelda: Ocarina of Time* (1998), and *Teenage Mutant Ninja Turtles: Turtles in Time* (1992) also do this, to name a few. But as an adventure game that privileges player choice, *Life*

[179] While characters in esports may have special powers that reverse or slow time, these kinds of powers do not serve to upend the "overlapping ludic rhythms" described in the previous section; Bayonetta's Witch Time in *Super Smash Bros. for Wii U* (2014), for example, does not crack a tournament match open for critical reflection mid-set or end the match in a draw. Tracer, a coincidentally queer hero from *Overwatch* (2016), reverses time but, again, does so within the competitive and productive logics of esports, including the player's twitchy, immediate responses to a dynamic game state.

Is Strange brings its decision-making process to the fore, which itself becomes subject to the game's time manipulation mechanic. The kind of choice *Life Is Strange* privileges is, to be certain, still highly constructed and constrained. As Anastasia Salter comments in *What Is Your Quest?: From Adventure Games to Interactive Books* (2014), "the interactivity of adventure games is in the opportunity for responsiveness within limits: the tension between narrative and play is used to tell the story" (35). In *Life Is Strange*, the player explores dialogue options and decision trees, and while the player has choices about how to characterize Max and how to respond to other characters' actions, the adventure genre can only offer these choices within specific boundaries. Given the adventure game-style system of *Life Is Strange*'s branching dialogue, its time reversal mechanic adds another wrinkle to its presentation of meaningful choice and alterity to linear storytelling. This quality of the game's interwoven narrative and mechanics requires further unpacking.

In *Life Is Strange*, players take on the role of Max Caulfield, an aspiring photographer and student at Blackwell, a boarding high school for the arts in the fictional town of Arcadia Bay, Oregon. After a nightmarish flash-forward that begins the game *in medias res*, Max discovers that she has acquired the ability to reverse time. This allows her to take things back, give the right answers, and prevent accidents and tragedies. Max prevents one such tragedy by saving the life of Chloe, an Arcadia Bay native and an estranged friend. Over the course of the game, the two strengthen their old friendship in a way that lays sexual tension on thick, but neither they nor the game put a label on what they have. They investigate the disappearance of Rachel Amber, a former Blackwell student, as they try to prevent the cataclysmic storm Max sees in her flash-forward. But when they finally confront the storm, they eventually conclude that Max's own temporal intervention in sparing Chloe's life in the first place is in fact the cause.

Having saved Chloe's life repeatedly and seeing Chloe die in practically every timeline, Max confronts the inescapable conclusion that Chloe is fated to die, suggesting that postponing her death will only oblige Max to save her again and again through more time manipulation. At this juncture, the player—who has made many story-affecting decisions throughout—must now choose between Chloe and Arcadia Bay. Max can go back in time to let Chloe die in order to prevent the catastrophe from destroying everyone and everything in town, or the player can keep Chloe at the expense of all else.

Time travel in the game works at two scales: small manipulations of less than a minute at a time and large manipulations of days or even years. The former is player-controlled: undoing dialogue choices or making a kind of spatial/temporal leapfrog by moving through part of the environment, reversing time, moving, reversing to arrive someplace as if in an instant. For example, an early conversation with her teacher presents Max with a multiple choice question that she can get right or wrong. If the player guesses wrong, they can listen to the teacher's correction and then reverse time to change their answer. Large-scale manipulations of time are more of a narrative function than gameplay mechanic (there is no "skip back to previous timeline" button). Max, whose preferred medium is analogue rather than digital photography, discovers that she can apply her powers to analogue photographs of her own life events and relive them at will.[180] Whereas the small manipulations of time enable a kind of in-game backtracking, the large-scale manipulations create entirely new timelines. For example, Max travels back to when she and Chloe were much younger and prevents Chloe's father from dying in a car accident. Consequently, when Max finds Chloe in this timeline, she is paralyzed from an

[180] This kind of large-scale time manipulation seems to be a take on an established convention in film and television, exemplified in *Blow Up* (1966), *Blade Runner* (1982) and *Stranger Things* (2016), all of which present analogue photography as boundlessly faithful to its subject. In each example, characters enhance analogue photographs to discover something recorded but previously unnoticed. Max's preference for analogue photography not only characterizes her as a hipster but also, in keeping with this convention, suggests that analogue photos come alive and reveal more than that which is initially legible (and, implicitly, more than a digital photograph can).

auto accident of her own, dying slowly and painfully enough to ask Max to assist with her suicide.

This context should illuminate why, at the end of the game as Max nears her final choice between Chloe and Arcadia Bay, Chloe despairs "I know I've been selfish, but for once I think I should accept my fate… our fate…" She advises Max to let her die and save the town; her revision of "my fate" to "our fate" suggests on the one hand that Max is fated to let Chloe die and on the other that their relationship is doomed to fail. Up to this point, Max has watched Chloe stumble into fatal situations numerous times, preserving her life only to see Chloe jeopardize it again or meet another accident. Consequently, by the end, Chloe seems ill-fit for chrononormativity: Max's attempt to restore Chloe's biological father to life only creates more suffering for Chloe, and every attempt to fix time for her sake leads to yet another dead end. Over the course of the game, Max and Chloe renew their old friendship after Max's years-long absence: they hang out together in Chloe's room, eat, investigate Rachel's disappearance, share a kiss (optionally), go swimming in the school pool after-hours in their underwear, sleep in the same bed, take pictures, and track down Rachel's suspected abductor/killer together. Their relationship would seem to grow past "just good friends" to something more serious and filled with sexual tension. And the coincidence of their sexual tension and Chloe's suggestion that their relationship is doomed calls up notions of queer failure.

Halberstam's *The Queer Art of Failure* (2011) responds to normative paradigms of success (not unlike the milestones of Freeman's concept of chrononormativity) and the crushing pressure placed on individuals to succeed economically or be found at fault. In the heteronormative, capitalist context in which Halberstam centers his argument, "[f]ailing is something queers do and have always done exceptionally well" (3). He subverts normative

paradigms of success by celebrating failure and recognizing negativity's potential to reach some kind of alterity, both queer and otherwise. To bring this style of analysis to *Life Is Strange*'s pair out of step with normative time, Chloe and Max would seem to fail spectacularly. Either they end up together and depart from a destroyed, survivor-less town, or they destroy their own relationship to save a city. There is no in-between and no authoritative "good ending" in which the player can manage to keep both. As such, the game intermingles one form of success with one form of failure, salvation with destruction, defiance with acceptance.

Bonnie Ruberg's distinction between "failing toward" and "failing against" helps illuminate some of this narrative uncertainty as well the ludic complexities of willful failure in videogames. In "Playing to Lose: The Queer Art of Failing at Video Games," they link Halberstam's work to Jesper Juul's *The Art of Failure* in order to better understand "queer failure through play" and vice-versa (198). Ruberg demonstrates how games can and do make failure playful and pleasurable, contra Juul's assertions that we only tolerate failure for the "rewards of struggling to overcome it" (202). To Ruberg, we "fail toward" a game when we fail "in the way that a game wants us to" and "fail against" when "failing in the way that a game does not want" (204). In providing the player an informed choice between Chloe's life and the town's safety, *Life Is Strange* encourages a kind of failure toward rather than against. It is not for a lack of skill that the player cannot achieve a happy resolution for both Chloe's and the town's safety; rather, Ruberg's interpretation of Halberstam suggests that we might find meaningful alterity in the significance of this difficult choice.

To bring this discussion back to queered temporality in gaming, *Life Is Strange*'s gameplay mechanics of reversing time and replaying dialogue require a kind of mandatory failure. After all, what good would a time reversal mechanic be if the player never needed to use

it? We might consider it a failure to guess wrongly when a character asks Max a question, and this bad guessing more concretely exemplifies "failing against" the game when the player has been told the right answer but forgets and answers wrongly again. But certain decisions in the game in fact require Max to make an unavoidable mistake only to reverse time and correct it. Such a scenario seems at first to be the result of the player's poor choice, but the player is likely to notice the subtle ways *Life Is Strange* requires failure when replaying the game, as I did when replaying a section in the junkyard in episode two. During this section, Max must collect glass bottles. After spotting one on top of a fridge, Max tries to reach for it but breaks it in the attempt. The player then reverses time to repair the bottle, and then Max brings a crate over to assist with the safe retrieval of the bottle (**Figure 1**). When I replayed this section, I naturally first attempted to interact with the crate, knowing that it was required for the solution. However, I discovered that the crate only becomes actionable after first breaking the bottle and reversing time.

Figure 1: *Reaching the bottle with the crate.*

The choicelessness of this kind of mandatory failure yields something closer to "failing toward" than "failing against." It is not the player's bad choice or poor performance that breaks the bottle, it is the fact that, in Ruberg's terms, the game "wants us to" fail. We break the bottle

as a necessary part of Max's interaction with the world, we experience the consequences and we rewind time in spite of them. Max's powers over time offer the player a radical refusal of strict linearity within a game that itself frustrates attempts at optimization and proficient play.

