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A social network analysis of online gamers' friendship networks: Structural attributes of Steam friendships, and comparison of offline-online social ties of MMO gamers

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A social network analysis of online gamers' friendship networks: Structural attributes of Steam friendships, and comparison of offline-online social ties of MMO gamers

by

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ABSTRACT

This study traces the boundaries of online-based social networks and its possible extensions and intersections with offline social networks. It focuses on the Massive Multiplayer Online gaming community. Most online gaming research has only addressed one side of the equation, i.e., the online aspect of social interaction, omitting the offline context. The primary objective is to look at both offline and online social contexts of gamers. The project was a three-prong approach.

Friendship data using the Steam API was collected in order to determine which factors, according to the available data points, affect the formation of ties within the network. Biased net models were used to ascertain the probability of ties targeting similar or dissimilar others. In general, there was a strong probability of choosing similar others over dissimilar others. However, there was a group of gamers that owned over a thousand games that were more likely to have a higher number of friends than all other groups. Thus, aside from a general tendency to connect similar others, there was an evident trend towards connecting with those individuals with large quantities of owned games.

The second and third prong relied on conducting an online questionnaire using Qualtrics and subsequent semi-structured interviews with some of the respondents. The analysis suggests that overall offline ties are slightly more important than online. Still, this does not imply that online ties are and cannot be as meaningful as their offline counterpart given the right

circumstances. The length of their online relationships plays a significant role in how participants qualify their ties. Most participants that had not met face-to-face were willing to meet their online ties. They also reported having shared personal and everyday life matters with their online social network at a lower rate of their offline network. Time spent with online relationships stemming from online gaming and a cooperative environment was more likely to be considered higher quality time.

According to this study's sample, in general terms, there does not seem to be a strict difference between what they consider a meaningful relationship when it comes to online or offline social ties. There were participants on both sides of the spectrum. One side considered their online contacts more meaningful due to their ability to look for and find others with similar interests with more ease, while the other side made a case for their offline ties.

An aspect that played a role in the deciding factor was the affordances that each medium provided. Most of the participants did agree that meeting others online was more accessible and more conducive to developing a meaningful relationship. Offline ties were slightly more likely to be considered more significant than their online counterparts. The modality by which one interacts with others is not as important as the content of the interaction. Offline interaction does present a more straightforward approach to forming ties, due in particular to the exposure factor (i.e., face-to-face interactions); however, as telecommunication technologies become more advanced and ubiquitous, the smaller the difference between online and offline. Interactions in MMOs shows a marked difference between other online social environments (e.g., Facebook and Twitter), in the sense that exchanges in MMOs can be continuous and allow for faster development of rapport in a shared joyful moment of gameplay. Even when the gameplay is

immersed in violence, the main point is that gamers are actively participating in a shared interest, which allows them to develop interest-based relationships.

CHAPTER 1 INTRODUCTION

As the recent boom in research regarding this topic suggests: “it is apparent that gaming forms an important part of (at least some) peoples’ everyday lives and identities, and is important and worthy of academic consideration”(Crawford, Gosling, & Light, 2011, p. 6). The literature reviewed here focuses on several topics that I find essential in the study of the culture of Massive Multiplayer Online Games (MMOs). Moreover, several gaps in the sociological coverage where there has not been enough research done have been identified.

One of these gaps is the convergence and divergence between the offline/online. The MMO community is of particular importance when considering that some players go beyond the game-scape when they partake in activities extraneous to the game itself (e.g., communicating with fellow players outside the game's interface; having a blog or forum; and meeting physically with other players). This group of gamers, those that play collaborative MMOs, is of interest due to the high requirement of social interaction evoked by these virtual spaces. That is, online gaming usually requires that players seek out help, get organized, and work together on a common goal or objective. Also, these interactions occur in real-time and fast-paced scenarios, quite the opposite of other online interactions most of us take part in (e.g., e-mails, social media), which in most cases allow for a more reflective reaction. In online gaming, each particular situation can alter the tone (e.g., work environment – working together to achieve a common goal; socializing – hanging out with friends/acquaintances) which might be closer to everyday face-to-face social interactions than having a conversation on Facebook, Twitter or other similar

Online Social Networks (OSNs), where interactions are paused, depict ephemeral snapshots, and most responses are well thought out. These types of real-time interactions prompt individuals to be more reactive in their identity management.

I assume the position, from a symbolic interactionist perspective, that our online and offline presences are not opposites or wholly independent of each other. They are part of a continuum where the individual negotiates his/her presence between the offline and the online. This perspective is even more salient when taking into account that these media users or gamers are actively consuming and participating in the production of the virtual world itself, a process Jenkins (2006, p. 3) calls *participatory culture*. My purpose then is to describe how this process takes place. As it will be argued throughout the chapters, it seems impossible to separate online life from offline life. They are intricately connected. Actions, mannerisms, attitudes and meaning creation can differ from one another-- sometimes slightly, and some other times more prominently, but they are still tied to a specific individual behind the *screen*. Which leads to Erving Goffman's (1959) notion of the situated identities/selves which are equipped on and off depending on the role to be played in a relational field (Gergen, 2009). Thus, it can be argued that donning an avatar online is similar to the way in which we switch between salient identities tied to specific scenarios.

Although some scholars have argued that the online self is an extension of the offline self and that there is no clear distinction (Boellstorff, 2008; Castronova, 2005; Crawford et al., 2011; Meredith, 2014; Taylor, 2006), there has not been in-depth studies regarding the implications of managing online/offline social networks and negotiating the gamers selves. To achieve this, I undertook a mixed-method and multi-field approach. With this type of approach, I was able to construct a more detailed understanding of the dynamics at play. This approach aimed to address

gaps in the current literature. Each data collection method served as a supplement to the next one and thus helped paint the bigger picture. The result was an in-depth look at the interactions and presentations of the self within and around these overlapping social networks.

The main goal of this chapter is to introduce and inform the reader regarding the general theoretical and conceptual background that guides the research that follows. In particular, this chapter will provide the reader with my positionality as a social researcher and the assumptions that stem from those theoretical tenets. Since this whole project deals with the understanding of relationships tied to online gaming and comparing both offline/online social networks of the participants, I deem it necessary to discuss the underlying self-concept and self-presentation conceptualizations that are ingrained throughout this work.

THEORETICAL BACKGROUND & ANALYTICAL CONCEPTS

IDENTITY THEORY

Identity is a crucial concept for sociologists and other social scientists. Conceptualizing identity is essential to the understanding and interpretation of social action and social order. However, as with many other sociological or psychological concepts, its conceptualization is complex and varied throughout the literature. In the simplest of terms, identity can be summarized to groups of shared meanings that, in one way or another, outline social actors in particular contexts and the roles therein (Stets & Serpe, 2014). Thus, identity is relational (Gergen, 2009) in the sense that we manage, wittingly or unwittingly, the roles we assume and how we reflexively project ourselves to others (Giddens, 1991), while at the same time how others interpret those self-presentations (Goffman, 1959). Another aspect that stems from the aforementioned core definition of identity is that individuals as social beings are bound to assume many identities of different kinds (Burke & Stets, 2009; Stryker, 1968, 2008), which are

managed and negotiated through interaction (Stets & Serpe, 2014), and are organized in mental scaffolds or cognitive schemas (Markus, 1977).

Throughout this work, I will be focusing on implementing the Identity Theory framework, as a baseline, first proposed by Sheldon Stryker ([1980] 2002), which is based on his structural symbolic interactionism. I will also be discussing other scholars (e.g., Erving Goffman, Anthony Giddens, and Kenneth Gergen) that are not officially aligned with or usually cited in Identity Theory literature. However, they are essential to the understanding of identity processes in the context of this work.

The basic tenet of Stryker's structural symbolic interactionism and his development of identity theory is that society defines the self and the self, in turn, shapes social interactions (Stryker, 2008), without considering the ontological discussion of what comes first—society or the self. For structural interactionists, considering this ontological inquiry is a waste of time, because, at this point, it would be impossible to separate individuals from society. This "perspective gives causal priority to society" since social actors are born into and embedded in society and "cannot survive outside of pre-existing organized social relationships" (Stets & Serpe, 2014, p. 33). This is mainly based on large social structures (Stryker, Serpe, & Hunt, 2005), i.e., the standard categories we use to organize individuals in society (e.g., race/ethnicity, class, gender, and socioeconomic status).

There are two other tiers of social structures considered by this perspective. The second tier would be intermediate social structures. Here, we find neighborhoods, associations, and organizations. The last layer is proximate social structures, which encompasses our closest social interactions and relationships (e.g., family, friends, teammates). This structural branch of symbolic interactionism is still faithful to ideas proposed by George Herbert Mead (1934) and

Herbert Blumer (1969), in the sense that it focuses on the co-creation of meaning through interactions which shape the world around us, but it differs by shifting its primary focus towards social structures that influence individuals self-definitions (Stets & Serpe, 2014).

Identity Theory assumes that the self is multifaceted and that self is composed of several hierarchically organized identities (Owens, Robinson, & Smith-Lovin, 2010). In general, three types of identities form part of the self. First, we have *role identities,* which are the meanings actors assume according to the social structure (e.g., worker, mother, father, police officer, teacher). Second, there are *group identities* these are simply memberships or groups we identify with (e.g., religious denominations, unions, subcultures, organizations). Lastly, we have the reflective interpretations of the self or *person identities* (e.g., "I am a good person," "I am funny"). Ideally, these groups of identities are interchangeable depending on the context of interaction, which means that they step in to guide actions and manage coherent social interactions within the larger social structure.

However, as mentioned, there is a ranking system of identities, which answers to a salience structure. That is, as salience on a particular identity increases, the more likely that it will be "invoked in an interactional situation that allows some agency or choice" (Owens et al., 2010, p. 482). Hence, salience is intertwined with both how invested individuals are with any identity and to their memberships and affinities to specific sections of the larger social structure (e.g., personal and professional social networks).

For Identity Theory, *commitment* is a fundamental concept in the process of understanding identity salience in social interactions (Owens et al., 2010; Stets & Serpe, 2014; Stryker, 2008). *Commitment* is divided into two dimensions, interactional and affective. The former is quantifiable in the sense that similar interactions with the same individuals can be

counted (e.g., the number of times one goes to a club meeting and assumes the role of a member and interact with other club members). The latter represents the qualitative aspects of those interactions, i.e., it takes into consideration how the actor perceives her/himself and how others perceive her/him. A*ffective commitment* considers the emotional investment an actor has with the social relationships that are aligned with an identity or identities and how emotionally close those social ties are.

The discussed perspective will help understand the processes by which online gamers manage their *multifaceted self* (Owens et al., 2010) or *saturated self* (Gergen, 1991) within their online and offline social networks. The former concept refers to the notions outlined in Identity Theory, in which identities are organized hierarchically by salience, and the latter refers to the constant expansion of how we relate to others through different mediums, mainly due to the advancements in communication technologies. What has been outlined here is how Stryker's theory looks on paper, and it will be bound to change throughout. As mentioned before, other frameworks were considered during the pre-data collection, data collection, and post-data collection stages. However, before we get ahead, there needs to be a discussion regarding the technological and virtual context of the topic at hand.

DIGITAL AGE IN CONTEXT: FRAMING ONLINE GAMING

Today, more than ever, we are witnessing a highly accessible technological life. A life in which telecommunication technologies evolve each year exponentially (i.e., devices that help us keep in contact with the rest of the online world at the tap of a screen). These handy and accessible technological advances function as extensions of our body, thus carrying with them new ways of conceptualizing time-space, culture, and reality. Griswold (2013, pp. 146-147) argues that the Information and Communications Technologies (ICTs) intensify our abilities to

transcend time and space, in cases where interaction is instant and constant (i.e., symmetrical Internet access), by giving us the capacity to communicate and participate in social interactions with people around the globe. Thus, it is necessary to reimagine and reinterpret the effects of time-space within a sociocultural context scattered with global access devices. It has been argued that society, at least in the developed world, is deeply embedded in digital culture (Gere, 2008) and that its citizens, at least a big chunk of them, can be considered "digital natives." The digitalization of the world became, and still is, an influential factor of the 20th and 21st centuries technological globalization project.

In this digital age, we are continually checking the wireless devices that circumvent the physical laws of time-space and drown us with endless flows of personalized and pre-mediated information. We act accordingly to an individuated logic when both the devices and the information processed therein are representations of our personal tastes:

> In a postindustrial society, every citizen can construct her own custom lifestyle and 'select' her ideology from a large (but not infinite) number of choices. Rather than pushing the same objects/information to a mass audience, marketing now tries to target each individual separately. The logic of new media technology reflects this new social logic. Every visitor to a Web site automatically gets her own custom version of the site created on the fly from a database. The language of the text, the contents, the ads displayed- all these can be customized (Manovich, 2001, p. 42).

The virtual experience of the world is not as rich (in the sense that it is a disembodied occurrence, at least in a physical way), but it is more convenient and fast-paced. In this sense, the digital experience of life does not necessarily displace the actual experience of an event, but the digital (just as other types of media) offer us a glimpse into information that may not have been as easy to obtain if we were to employ analog methods. Undoubtedly, these ways of seeing/knowing the world are not as compelling as being physically in situ, but they do offer a glimpse into something that is not readily available to everyone. Through the virtual we can connect, interact, and construct relationships with others around the world.

These new interactions pave the way for the creation of social networks in virtual space, consequently, creating new fields where new forms of culture can develop. The digital-scape positions us in an eternal present, ruled by the immediate and ephemeral. The relationship we had with the unknown and "the other" is lost, everything becomes instantly reachable with the touch of a button. In other words, we are living in an *eternal present* as we experience the anxiety of being technologically linked to a fast-paced world of information (Rushkoff, 2014).