From a conventional game design perspective, required failure of this kind ensures that the player makes frequent use of the game's mechanics, but it grates against the proficient player's desire for mastery and the speedrunner's will to optimize.[181] As Juul recognizes in *The Art of Failure,* games are often designed to allow for safe failure, and those that never make us fail can feel just as frustrating as those that constantly do. In this sense, failure is an anticipated (and even desired) state for practically all games, including those that play with time. However, forcing the player to fail repeatedly is a slow and inelegant design choice that prioritizes narrative development over gameplay fluidity. And yet, the mechanics of *Life Is Strange* are not useful unless the player regularly fails. The game features a central mechanic built upon player failure. However, other time manipulation games such as *Braid* and *The Prince of Persia: Sands of Time* can be played proficiently for practically their entire length without requiring their players to fail. These games of dexterity differ significantly from *Life Is* Strange, which is a decision-making game in the adventure genre. Rather than failing because the player misses a jump or is hit by an enemy (both of which are "failing against" moments that inevitably occur for first-time players of platformers), *Life Is Strange* implements player failure in the options for what the player is and is not allowed to do—as with the crate example, these are more in line with "failing toward." At a broader level, the narrative culminates in Max's failure to preserve her relationship with Chloe in their town (sacrificing one or the other). And the cultural context

[181] There are, in fact, speedruns of *Life Is Strange*. At time of writing, the Any% (the fastest category) world record is held by Kevbot43 with 5 hours, 12 minutes, and 21 seconds (according to speedrun.com). Much of *Life Is Strange*'s length comes from unskippable cutscenes, and mandatory failures such as the one described above also increase the time.

for Max and Chloe's failure, as Halberstam would suggest, is one of crushing pressures to succeed and a queer negativity in contradistinction from conventional notions of success.

The defining mechanic of time reversal in *Life Is Strange* exemplifies a queer temporality, one that recognizes failure, grows past it in some ways and accepts it in others—sometimes fatalistically. The game unwinds normative, profitable styles of play through its mechanics: there is comparatively little to be gained from training oneself in proficiency at this game rather than, say, *League of Legends* (2009). And while even the most lumbering game can nonetheless enjoy a community of dedicated and proficient players, including speedrunners, there is no financial incentive to cultivate a rapid twitch response, or memorize frame data, or optimize routes or map decision trees for speedier responses to the in-game events of *Life is Strange*. Moreover, the game does not lend itself to spectacle or replayability the way games most profitable for live-streaming tend to. By encouraging backtracking, rewinding, and careful decisions rather than linearity and twitch reflexes, the game queers normative temporal practices in gaming.

To the extent that play is creative and emancipatory, it is of critical importance to be able to dislodge play from normative structures, especially those that arise within gaming. As described in chapters 1 and 2, while some very lucrative sectors of the industry focus their attention on the countless incentives to optimize and professionalize play. In this context, reencountering the playfulness of play becomes, in part, a queer project. How do we navigate our way back to a creative, emotionally engaged, freed space for play, even as some of the most visible and spectacular practices in gaming obsess over frame-perfect timing, constant drilling, twitch reactions, stage memorization, decision trees, build orders, and other modes of standardization? Queer theory turns our attention to methods of finding meaningful alterity to

normative structures of all kinds; specifically, Freeman's concept of chrononormativity illuminates temporal standardization of media conventions and labor practices. As a digital medium produced by post-fordist labor and, in the case of esports, mobilized for the continued production of post-fordist labor, gaming inevitably establishes its own sorts of chrononormativity. What the example of *Life Is Strange* illustrates is that even as new norms become established, their queer corollaries point us to the periphery, to being different and playing differently. To recognize nonnormative temporal acts such as resetting, rewinding, pausing, and backtracking as not only mechanics within a commercial medium but also deviations from wider norms is to open up that medium to reencounter what makes play creative, free, and playful.

Conclusion

> Pure madeness. Gods among men... yes. Super l337-human powers? Yes. (NSPIRE 2003)
> :shock: that's inhuman... that's just wrong..... (nublu01 2003)

These comments, quoted in Patrick LeMieux's "From NES-4021 to moSMB3.wmv: Speedrunning the Serial Interface" (2014),[182] respond to a video made by a player known as Morimoto. In this video, Morimoto executes an ostensibly flawless run of *Super Mario Bros. 3* in eleven minutes. Morimoto's "[madness]," "Super 1337-human powers," and "inhuman" performance mark the video as not merely an excellent play of the game but as an impossibly perfect one. Morimoto maintains full running speed through practically the whole run, and during auto-scrolling levels goes to the trouble of stomping on consecutive enemies to earn 99 extra lives; moreover Morimoto is never hit by an enemy, never misses a jump, and never runs into a pit. The quality of play in this video is so virtuosic as to be *too* good.

As noted by LeMieux, this video that viewers took to be a live speedrun (or RTA, for "real-time attack") was eventually discovered to be a tool-assisted speedrun (or TAS) of the game. Speedrunning in general is about playing through a game as quickly as possible. The "tools" in a TAS allow someone to stop the game and advance one frame at a time, selecting the exact inputs desired. Random elements in the game (colloquially referred to as "RNG" for "random number generator") can be rewound until the desired outcome transpires (such as a rare item drop), and difficult techniques and impossible inputs (such as pressing the directional pad in opposite directions simultaneously) become trivially easy with the help of tools. A TAS is a perfect execution of the most optimal known strategy; it eliminates the contingency of unexpected outcomes; its outcome is calculable and repeatable. As such, it would seem to have

[182] LeMieux, Patrick. "From NES-4021 to MoSMB3.Wmv: Speedrunning the Serial Interface." *Eludamos. Journal for Computer Game Culture*, vol. 8, no. 1, Dec. 2014, pp. 7–31.

little in common with the creativity, openness to contingency, and freedom of play. The present project has heretofore discussed esports as a site at which play has become optimized, but speedruns, and especially tool-assisted speedruns, feature the same kind of play optimization, even if there are comparatively few professional opportunities for speedrunners.

At Games Done Quick, a semi-annual marathon of game speedruns streamed via Twitch to benefit charity, most runners perform their work as a real-time attack (RTA): live with a controller or keyboard and mouse in hand. Behind them sits a couch with other experts on the game's speedrun, and behind them an audience of perhaps several hundred.

Figure 1: *Games Done Quick 2016 speedrun by duckfist of* Mega Man 2 *"any%"*

The drama of Games Done Quick is to see if the runners will perform well under pressure, if the viewers will meet donation goals to place external constraints on how the game should be played (such as whether the runner should "save" or "kill the animals" near the end of the *Super Metroid* speedrun), and if the event will break its previous fundraising record. But when a TAS

speedrun is exhibited during the marathon, there can be no drama of performance (other than perhaps whether there will be mishaps such as electrical failures). The operator, whether or not they should be called a player, pushes a button to show the run. TAS is, consequently, usually a small part of Games Done Quick.

Among speedrunners, it is common to hear "this isn't really possible/practical other than in TAS." Whether the technique in question requires multiple rare randomized events to happen in succession; or a sequence of frame-perfect inputs (and in the case of some runs, "pixel-perfect," meaning that a certain technique can only happen on a single pixel, sometimes on a single frame as well); or a technique potentially saves a fraction of a second but risks a great deal of time if not done correctly; tool-assisted speedruns do things that runners cannot do or will not go to the trouble of doing for practical reasons. The TAS is, in effect, always out of human reach for live speedrunners. It is a fully optimized run imagined by humans but made perfect by machines. If all performance in videogames is cybernetic, the tool-assisted speedrun tips gameplay in favor of the machine as if to say *Here, give me the controller – you can't do it right*. Like the play dystopia of 20XX, in TAS the robots (figurative or actual) displace human agency in the pursuit of more perfectly optimized performance.

An example TAS video that uses many of the machine advantages described above is a run of *Zelda II* (1987) for the Nintendo Entertainment System. TASeditor explains the run's major exploits, including the "speed glitch":

> **Speed glitch**
> Whenever left+right is pressed simultaneously, Links [*sic*] top speed will break and is set to 127 or -128, depending on the direction Link travels. In case the value overflows/underflows Link will quickly change his direction of movement. [183]

This glitch highlights one of the significant advantages a TAS run has: it is not limited by the

[183] *TASVideos Submissions: #4371: TASeditor's NES Zelda II: The Adventure of Link "Warp Glitch" in 05:35.93*. http://tasvideos.org/4371S.html. Accessed 17 Apr. 2019.

hardware's physical composition. It would be impossible to press both left and right simultaneously on an unmodified NES controller,[184] but on TAS this is simple. The payoff of executing this technique in TAS is obvious and immediate, as Link accelerates to maximum speed in one frame. This glitch also makes possible other techniques in TAS:

> **Wall climbing**
> The speed glitch is requires to go inside a wall. Doing this repetivly while jumping Link can get to places normally unreachable for him. [*sic*][185]

In practice, the run of *Zelda II* accelerates Link to top speed using the speed glitch, and at several points Link jumps into the wall (where he could not and ostensibly should not otherwise be). Sometimes from there Link jumps through the wall into another open space; at others he jumps up to the top of the screen to make use of yet another glitch:

> **Fairy glitch**
> Using the fairy spell when Link is on a ceiling, he will fall down to the screen below.[186]

This glitch transports Link from the top of the screen (sometimes while he is abusing the wall glitch) to the screen immediately below him. Dungeons in *Zelda II* are laid out in grid format, and generally one does not move from one floor to another without an elevator. Using the wall glitch allows for floor skipping without having to gain access to an elevator.

TAS videos require footnotes such as these to describe what is happening on screen. Even to *Zelda* series veterans, a glitch like the speed glitch appears inexplicable on the first viewing. Often at a public viewing of a speedrun such as Games Done Quick, viewers comment on how the runners are "breaking the game," sometimes rendering it unrecognizable to longtime fans. This common phrase is only a figure of speech, since the runners are playing the game

[184] The NES directional pad is all one piece, unlike, for example, the PlayStation 4's directional pad which has separate buttons for each direction that can be pressed independently. On the back of the NES directional pad is a bulbous nub that works somewhat like a see-saw: when one direction is pressed down, the opposite side is lifted up. Consequently, the two opposite sides cannot physically be pressed down simultaneously.
[185] Ibid.
[186] Ibid.

according to its computational structures rather than hacking it, but in appearance they seem to be "breaking" it. The footnotes explaining what the run is doing often give specific numeric values to the techniques, as the footnote on the speed glitch explains that Link's speed becomes "127 or -128," whatever that might mean to one unfamiliar with the intricacies of the software. Play in this regard is not solely in the realm of the intuitively understood; rather, this kind of play exposes certain quantitative underpinnings of the game that, while internally consistent, are to the viewer apparently senseless. But in the optimized play of TAS, sense is inconsequential to the objective of improved performance; as with so much of what we humans enjoy about play, sense is thrown out by the machines as useless to optimization.

Like the play dystopia of 20XX, the TAS is an asymptotic limit point of play beyond live human capability. In name, the run is merely "assisted" by tools, but in principle, the machine does the heavy lifting, and the operator's choice is essentially always forced by the techniques and glitches available.[187] In the limit cases of 20XX and tool-assisted speedruns, there is no creativity, contingency, or freedom – there is no apparent playfulness in play. Full optimization wins, but in winning it undermines the kind of play that makes winning and losing distinguishable in the first place.

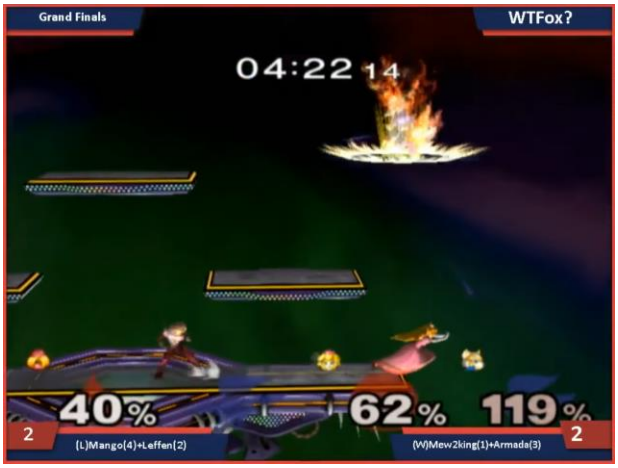
Style Against the Machine

In certain spheres of competitive gaming, players directly address the machinelike optimization of esports and acknowledge what is at stake in losing the playfulness of play. One example from *Melee* features Mang0 as a self-appointed champion against robotic optimization. At the *Smash Bros. Melee* tournament What the Fox in 2015, Leffen and Mang0 played two doubles sets against M2K and Armada. Mew2King and Armada had defeated Leffen and Mang0

[187] I should stress that by "glitches available," I mean any method or technique that the software allows for. However game-breaking a TAS may seem, TAS runners are not inserting new glitches into the code but exploiting whatever is already present.

in winner's finals 3-1, and when the two teams rematched in grand finals, the set went to a deciding game five. Mew2King and Armada eliminated all of Leffen's stocks and took Mang0 to his last, while they still had two stocks each. A four-to-one comeback is rare in *Melee* doubles at any level, but unheard of at the highest level of play, especially against Armada and Mew2King, who built careers on unshakably optimal play.

The commentators remarked that though Mang0 had made "sick comebacks before," such a feat would be "too much." As Mang0's Fox aggressed the other two players, taking a stock off of each, and accumulating damage against the final stock of both Armada's Peach and Mew2King's Sheik, the commentators' tone changed: "Mang0 oh my God, Mang0! Mang0 you can't do this!"



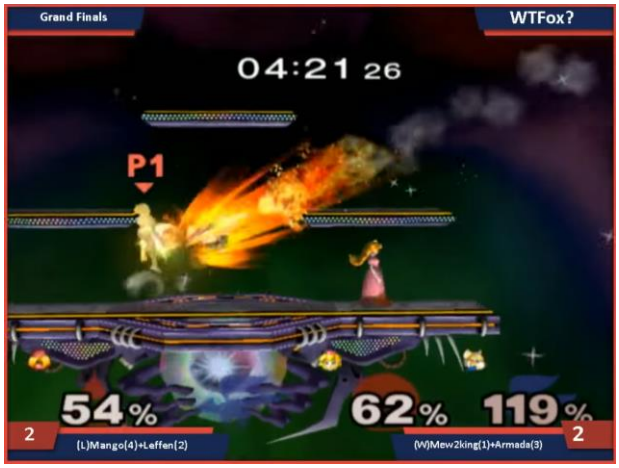


Figure 2: *Mang0's Fox hovers momentarily in the startup to the firefox animation.* ***Figure 3:*** *Mang0 surprises Mew2King by pointing the firefox directly at him.*

In F**igures 2** and **3**, Mang0 is playing as Fox in the midst of his "Up-B" recovery, also known as "firefox," in which Fox hangs for a moment in the air, and then shoots his body at an angle of the player's choice. With Mew2King's Sheik and Armada's Peach both grounded on the stage rather than occupying any of the three smaller platforms, the safest option would be for Mang0 to recover high and land on the top platform, where he would be least vulnerable to counter-attack.

Instead, Mang0's Fox lunged straight at Mew2King, who tried to counterattack but was struck by the firefox instead. Mang0 continued opting for aggressive lines such as these, approaching his opponents when outnumbered and when the chances of making a successful assault seemed to be zero. Mang0 attacked his opponents' shields (referred to as "shield pressure") to weaken their defenses and stay in the role of the aggressor, and he split his opponents with a shine to get separation from one while attacking the other. Taking Mew2King's last stock and bringing Armada up to 90% damage (near-death), Mang0 was finally knocked offstage and successfully edge-guarded by Armada. But he had made a statement by even coming close to a 4-to-1 comeback against two other "gods" of *Melee*. After the match he approached the commentators' desk and, true to form, hyped his own performance:

> "The Mr. Smiths were like 'Neo's coming out!' They were so scared! [...] Four Mew2King/Armada stocks, against Mang0's one lone stock? Ugh, that would've been sick. They're scared, dude, they're scared. They got a glimpse!"

Invoking Neo and Mr. Smith from *The Matrix*, Mang0 cast himself as the human hero against the machines, as the unlikely champion over passionless optimization, as "The One" capable of transcendent play that defies limitation through emphatically human, creative, virtuosic performance. By contrast, the "Mr. Smiths" of Mew2King and Armada figured as the machinelike "optimal" players whose prowess may intimidate most but is ultimately limited by its lack of humanity. In this case, their performance is critically absent of the playfulness of play.

We can read the match's outcome two ways: that the humanistic play Mang0 represents is ultimately defeated in tragic fashion, like John Henry's collapse against the machine made to replace him in folklore. Or we can celebrate the achievement of making the spectator believe again that transcendent play is indeed still possible when machinelike optimization seems to be encroaching inexorably toward domination of all play. In this second reading, the transcendence

of human creativity is not dependent on the match's outcome; instead, it can be revealed in a surprising moment or brief interaction. Humanistic striving does not have to carry the day; just making an appearance is enough to reassert itself.

To discuss some critical concepts around play and playfulness, let us return to a quotation from Sicart offered in the introduction:

> Mine is a romantic theory (or rhetoric) of play, based on an idea of creativity and expression that has been developed in the highly postromantic cultural environment of the early twenty-first century. I write this theory of play as a reaction to the instrumentalized, mechanistic thinking on play championed by postmodern culture industries. This is a theory that acts as a call to playful arms, an invocation of play as a struggle against efficiency, seriousness, and technical determinism. (5)

This project takes up a similarly "romantic" position on play inasmuch as it asserts that there is a humanizing quality to play that we lose when play is professionalized and optimized. In esports, play is indeed instrumentalized to the end of making money; esports are indeed rife with efficiency and seriousness; esports lead play to their own kind of determinism, as imagined in the dystopia of 20XX. We might well count professional live-streaming and esports among the "postmodern culture industries" that Sicart responds to, although I have thus far referred to contemporary labor as "post-fordist" rather than "postmodern." In referencing Sicart, Huizinga, Caillois, and others, I have taken it as a given that play has value, and that aspects of that value are unique to play. Huizinga asserts that "pure play is one of the main bases of civilization,"[188] and Caillois in turn agrees with Huizinga by praising him for "[demonstrating] the importance of [play's] role in the very development of civilization";[189] Suits suggests that "game playing is what makes Utopia intelligible";[190] Salen and Zimmerman assert that "Transformative play can metamorphosize the players of a game, the culture of which the game is a part, even the game

[188] *Homo Ludens,* p 8.
[189] *Man, Play and Games*, p 3.
[190] *The Grasshopper,* p. 171.

itself";[191] TL Taylor argues that "The work of play is often deeply transformative."[192] Across many of the works that guide this project, play offers something profound, and consequently play has something to lose in contemporary contexts. Through such a lens I am willing to celebrate the playfulness one still can encounter even in esports. I do not mean to put Mang0 on a pedestal (he has his share of faults and can be as much a "streaming bro" as any other Twitch personality), but his style makes clear the human struggle for alterity and creativity in play.