These transformations, at a micro and macro levels, in the way we communicate, trade, consume, play, and portray ourselves in the networked/virtualized world has in turn given us new spaces where cultures are being deployed, employed, and transformed at the speed of our Internet connection. Thus, the Internet becomes a field of social action and social order worthy of our attention. Not only do we consume, socialize, and work in virtual space, we also create and reproduce sociocultural notions through the virtual. The networked society (Castells, 1996) is part of our daily lives, and we, as social actors, have been virtualized.

In his most recent book, Douglas Rushkoff (2014) considers consequences that have come about by our focus on the *eternal present*. These consequences affect the way we perceive time and the social world around us. He suggests a collapse of the linear narrative, similar to the idea of the end of metanarratives by the early post-modern theorists (e.g., Lyotard, 2006), with the distinction that Rushkoff is targeting the micro-narratives of individuals and their immediate social world. The focus falls on what is happening right now (e.g., Facebook or Twitter status updates, live blogging trivial experiences). Hence, we wittingly or unwittingly disregard or become oblivious to other sources of information, because that information is not as accessible as reading ephemeral snippets of fresh news/updates from your notification bar. This is exacerbated by our desire to be in more than one place at a time. We might be out with friends at

a bar, but at the same time, we are taking pictures, uploading them to the cloud, and updating our status online. Through this constant switching back and forth between our smartphones, the Internet, and our immediate physical surroundings, we experience a disjointed or disordered way of perceiving the world, i.e., what Rushkoff calls *digiphrenia*.

This begs the question of what happens to face-to-face interactions? Especially when in social gatherings, we spend much time staring at our smartphones. At the same time, what does this mean for our online social ties? Do we interact more with our online contacts (which includes offline ties and ties that have been strictly experienced online) since it is less cumbersome and more immediate? Ultimately, what happens to relationships born out of cooperative gameplay in online games? Are they as or more meaningful than our disjointed social gatherings? Just as work teams, online gaming would suggest that gamers will be focused on interacting with their teammates and in completing whichever goal they were assigned.

OVERVIEW OF MMOs & RESEARCH

New spaces for social interactions online can be found in virtual communities, for example, in Massive Multiplayer Online Games (MMOs). MMOs are a widespread phenomenon, with hundreds maybe thousands of virtual worlds with active communities throughout the globe, which are inhabited by millions of people from different socio-cultural backgrounds.

These highly sophisticated games, although still limited by technology, try to emulate life in most of its facets. Gamers get the chance of virtually embodying a character or characters in these virtual worlds. They are in control of how their character/s develops in their world and how they relate to others. During the gameplay, gamers deal with most of the social interactions (e.g., interpersonal relationships, communities, currency and merchandise transactions, in-game

politics, ethical and moral decisions, and embodiment of identities) that we experience outside the virtual world.

Virtual worlds represent new transnational spaces that do not require geographical movement to engage or partake in the social exchanges happening daily across the globe. More so, when considering that smart mobile devices allow global online participation while on the move. These are "[p]laces where players undertake social activities similar or identical to those in a non-virtual space but do so with an awareness that they are in a realm that includes ludic codes of practice"(MacCallum-Stewart, 2011, p. 41). The vast active audience contains an equally broad set of orientations (i.e., lenses or perspectives through which we view the social world) that are tasked with the interpretation of symbolic actions embedded in these virtual worlds. These virtual spaces become a melting pot of cultural syncretism.

The bulk of the literature regarding online gaming can be crudely lumped into two categories: the first one relies on psychological approaches, and the second conceptualizes the "internet as a cultural context" (Hine, 2005, p. 7). Most of the psychological literature on video games focus on gaming addiction and other negative aspects. Lately, however, others have been focusing on socio-psychological approaches that seek to shed light on the effect of video games on motivation, social capital, and social support (e.g., Hau & Kim, 2011; Hsu & Lu, 2007; Snodgrass et al., 2012; Tseng, 2011; Yee, 2006). Hence, there is a niche and interest in researching the offline and online aspects of social interactions that stem from MMOs as a cohesive unit, not as independent aspects of social life. However, this has not flourished as it should, and there is a lack of research that focuses on both aspects of a gamer's life.

The virtual spaces in which MMOs are hosted serve as new places where cultural and social self-concepts are being negotiated through social interactions between embodied virtual

avatars. Studies in this area have focused on "knowledge acquisition, identity and performance, representation, and the relationship between media and audiences" (Shaw, 2010, p. 404).

In her article, Shaw (2010) examines how video game culture is defined and the implications of these significations by examining academic and popular press articles. Shaw argues that the way it has been defined has affected and limited the way we study video games. She suggests that to enrich this field, we must take a critical cultural study stance on video games. Shaw argues that we should not look at games only as cultures in and of themselves. Thus, we should also focus on understanding games as part of the culture, i.e., video games in culture. These platforms are being used not only for role-playing or just for fun, but they are also being used for educational purposes and training. Several scholars have looked at the effectiveness of virtual worlds as educational tools (e.g., Annetta, 2008; Yang, 2012).

Research on the educational aspect of video games has not only focused on the integration of gaming as part of the school system, researchers have also discussed the potential of these virtual worlds, such as *Second Life*, hold as arenas for the dissemination of public service announcements, for example, the communication of public health information (Boulos, Hetherington, & Wheeler, 2007). Another aspect that has been discussed is the validity of this type of serious gaming, which tries to serve a practical and professional purpose. Some scholars have argued for a more rigorous validation process of video games before including them as part of the curricula (Graafland, Schraagen, & Schijven, 2012).

WHY DO WE GAME?

When considering this socio-cultural significance of MMOs, we encounter in the literature three vital motivational aspects that entice individuals to partake in these virtual worlds. The categories, first posited by Burn and Carr (2006), are "ludic," "representation," and

"communal." Thus, there is an aspect of gaming as leisure time (ludic), although this might be the main reason for participating in most occasions, it is not the only important factor at play. The second motivator could be expressed regarding Cogburn and Silcox (2009) as an "extended self." We use the avatar as a tool for representation and acknowledgment in the virtual world, i.e., as an extension of our identities (Crawford et al., 2011). The third and last motivator is as simple as wanting to interact with others. This is epitomized by the creation of virtual communities that share certain aspects of virtual life (e.g., values, game objectives, social networks).

Still, the notion of ludic motivation and leisure time implies that gamers must embody some social and cultural capital. The concept of cultural capital could play a significant role in understanding the complex relations between the individual, the physical world, and the virtual world. Cultural capital influences how individuals are perceived in a particular socio-cultural context. Accumulated cultural capital could be regarded as a higher status marker online than offline, and vice versa. Not everyone has the same power of acquisition of and access to cultural capital. "[C]ultural capital is more easily acquired if the person has a disposition that is oriented to its acquisition" (North, Snyder, & Bulfin, 2008, p. 898).

Thus, gamers and would-be gamers must have, to some degree, technical knowledge of working with computers. Moreover, simultaneously, they must possess enough economic capital (i.e., they must own or have reliable access to the equipment and the Internet). Another important aspect worth considering regarding Bourdieu's (1984) types of capital, is if they are translatable or transferable from one realm to the other. Hence, its implication can vary between how one is perceived outside and inside the virtual realm. What aspects of our cultural capital are

useful or not in these fields of socio-cultural interaction? This leads us to discuss the other two key motivations, which are intertwined with the notion of cultural capital.

First, the representational motivation entails how we present and represent ourselves in the virtual realm, and thus our ability to shape our identities to our liking. Lastly, communal motivation brings about how we relate to others and form communities (e.g., guilds, factions, gaming sub-cultures). These motivational aspects serve as useful ways of portraying how individuals experience social and cultural life in and through MMOs.

There is also a need to tackle the experiential gap, as Steven Johnson (2005) suggests, between the avid video game player and the non-gamer who hears about games through secondhand accounts. Hence, there is a need to better understand the socio-cultural implications of the "gamer's side" (Johnson, 2005, p. 25), especially from the player who partakes in MMOs. Thus, if we are to study MMOs, we need to consider the offline and online lives of the social actors that play them; the way they perceive themselves and others perceive them inside and outside the virtual world.

THE ACTUAL AND THE VIRTUAL – OFFLINE AND ONLINE LIVES

The virtual world is conceived as part of the actual world, and it is as real as the actual (Deleuze, 2004). We need to consider the virtual for what it is- a socio-cultural creation that brings with it particular contextual baggage from the actual world. Thus, in this sense, it does represent an aspect of our reality as social actors. "[F]or the first time, humanity has not one but many worlds in which to live" (Castronova, 2005, p. 70). The actual world shapes and influences the virtual world, perhaps leading to new ways of conceptualizing cultures and meaning (Boellstorff, 2008, p. 25). As shown, scholars do not posit these concepts as total opposites; instead, they suggest that they are connected. The virtual represents new spaces where we can

socially interact with others. Each of these realms has a particular culture. Even though virtual worlds might draw from actual-world cultures, virtual worlds have their own distinct culture (Boellstorff, 2008, p. 18). “What happens in virtual worlds often is just as real, just as meaningful, to participants” (Taylor, 2006, p. 19). Sometimes, even virtual life permeates through actual life in the form of actual life meetings of virtual acquaintances (Taylor, 2006) or the use of actual currency in a virtual world (Castronova, 2005).

Thus the difference, as Boellstroff (2008, p. 21) suggests, is that the *actual* are “the places of human culture not realized by computer programs.” Hence, the virtual worlds are the places of human culture realized by software. This differentiation of conceptual spaces and the delineation of a border is what T.L. Taylor (2006) calls *boundary work*, which concerning virtual spaces entails the negotiation between both fields (virtual or actual), i.e., the power/capacity each has to transform the other. As Steinkuehler (2006) suggests, virtual worlds are not static communities; just as in the actual world, they are transformed by the interactions and practices acted out by their creators and inhabitants (e.g., game designers and players). One noteworthy aspect of these spaces is how they influence and transform notions of our embodied identities and how individuals relate to others in virtual worlds, especially when we are never far away from our “precious” technological accessories (e.g., smartphones, tablets, personal computers).

> We are about to enter an intensification of the mediation of our everyday lives. An intensification in which we learn how to flow seamlessly between the virtual and the actual, with our experiences in one being just as affecting as those in the other (Dovey & Kennedy, 2006, p. 2).

There has been much scholarly research done in the discipline of game studies. Although these studies are essential and influential in how we understand video games (e.g., Bogost, Consalvo, and Wark), they do not take into consideration other aspects of online gaming. Thus, social scientists such as Boellstroff suggest that social research can play a significant role “in charting emergent forms of cyberscociality” (Boellstorff, 2008, p. 24). There is literature that

would indicate that these online communities serve under a logic of escapism (Berger, 2002). Although this may be the case for some people, recent literature suggests that MMOs aid in the creation of new forms of social support and sociability rather than functioning as an instrument of escapism (Barak, Boniel-Nissim, & Suler, 2008; Boellstorff, 2008; Ducheneaut & Moore, 2004). Thus, in a sense, these virtual worlds work as an extension of our social life, and in some cases, as Castronova (2005) suggests, can become part of our work life. Scholars have suggested that gamers are loyal to their social networks, both virtual and actual since they join and migrate (from one virtual world to another) with their friends (Ducheneaut, Yee, Nickell, & Moore, 2007; MacCallum-Stewart, 2011; Taylor, 2006).

Virtual worlds are becoming more extensive and elaborate each year. They offer new socio-cultural and socio-spatial realms in which millions of people around the world can interact through a medium that compresses actual time and space. People from distant parts of the world and different cultural and ethnic backgrounds can converge together inside these worlds. Thus, as Boellstroff (2008, p. 54) would suggest: "it is clear that concepts and practices from the actual world are being brought into them." That is, "players may bring to the game their own social norms from more familiar groups such as family, home and work" (MacCallum-Stewart, 2011, p. 41), and by doing so, they solidify the virtual realm as an interactive socio-cultural field worthy of our attention. While at the same time, these virtual spaces may also present an opportunity of escaping certain aspects of our offline lives, which leads to the potential of exploring aspects of our identities and/or identities that are not salient in face-to-face interactions.

Examples of these transferences can be observed when players partake of real money transactions (e.g., selling player-created content), when actual life stereotypes are employed (e.g., racial, ethnic, and/or gender biases), and when common social practices are acted or

reciprocated upon (e.g., the nature of obligation and gift-giving, courtship, and making friends). There is more to these virtual worlds than meets the eye. They are new transnational spaces that do not require geographical movement to engage or partake in the social exchanges happening daily across the globe.

VIRTUAL COMMUNITIES

When we talk about communities in the virtual sense, we are talking about relational communities (Griswold, 2013). Being identified with a relational community does not rely on an actual geographical boundary. We feel a sense of belonging no matter where in the world we are, i.e., a strong communal identity. In a broad sense, those of us who have access to and navigate the Internet are part of the community of cybernauts.

This notion of a relational community is not a new variable. The digitalized and globalized world has multiplied exponentially our ability to maintain relational connections around the globe. This is achieved by the process Miller (2011, p. 73) calls "technological convergence," which entails the digital transference of "all media and information." Miller argues that the rise of the internet and the digitalization of the world have brought changes in how we identify ourselves and how we interact with cultural information. It opens new doors, while at the same time it "blurs the distinction between producer and consumer, and locates the media viewer more as an active user/collaborator in a diverse, cross-media, multi-site media experience" (Miller, 2011, p. 94).