Strategies for Encountering Playfulness

Style is one of a handful of strategies this project has examined for rediscovering the playfulness of play in our moment of rising professionalization and optimization of play, particularly in esports. By analyzing the conventions of standardized timekeeping – frame rates and authoritative server time – we can better understand the rhythms that structure digital play. These rhythms are highly normative because in *agon* especially, games are expected to enable honest, fair competition. Temporal fluctuations and inconsistencies would unbalance a game like *Super Smash Bros. Melee* and make gameplay feel frustrating and unpredictable, especially when the outcome matters to its participants.

In the periphery of such a context we encounter queer, nonlinear temporalities working against normative paradigms of time. We also find stylish types of play that refuse optimization in favor of spectacle and unbound creativity. These are two strategies (of which there may be many more) for a return to the playfulness of play. Queer temporalities unwind the strict linearity of frame-perfect play and a reliance on microtemporal timings. As discussed in chapter 2, *Twitch Plays Pokémon* offers a new experience of multiplayer at a chaotically large scale, and in playing through lag we add a highly contingent layer onto an already widely played game. A queer

[191] *Rules of Play*, p. 605.
[192] *Watch Me Play*, p. 261.

reading of *Twitch Plays Pokémon* might emphasize that in the chaos of play there is a great deal of inadvertent backtracking, and progress is unnaturally slow. While the server is still the authority in determining the sequence of which commands go in which order, there is a kind of play involved in entering a command without knowing exactly what effect it will have on gameplay; the lag in between creates a certain space for playfulness.

Style, too, leads to unexpected results by defying that which is normatively optimal. Style does not necessarily object to the desirability of the win (whereas queer temporality would be predisposed to wave off the outcome and seek alterity from winning and losing a la Halberstam). But style distinguishes itself from the standard means to get the win. Style proclaims "I don't need decision trees or frame-perfect techniques, I'll just beat you by sheer talent and make you second-guess yourself as I pick absurd options and win anyway." Style especially is about recovering playfulness in the context of esports, where play has been so optimized and professionalized that it seems little like play anymore.

To put these strategies in relation to each other, I borrow an organizational principle from Bernard Suits. Suits presents his reader with four archetypes that can be arranged in a Punnett square.[193] Players can have or lack an adherence to the rules, and they can have or lack a "lusory attitude," or in other words the will to win the game.

	Lusory attitude	**No lusory attitude**
Adheres to the rules	The player	The trifler
Does not adhere to the rules	The cheat	The spoilsport

Few would quibble that adherence to the rules is important when determining what is or is not

[193] This style of diagram is familiar to genetics for predicting the likelihood of dominant/recessive genes, and it is used in game theory for such concepts as the prisoner's dilemma. I use it here to articulate clearly the distinctions Suits makes between these archetypes.

play; for Suits, these archetypes clarify why the lusory attitude is also of definitional importance to play. Without one, we are all just triflers idly fiddling with the game or spoilsports out to ruin the fun the game might otherwise create. In this work, I have presented a few approaches toward play that might similarly be mapped out into archetypes. But instead of the top-left corner being the position of privilege, I have dedicated more space to the others:

	Lusory attitude	**Unconcerned with lusory attitude**
Optimized play	The professional player	The sandbagger
Suboptimal play	The styler	Queer play

One of these terms has not yet been discussed. The "sandbagger," in esports lingo, is the player who shows up to the tournament and might win if they expend effort, but they choose not to. The sandbagger is capable of optimal play but does not act like they care. They may bypassing the pressures of having to meet expectations, or they might be mentally checked out due to fatigue, or they might simply not care about the results; the sandbagger's motivation is often opaque.

Mang0 himself has sandbagged tournaments; at one that happened to be named "Frame Perfect" in Orlando FL, March 17-18th 2017, Mang0 used a secondary character of his, Captain Falcon, and not his main characters Fox and Falco. Despite being ranked among the top five players in the world, Mang0 finished 13th behind a number of lower-ranked players. Mang0's coach at the time, Tafokints, informed the community via a tweet that "We both agreed to have @C9Mang0 go falcon and have fun for this weekend." It was not that Mang0 could not play well or that he lacked the will to play; he was there to "have fun" with a secondary character that he knew would not be competitive with the field. Sandbagging is not styling, in which the player tries to win through suboptimal move choices, because the sandbagger lacks a

lusory attitude. Closer to a trifler than a spoilsport (since they are not trying to ruin anyone's fun), the sandbagger shows up and plugs in their controller but has nothing to prove. If they get the win, that is fine; if they do not, that is also fine. Sandbagging is a type of play that announces general disinterest with outcome, but it can only do so in a context of proven skill. As such, to be an unskilled player and "play for fun" is not the same as sandbagging because there is no established difference between how well one is capable of playing and how well one is currently playing.

There are, of course, other figures we could try to fit into similar Punnett squares – the griefer, the feeder, the troll. Sandbagging fits here because of its relation to esports and the playfulness of play. The sandbagger pulls their punches, not to be intentionally suboptimal, but to play without an uncompromising commitment to a serious, lusory attitude.

Optimization, Injury, and Queer Temporalities of Creativity

The case of Narcissa Wright ties together many common threads in this work –perfected play, live-streaming, and queer temporalities – in a way that exemplifies the transformative qualities of play that distinguish it from the uncompromisingly optimal. Wright had been a prolific speedrunner of *Ocarina of Time* and other games such as *Paper Mario*; incidentally, Wright was also a proficient and highly technical *Melee* player. As such, the experience of performing many actions per minute for a sustained time carried over well from speedrunning. The lay gamer is most likely to know Wright from one of two *Ocarina of Time* "any%" speedruns: one performed in front of an audience at a Games Done Quick marathon while narrating the run's method and history, the other via Twitch for the (then) world record time for an RTA.

In 2015, two major events in Wright's life transpired around the same time: she began

hormone replacement therapy, and she started experiencing chronic pain in her hands. In an interview with Kotaku, Wright suggested that games were the pain's cause – specifically the long, high-APM sessions of *Smash Bros.* games and speedruns. As Jordan Youngblood has previously discussed, [194] in a short time, the optimized play Wright had been streaming on her Twitch channel was replaced by creative streams of Wright painting self-portraiture. Kotaku writer Nathan Grayson's description of this change was that Wright had found speedrunning's "polar opposite." Wright subsequently began to lose many of her Twitch subscribers. Some had left because of the change in content; others, presumably, left because of her gender transition. She was also the target of repeated DDOS attacks, a surer sign of prejudice toward her gender identity. Wright would later have her Twitch account taken down for (apparently repeated) violations of Twitch policy regarding graphic media content and/or revealing clothing on streamers.[195]

To synthesize some of the dimensions of this anecdote in relation to the present project, Wright had secured a revenue stream through Twitch subscriptions to enable her to play games for a living, but when the toll of accumulated hours playing games at a high intensity for long periods of time eventually struck, Wright was left without health insurance to cover physical therapy for her gaming injuries. Her content transformed into a "polar opposite": not optimized, frame-perfect, or competitive, but infinitely open-ended, slow, and self-fulfilling. While self-portraiture is not quite play, it nonetheless is creative, humanistic, open to contingency, and even sometimes playful. Her gender transition that coincided with this transformation of play happens

[194] Jordan Youngblood, "Gotta Go Past: Speedrunning and the Politics of the Archive," Extending Play 3 Conference (2016).

[195] To clarify, there is no Twitch policy against dress pertaining to gender identity; rather, Wright's apparent violations have to do with the degree to which her clothing was revealing, and Twitch has strict guidelines about dress intended to apply to all streamers regardless of gender identity. Such policies have a history both online and off of selective enforcement for women in particular, but I cannot say whether Wright's dismissal was merited or not.

to reinforce the queering of time entailed in moving from chrononormative paradigms in speedrunning to the slower and un-optimized temporalities of visual arts. I do not mean to suggest that this gender transition caused a temporal shift in streaming content, but it did end up exposing the economic precarity of professional streaming. Not only are speedrunning and esports hegemonically masculine, but the presentation of self on Twitch is itself subject to gender policing. Not all of Wright's fans left, and not all of her viewers engaged in gender-based harassment, but enough did harass her for her to set the chat to "subscribers only," and enough subscribers left for her to no longer be making ends meet financially – even before her account was suspended.

To gain financial stability playing esports, make money in competitive games; to make money in competitive games, play optimally; to play optimally, set winning as the sole objective and put aside everything else. This string can unravel once one realizes that the optimal play it takes to win no longer resembles anything playful, and the abstract joy of making money through play turns out to be just another form of digital labor – perhaps even the same kind of labor that one's peers experience elsewhere in the post-fordist economy. The string can also unravel when one no longer can sustain optimal play. When one's hands are injured, one cannot play optimally, cannot make money in competitive games, and can no longer be financially stable. Young esports players who stream on services like Twitch seem to fulfill a fantasy of making money through play, but not only do they displace the playfulness of play, they also labor on a tightrope of intense stakes. There is no safety net of health benefits for workplace injury,[196] no retirement plan for the 20-somethings who age out of their brief prime,[197] no union to represent

[196] As reported on by CBS News and others, the pervasiveness of injuries in professional and collegiate esports programs is only recently receiving the necessary attention. *Doctors Raise the Alarm about Esports Injuries*. https://www.cbsnews.com/news/esports-video-game-players-injuries-can-be-serious/. Accessed 4 May 2019.
[197] Winkie, Luke. "Retired At 20: A Pro Gamer's Life After ESports." *Kotaku*, https://kotaku.com/retired-at-20-a-

their collective interests, no room to stumble when they count on every subscriber they have for their livelihood. Just the free market of tantalizing figures at the very top (streamers with ten thousand or more subscribers can make $300K+ per year) but a labor dynamic composed of fickle fans, lapsing subscriptions, flavor-of-the-month games, and a harsh grind for everyone else.