MMOs present themselves as one of those new fields where we can explore our sense of communal belonging. Just as with any other community, relational communities rely on symbols. Thus, the process of identification and identifying other is achieved through the reading and interpretation of these symbols in virtual spaces. This is even more apparent when individuals

have more control of the virtual worlds (e.g., Second Life communities in Bardzell & Odom, 2008). In virtual worlds, we cannot smell or touch. We depend on our senses of vision and hearing. This leads us towards the notion of visual culture as the primary focus of virtual communities. It is through visual culture that most of our virtual lived experiences are recorded and internalized.

Space, place, embodiment, and visual culture are essential aspects of our lived experiences in actual life just as much as in virtual life. This is not necessarily the case for everyone that participates in MMOs. Some people care about the ludic and leisure aspects of the games. Meanwhile, avid gamers create intricate and complex networks of social relations and support that span the boundaries between the virtual and the actual. At the same time, these individuals negotiate virtual/actual identities by translating between mediums, their notions of self-concept.

BIG DATA AND ONLINE GAMING

Data is more accessible when the servers that host the games and websites keep logs of all activities. Thus, if a researcher gains access to those log files, he/she can analyze big sets of data. Of interest in quantitative methods are the techniques used in social network analysis. As posited by Shi and Huang (2004), applying social network analysis and data mining to the study of MMOs can be beneficial to multiple parties. Among these are social scientists, who could "apply social network analysis to understand social structure of MMORPG virtual world[s]" and in doing so, enrich our knowledge of the social aspect of the Internet, more specifically, MMOs (Shi & Huang, 2004, p. 205). Shi and Huang through their article, discuss how using these methods can better inform social scientific knowledge and how can game designers/developers use the resulting analyses for creating MMOs that are more directed towards and aware of their

user's social interactions. That is, from a researcher's perspective MMOs are an effective way of studying collective behavior and socio-cultural dynamics at a massive scale (Bainbridge, 2007; Castronova, 2006; Szell & Thurner, 2010), especially when all user activity is saved in the server's log files.

These types of big data studies can help us better understand how social relations happen in these virtual worlds. For example, Ang and Zaphiris (2010) looked at how roles emerged in a World of Warcraft (WoW) guild by logging and taking field notes of guild members' interactions and behaviors. Using their collected data, they were able to identify "the structural characteristics of three social roles of a guild community in WoW" (Ang & Zaphiris, 2010, p. 609).

One of the most prominent social network dataset analysis of an MMO to date was done by (Szell & Thurner, 2010). They looked at activity logs of "300,000 players over a period of 3 years." They concluded that some players do live "a second economic life and are typically engaged in a multitude of social activities within the game" (Szell & Thurner, 2010, p. 328). Studies like these suggest that social dynamics in online gaming are remarkably robust and similar to real-world communities (Jiang, Zhou, & Tan, 2009; Johnson et al., 2009; Szell & Thurner, 2010), others have suggested that the way ad hoc groups form in-game is very similar to way we assemble into project teams in real life (Zhu, Huang, & Contractor, 2013).

The main idea here is that these studies have shown the similarity between how we act online and how we act offline. This makes the study of the virtual much more interesting and worthy of our attention, especially when we consider its scope and lack of physical barriers for social interaction.

CHAPTER OUTLINE

This dissertation is divided into three main data analysis chapters (two through four) and two generalized discussion chapters (one and five). The data chapters focus on three distinct cases, each represented by particular methods, in an attempt to produce a multi-field and multi-modal approach to the research inquiries at hand. Although the data chapters are interrelated, especially three and four, each one represents its own independent research project. The objective here is to present three approaches to understanding better the underlying topic of the project. This is what is known as a *Three Article Dissertation*, i.e., interconnected and at the same time standalone academic articles that each has their own respective inquiries, methodological approach, and, to some extent, their own theoretical framework, considering that all of the chapters stem from the discussion above.

In the second chapter, I used data scraped from Steam, online digital distribution, and social platform for gaming, to conduct a social network analysis of friendship ties. Using a randomly sampled subnetwork from Steam, this chapter discusses the general structural and topological characteristics that drive said network. In addition to structural analysis, I employ a statistical test of homophily in order to predict potential ties between users, which showed that homophily, across several variables (e.g., number of games owned, continental region, and overall playtime), was the leading factor for current and potential relationships. Biased net models were used to further discuss the distribution of ties among similar or dissimilar individuals. Distance inbreeding models were applied to several variables in order to derive target propensities between ranked groups (variables were grouped into quintiles). Although there was evidence of similar others forming ties, most individuals preferred forming ties with those in higher-ranked groups.

In the third chapter, I use data from an online questionnaire, designed by me, to compare the top three online and top three offline social ties of the respondents (n = 242). Through this collection tool, I gathered basic socio-demographics, MMO gaming, and social tie information from the participants. The findings suggest that overall offline ties are slightly more important than online. However, this does not entail that online relationships are not meaningful. For respondents, relationship length played a pivotal role when qualifying ties. The more active they were online, playing a game, or interacting outside the game with their ties, the more likely they were to consider those relationships meaningful. Thus, exposure was an important factor when considering the importance of their ties. Participants showed interest in meeting their online contacts, most respondents that had not yet met face-to-face, were willing to meet with their online counterparts.

In the fourth and last data chapter, I use interviews conducted with several participants from the questionnaire to discuss further how they manage their networks and how they present themselves within them. The semi-structured interviews focused on three main topics: 1) comparison between type of ties; 2) meaningfulness of those ties; and 3) comparison of their identity and self-concept management when interacting online or offline. Overall, most participants agreed that making friendships or finding others with similar interests is easier online. All participants claimed to be honest when it came to how they present themselves online, i.e., there is no difference between offline and online. However, several participants mentioned that they felt more comfortable being themselves online than offline. When it came to measuring relationship meaningfulness, the findings were somewhat mixed. For those who partook of mostly MMOs that are not primarily focused on competitiveness, claimed to have made more meaningful friendships with fellow gamers. Proximity and exposure (i.e., time spent

interacting) were the most common factors when it came to ranking the importance of a relationship.

The final and fifth chapter is my reflection of the three independent research projects presented in this dissertation. It includes a short discussion of the general and over-arching findings, limitations, and considerations for future research.

REFERENCES

Ang, C. S., & Zaphiris, P. (2010). Social roles of players in mmorpg guilds: A social network analytic perspective. *Inf. Commun. Soc. Information Communication and Society, 13*(4), 592-614.

Annetta, L. A. (2008). Video Games in Education: Why They Should Be Used and How They Are Being Used. *Theory Into Practice, 47*(3), 229-239.

Bainbridge, W. S. (2007). The Scientific Research Potential of Virtual Worlds. *Science, 317*(5837), 472-476. Retrieved from http://www.sciencemag.org/content/317/5837/472.abstract. doi:10.1126/science.1146930

Barak, A., Boniel-Nissim, M., & Suler, J. (2008). Fostering empowerment in online support groups. *Computers in Human Behavior, 24*(5), 1867-1883. Retrieved from http://www.sciencedirect.com/science/article/pii/S0747563208000198.

Bardzell, S., & Odom, W. (2008). The Experience of Embodied Space in Virtual Worlds: An Ethnography of a Second Life Community. *Space and Culture, 11*(3), 239-259.

Berger, A. A. (2002). *Video games: a popular culture phenomenon*. New Brunswick, N.J.: Transaction.

Blumer, H. (1969). Symbolic interactionism: perspective and method.

Boellstorff, T. (2008). *Coming of age in Second Life: an anthropologist explores the virtually human*. Princeton: Princeton University Press.

Boulos, M. N. K., Hetherington, L., & Wheeler, S. (2007). Second Life: an overview of the potential of 3-D virtual worlds in medical and health education. *Health information and libraries journal, 24*(4), 233-245.

Bourdieu, P. (1984). *Distinction: a social critique of the judgement of taste*. Cambridge, Mass.: Harvard University Press.

Burke, P. J., & Stets, J. E. (2009). *Identity theory*. Oxford; New York: Oxford University Press.

Burn, A., & Carr, D. (2006). Motivation and online gaming. In D. Carr, D. Buckingham, A. Burn, & G. Schott (Eds.), *Computer games: text, narrative, and play* (pp. 103-118). Cambridge; Malden, MA: Polity.

Castells, M. (1996). *The rise of the network society*. Malden, Mass.: Blackwell Publishers.

Castronova, E. (2005). *Synthetic worlds: the business and culture of online games*. Chicago: University of Chicago Press.

Castronova, E. (2006). On the Research Value of Large Games: Natural Experiments in Norrath and Camelot. *Games and Culture, 1*(2), 163-186. Retrieved from http://gac.sagepub.com/content/1/2/163.abstract. doi:10.1177/1555412006286686

Cogburn, J., & Silcox, M. (2009). *Philosophy through video games*. New York: Routledge.

Crawford, G., Gosling, V. K., & Light, B. (2011). The social and cultural significance of online gaming. In G. Crawford, V. K. Gosling, & B. Light (Eds.), *Online gaming in context: the social and cultural significance of online games* (pp. 3-22). London; New York: Routledge.

Deleuze, G. (2004). *Difference and repetition* (P. Patton, Trans.). London: Continuum.

Dovey, J., & Kennedy, H. W. (2006). *Game cultures: computer games as new media*. New York, NY: Open University Press.

Ducheneaut, N., & Moore, R. J. (2004). *The social side of gaming: a study of interaction patterns in a massively multiplayer online game*. Paper presented at the Proceedings of the 2004 ACM conference on Computer supported cooperative work, Chicago, Illinois, USA.

Ducheneaut, N., Yee, N., Nickell, E., & Moore, R. J. (2007). *The Life and Death of Online Gaming Communities: A Look at Guilds in World of Warcraft.* Paper presented at the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, San Jose, CA, USA.

Gere, C. (2008). *Digital culture* (2nd ed.). London: Reaktion Books.

Gergen, K. J. (1991). *The saturated self: dilemmas of identity in contemporary life*. [New York]: Basic Books.

Gergen, K. J. (2009). *Relational being beyond self and community*. Oxford; New York: Oxford University Press.

Giddens, A. (1991). *Modernity and self-identity: self and society in the late modern age*. Cambridge: Polity Press.

Goffman, E. (1959). *The presentation of self in everyday life*. Garden City, N.Y.: Doubleday.

Graafland, M., Schraagen, J. M., & Schijven, M. P. (2012). Systematic review of serious games for medical education and surgical skills training. *BJS British Journal of Surgery, 99*(10), 1322-1330.

Griswold, W. (2013). Culture and Connection. In *Cultures and societies in a changing world* (pp. 141-161). Thousand Oaks, Calif.: SAGE Publications.

Hau, Y. S., & Kim, Y.-G. (2011). Why would online gamers share their innovation-conducive knowledge in the online game user community? Integrating individual motivations and social capital perspectives. *Computers in Human Behavior Computers in Human Behavior, 27*(2), 956-970.

Hine, C. (2005). *Virtual methods: issues in social research on the Internet*. Oxford, UK; New York: Berg.

Hsu, C.-L., & Lu, H.-P. (2007). Consumer behavior in online game communities: A motivational factor perspective. *Computers in Human Behavior Computers in Human Behavior, 23*(3), 1642-1659.

Jenkins, H. (2006). *Convergence culture: where old and new media collide*. New York: New York University Press.

Jiang, Z. Q., Zhou, W. X., & Tan, Q. Z. (2009). Online-offline activities and game-playing behaviors of avatars in a massive multiplayer online role-playing game. *Europhys. Lett. Europhysics Letters, 88*(4).

Johnson, N. F., Zhao, Z., Xu, C., Hui, P. M., Ducheneaut, N., Yee, N., & Tita, G. (2009). Human group formation in online guilds and offline gangs driven by a common team dynamic. *Phys. Rev. E Stat. Nonlinear Soft Matter Phys. Physical Review E - Statistical, Nonlinear, and Soft Matter Physics, 79*(6).

Johnson, S. (2005). *Everything bad is good for you: how popular culture is making us smarter*. London: Allen Lane.

Lyotard, J.-F. (2006). *The postmodern condition: a report on knowledge*. Minneapolis, Minn: University of Minnesota Press.

MacCallum-Stewart, E. (2011). Conflict, thought communities and textual appropriation in MMORPGs. In G. Crawford, V. K. Gosling, & B. Light (Eds.), *Online gaming in context: the social and cultural significance of online games* (pp. 40-59). London; New York: Routledge.

Manovich, L. (2001). *The language of new media*. Cambridge, Mass.: MIT Press.

Markus, H. (1977). Self-schemata and processing information about the self. *Journal of Personality and Social Psychology Journal of Personality and Social Psychology, 35*(2), 63-78.

Mead, G. H. (1934). *Mind, self, and society*. Chicago: University of Chicago Press.

Meredith, A. (2014). *The presentation of self in Massively Multiplayer Online games.* (Doctoral), Nottingham Trent University, Nottingham. Retrieved from http://irep.ntu.ac.uk/id/eprint/240/

Miller, V. (2011). *Understanding digital culture*. London; Thousand Oaks, Calif.: SAGE Publications.

North, S., Snyder, I., & Bulfin, S. (2008). DIGITAL TASTES: Social class and young people's technology use. *Information, Communication & Society, 11*(7), 895-911. Retrieved from http://dx.doi.org/10.1080/13691180802109006.

Owens, T. J., Robinson, D. T., & Smith-Lovin, L. (2010). Three faces of identity. *Annual Review of Sociology, 36*, 477-499.

Rushkoff, D. (2014). *Present Shock: When Everything Happens Now*. New York: Current.

Shaw, A. (2010). What Is Video Game Culture? Cultural Studies and Game Studies. *Games and Culture, 5*(4), 403-424. Retrieved from http://gac.sagepub.com/content/5/4/403.abstract.

Shi, L., & Huang, W. (2004). Apply Social Network Analysis and Data Mining to Dynamic Task Synthesis for Persistent MMORPG Virtual World. *Lecture notes in computer science.*(3166), 204-215.

Snodgrass, J. G., Dengah, H. J. F., Lacy, M. G., Fagan, J., Most, D., Blank, M., . . . Wintersteen, B. (2012). Restorative Magical Adventure or Warcrack? Motivated MMO Play and the Pleasures and Perils of Online Experience. *Games and Culture, 7*(1), 3-28. Retrieved from http://gac.sagepub.com/content/7/1/3.abstract. doi:10.1177/1555412012440312

Steinkuehler, C. (2006). The mangle of play. *Games and Culture, 1*(3), 199-213.

Stets, J. E., & Serpe, R. T. (2014). Identity Theory. In J. DeLamater & A. Ward (Eds.), *Handbook of social psychology* (2nd ed., pp. 31-60). Dordrecht: Springer.

Stryker, S. (1968). Identity Salience and Role Performance: The Relevance of Symbolic Interaction Theory for Family Research. *Journal of Marriage and Family, 30*(4), 558-564.

Stryker, S. (2002). *Symbolic interactionism: a social structural version*. Caldwell, N.J: Blackburn Press.

Stryker, S. (2008). From Mead to a Structural Symbolic Interactionism and Beyond. *Annual Review of Sociology, 34*(1), 15-31. Retrieved from https://www.annualreviews.org/doi/abs/10.1146/annurev.soc.34.040507.134649. doi:10.1146/annurev.soc.34.040507.134649

Stryker, S., Serpe, R. T., & Hunt, M. O. (2005). Making Good on a Promise: The Impact of Larger Social Structures on Commitments. In S. R. Thye & E. J. Lawler (Eds.), *Social Identification in Groups* (pp. 93-123).

Szell, M., & Thurner, S. (2010). Measuring social dynamics in a massive multiplayer online game. *Social Networks Social Networks, 32*(4), 313-329.

Taylor, T. L. (2006). *Play between worlds: exploring online game culture*. Cambridge, Mass; London: MIT Press.

Tseng, F.-C. (2011). Segmenting online gamers by motivation. *Expert Systems With Applications, 38*(6), 7693-7697.

Yang, Y.-T. C. (2012). Building virtual cities, inspiring intelligent citizens: Digital games for developing students problem solving and learning motivation. *Computers & Education Computers & Education, 59*(2), 365-377.

Yee, N. (2006). Motivations for play in online games. *Cyberpsychology & behavior: the impact of the Internet, multimedia and virtual reality on behavior and society, 9*(6), 772-775.

Zhu, M., Huang, Y., & Contractor, N. S. (2013). Motivations for self-assembling into project teams. *Social Networks, 35*(2), 251-264.

CHAPTER 2 STEAM DATA

INTRODUCTION

Video games, in general, have become widespread and embedded in our culture. The Entertainment Software Association (ESA) estimates that about 65% of adults in the USA play video games across several devices (Entertainment Software Association, 2019). Thanks to technological advances in telecommunications, computers in general and the increased accessibility to these technologies, video gaming has become part of our daily lives, to the point that "it is apparent that gaming forms an important part of (at least some) peoples' everyday lives and identities, and is important and worthy of academic consideration"(Crawford, Gosling, & Light, 2011, p. 6). With the help of the Internet, gaming has become a social activity that spans sociocultural and geographical boundaries. Thus, gamers form communities around the games they play, and developers endow their software with communal, cooperative, and/or competitive features to ensure the diffusion of their work.

Steam is an online digital distribution and social platform that provides both access to game software and other gamers. In this sense, Steam is a community-driven online gaming store where individuals can purchase games and interact (e.g., comparing achievements, joining communities, sharing strategies, and forming friendships) with millions of users around the world. In 2018, Steam had an average of 47 million daily users, 90 million monthly users (Bui, 2019), and on April 28th, 2019, they broke the one billion user accounts milestone (Lanier, 2019).

In this work, using a randomly sampled Steam friendship network, I provide analysis and discussion regarding the formation of social ties within this network. Specifically, I look at how various shared attributes/characteristics of Steam users affect the potential for ties to form. Previous studies of online gaming social networks (e.g., Steam and XFire) have mainly focused on behavioral analytics and the general structural elements of these network types (see the section below for a discussion on previous research). The present work aims to expand on the current literature by solely focusing on friendship tie formation.

HOMOPHILY AND THE BIASED NET FRAMEWORK

Homophily is a fundamental organizing principle that has been a staple concept for the study of social networks and social interactions (McPherson, Smith-Lovin, & Cook, 2001). The assumption is that individuals are attracted to, feel it is easier to communicate with, and are more likely to interact with and form ties with others of similar rather than different backgrounds. Similar background means that individuals exhibit the same (e.g., racial identity) or similar states (e.g., being close in age) of some differentiating characteristic while different background means individuals exhibit different or dissimilar states of some differentiating characteristic. However, we have to consider that a pair of individuals may have a similar background on one attribute and different background on another. Homophily occurs across the spectrum of social relations (e.g., from friend and partner selection to sharing personal matters or advice in an informal setting). The consummation of a relationship or the decision to participate in a particular social interaction is affected by individual ascribed or *status* attributes—race, gender, and social class—and *value* attributes—moral codes, behavior, and attitudes (Lazarsfeld & Merton, 1954).

Status and *value* are interrelated, and the latter can be considered a derivative of the former (McPherson et al., 2001). The closer an individual is to another, i.e., proximity similarity-

wise across *status* and *value homophily*, the more likely a tie is to be consummated. However, there is an extra dimension regarding the encounter/context in which interaction may be elicited. Similarity comes into play when the possibility of an encounter exists (e.g., both individuals go to the same school or work at the same office). Additionally, group distribution within a population also plays a pivotal role. Being part of a minority group will affect the pool of opportunities one has for encountering similar others (e.g., Marsden, 1987). Thus, it is expected that majority groups would show more homogenous networks than minority groups since they would have a higher chance of encountering similar others within the population. However, the tendency towards similar others is exacerbated in minority groups when communities are isolated or segregated across different social dimensions (e.g., race as a dimension in McPherson et al., 2001; Ooka & Wellman, 2006). In the case of Steam friendships, the publicly available data is devoid of any particular socio-cultural markers. Thus, majority and minority groups will depend on available characteristics from gamer profiles (e.g., total owned games, time played, and country).

Tie consummation is highly contextual and relies on varied sets of sociodemographic dimensions. When researching homophily in a set population, one needs to be aware of the scope (e.g., city vs. neighborhood), location (commercial vs. residential areas), and focus (e.g., tastes, beliefs, and attitudes). These can play a crucial role when equating integrating/non-integrating effects within the population. This is more evident when the distribution of groups is significantly uneven, and interaction across ascribed and valued traits is not encouraged (e.g., intermarriage across racial lines or friendships among political rivals).

McPherson et al. (2001) suggest that two factors need to be accounted for to understand the intricacies between dimensions. The first factor is *baseline homophily,* which refers to the

expected chance a tie between similar individuals will be consummated within a population (relies on group sizes and their respective distribution). The second factor is *inbreeding homophily*, which considers tie formation influenced by similarity that goes beyond what is expected within a specific population distribution.

According to biased net theory (Skvoretz, 2013), two mechanisms may drive homophily effects over and above baseline effects. The first mechanism is attraction (Karpiński, 2017; Skvoretz, 2013), which considers the probability that a specific relationship is consummated by focusing on how similarity between two individuals influences the probability of encounter. Attraction postulates that interactions are biased towards individuals with similar social characteristics. The second mechanism is repulsion (Huckfeldt, 1983; Karpiński & Skvoretz, 2015; Skvoretz, 2013), which considers that intergroup ties are influenced by rejecting dissimilar others and the further away from one's category the more likely a rejection is to occur given a chance for an encounter. Repulsion stipulates that the interactions themselves might not be biased, but that the consummation of a relationship is less likely with dissimilar others.

Statistical models for measuring these mechanisms were developed by applying the biased net theory framework (Skvoretz, 1983, 1990, 1991, 2013), and Peter M. Blau's macrosociological theory of social structure (Blau, 1977) as a conceptual framework. The models take into account the distribution of a population among categorical characteristics (e.g., gender, class, and race) and evaluate these distribution effects on the formation of intergroup and intragroup ties. The objective is to highlight how interactions between social actors may be biased towards forming relationships with similar others via a process of *inbreeding bias* and/or how the consummation of relationships may be biased against dissimilar others by a *rejection bias* (Skvoretz, 2013).

The Internet, in theory, provides a higher chance of interacting with dissimilar others than encounters that are tied to geographical proximity. Thus, online encounters might depend more on value (e.g., shared interests) over status homophily (e.g., shared country). The Steam network provides insight into how encounters generally devoid of visual cues/physical traits (tied to specific ascribed statuses), may develop through other categories of similarity (e.g., interest in a particular genre of games, time spent playing, and amount of games owned). Additionally, the available data regarding Steam users do not have classic organizing categories as race, age, gender, religion, and education. Thus, this population provides a novel domain for the analysis of homophily in the formation of social ties.

RELATED WORK

Gaming, in particular online, platforms like Steam provide access to millions of data points from which social science, computer science, and information systems researchers can conduct large-scale analysis on user behavior (Baumann, Emmert, Baumgartl, & Buettner, 2018; El-Nasr, Drachen, & Canossa, 2013). Like other types of online social networks (OSNs), gaming social media and distribution platforms like Steam are continuously collecting data from their members that span across the world and socio-cultural backgrounds. Most research in this domain has focused on technical discussion of large-scale social network evolution (e.g., Becker, Chernihov, Shavitt, & Zilberman, 2012), player behavior (e.g., Baumann et al., 2018; O'Neill, Vaziripour, Wu, & Zappala, 2016; Sifa, Bauckhage, & Drachen, 2014; Sifa, Drachen, & Bauckhage, 2015), networks of cheating behaviors (e.g., cheaters in Blackburn, Kourtellis, Skvoretz, Ripeanu, & Iamnitchi, 2014), and single-game mechanics (e.g., Pirker, Rattinger, Drachen, & Sifa, 2018).

One of the fields of greatest interest within social network analysis of games is Behavioral Analytics. This field relies on behavioral telemetry data that is automatically recorded in the platform's servers, which gives access to countless information about a specific population of players (Drachen, 2015; El-Nasr et al., 2013). The focus of this approach is to understand better player behavior within the gaming mechanics, i.e., the interaction between player and game. This interaction is based on the activity that is strictly tied to the software code (e.g., player efficiency, popular items, most used character type/class). This type of approach is of interest to software developers, designers, and marketing strategists because it offers insight into the players' experience (e.g., Drachen, Sifa, Bauckhage, & Thurau, 2012).

One of the most ambitious studies regarding an online gaming platform was undertaken by O'Neill et al. (2016), using the Steam REST API they were able to gather data on all user profiles (108.7 million) available up to March 2013. Using this dataset, they were able to offer a comprehensive data analysis of the following network characteristics: social structure (degree distributions of friends and group memberships); game ownership (distribution by genres and size of game libraries); time and money (playtime distributions and account market values); player behavior and homophily (relationships between games owned and playtime, friend homophily); network evolution (using a second smaller dataset for comparison); and achievements (correlations between playtime and achievements). The data they collected have been used in recent behavioral analytics studies. For example, Baumann et al. (2018) looked at behaviors of hardcore gamers, Steam profiles that had 40 or more hours of playtime during the past two weeks; and Fire and Guestrin (2019) used the dataset to study network evolution. The work done by O'Neill et al. (2016) used data collected during 2013 (the complete Steam

network) and 2014 (a smaller snapshot). Their structural analysis provides a comparative baseline for the data collected for this project.

Through the previous research in this area, we have gained a better understanding of the structural characteristics of large-scale networks. All these studies provide an insight into the formation, evolution, and scope of, to some extent, large-scale networks. However, there has not been sufficient coverage regarding the formation of social ties within these networks, except for cheaters and the effects of being tagged as one on their friendship ties within the Steam network (Blackburn et al., 2014) and the small section on homophily in O'Neill et al. (2016). To further explore the meaning of online social ties within the Steam community, we need to study variables that can and may affect the formation of an edge between two individuals. That is, how do different aspects of a gamer profile shared with other gamers impact a gamer's formation of friendship ties? Throughout this work, I argue that homophily factors (e.g., country of origin, primary community), shared ownership (e.g., amount of games shared with ties), type of frequently played games (e.g., single-player vs. multi-player), and time spent engaging in these games can be used to predict tie formation and offer insight into potential friendship measures for online gaming social networks.

METHODS

Valve, the corporation that owns and runs Steam, provides access to publicly available data from their users' profiles through their open-access API. Anyone with a Steam account can request a Web API Key in order to access the database. Through this access point, a researcher can obtain information from user profiles that are set as public, community data (e.g., user-created groups within the Steam platform), and application data (including but not limited to all software accessible and hosted, reviews, pricing, and tags). The data used for this project were

scraped using this API, of particular interest, were the variables that had to do with user information. See Table 2.1 for a list and a short description of the data that was scraped.