These are the twin stakes of professionalized play: the abstract concern of what happens to the playfulness of play, and the practical concern of financial precarity pervasive in digital labor. Like the gig economy of Uber drivers, or Amazon's Mechanical Turk, or the countless platforms for self-employed labor such as YouTube and Etsy, or freelancing sites for coding tasks like Upwork, Twitch appeals to the prospective digital laborer through flexible working hours and a promise of getting paid for what one loves to do. The dissolution of play and work is symptomatic of digital labor generally rather than something particular to Twitch. Play is work, freedom is platform-dependence, flexibility is obligation, intrinsic joy is extrinsic motivator, authenticity is persona, contingency is regularity, intimacy is publicity, creativity is profit-optimization. In post-fordist times, we need again to imagine alterity in order to reencounter what makes play playful. This work has looked to the periphery for resistance to normative trends, objections to optimization, protean creativity, and queer time. Perhaps our reencounter with play is a stylish denial of optimization; perhaps it is a recognition of chrononormativity and a commitment to acting and thinking outside of normative structures. Whatever our method, the responsibility is on us to recognize what of value in play we may be losing and how to recover it if we are to live by those values.

---

pro-gamer-s-life-after-esports-1746907605. Accessed 4 May 2019.
Emily Gera. "What Happens When You're Too Old to Play League of Legends Professionally?" *Polygon*, 15 Aug. 2014, https://www.polygon.com/2014/8/15/6006211/league-of-legends-riot-games-esports-age.

Bibliography

Aarseth, Espen. *A Narrative Theory of Games*. ACM, 2012, pp. 129–133. *uci.primo.exlibrisgroup.com*, doi:10.1145/2282338.2282365.

---. "I Fought the Law: Transgressive Play and the Implied Player." *From Literature to Cultural Literacy*, edited by Naomi Segal and Daniela Marinova Koleva, Palgrave Macmillan, 2014, pp. 180–88.

Aarseth, Espen J. *Cybertext: Perspectives on Ergodic Literature*. Johns Hopkins University Press, 1997.

Adorno, Theodor W. *The Culture Industry: Selected Essays on Mass Culture*. Routledge, 1990.

ajpanton. *Genesis 2: SLF, Mango vs Taj*. *YouTube*, https://www.youtube.com/watch?v=Omi9MyweC_I. Accessed 17 Apr. 2019.

Alvarez Igarzábal, Federico. *Time and Space in Video Games: A Cognitive-Formalist Approach*. Transcript Verlag, 2019.

Andrews, Lori, et al. *Gameful World: Approaches, Issues, Applications*. MIT Press, 2015.

Anther's Ladder | Super Smash Bros Online Community Site. https://www.smashladder.com/. Accessed 17 Apr. 2019.

AnyKey. "Live Streaming Moderation Best Practices for Event Organizers." *Anykey.Org*, Sept. 2018, https://www.anykey.org/wp-content/uploads/AnyKey-Moderator-Best-Practices-Sept-2018-1.pdf.

Apex 2015 - PewPewU (Marth) Vs. Hungrybox (Jigglypuff) - Winners Round 2 - SSBM - YouTube. https://www.youtube.com/watch?v=tDxvY_MVctI. Accessed 29 July 2019.

Baran, P. “On Distributed Communications Networks.” *IEEE Transactions on Communications Systems*, vol. 12, no. 1, Mar. 1964, pp. 1–9. *IEEE Xplore*, doi:10.1109/TCOM.1964.1088883.

Baudrillard, Jean. *The Consumer Society: Myths and Structures*. Sage, 1998.

Beauchamp, Travis. *The Smash Brothers*. East Point Pictures, 2013. *www.imdb.com*, http://www.imdb.com/title/tt4513022/.

Becker, Jo, and Scott Shane. “Secret ‘Kill List’ Tests Obama’s Principles.” *The New York Times*, 29 May 2012. *NYTimes.com*, https://www.nytimes.com/2012/05/29/world/obamas-leadership-in-war-on-al-qaeda.html.

Benjamin, Walter. *Illuminations*. Schocken Books, 2007.

Bergson, Henri. *Creative evolution*. University Press of America, 1983.

---. *Matter and Memory*. Humanities Press, 1978.

---. *Time and Free Will; an Essay on the Immediate Data of Consciousness*. GAllen & Company, 1910.

Beyond the Summit - Smash. *Hax vs Axe - Melee Singles: Group D - Smash Summit 5*. *YouTube*, https://www.youtube.com/watch?v=be-zpO9jWsQ. Accessed 17 Apr. 2019.

Bogost, Ian. *How to Do Things with Videogames*. University of Minnesota Press, 2011.

---. *How to Talk about Videogames*. University of Minnesota Press, 15.

---. *Persuasive Games: The Expressive Power of Videogames*. MIT Press, 2007.

---. *Play Anything: The Pleasure of Limits, the Uses of Boredom, and the Secret of Games*. Basic Books, 2016.

---. “The Rhetoric of Video Games.” *The Ecology of Games: Connecting Youth, Games, and Learning*, p. 23.

Bolter, J. David. *Remediation: Understanding New Media*. MIT Press, 1999.

Boluk, Stephanie, and Patrick LeMieux. "The Turn of the Tide: International E-Sports and the Undercurrency in Dota 2." *Metagaming: Playing, Competing, Spectating, Cheating, Trading, Making, and Breaking Videogames*, 2017.

Brookey, Robert Alan, and Thomas Patrick Oates. *Playing to Win: Sports, Video Games, and the Culture of Play*. Indiana University Press, 2015.

Caillois, Roger. *Man, Play, and Games*. University of Illinois Press, 2001.

Chamayou, Grégoire. *A Theory of the Drone*. The New Press, 2015.

Chun, Wendy Hui Kyong. "The Enduring Ephemeral, or the Future Is a Memory." *Critical Inquiry*, vol. 35, no. 1, 2008, pp. 148–171. *uci.primo.exlibrisgroup.com*, doi:10.1086/595632.

Cone, Jared. *It IS Rocket Science!: The Physics and Networking of Rocket League*. Game Developers Conference 2018, San Francisco.

Consalvo, Mia. *Cheating: Gaining Advantage in Videogames*. MIT Press, 2007.

---. "Confronting Toxic Gamer Culture: A Challenge for Feminist Game Studies Scholars." *Ada New Media*, vol. 1, no. 1, Nov. 2012, https://adanewmedia.org/2012/11/issue1-consalvo/.

---. *Sports Videogames*. Routledge, 2013.

Conway, Ryan M. Moeller, Bruce Esplin, Steven. "Cheesers, Pullers, and Glitchers: The Rhetoric of Sportsmanship and the Discourse of Online Sports Gamers." *Game Studies*, vol. 9, no. 2, Nov. 2009. *Game Studies*, http://gamestudies.org/0902/articles/moeller_esplin_conway.

Data - Kadano's Perfect Marth Class -- Advanced Frame Data Application | Smashboards. https://smashboards.com/threads/kadanos-perfect-marth-class-advanced-frame-data-application.337035/. Accessed 16 May 2020.

De Duve, Thierry. "Time Exposure and Snapshot: The Photograph as Paradox." *October*, vol. 5, MIT Press, 1978, pp. 113–125. *uci.primo.exlibrisgroup.com*, doi:10.2307/778649.

Deleuze, Gilles. *Cinema 1: The Movement Image*. Bloomsbury Publishing, 2014.

---. *Cinema 2: The Time-Image*. Translated by Hugh Tomlinson and Robert Galeta, University of Minnesota Press, 1989.

---. "Postscript on the Societies of Control." *October*, vol. 59, The MIT Press, 1992, pp. 3–7. JSTOR.

Deterding, Sebastian. "The Ambiguity of Games: Histories and Discourses of a Gameful World." *The Gameful World: Approaches, Issues, Applications*, edited by Steffen P. Walz and Sebastian Deterding, The MIT Press, 23.

Doane, Mary Ann. *The Emergence of Cinematic Time: Modernity, Contingency, the Archive*. Harvard University Press, 2002.

Doctors Raise the Alarm about Esports Injuries. https://www.cbsnews.com/news/esports-video-game-players-injuries-can-be-serious/. Accessed 4 May 2019.

Dohrn-van Rossum, Gerhard. *History of the Hour: Clocks and Modern Temporal Orders*. University of Chicago Press, 1996.

"Dolphin Emulator." *Dolphin Emulator*, https://dolphin-emu.org/. Accessed 17 Apr. 2019.

Dolphin Is a GameCube / Wii Emulator, Allowing You to Play Games for These Two Platforms on PC with Improvements.: Dolphin-Emu/Dolphin. 2013. Dolphin Emulator, 2019. *GitHub*, https://github.com/dolphin-emu/dolphin.

Donovan, Tristan. *Replay: The History of Video Games*. Yellow Ant, 2010.

DrewTV. *Smash Ladder/ Dolphin Melee Netplay Setup Tutorial Guide (Windows). YouTube*, https://www.youtube.com/watch?v=yP6nt6eFJmI. Accessed 17 Apr. 2019.

Dyer-Witheford, Nick, and Greig De Peuter. *Games of Empire: Global Capitalism and Video Games*. University of Minnesota Press, 2009.