Table 2.1 Variables Collected from Steam API

Data Points	Optional	Description
steamid	No	Identifier for user profiles
primaryclanid	Yes	Id for the user's primary group, if set on public profile
timecreated	No	Date when the account was created
loccountrycode	Yes	2-character country code (e.g., US), if set on public profile
locstatecode	Yes	State of residence (e.g., FL), if set on public profile
friends list	No	List of friends' steamids, only returns ids if profiles are public
appid	No	Ids for owned software obtained through the Steam Store, only recent played games were considered
playtime_2weeks	No	Minutes an appid a player has run in the last two weeks
playtime_forever	No	Minutes an appid a player has run throughout the account's history
appid tags	No	Software developer and community assigned tags extracted from all applications available in the Steam Store
numberOfGameBans	No	Number of times a steamid has been banned from a game by the developer's own system
numberOfVACBans	No	Number of times a steamid has been banned from a game by Steam's own anti-cheat system

The way the data collection tool works is by querying the API with randomly generated Steam IDs until a public profile is found, then it extracts the above variables, and finally, it repeats that process by collecting data from each friend that has a public profile. This meant that the database grew exponentially with each new profile query. The process also produced an edge list, containing all friendship ties publicly available. A section of about 130,000 IDs that contained most of the basic data detailed above was extracted from the primary database for this project. In order to address the objectives of this study, the dataset needed to have enough information regarding players' gaming behaviors and their friends' behavior. Aside from player information, details from all applications distributed through Steam were collected. A dataset was

created for these to later cross-reference with player-owned games. All the data were collected over three months during 2018.

The initial dataset was reduced by crosschecking if particular Steam IDs had profile summaries and game data. After removing duplicates and IDs with no usable data, the final dataset had 11,537 profiles and a total of 26,798 friendship ties. From this final dataset, several subsets were constructed in order to conduct different statistical analyses. First, an edge list with vertex attributes (i.e., data from player summaries) and edge attributes (e.g., amount of shared games; length of friendship; shared group membership) for conducting social network analysis using the *igraph* package (Csardi & Nepusz, 2006) and the *statnet* package (Handcock et al., 2014) for R (R Core Team, 2019). A second dataset was constructed using each of the 11,537 IDs as cases, which included individual variables for each user profile.

First, I discuss the overall structure of the network and how it compares to what similar studies find regarding gaming networks. After the initial discussion of the network structure, I present and discuss the descriptive statistics and inferential analysis of vertex attributes and dyadic attributes. In particular, I looked at the effects that attributes have on the formation of ties based on homophily.

Biased net models were used to test if the sample's distribution among categorical variables is predisposed to accumulate ties among similar others. Since most of the data offered by the Steam API are continuous variables (e.g., number of friends, count of owned games, and time spent playing), except for country, they were collapsed into quintiles. By grouping these variables, I was able to construct the tie distribution matrices among inter- and intragroup categories. Friendship ties on Steam are symmetrical, i.e., each party must agree to the consummation. Although we are unable to tell where a link originated from, there was

reciprocity, at least in the instant when the tie was formed. Which leads to the question, do any of these individual characteristics affect the likelihood of relationships forming among similar and/or dissimilar others? It was expected that Steam users that share categorical attributes would be more likely than chance to have a tie between them than users who do not share the value of an important attribute.

Differential *inbreeding bias* and *rejection bias* models were used to see if these biases differ among groups. Additionally, distance or ranked models were used to determine the probability of a tie between individuals of different categories occurring at greater than chance levels depending on the distance between the two categories. Ranked models help explain what happens if and when biases for those of identical background fail to occur and thus allow ties to form between individuals of different background. These models postulate that as dissimilarity increases among actors, ties are less likely to be consummated. Thus, ranked models take into consideration the increasing dissimilarity along an ordinal characteristic (e.g., a continuous variable collapsed into quintiles) of the parties involved. Depending on the position of the initial actor and the number of dimensions within a category, a tie can occur at x steps above or below of the originator's group at a certain probability greater than expected by chance based on biases related to the distance as measured by the number of steps.

STEAM NETWORK STRUCTURE

The Steam network is sparse, more so when considering the initial graph with the six million vertices. Only about 0.04% of all possible edges exist within the final subgraph. The sparsity is more evident as the network grows in scale. The average number of friends for the subgraph was 4.65 and 3.91 for the original graph. This finding is similar to the results discussed in O'Neill et al. (2016), where they found that the average number of friends was four for the

complete Steam network in 2013. However, these averages are primarily affected by outliers, which makes the median (2) a more accurate depiction of the number of friendships. Only 8.3% of profiles in the subgraph and 3.3% in the original graph had four friends (67% and 87.9% respectively, had less than four friends). The number of ties ranged from one to 258 in the subgraph and one to 2000 in the original graph. This tie distribution is best understood by visualizing it. The lognormal degree distribution for the Steam network shown in Figure 2.1 and Figure 2.2 displays the degree distributions of this sparsely connected network.

A lognormal distribution indicates that there is a higher probability that more individuals will have a small number of ties (O'Neill et al., 2016), and consequently, there will be a small group of individuals with a large number of friends. The findings regarding the degree distribution are similar to other OSNs network analyses that show a similar trend, for example, in Google+ (Magno, Comarela, Saez-Trumper, Cha, & Almeida, 2012) and Facebook (Ugander, Karrer, Backstrom, & Marlow, 2011). The potential factors that produce this type of distribution in OSNs are outside the scope of this research.

This degree distribution is also evident in the degree assortativity scores (see Table 2.2 for summarized details on both graphs). Degree assortativity considers the degree similarity between dyads in the graph, i.e., a positive score tells us that vertices of similar degrees tend to connect, and for a negative score, the inverse is true. There was a considerable difference between the assortativity scores for the subgraph and the original graph, the first being positive and the latter negative. This is mainly due to a small number of individuals in the original graph that have a surprisingly extensive friend list.

Figure 2.1 Lognormal Degree Distribution for Steam Subset (26.7K Edges)

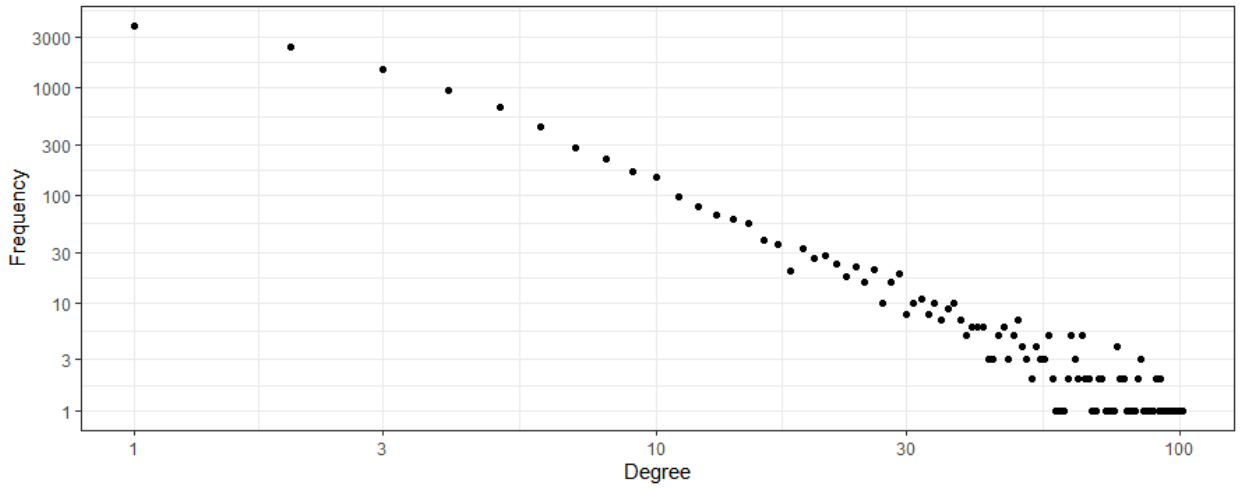
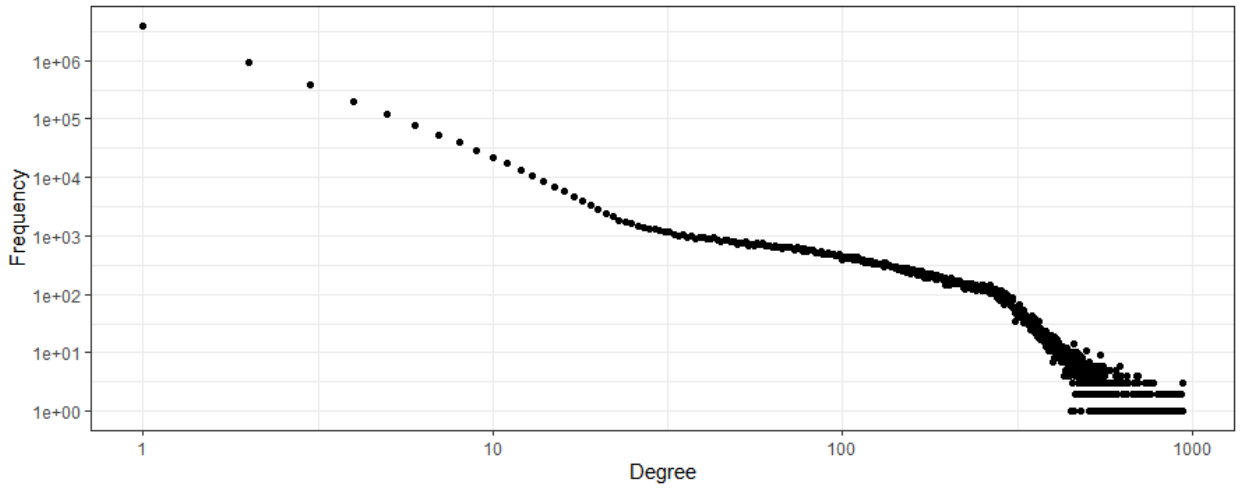


Figure 2.2 Lognormal Degree Distribution for Initial Steam Graph (11.7M Edges)



About 1% of the profiles had more than 50 friends, and this affects the assortativity score by having high degree accounts connected to many Steam users that have a substantially smaller pool of friends. The top one-hundred profiles with the most friends in the original graph had an average degree of 1606, while the top 1% had an average degree of 172. For the subgraph, the story is different since the degree range is much smaller, as detailed above.

Table 2.2 Steam Friendship Graph Properties

	Subgraph	Original Graph
Vertices	11,537	6,026,049
Edges/Dyads	26,798	11,785,636
Triangles	35,002	3,361,308
Density	4.03E-04	6.49E-07
Diameter	23	
Avg. Shortest Path	6.95	
Avg. Degree	4.65	3.91
Betweenness	28217.35	
Closeness	7.35E-08	
Transitivity	0.188	0.007
Degree Assortativity	0.24	-0.26

RESULTS

In this section, I focus on the subgraph, since the profiles within this graph had at least some data points that were publicly available. The descriptive statistics for the available variables extracted from the Steam API are summarized in Table 2.3.

The profiles sampled were users from 195 different countries. About 37% of the dyads within the network shared the same country. The results are different from what O'Neill et al. (2016) found in their study of the 2013 Steam network. They found that 30.34% of the friendship ties were international; meanwhile, in the current study, it is observed that about 63% of the dyads with a specified country code were international. Two Chi-Square goodness of fit tests were run using a 30.34/69.66 and 50/50 distribution. The results showed that the observed distribution was significantly different from the expected values in both cases (p-value < 0.001). This result suggests that Steam users routinely cross sociocultural and geographical boundaries when making connections with others online.

However, there is no way of measuring the level of interaction, if any, between these friendship dyads since Steam does not record this type of data. Thus, a friendship formation in

Steam could be a spur of the moment situation, where users add each other after meeting during a gameplay session but never or seldom interact again. Still, an assumption could be made regarding the potential weight of a friendship tie by looking at shared characteristics from their public profiles.

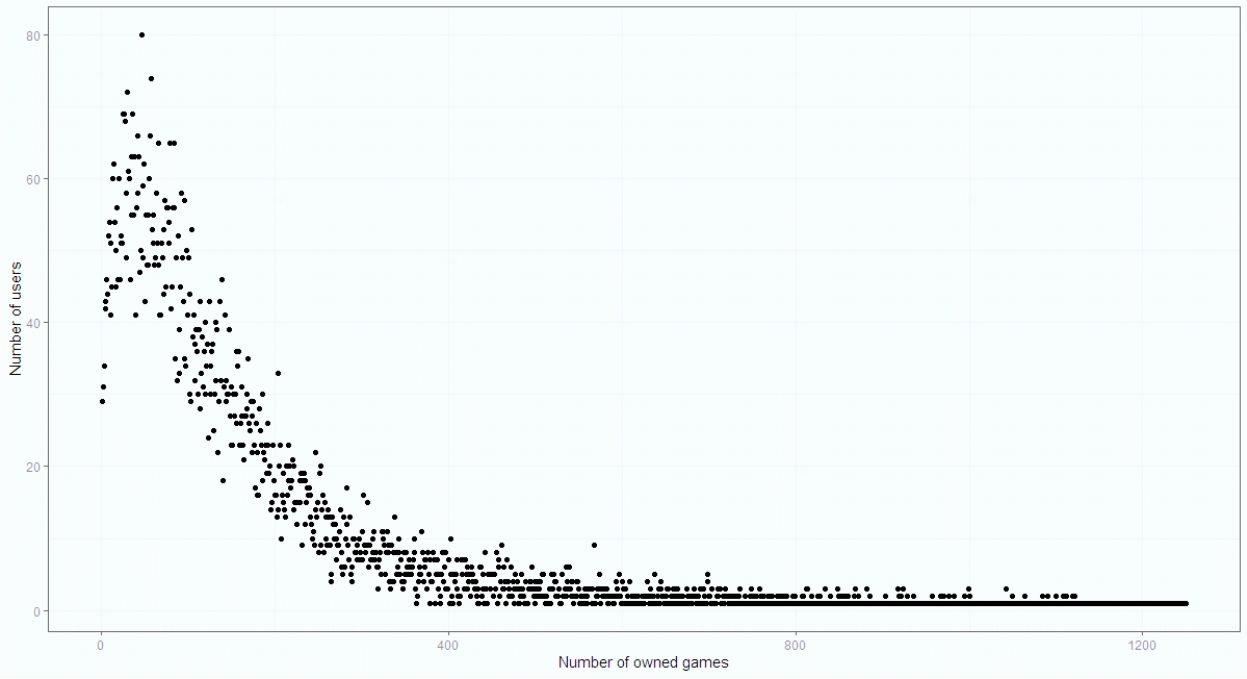
When it came to the primary community group specified in each player's profile, only 3.5% of the dyads shared group membership. However, it is expected that dyads would share membership in other community groups at a higher rate. When querying for player summaries through the Steam API, it only returns the primary clan id set by the user on their profile.

Table 2.3 Steam Descriptive Statistics – Individuals & Ties

	N	**% Profiles NAs**		
Profiles	11,537			
Total Ties	26,798			
Countries	195	19.8%		
Primary Groups	8,294	0.0%		
	Mean (SD)	**% Profiles NAs**	**Median**	**Range**
Friends	4.65 (8.9)	0.0%	2	1-258
Games Owned	277.8 (812.31)	0.0%	116	1-18,653
Recent games (2-weeks)	5.4 (7.66)	0.0%	4	1-302
MP Games	97.3 (142.9)	0.0%	62	0-2508
Prop. MP Games	0.52 (0.14)	0.0%	0.53	0-1.00
Total Playtime (minutes)	1,736 (5,585)	11.6%	1,037	0.02-332,671.91
2wks Playtime (minutes)	32.9 (189)	11.6%	12.73	0.02-7,320.75
	Valid %	**% Tie NAs**		
Shared Country	37.2%	31.5%		
Shared Primary Grp	3.5%	0.0%		
Both VAC Bans	0.1%	0.0%		
Both Game Bans	0.7%	0.0%		
	Mean (SD)	**% Tie NAs**	**Median**	**Range**
Friendship in Years	1.60 (1.42)	0.08%	1.2	0-10.2
Total Shared Games by Dyad	211.91 (697.78	0.0%	34	0-15,387
Shared Online Games	55.1 (121.7)	0.0%	20	0-2291
Shared Prop. Online Games	0.51 (0.19)	0.0%	0.55	0-0.97
Diff Days Acct. Creation	1,015.23 (915.30)	0.0%	749	0-5,337

Another aspect to consider as a potential factor of friendship in the Steam platform is the games owned by a user and the amount of those that are also owned by their ties. The Steam API offers the total game count (all time) and the recent game count (past two weeks) for each of the profiles. The average of total owned applications was 277 for all sampled profiles. Again, we can observe a broad range (1-18,653). The top tail of this distribution depicts what previous studies have called game collectors (O'Neill et al., 2016), which are individuals that acquire large amounts of games for the sake of owning them. For this reason, we will use the median (116) as our measure of central tendency (see Figure 2.3 for a visualization of the distribution of game ownership).

Figure 2.3 Distribution of game ownership



Only the top one percent has 3242.5 games or more. About 4% of the profiles owned 1,000 or more games. Clearly, game collectors are in the minority, but they substantially own more games than other users. A linear regression showed that the number of owned games positively affects the number of friends. Still, the coefficient was minimal (0.004, a rate of four

friends by every thousand games owned). By computing a dummy variable for game collectors (owns at least one thousand games), we can observe that the effect of the number of games owned on the number of friends is exponentially larger (coefficient = 15.9), more so if we increase the cutoff point for considering a profile a game collector. This suggests that in general, game collectors tend to have more friends. However, they tend to have a lower rate of minutes played per owned games. On average game collectors had 1.77-minute playtime per owned games, while non-collectors played each game on average for 30.37 minutes. When considering the proportion of games owned that are online multiplayer, collectors had a significantly lower mean (0.24) than non-collectors (0.53).

About 9% of all ties were between game collectors, even though they only represent 4% of the sample. This suggests that there is a homophily effect at play. Two subgraphs were extracted using the game collector attribute. The collectors (0.324) had a 2.29 times higher transitivity than the non-collectors (0.142), and they were also 65.95 times denser. As expected, profiles that share similar interests, in this case, collecting games, were more likely to form ties among themselves.

Biased net models showed further evidence of homophily within several categorical attributes. As explained above, in order to analyze bias mechanisms that are salient in the Steam network, several continuous variables were collapsed into quintile categories. The distribution from origin to target used to generate the distance models are shown in Table 2.4 for all variables of interest. The highlighted cells show the highest value across each row, i.e., ties originating from a specific quintile connected more with the represented group on the columns.

Table 2.4 Origin to Target Distribution for Distance Models

Game Count

	1st	2nd	3rd	4th	5th
1st	2380	1849	1633	1203	997
2nd	1849	1670	1709	1473	1372
3rd	1633	1709	1954	1906	2178
4th	1203	1473	1906	2188	3048
5th	997	1372	2178	3048	10668

Playtime Forever

	1st	2nd	3rd	4th	5th
1st	2474	1850	1260	1361	1318
2nd	1850	1688	1306	1324	1260
3rd	1260	1306	1416	1507	1472
4th	1361	1324	1507	1850	2117
5th	1318	1260	1472	2117	3808

MP Game Count

	1st	2nd	3rd	4th	5th
1st	2380	1849	1633	1203	997
2nd	1849	1670	1709	1473	1372
3rd	1633	1709	1954	1906	2178
4th	1203	1473	1906	2188	3048
5th	997	1372	2178	3048	10668

Account Age

	1st	2nd	3rd	4th	5th
1st	2506	1983	1627	1238	1236
2nd	1983	2450	2114	1746	1748
3rd	1627	2114	2178	2213	2023
4th	1238	1746	2213	2798	2938
5th	1236	1748	2023	2938	5932

MP Game Prop

	1st	2nd	3rd	4th	5th
1st	14872	2398	1492	1139	978
2nd	2398	1920	1733	1539	1300
3rd	1492	1733	2004	1669	1518
4th	1139	1539	1669	1740	1700
5th	978	1300	1518	1700	2128

Continent

	AF	AS	EU	NA	OC	SA
AF	16	38	151	305	14	28
AS	38	954	828	1274	78	62
EU	151	828	4886	3346	393	273
NA	305	1274	3346	14558	399	399
OC	14	78	393	399	82	29
SA	28	62	273	399	29	558

An overview of the calculated distance models is available in Table 2.5. The table presents three variants of models available within the bias net framework (constant, which assumes the effect of inbreeding or rejection does not vary over groups defined by a characteristic; differential inbreeding, which allows the inbreeding bias to vary by groups within a characteristic; and differential rejection, which allows the rejection bias to vary by groups within a characteristic).

The assumptions of the models are used to derive the complete set of probabilities that a tie occurs between an origin category denoted by *i* and a target category denoted by *j*. These probabilities are denoted by p_{ij}. The logic of the constant inbreeding model goes as follows. A tie

originates in category *i* with the probability determined by the proportion of the population in that category. It is assumed that an inbreeding event may then occur with a specific probability (to be estimated from the data). If the event occurs, the target of the tie is a person in the same category *i*. If it fails to occur, the choice of target is random and is found in category *j* with a probability denoted by t_j. These probabilities are called target propensities. The logic of the constant rejection model is similar at the beginning in that it is assumed that a tie originates in category *i* with the probability determined by the proportion of the population in that category. But then a potential target is randomly drawn from the population, and if that target is in the same category as the originator, a tie forms but if the target is in another category, a rejection bias event may occur with a specific probability (to be estimated from the data). If the bias event does not occur, the tie forms but if it does occur the search continues with another draw from the population (and the process continues, if necessary, until a tie forms). In the differential models, each originator group has its own inbreeding bias probability or its own rejection bias probability and these probabilities, in general, differ from group to group.

In the descriptive discussion of the Steam network, it was observed that similarity in the number of owned games seemed to suggest that it was an essential aspect of tie formation. Game collectors, in general, had more ties and appeared more likely to form ties with other game collectors, and overall, a subgraph of collectors showed more connectivity than non-collectors. As expected, this group had substantially higher inbreeding (0.582) and rejection (0.871) effects than the other groups. The first quintile, the group with the least number of games, had the second-highest effect on both inbreeding (0.169) and rejection (0.567). This was followed by the second quintile's substantially lower inbreeding bias. The other two groups (the third and fourth quintiles) did not display any significant inbreeding and rejection biases.

Table 2.5 Overview Results from Inbreeding and Rejection Bias Models

Parameter	Inbreeding		Std. Error	Rejection		Std. Error
Game Count - Constant	0.176	***	0.003	0.562	***	0.004
1st Quintile	0.169	***	0.006	0.567	***	0.013
2nd Quintile	0.032	***	0.006	0.145	***	0.026
3rd Quintile	0.000		0.006	0.000		0.028
4th Quintile	0.000		0.006	0.000		0.028
5th Quintile	0.582	***	0.004	0.871	***	0.003
MP Game Count - Constant	0.141	***	0.003	0.488	***	0.005
1st Quintile	0.167	***	0.006	0.564	***	0.012
2nd Quintile	0.034	***	0.006	0.163	***	0.026
3rd Quintile	0.000		0.006	0.000		0.028
4th Quintile	0.000		0.006	0.000		0.027
5th Quintile	0.463	***	0.005	0.793	***	0.004
MP Game Prop - Constant	0.197	***	0.003	0.601	***	0.004
1st Quintile	0.644	***	0.004	0.904	***	0.002
2nd Quintile	0.000		0.007	0.000		0.028
3rd Quintile	0.035	***	0.007	0.146	***	0.025
4th Quintile	0.036	***	0.006	0.162	***	0.026
5th Quintile	0.129	***	0.007	0.464	***	0.016
Account Age - Constant	0.110	***	0.002	0.390	***	0.006
1st Quintile	0.165	***	0.006	0.567	***	0.012
2nd Quintile	0.054	***	0.006	0.223	***	0.021
3rd Quintile	0.000		0.006	0.000		0.027
4th Quintile	0.046	***	0.006	0.178	***	0.021
5th Quintile	0.272	***	0.005	0.637	***	0.008
Playtime Forever - Constant	0.086	***	0.003	0.332	***	0.007
1st Quintile	0.130	***	0.007	0.436	***	0.016
2nd Quintile	0.043	***	0.007	0.191	***	0.026
3rd Quintile	0.024	***	0.007	0.120	***	0.029
4th Quintile	0.011		0.007	0.048	*	0.029
5th Quintile	0.216	***	0.006	0.565	***	0.011
Continent - Constant	0.285	***	0.004	0.644	***	0.004
Africa	0.005		0.007	0.532	***	0.079
Asia	0.206	***	0.009	0.699	***	0.014
Europe	0.258	***	0.009	0.519	***	0.014
North America	0.469	***	0.008	0.654	***	0.009
Oceania	0.043	***	0.009	0.541	***	0.053
South America	0.392	***	0.012	0.947	***	0.004

The results suggest that the poles within this category are more likely to form ties with others from the same category. Similar results are observed in the other two game categories (Multiplayer/MP Game Count, and MP Game Proportion).

There is an aversion to dissimilar others and a significant attraction to similar others when it comes to the quintiles of continuous variables, and the regional categorical variable (Continent) presented in Table 2.5. The continent model shows significant values for all regions except for Africa. Within the sampled network, about 84% of the profiles were from North America or Europe, while the other regions did not surpass 10% on their own. South America presents a compelling case; it had the second-highest value for inbreeding and the highest value for rejection, considering that they were only represented by 4.2% of the sample. According to their proportion in the sample, South Americans show a strong bias towards other users within their continental region.

In comparison, Europeans, which had about half the inbreeding propensity of South American, and composed 22.2% of the whole sample, did not have such a strong bias towards other members of their continental region. Although we cannot make any conclusions as to why this is, we could assume it has to do with a shared language and/or cultural values. Except for countries like Brazil, Suriname, and French Guyana and indigenous dialects throughout, most countries in South America share, to some extent, Spanish as a common language and similar history which helps shape their socio-cultural values.

When it comes to the variables divided into quintiles, inbreeding bias is most salient within the first and fifth quintiles in comparison to the other three groups. Meanwhile, for the groups in the middle, both the inbreeding and rejection scores are lower in magnitude when

compared to the poles. Thus, we are prompted to look for distance effects on the probabilities of ties occurring across groups to get a better understanding of the dynamics at play.

Inbreeding distance models allows us to calculate the propensities of ties occurring intra-group and inter-group at different distances. If our primary assumption is that people tend to relate more with similar others than with dissimilar others, we would expect that as similarity decreases, so does the probability of a connection forming between two individuals. In the previous models (Table 2.5), it was observed that most of the quintiles had a positive and significant effect when it came to the inbreeding bias, which is also supported by the values for the rejection models. In the cases where there is no significant value, then we consider the constant inbreeding propensity (e.g., 0.176 for Game Count, see third and fourth quintiles). In order to expand on this exploration of the data, we must consider the probabilities at which ties occur in-group, out-group, and at which distances from the origin category.