"Edgeguarding Fox as Marth." *Reddit*, https://www.reddit.com/r/SSBM/comments/3grvlv/edgeguarding_fox_as_marth/. Accessed 17 Apr. 2019.

Elkins, James. *Photography Theory*. 1st ed., Routledge, 2013. *DOI.org (Crossref)*, doi:10.4324/9780203944141.

Elmezeny, A., and J. Wimmer. "How Gaming Achieves Popularity: The Case of The Smash Brothers." *Proceedings of the 205 DiGRA International Conference: Diversity of Play, 2015.*, 2016, https://uci.primo.exlibrisgroup.com/discovery/fulldisplay?docid=scopus2-s2.0-85000916351&context=PC&vid=01CDL_IRV_INST:UCI&lang=en&search_scope=MyInst_and_CI&adaptor=Primo%20Central&tab=Everything&query=any,contains,elmezeny%20wimmer%20gaming%20achieves&sortby=rank&offset=0.

Ender's Game. 1st edition, Tor Books, 1991.

Ernst, Wolfgang. *Digital Memory and the Archive*. University of Minnesota Press, 2013.

Eskelinen, Markku. "The Gaming Situation." *Game Studies*, vol. 1, no. 1, July 2001, http://www.gamestudies.org/0101/eskelinen/.

"Exposure: Motion Efficiency Study, Photographed by Frank Gilbreth." *Design Observer*, http://designobserver.com/feature/exposure-motion-efficiency-study-by-frank-gilbreth/39272. Accessed 17 Apr. 2019.

Fine, Gary Alan. *Shared Fantasy: Role-Playing Games as Social Worlds*. University of Chicago Press, 1983.

Firoiu, Vlad, et al. "Beating the World's Best at Super Smash Bros. with Deep Reinforcement Learning." *ArXiv.Org*, 2017. *uci.primo.exlibrisgroup.com*, http://search.proquest.com/docview/2075057679/?pq-origsite=primo.

Flanagan, Mary. *Critical Play: Radical Game Design*. MIT Press, 2009.

Ford, Colin, et al. "Chat Speed OP PogChamp: Practices of Coherence in Massive Twitch Chat." *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems*, Association for Computing Machinery, 2017, pp. 858–871. *ACM Digital Library*, doi:10.1145/3027063.3052765.

Fordyce, Robbie, et al. "Avatars: Addressing Racism and Racialized Address." *Woke Gaming: Digital Challenges to Social Injustice*, edited by Kishonna L. Gray and David J. Leonard, University of Washington Press, 2018.

Frasca, Gonzalo. *Simulation versus Narrative: Introduction to Ludology*. Edited by Mark J. P. Wolf and Bernard Perron, Routledge, 2003.

Freedom.to. "Freedom: Internet, App and Website Blocker." *Freedom*, https://freedom.to. Accessed 17 Apr. 2019.

Freeman, Elizabeth. *Time Binds: Queer Temporalities, Queer Histories*. Duke University Press, 2010.

Friedberg, Anne. "The End of Cinema; Multimedia and Technological Change." *Reinventing Film Studies*, edited by Christine Gledhill and Linda Williams, Arnold, 2000, pp. 438–52.

Galloway, Alexander R. "Allegories of Control." *Gaming: Essays on Algorithmic Culture*, University of Minnesota Press, 2006.

Games Done Quick. *Mega Man 2 by Duckfist in 28:40 - Awesome Games Done Quick 2016 - Part 137*. *YouTube*, https://www.youtube.com/watch?v=9pa1eMNdM-k. Accessed 17 Apr. 2019.

Gehl, Robert W. "The Archive and the Processor: The Internal Logic of Web 2.0:" *New Media & Society*, SAGE Publications UK: London, England, May 2011. Sage UK: London, England, *journals.sagepub.com*, doi:10.1177/1461444811401735.

Genesis 2: SLF, Mango vs Taj - YouTube. https://www.youtube.com/watch?time_continue=9&v=Omi9MyweC_I. Accessed 29 July 2019.

Gera, Emily. "What Happens When You're Too Old to Play League of Legends Professionally?" *Polygon*, 15 Aug. 2014, https://www.polygon.com/2014/8/15/6006211/league-of-legends-riot-games-esports-age.

Gilbreth, Frank. *Motion Efficiency Study*. c 1914. National Museum of American History.

Grayson, Nathan. "One of the World's Best Speedrunners Can't Speedrun Anymore." *Kotaku*, https://kotaku.com/one-of-the-worlds-best-speedrunners-cant-speedrun-anymo-1752274907. Accessed 17 Apr. 2019.

Grimes, M., and Andrew Feenberg. "Rationalizing Play." *(Re)Inventing The Internet*, edited by Andrew Feenberg and Norm Friesen, SensePublishers, 2012, pp. 21–41. *DOI.org (Crossref)*, doi:10.1007/978-94-6091-734-9_2.

Halberstam, Judith. *In a Queer Time and Place: Transgender Bodies, Subcultural Lives*. New York University Press, 2005.

Hamari, Juho, and Max Sjöblom. “What Is ESports and Why Do People Watch It?” *Internet Research*, vol. 27, no. 2, Emerald Publishing Limited, 2017, pp. 211–232. *uci.primo.exlibrisgroup.com*, doi:10.1108/IntR-04-2016-0085.

Hanson, Christopher. *Game Time - Understanding Temporality in Video Games*. Indiana University Press, 2018.

Hassan, Robert, and Ronald E. Purser. *24/7: Time and Temporality in the Network Society*. Stanford Business Books, 2007.

“Hax Releases Statement on Medical Status.” *ESPN.Com*, 8 Sept. 2016, http://www.espn.com/esports/story/_/id/17497133.

Heeew. *Ranked Random*. *YouTube*, https://www.youtube.com/watch?v=N51Hex-bE4w. Accessed 17 Apr. 2019.

Hemphill, Dennis. “Cybersport.” *Journal of the Philosophy of Sport*, vol. 32, no. 2, 2005, pp. 195–207. *uci.primo.exlibrisgroup.com*, doi:10.1080/00948705.2005.9714682.

Hern, Alex. “Twitch Plays Pokémon: Live Gaming’s Latest Big Hit.” *The Guardian*, 24 Feb. 2014. *www.theguardian.com*, https://www.theguardian.com/technology/2014/feb/24/twitch-plays-pokemon.

Herz, J. C. *Joystick Nation: How Videogames Ate Our Quarters, Won Our Hearts, and Rewired Our Minds*. 1st ed., Little, Brown, and Co, 1997.

Huizinga, Johan. *Homo Ludens; a Study of the Play-Element in Culture.* Beacon Press, 1955.

Huntemann, Nina. “Women in Video Games: The Case of Hardware Production and Promotion.” *Gaming Globally: Production, Play, and Place*, edited by Ben Aslinger and Nina Huntemann, 1st ed., Palgrave Macmillan, 2013.

icymate. *Twitch Plays Pokemon - Zapdos Captured under Anarchy (AA-j). YouTube*, https://www.youtube.com/watch?v=ZI03x4NIB9E. Accessed 17 Apr. 2019.

Jagoda, Patrick. *Network Aesthetics*. The University of Chicago Press, 2016.

Jakobsson, Mikael, and Baba Akira. *Playing with the Rules: Social and Cultural Aspects of Game Rules in a Console Game Club*. 2007.

Jenkins, Henry. *Confronting the Challenges of Participatory Culture: Media Education for the 21st Century*. MIT Press, 2009.

---. *Convergence Culture Where Old and New Media Collide*. NYU Press, 2006.

Jenny, Seth E., et al. "Virtual(Ly) Athletes: Where ESports Fit Within the Definition of 'Sport.'" *Quest*, vol. 69, no. 1, Routledge, 2017, pp. 1–18. *uci.primo.exlibrisgroup.com*, doi:10.1080/00336297.2016.1144517.

Jin, Dal Yong. *Korea's Online Gaming Empire*. MIT Press, 2010.

Jonasson, Kalle, and Jesper Thiborg. "Electronic Sport and Its Impact on Future Sport." *Sport in Society*, vol. 13, no. 2, 2010, pp. 287–299. *uci.primo.exlibrisgroup.com*, doi:10.1080/17430430903522996.

Julian Kücklich. "Precarious Playbour: Modders and the Digital Games Industry." *Fibreculture Journal*, no. 5, 2005. *uci.primo.exlibrisgroup.com*, https://doaj.org/article/8c55373d52334369b1708c1f0ac07fee.

Juul, Jesper. *A Casual Revolution: Reinventing Video Games and Their Players*. MIT Press, 2010.

---. *The Art of Failure: An Essay on the Pain of Playing Video Games*. MIT Press, 2013.

Kaplan, E. Ann. *Regarding Television: Critical Approaches--an Anthology*. University Publications of America, 1983.

Kaun, Anne. "'Our Time to Act Has Come': Desynchronization, Social Media Time and Protest Movements." *Media, Culture & Society*, vol. 39, no. 4, SAGE Publications Ltd, May 2017, pp. 469–86. *SAGE Journals*, doi:10.1177/0163443716646178.

Kline, Stephen. *Digital Play: The Interaction of Technology, Culture, and Marketing*. McGill-Queen's University Press, 2003.

Kocurek, Carly A. *Coin-Operated Americans: Rebooting Boyhood at the Video Game Arcade*. University of Minnesota Press, 2015.

---. *Coin-Operated Americans: Rebooting Boyhood at the Video Game Arcade*. University of Minnesota Press, 2015.