The logic of these inbreeding distance models is as follows. One can think of the inbreeding bias event as a distance 0 bias event (D0). If it fails to occur, then the model assumes there is a distance 1 bias event (D1) which if it occurs with a specified probability (to be estimated from the data), the choice of target is random from the union of all target categories within D1 of the origin category (note that this includes the origin category itself). If the D1 bias event fails to occur, it is assumed there is a distance 2 bias event (D2) which if it occurs with a specified probability (to be estimated from the data), the choice of target is random from the union of all target categories with D2 of the origin category. The maximum number of useful distance biases is the number of categories less 2 (because this quantity is one less than the largest distance between categories. When the largest distance bias fails to occur, the choice of target is random from the population and from category j with probability t_j, the target propensity

of the j^{th} category. (Although similar distance models can be defined based on rejection biases, these models are not presented here for space reasons.)

Table 2.6 shows the results for the differential inbreeding distance models for each of the quintile ranked variables. The first column of the table has three new entries in comparison with the previous models. These are fixed effects that provide a constant probability for a maximum of distance three (i.e., the max distance between groups before choosing by chance from the complete pool is three; from first to fourth or fourth to first). Not all distance effects apply to all groups, and the distance effect is applied to both going up or going down in rank. The estimate column contains the probability of a D0 inbreeding bias occurring. For example, if a meeting between two individuals belonging to the fifth quintile for *Game Count* occurs, then there is a 49.3% chance that a friendship tie will be consummated.

The other element on this table that has not been previously described is *Target Probabilities* (Tar. Prob.). These are the probabilities of a tie forming from and to any position if all inbreeding biases events fail to occur (Distances 1-3). As mentioned, all distance effects do not apply to all starting positions before considering target probabilities. For example, the second quintile has a maximum of two distances before considering a choice between all five groups (at D2, the second group will choose from groups one, two, and three each at a certain probability).

On all the models, except for *MP Proportion*, we observe that the fifth group has the highest probability/preference to form ties intra-group, to the point that its estimate is larger than the distance probability effects. As discussed earlier, the game collector group within the sample skews the data. The game collectors have a more substantial amount of owned games than non-collectors, and they are also more likely to form ties among themselves (i.e., higher density,

transitivity, and they form part of 9% of all ties). Thus, the distance models accurately represent this difference between collectors and non-collectors.

Table 2.6 Differential Inbreeding Distance Models

Game Count	**Estimate**	**Sig.**	**Tar. Prob.**
1st Quintile	0.006		0.196
2nd Quintile	0.017	**	0.176
3rd Quintile	0.011	*	0.179
4th Quintile	0		0.195
5th Quintile	0.493	***	0.255
Distance 1	0.136	***	
Distance 2	0.26	***	
Distance 3	0.37	***	
p < 0.001 AIC 46.13 BIC 117.2			

Playtime Forever	**Estimate**	**Sig.**	**Tar. Prob.**
1st Quintile	0.024	***	0.22
2nd Quintile	0.034	***	0.178
3rd Quintile	0.027	***	0.165
4th Quintile	0.006		0.201
5th Quintile	0.124	***	0.236
Distance 1	0.116	***	
Distance 2	0.12	***	
Distance 2	0.116	***	
p < 0.001 AIC 38.73 BIC 107.7			

MP Game Count	**Estimate**	**Sig.**	**Tar. Prob.**
1st Quintile	0.006		0.195
2nd Quintile	0.018	***	0.161
3rd Quintile	0.016	**	0.176
4th Quintile	0.007		0.194
5th Quintile	0.351	***	0.273
Distance 1	0.121	***	
Distance 2	0.253	***	
Distance 3	0.327	***	
p < 0.001 AIC 38.44 BIC 109.6			

MP Proportion	**Estimate**	**Sig.**	**Tar. Prob.**
1st Quintile	0.595	***	0.224
2nd Quintile	0		0.21
3rd Quintile	0.052	***	0.181
4th Quintile	0.024	***	0.18
5th Quintile	0.005		0.204
Distance 1	0.109	***	
Distance 2	0.193	***	
Distance 3	0.209	***	
p < 0.001 AIC 114.5 BIC 185.6			

Account Age	**Estimate**	**Sig.**	**Tar. Prob.**
1st Quintile	0.065	***	0.176
2nd Quintile	0.034	***	0.189
3rd Quintile	0.006		0.19
4th Quintile	0.045	***	0.2
5th Quintile	0.168	***	0.246
Distance 1	0.138	***	
Distance 2	0.148	***	
Distance 3	0.162	***	
p < 0.001 AIC 62.59 BIC 133.7			

On the *MP Proportion,* the reverse is true. In this model, we are considering the proportion of owned games that are labeled as multi-player (MP). Considering that at the moment of data collection there were 3,009 MP and 10,452 single-player (SP) available from the

Steam platform (this can change as games are added, removed or discontinued by publishers)[1], game collectors have a lower proportion of MP games since most games on the platform are SP. An independent sample t-test showed a significant difference in means for MP proportion between collectors (x = 0.15) and non-collectors (x = 0.52). Thus, we can assume that collectors are substantially overrepresented within the first group in this model.

Another aspect to consider from these models is that non-significant values suggest that those groups in the model do not have a significant tendency to form ties within their own group, inbreeding bias at D0, beyond the biases that occur at subsequent distances. This does not entail that they do not form intra-group ties. Instead, it suggests that there is a higher probability that they would make their choice at a D1 bias rather than D0. For example, when it comes to the first group on the first model, since D0 is not significant, we would have to consider the probabilities of a D1 event occurring and calculate the likelihood of biased selection between group one and group two.

When it comes to distance biases, there are several trends throughout the different categories (see Table 2.7 for target propensities from D1 to D3, and Table 2.8 for propensities when all distance bias events fail to occur). For *Game Count*, *MP Game Count*, and *Playtime Forever*, both the first and fifth quintiles had a higher preference for intra-group ties at all three distances. Their probability fell as the pool of options increases; still, they preferred their group over others. When all distance biases fail to occur for all these groups (Table 2.8), they had a

[1] The maximum for owned games recorded in this sample was 18,653, at the moment of data collection 13,461 gamers were available for acquisition on the platform. This difference in more than 5,000 titles is due to the removal of previously available titles and or expansions (DLCs) that are already accounted for via the main game. Thus, the analyses conducted throughout this chapter are based on how those current 13,461 games are categorized.

Table 2.7 Target Propensities for Distance Models

Game Count	D1D	D1O	D1U	D2D	D1D	D2O	D1U	D2U	D3D	D2D	D1D	D3O	D1U	D2U	D3U
1st Quintile	NA	0.527	0.473	NA	NA	0.356	0.319	0.324	NA	NA	NA	0.263	0.236	0.239	0.261
2nd Quintile	0.356	0.319	0.324	NA	0.263	0.236	0.239	0.261	NA	NA	0.196	0.176	0.179	0.195	0.255
3rd Quintile	0.320	0.325	0.355	0.196	0.176	0.179	0.195	0.255	NA	0.196	0.176	0.179	0.195	0.255	NA
4th Quintile	0.284	0.310	0.405	0.219	0.222	0.242	0.317	NA	0.196	0.176	0.179	0.195	0.255	NA	NA
5th Quintile	0.434	0.566	NA	0.284	0.310	0.405	NA	NA	0.219	0.222	0.242	0.317	NA	NA	NA
MP Game Count	**D1D**	**D1O**	**D1U**	**D2D**	**D1D**	**D2O**	**D1U**	**D2U**	**D3D**	**D2D**	**D1D**	**D3O**	**D1U**	**D2U**	**D3U**
1st Quintile	NA	0.547	0.453	NA	NA	0.366	0.303	0.331	NA	NA	NA	0.268	0.222	0.243	0.267
2nd Quintile	0.366	0.303	0.331	NA	0.268	0.222	0.243	0.267	NA	NA	0.195	0.161	0.176	0.194	0.273
3rd Quintile	0.303	0.332	0.365	0.268	0.161	0.176	0.194	0.273	NA	0.195	0.161	0.176	0.194	0.273	NA
4th Quintile	0.274	0.301	0.425	0.200	0.219	0.241	0.340	NA	0.195	0.161	0.176	0.194	0.273	NA	NA
5th Quintile	0.415	0.585	NA	0.274	0.301	0.425	NA	NA	0.200	0.219	0.241	0.340	NA	NA	NA
Account Age	**D1D**	**D1O**	**D1U**	**D2D**	**D1D**	**D2O**	**D1U**	**D2U**	**D3D**	**D2D**	**D1D**	**D3O**	**D1U**	**D2U**	**D3U**
1st Quintile	NA	0.482	0.518	NA	NA	0.317	0.340	0.343	NA	NA	NA	0.233	0.250	0.253	0.265
2nd Quintile	0.317	0.340	0.343	NA	0.233	0.250	0.253	0.265	NA	NA	0.176	0.189	0.190	0.200	0.246
3rd Quintile	0.326	0.329	0.345	0.233	0.189	0.190	0.200	0.246	NA	0.176	0.189	0.190	0.200	0.246	NA
4th Quintile	0.299	0.314	0.387	0.229	0.231	0.242	0.298	NA	0.176	0.189	0.190	0.200	0.246	NA	NA
5th Quintile	0.448	0.552	NA	0.299	0.314	0.387	NA	NA	0.229	0.231	0.242	0.298	NA	NA	NA
Playtime Forever	**D1D**	**D1O**	**D1U**	**D2D**	**D1D**	**D2O**	**D1U**	**D2U**	**D3D**	**D2D**	**D1D**	**D3O**	**D1U**	**D2U**	**D3U**
1st Quintile	NA	0.552	0.448	NA	NA	0.390	0.316	0.293	NA	NA	NA	0.288	0.233	0.216	0.263
2nd Quintile	0.390	0.316	0.293	NA	0.288	0.233	0.216	0.263	NA	NA	0.220	0.178	0.165	0.201	0.236
3rd Quintile	0.327	0.303	0.370	0.288	0.178	0.165	0.201	0.236	NA	0.220	0.178	0.165	0.201	0.236	NA
4th Quintile	0.274	0.334	0.392	0.228	0.211	0.258	0.303	NA	0.220	0.178	0.165	0.201	0.236	NA	NA
5th Quintile	0.460	0.540	NA	0.274	0.334	0.392	NA	NA	0.228	0.211	0.258	0.303	NA	NA	NA
MP Proportion	**D1D**	**D1O**	**D1U**	**D2D**	**D1D**	**D2O**	**D1U**	**D2U**	**D3D**	**D2D**	**D1D**	**D3O**	**D1U**	**D2U**	**D3U**
1st Quintile	NA	0.517	0.483	NA	NA	0.364	0.341	0.295	NA	NA	NA	0.282	0.264	0.228	0.226
2nd Quintile	0.364	0.341	0.295	NA	0.282	0.264	0.228	0.226	NA	NA	0.224	0.210	0.181	0.180	0.204
3rd Quintile	0.368	0.317	0.315	0.282	0.210	0.181	0.180	0.204	NA	0.224	0.210	0.181	0.180	0.204	NA
4th Quintile	0.321	0.318	0.361	0.271	0.234	0.232	0.263	NA	0.224	0.210	0.181	0.180	0.204	NA	NA
5th Quintile	0.469	0.531	NA	0.321	0.318	0.361	NA	NA	0.271	0.234	0.232	0.263	NA	NA	NA

higher propensity towards forming ties with those in the fifth quintile.

At D3, all groups, except for the first quintile, had a higher propensity for choosing the fifth quintile as their target. For both game counts and playtime variables, the second quintile was more likely to prefer the first quintile at D1 and D2 over choosing their own or a higher quintile. The other two groups, i.e., third and fourth quintiles, were more probable to choose ties from larger groups at D1. At D2 for the playtime category, the third group had a higher preference towards the first group over all other options, while the fourth group preferred the fifth group. Game ownership and playtime seem to follow a pecking order, in which most groups present an inclination towards choosing a target that is ranked above themselves, except for the first quintile.

Account age displayed a different dynamic. All groups at all distances were more likely to target someone from the highest group available than their own. As shown in Table 2.6, all distance probabilities were larger than the intra-group inbreeding bias probability for the first four groups.

The results discussed up till now, consider the whole sampled network, which, as it has been previously discussed, is a very sparse network. What would happen to these tendencies if the third quartile for game ownership was used as the cutoff point to remove the outliers that substantially surpass the median (116), especially when considering the high percentage of all ties contained within a small group of individuals (collectors)? Certainly, game collectors are not representative of the typical gamer in this sample. The results that follow take this into account and look at ties between individuals that owned 232 games or less.

The tie distribution among the categories for each variable in the subgraph is shown in Table 2.9. The first and third quintiles contain the most ties for both total game count variables. Both quintiles have the largest number of in-group ties, and also attract the most ties from groups

ranked higher at D1 (e.g., ties from the second to the first group), and at D2 for the third group (receives the most ties originating from the fourth and fifth groups). The playtime variable displays a more proportional biased distribution among the groups.