Krapp, Peter. *Gaming the Glitch: Room for Error*. University of Minnesota Press, 2011.

---. *Noise Channels: Glitch and Error in Digital Culture*. University of Minnesota Press, 2011.

Le Goff, Jacques. *Time, work & culture in the Middle Ages*. University of Chicago Press, 1980.

LeMieux, Patrick. "From NES-4021 to MoSMB3.Wmv: Speedrunning the Serial Interface." *Eludamos. Journal for Computer Game Culture*, vol. 8, no. 1, Dec. 2014, pp. 7–31.

Life Is Strange - Leaderboard - Speedrun.Com. https://www.speedrun.com/Life_Is_Strange. Accessed 16 Apr. 2019.

Lim, Bliss Cua. *Translating Time: Cinema, the Fantastic, and Temporal Critique*. Duke University Press, 2009.

Lo, Claudia. "Everything Is Wiped Away: Queer Temporality in Queers in Love at the End of the World." *Camera Obscura: Feminism, Culture, and Media Studies*, vol. 32, no. 2 (95), Sept. 2017, pp. 185–92. *read.dukeupress.edu*, doi:10.1215/02705346-3925194.

Manovich, Lev. *The Language of New Media*. 1st MIT Press pbk. ed., MIT Press, 2002.

Marquez, Joseph "Mang0." *Personal Interview*. Nov. 2017.

Matsuda, Goh, and Kazuo Hiraki. “Sustained Decrease in Oxygenated Hemoglobin during Video Games in the Dorsal Prefrontal Cortex: A NIRS Study of Children.” *Neuroimage*, vol. 29, no. 3, 2006, pp. 706–711. *uci.primo.exlibrisgroup.com*, doi:10.1016/j.neuroimage.2005.08.019.

McGonigal, Jane. *Reality Is Broken: Why Games Make Us Better and How They Can Change the World*. Penguin Press, 2011.

McLuhan, Marshall. *Understanding Media; the Extensions of Man*. [1st ed.], McGraw-Hill, 1964.

Montfort, Nick, and Ian Bogost. *Racing the Beam: The Atari Video Computer System*. MIT Press, 2009.

motbob. *Scar and Toph Commentary Highlights at Big House 3*. *YouTube*, https://www.youtube.com/watch?v=MBctSbV3rRE&t=73s. Accessed 16 Apr. 2019.

#MPGR2018: 100-91. https://www.redbull.com/us-en/mpgr-2018-100-91. Accessed 8 May 2019.

Mulvey, Laura. *Death 24x a Second: Stillness and the Moving Image*. Reaktion Books, Limited, 2011.

Murray, Janet H., and Janet H. Murray. *Hamlet on the Holodeck*. Free Press, 2016.

Murray, Soraya. *On Video Games: The Visual Politics of Race, Gender and Space*. IBTauris & Co. Ltd., 2018.

My Super Hardcore Very In-Depth Video Game Site. 18 Mar. 2007, http://web.archive.org/web/20070318161704/http:/hometown.aol.com/oovideogamegodoo/myhomepage/profile.html.

Nakamura, Lisa. “Racism, Sexism, and Gaming’s Cruel Optimism.” *Gaming Representation*, https://uci.primo.exlibrisgroup.com/discovery/fulldisplay?docid=scopus2-s2.0-85038836381&context=PC&vid=01CDL_IRV_INST:UCI&lang=en&search_scope=MyInst_and_CI&adaptor=Primo%20Central&tab=Everything&query=any,contains,nakamura%20gaming%27s%20cruel%20optimism&sortby=rank&offset=0. Accessed 19 Feb. 2020.

NASEF. “Code of Conduct.” *NASEF Official Site*, Jan. 2019, https://www.esportsfed.org/league/code-of-conduct/.

Newman, James. *Playing with Videogames*. Routledge, 2008.

“Nintendo’s President Explains Its Reluctance To Fund Smash Bros. Tournament Prizes.” *Kotaku*. *kotaku.com*, https://kotaku.com/nintendos-president-explains-its-reluctance-to-fund-sma-1840886267. Accessed 16 May 2020.

Nitsche, Michael. *Mapping Time in Video Games - University of California Irvine*. 2007, pp. 145–51, https://uci.primo.exlibrisgroup.com/discovery/fulldisplay?docid=scopus2-s2.0-78650018143&context=PC&vid=01CDL_IRV_INST:UCI&lang=en&search_scope=MyInst_and_CI&adaptor=Primo%20Central&tab=Everything&query=any,contains,nitsche%202007%20game%20time&sortby=rank&offset=0.

Parr, Ben, et al. *Nintendo Super Smash Bros. Melee: An “Untouchable” Agent*. 20171208. *uci.primo.exlibrisgroup.com*, http://arxiv.org/abs/1712.03280.

Patrick Porter. *The Global Village Myth: Distance, War, and the Limits of Power*. Georgetown University Press, 27.

Pelurson, Gaspard. “Flânerie in the Dark Woods: Shattering Innocence and Queering Time in The Path.” *Convergence*, Apr. 2018, p. 1354856518772421. *SAGE Journals*, doi:10.1177/1354856518772421.

Phillips, Amanda. “Welcome to My Fantasy Zone: Bayonetta and Queer Femme Disturbance.” *Queer Game Studies*, edited by Bonnie Ruberg and Adrienne Shaw, University of Minnesota Press, 2017.

Prodger, Phillip. *Time Stands Still: Muybridge and the Instantaneous Photography Movement*. Oxford University Press, 2003.

“Psyonix AMA - Questions and Answers Here!” *Reddit*, https://www.reddit.com/r/RocketLeague/comments/3rfeln/psyonix_ama_questions_and_answers_here/. Accessed 17 Apr. 2019.

QGCon. “Inclusivity.” *QGCon.Com*, https://qgcon.com/inclusivity/. Accessed 12 June 2019.

Rea, Stephen C. “Calibrating Play: Sociotemporality in South Korean Digital Gaming Culture.” *American Anthropologist*, vol. 120, no. 3, 2018, pp. 500–11. *Wiley Online Library*, doi:10.1111/aman.13020.

Ready Player One. *www.imdb.com*, http://www.imdb.com/title/tt1677720/. Accessed 17 Apr. 2019.

Reitman, Jason G., et al. “Esports Research: A Literature Review.” *Games and Culture*, Apr. 2019, p. 1555412019840892. *SAGE Journals*, doi:10.1177/1555412019840892.

Reitman, Jason Ginsberg. “Distributed Cognition and Temporal Knowledge in League of Legends.” *Int. J. Gaming Comput. Mediat. Simul.*, vol. 10, no. 1, Jan. 2018, pp. 23–41. *ACM Digital Library*, doi:10.4018/IJGCMS.2018010102.

Rice, Carolyn. “Twitch Plays Pokemon Completes Game.” *BBC News*, 3 Mar. 2014. *www.bbc.com*, https://www.bbc.com/news/technology-26417482.

Ruberg, Bonnie. “No Fun: The Queer Potential of Video Games That Annoy, Anger, Disappoint, Sadden, and Hurt.” *QED: A Journal in GLBTQ Worldmaking*, vol. 2, no. 2, July 2015, pp. 108–24.

---. “Permalife: Video Games and the Queerness of Living.” *Journal of Gaming & Virtual Worlds*, vol. 9, no. 2, June 2017, pp. 159–73, doi: info:doi/10.1386/jgvw.9.2.159_1.

---. “Playing to Lose: The Queer Art of Failing at Video Games.” *Gaming Representation: Race, Gender, and Sexuality in Video Games*, edited by Jennifer Malkowski and TreaAndrea M. Russworm, Indiana University Press, 2017, pp. 197–211.

Ruberg, Bonnie, and Adrienne Shaw. *Queer Game Studies*. University of Minnesota Press, 2017.

SAK Gaming. *Runback 2018 Pools - Chardlos (Fox) vs Captain Faceroll (Sheik). YouTube*, https://www.youtube.com/watch?v=ICq7jFHRBxg. Accessed 17 Apr. 2019.

Salen Tekinbaş, Katie, and Eric Zimmerman. *Rules of Play: Game Design Fundamentals*. MIT Press, 2004.

Salter, Anastasia. *What Is Your Quest?: From Adventure Games to Interactive Books*. Univ. of Iowa Press, 2014.

Salvato, Dan. *Frame Perfect (?) Dissertation*. 29 Apr. 2019.

Schall, Jan, and Nelson-Atkins Museum of Art. *Tempus Fugit, Time Flies*. Nelson-Atkins Museum of Art, 2000.

Schmid, David. “Data - Kadano’s Perfect Marth Class -- Advanced Frame Data Application.” *Smashboards*, https://smashboards.com/threads/kadanos-perfect-marth-class-advanced-frame-data-application.337035/. Accessed 29 July 2019.

Schüll, Natasha Dow. “Data for Life: Wearable Technology and the Design of Self-Care.” *BioSocieties*, vol. 11, no. 3, Sept. 2016, pp. 317–33. *DOI.org (Crossref)*, doi:10.1057/biosoc.2015.47.

Sicart, Miguel. “Against Procedurality.” *Game Studies*, vol. 11, no. 3, Dec. 2011. *Game Studies*, http://gamestudies.org/1103/articles/sicart_ap.

---. *Play Matters*. The MIT Press, 2014.

Skrai [Aranfara]. *All Five Gods Interviews Edit [Re-Upload]*. *YouTube*, https://www.youtube.com/watch?v=Ltq_YoALbbs. Accessed 17 Apr. 2019.

Smash Studios. *WTFox: Mango & Leffen vs Mew2king & Armada (GFs)*. *YouTube*, https://www.youtube.com/watch?v=WVMKVSOwcus. Accessed 17 Apr. 2019.

Spigel, Lynn. *Make Room for TV: Television and the Family Ideal in Postwar America*. University of Chicago Press, 1992.

Squire, Kurt D. “Educating the Fighter: Buttonmashing, Seeing, Being.” *On the Horizon*, edited by Drew Davidson, vol. 13, no. 2, June 2005, pp. 75–88. *DOI.org (Crossref)*, doi:10.1108/10748120510608106.

SSBM Tutorials. *Are You a Fox Player? - Super Smash Bros Melee*. *YouTube*, https://www.youtube.com/watch?v=7GZ9rE9F7ZA. Accessed 16 Apr. 2019.

---. *Optimal Rest Punishes - Super Smash Bros. Melee*. *YouTube*, https://www.youtube.com/watch?v=9l3vKBfh_QA. Accessed 17 Apr. 2019.

Steinkuehler, Constance. “Esports Research: Critical, Empirical, and Historical Studies of Competitive Videogame Play.” *Games and Culture*, Mar. 2019, p. 1555412019836855. *SAGE Journals*, doi:10.1177/1555412019836855.

Stiegler, Bernard. *Technics and Time*. Stanford University Press, 1998.

StrikerTC1. *Shenmue - YOU ARCADE*. *YouTube*, https://www.youtube.com/watch?v=Ltq_YoALbbs. Accessed 17 Apr. 2019.

Sudnow, David. *Pilgrim in the Microworld*. Warner Books, 1983.

Suits, Bernard Herbert. *The Grasshopper: Games, Life, and Utopia*. University of Toronto Press, 1978.

Tafo, C. L. G. "We Both Agreed to Have @C9Mang0 Go Falcon and Have Fun for This Weekend. Just a Heads up for Everyone." *@tafokints*, 19 Mar. 2017, https://twitter.com/tafokints/status/843534764623638528?lang=en.

Tanenbaum, Tess, and Jim Bizzocchi. *Rock Band: A Case Study in the Design of Embodied Interface Experience*. ACM, 2009, pp. 127–134. *uci.primo.exlibrisgroup.com*, doi:10.1145/1581073.1581093.

TASVideos Submissions: #4371: TASeditor's NES Zelda II: The Adventure of Link "Warp Glitch" in 05:35.93. http://tasvideos.org/4371S.html. Accessed 17 Apr. 2019.

Taylor, T. L. *Play between Worlds: Exploring Online Game Culture*. MIT Press, 2006.

---. *Raising the Stakes: E-Sports and the Professionalization of Computer Gaming*. MIT Press, 2012.

---. *Watch Me Play: Twitch and the Rise of Game Live Streaming*. Princeton University Press, 2019.

Terranova, Tiziana. *Network Culture: Politics for the Information Age*. Pluto Press, 2004.

Thompson, E. P. "Time, Work-Discipline, and Industrial Capitalism." *Past and Present*, vol. 38, no. 1, 1967, pp. 56–97. *DOI.org (Crossref)*, doi:10.1093/past/38.1.56.

"Tier List." *SmashWiki*, https://www.ssbwiki.com/Tier_list. Accessed 29 July 2019.

Turkle, Sherry. *Alone Together: Why We Expect More from Technology and Less from Each Other*. Basic Books, 2011.

Twain, Mark. *The Adventures of Tom Sawyer*. Broadview Press, 2006.

"UCI CARE | Green Dot Bystander Intervention." *Care.Uci.Edu*, https://care.uci.edu/greendot/#overview. Accessed 12 June 2019.

VGBootCamp. *Apex 2015 - PewPewU (Marth) Vs. Hungrybox (Jigglypuff) - Winners Round 2 - SSBM*. *YouTube*, https://www.youtube.com/watch?v=tDxvY_MVctI. Accessed 17 Apr. 2019.

---. *GENESIS 5 SSBM - [A]Rmada (Fox) VS TSM RB | Leffen (Fox) - Smash Melee LSF*. 2018. *YouTube*, https://www.youtube.com/watch?v=tt1xGQ7E7OQ.

Wagner, Michael G. *On the Scientific Relevance of ESports*. 2006.

"'Wait Wait' For June 17, 2017: With Not My Job Guest Andrew Farah." *NPR.Org*, https://www.npr.org/programs/wait-wait-dont-tell-me/533244496/wait-wait-for-june-17-2017-with-not-my-job-guest-andrew-farah. Accessed 17 Apr. 2019.

Ward, Paul. "Videogames as Remediated Animation." *Screenplay: Cinema/Videogames/Interfaces*, edited by Geoff King and Tanya Krzywinska, Wallflower, 2002.

Wardrip-Fruin, Noah, and Pat Harrigan, editors. *First Person: New Media as Story, Performance, and Game*. New Ed edition, The MIT Press, 2006.

Wark, McKenzie. *Gamer Theory*. Harvard University Press, 2007.

---. *Telesthesia: Communication, Culture and Class*. 1 edition, Polity, 2012.

Wei, Huaxin, et al. “Time and Space in Digital Game Storytelling.” *International Journal of Computer Games Technology*, vol. 2010, no. 2010, 2010, p. 23. *uci.primo.exlibrisgroup.com*, doi:10.1155/2010/897217.

Weltevrede, Esther, et al. “The Politics of Real-Time: A Device Perspective on Social Media Platforms and Search Engines:” *Theory, Culture & Society*, SAGE Publications UK: London, England, June 2014. Sage UK: London, England, *journals.sagepub.com*, doi:10.1177/0263276414537318.

West, Mick. “Programming Responsiveness.” *Gamasutra*, 9 July 2008. *www.gamasutra.com*, https://www.gamasutra.com/view/feature/130359/programming_responsiveness.php.

Williams, Raymond. *Television; Technology and Cultural Form.* Fontana, 1974.

Winkie, Luke. “Retired At 20: A Pro Gamer’s Life After ESports.” *Kotaku*, https://kotaku.com/retired-at-20-a-pro-gamer-s-life-after-esports-1746907605. Accessed 4 May 2019.

Witkowski, Emma. “On the Digital Playing Field: How We ‘Do Sport’ With Networked Computer Games.” *Games and Culture*, vol. 7, no. 5, 2012, pp. 349–374. *uci.primo.exlibrisgroup.com*, doi:10.1177/1555412012454222.

Wittmann, Marc. *Felt Time: The Psychology of How We Perceive Time*. Translated by Erik Butler, MIT Press, 2016.

Wohn, Donghee Yvette, and Guo Freeman. “Live Streaming, Playing, and Money Spending Behaviors in ESports.” *Games and Culture*, vol. 15, no. 1, SAGE Publications, 2020, pp. 73–88. *uci.primo.exlibrisgroup.com*, doi:10.1177/1555412019859184.

Wolf, Mark J. P. *The Medium of the Video Game*. University of Texas Press, 2001.

Wolf, Mark J. P., and Bernard Perron. *The Video Game Theory Reader*. Routledge, 2003.

Zagal, José P., and Michael Mateas. “Temporal Frames: A Unifying Framework for the Analysis of Game Temporality.” *3rd Digital Games Research Association: “Situated Play,”* 2007, https://uci.primo.exlibrisgroup.com/discovery/fulldisplay?docid=scopus2-s2.0-76749162804&context=PC&vid=01CDL_IRV_INST:UCI&lang=en&search_scope=MyInst_and_CI&adaptor=Primo%20Central&tab=Everything&query=any,contains,zagal%20mateas%20temporal%20frames&sortby=rank&offset=0.

---. “Time in Video Games: A Survey and Analysis.” *Simulation & Gaming*, vol. 41, no. 6, 2010, pp. 844–868. *uci.primo.exlibrisgroup.com*, doi:10.1177/1046878110375594.

Zimmerman, Jason. *My Super Hardcore Very In-Depth Video Game Site*. 18 Mar. 2007, http://web.archive.org/web/20070318161704/http://hometown.aol.com/oovideogamegodoo/myhomepage/profile.html.

Ludography

Beyond: Two Souls
BioShock: Infinite
Braid
Burnout Revenge
Call of Duty
Counter-Strike: Global Offensive
DotA 2
Dungeons and Dragons
EarthBound
F-Zero
Fire Emblem
Fortnite
God of War
Hang-On
Hearthstone
Indigo Prophecy
League of Legends
The Legend of Zelda II
The Legend of Zelda: Ocarina of Time
Life is Strange
Magic: The Gathering
Magic: The Gathering Online
Mario Kart 8
Mega Man II
Mega Man V
Mega Man X
Overwatch
Paper Mario
The Path
Pokémon Red
Pokémon X and Y
Prince of Persia: Sands of Time
Queers in Love at the End of the World
Ratchet & Clank Future: A Crack in Time
Rock Band
Rocket League
Shenmue
Shenmue II
The Sims
Space Harrier
StarCraft II
Super Mario Bros. 3
Super Metroid
Super Smash Bros.

Super Smash Bros. Brawl
Super Smash Bros. for 3DS
Super Smash Bros. for Wii U
Super Smash Bros. Melee
Super Smash Bros. Ultimate
Teenage Mutant Ninja Turtles: Turtles in Time
Undertale
The Wolf Among Us
World of Warcraft