Table 2.8 Target Propensities when Distance Biases Fail

Game Count	**D4D**	**D3D**	**D2D**	**D1D**	**O**	**D1U**	**D2U**	**D3U**	**D4U**
1st Quintile	NA	NA	NA	NA	0.196	0.176	0.179	0.195	0.255
2nd Quintile	NA	NA	NA	0.196	0.176	0.179	0.195	0.255	NA
3rd Quintile	NA	NA	0.196	0.176	0.179	0.195	0.255	NA	NA
4th Quintile	NA	0.196	0.176	0.179	0.195	0.255	NA	NA	NA
5th Quintile	0.196	0.176	0.179	0.195	0.255	NA	NA	NA	NA
MP Game Count	**D4D**	**D3D**	**D2D**	**D1D**	**O**	**D1U**	**D2U**	**D3U**	**D4U**
1st Quintile	NA	NA	NA	NA	0.195	0.161	0.176	0.194	0.273
2nd Quintile	NA	NA	NA	0.195	0.161	0.176	0.194	0.273	NA
3rd Quintile	NA	NA	0.195	0.161	0.176	0.194	0.273	NA	NA
4th Quintile	NA	0.195	0.161	0.176	0.194	0.273	NA	NA	NA
5th Quintile	0.195	0.161	0.176	0.194	0.273	NA	NA	NA	NA
Account Age	**D4D**	**D3D**	**D2D**	**D1D**	**O**	**D1U**	**D2U**	**D3U**	**D4U**
1st Quintile	NA	NA	NA	NA	0.176	0.189	0.190	0.200	0.246
2nd Quintile	NA	NA	NA	0.176	0.189	0.190	0.200	0.246	NA
3rd Quintile	NA	NA	0.176	0.189	0.190	0.200	0.246	NA	NA
4th Quintile	NA	0.176	0.189	0.190	0.200	0.246	NA	NA	NA
5th Quintile	0.176	0.189	0.190	0.200	0.246	NA	NA	NA	NA
Playtime Forever	**D4D**	**D3D**	**D2D**	**D1D**	**O**	**D1U**	**D2U**	**D3U**	**D4U**
1st Quintile	NA	NA	NA	NA	0.220	0.178	0.165	0.201	0.236
2nd Quintile	NA	NA	NA	0.220	0.178	0.165	0.201	0.236	NA
3rd Quintile	NA	NA	0.220	0.178	0.165	0.201	0.236	NA	NA
4th Quintile	NA	0.220	0.178	0.165	0.201	0.236	NA	NA	NA
5th Quintile	0.220	0.178	0.165	0.201	0.236	NA	NA	NA	NA
MP Proportion	**D4D**	**D3D**	**D2D**	**D1D**	**O**	**D1U**	**D2U**	**D3U**	**D4U**
1st Quintile	NA	NA	NA	NA	0.224	0.210	0.181	0.180	0.204
2nd Quintile	NA	NA	NA	0.224	0.210	0.181	0.180	0.204	NA
3rd Quintile	NA	NA	0.224	0.210	0.181	0.180	0.204	NA	NA
4th Quintile	NA	0.224	0.210	0.181	0.180	0.204	NA	NA	NA
5th Quintile	0.224	0.210	0.181	0.180	0.204	NA	NA	NA	NA

Most ties are intra-group except for the fourth group, which targets the fifth group more than its own. When it comes to continental regions, most groups have a propensity towards North American gamers. As discussed in the whole network distribution, this is not surprising since most profiles in the sample stemmed from North America. South Americans, again, targeted others in their region over all other groups. Lastly, those that had a high proportion of

MP games garnered most of the intra- and inter-group ties, with the second and third groups being the exception. The third group targeted in-group members, while the second group targeted group four at D2 the most over all other options.

Table 2.9 Origin to Target Distribution for Distance Models <=232 Owned Games

Game Count

	1st	2nd	3rd	4th
1st	2240	1882	1499	846
2nd	1882	1820	1782	1080
3rd	1499	1782	1820	1300
4th	846	1080	1300	998

Playtime Forever

	1st	2nd	3rd	4th	5th
1st	852	739	516	463	460
2nd	739	828	718	618	566
3rd	516	718	874	800	730
4th	463	618	800	914	1106
5th	460	566	730	1106	2140

MP Game Count

	1st	2nd	3rd	4th	5th
1st	2374	1833	1557	867	37
2nd	1833	1656	1633	1026	47
3rd	1557	1633	1804	1283	52
4th	867	1026	1283	1052	46
5th	37	47	52	46	8

Account Age

	1st	2nd	3rd	4th	5th
1st	1964	1376	1076	648	435
2nd	1376	1640	1342	878	524
3rd	1076	1342	1272	1127	577
4th	648	878	1127	1096	572
5th	435	524	577	572	574

MP Game Prop

	1st	2nd	3rd	4th	5th
1st	348	379	430	431	444
2nd	379	816	964	1021	969
3rd	430	964	1354	1302	1284
4th	431	1021	1302	1506	1564
5th	444	969	1284	1564	2056

Continent

	AF	AS	EU	NA	OC	SA
AF	8	12	77	201	3	12
AS	12	214	179	587	15	13
EU	77	179	1048	1072	58	74
NA	201	587	1072	8458	182	147
OC	3	15	58	182	28	5
SA	12	13	74	147	5	350

In Table 2.10, we have the differential inbreeding model results for the subnet of 232 games or less. Similar to the results from Table 2.5 (differential inbreeding models for the whole network), we observe that most groups have a significant inbreeding bias, meaning that they, in general, prefer their own group over others. However, the bias scores are not as large as the ones from the whole network, in which the top value in all quintile variables more than doubled or tripled the second-highest value). The models seem to suggest a more balanced distribution of

bias among the groups due to the removal of the game collectors, which had high density and transitivity among themselves. Does this balanced tendency hold when we consider D0 bias event failing?

Table 2.10 Differential Inbreeding Model for 232 or Fewer Games

Parameter	Inbreeding		Std. Error	Parameter	Inbreeding		Std. Error
Game Count	0.048	***	0.004	**Playtime Forever**	0.107	***	0.004
1st Quintile	0.128	***	0.009	1st Quintile	0.152	***	0.010
2nd Quintile	0.000		0.010	2nd Quintile	0.055	***	0.010
3rd Quintile	0.000		0.010	3rd Quintile	0.042	***	0.010
4th Quintile	0.076	***	0.008	4th Quintile	0.006		0.010
MP Game Count	0.053	***	0.004	5th Quintile	0.270	***	0.009
1st Quintile	0.131	***	0.009	**Continent**	0.282	***	0.007
2nd Quintile	0.000		0.009	Africa	0.000		0.012
3rd Quintile	0.005		0.009	Asia	0.126	***	0.014
4th Quintile	0.087	***	0.009	Europe	0.276	***	0.013
5th Quintile	0.034	**	0.015	North America	0.464	***	0.017
MP Game Prop	0.049	***	0.003	Oceania	0.069	***	0.018
1st Quintile	0.098	***	0.009	South America	0.570	***	0.017
2nd Quintile	0.020	**	0.008				
3rd Quintile	0.033	***	0.009				
4th Quintile	0.001		0.009				
5th Quintile	0.098	***	0.009				
Account Age	0.085	***	0.004				
1st Quintile	0.191	***	0.009				
2nd Quintile	0.040	***	0.009				
3rd Quintile	0.000		0.009				
4th Quintile	0.088	***	0.009				
5th Quintile	0.118	***	0.009				

Table 2.11 provides an overview of the differential inbreeding models for this subset of the network. By removing the number of profiles using the third quartile for game ownership, we are left with a total of 8,659 gamers and 11,828 mutual ties, compared to the original 11,537 gamers and 26,798 mutual ties (this drop showcases the substantial amount of ties that exists between higher-ranked game owners). As expected, the most considerable difference between

these differential inbreeding models (Table 2.11) and the ones discussed above (Table 2.6) can be observed within the game ownership variables.

Table 2.11 Differential Inbreeding Distance Models for 232 or Fewer Games

Game Count	**Est.**	**Sig.**	**T. Prob.**
1st Quintile	0.048	***	0.276
2nd Quintile	0.000		0.270
3rd Quintile	0.013	*	0.263
4th Quintile	0.007		0.192
Distance 1	0.122	***	
Distance 2	0.176	***	
p=0.297 AIC 15.69 BIC 64.12			

Playtime Forever	**Est.**	**Sig.**	**T. Prob.**
1st Quintile	0.036	***	0.178
2nd Quintile	0.030	***	0.182
3rd Quintile	0.045	***	0.182
4th Quintile	0.003		0.207
5th Quintile	0.156	***	0.250
Distance 1	0.160	***	
Distance 2	0.166	***	
Distance 3	0.118	***	
p=0.569 AIC 22.7 BIC 85.53			

MP Game Count	**Est.**	**Sig.**	**T. Prob.**
1st Quintile	0.047	***	0.286
2nd Quintile	0.007		0.255
3rd Quintile	0.019	**	0.260
4th Quintile	0.025	**	0.190
5th Quintile	0.027	*	0.010
Distance 1	0.108	***	
Distance 2	0.181	***	
Distance 3	0.126	.	
p=0.221 AIC 26.67 BIC 91.24			

MP Proportion	**Est.**	**Sig.**	**T. Prob.**
1st Quintile	0.080	***	0.085
2nd Quintile	0.005		0.182
3rd Quintile	0.038	***	0.221
4th Quintile	0.004		0.251
5th Quintile	0.067	***	0.262
Distance 1	0.034	***	
Distance 2	0.067	***	
Distance 3	0.006		
p=0.968 AIC 18.37 BIC 82.94			

Account Age	**Est.**	**Sig.**	**T. Prob.**
1st Quintile	0.122	***	0.226
2nd Quintile	0.038	***	0.240
3rd Quintile	0.000		0.232
4th Quintile	0.062	***	0.180
5th Quintile	0.054	***	0.123
Distance 1	0.117	***	
Distance 2	0.132	***	
Distance 3	0.032		
p < 0.001 AIC 50.84 BIC 115.4			

First, when it comes to the total game count, no ties were going from or to the fifth quintile, and the difference between the inbreeding bias at D0 values (denoted as the Est. column) is considerably smaller than in the previous models. In this case, the top quintile is seven times larger than the next highest, in comparison with the fifth quintile D0 bias being almost 30 times larger than the second quintile in the differential models for the whole network (Table 2.6).

Another noticeable aspect is that target probabilities, in most cases, decrease orderly in magnitude from the first quintile to the fifth quintile. The first three variables on the left side of Table 2.10 show this trend to some extent (with *Account Age* holding the higher target probabilities in the first three quintiles and the two lowest being the fourth and fifth), the last variable *MP Proportion*, as discussed above, displays the reverse. The outlier in these models is *Playtime Forever*, which shows the order of magnitude decreasing from the fifth to the first quintile. For *Game Count, MP Game Count*, and *Account Age,* the target probabilities for the first three quintiles are almost evenly distributed (roughly 25% probability of targeting one of these three groups). This can also be appreciated in the raw counts in Table 2.9. *MP Proportion* follows the same trend but inversed, and when it comes to *Playtime Forever,* it suggests that when all distance bias events fail to occur, gamers are more likely to choose others with higher playtime over lower time spent playing.

How do these results compare to the target propensities for each quintile at each distance in the whole network? Table 2.12 and 2.13 show the probabilities of a tie forming at all distances and when all bias events fail to occur. The highlighted cells represent the highest probability for each row at each distance.

Table 2.12 Target Propensities for Distance Models for 232 or Fewer Games

Game Count	D1D	D1O	D1U	D2D	D1D	D2O	D1U	D2U
1st Quintile	NA	0.505	0.495	NA	NA	0.341	0.334	0.325
2nd Quintile	0.341	0.334	0.325	NA	0.276	0.270	0.263	0.192
3rd Quintile	0.373	0.362	0.265	0.276	0.270	0.263	0.192	NA
4th Quintile	0.578	0.422	NA	0.373	0.362	0.265	NA	NA

MP Game Count	D1D	D1O	D1U	D2D	D1D	D2O	D1U	D2U	D3D	D2D	D1D	D3O	D1U	D2U	D3U
1st Quintile	NA	0.529	0.471	NA	NA	0.357	0.318	0.325	NA	NA	NA	0.289	0.257	0.262	0.192
2nd Quintile	0.357	0.318	0.325	NA	0.289	0.257	0.262	0.192	NA	NA	0.286	0.255	0.260	0.190	0.010
3rd Quintile	0.362	0.369	0.270	0.289	0.255	0.260	0.190	0.010	NA	0.286	0.255	0.260	0.190	0.010	NA
4th Quintile	0.565	0.414	0.021	0.357	0.364	0.266	0.013	NA	0.286	0.255	0.260	0.190	0.010	NA	NA
5th Quintile	0.952	0.048	NA	0.565	0.414	0.021	NA	NA	0.357	0.364	0.266	0.013	NA	NA	NA

Account Age	D1D	D1O	D1U	D2D	D1D	D2O	D1U	D2U	D3D	D2D	D1D	D3O	D1U	D2U	D3U
1st Quintile	NA	0.484	0.516	NA	NA	0.324	0.344	0.332	NA	NA	NA	0.257	0.274	0.264	0.205
2nd Quintile	0.324	0.344	0.332	NA	0.257	0.274	0.264	0.205	NA	NA	0.226	0.240	0.232	0.180	0.123
3rd Quintile	0.369	0.355	0.276	0.257	0.240	0.232	0.180	0.123	NA	0.226	0.240	0.232	0.180	0.123	NA
4th Quintile	0.434	0.337	0.229	0.310	0.299	0.232	0.158	NA	0.226	0.240	0.232	0.180	0.123	NA	NA
5th Quintile	0.595	0.405	NA	0.434	0.337	0.229	NA	NA	0.310	0.299	0.232	0.158	NA	NA	NA

Playtime Forever	D1D	D1O	D1U	D2D	D1D	D2O	D1U	D2U	D3D	D2D	D1D	D3O	D1U	D2U	D3U
1st Quintile	NA	0.494	0.506	NA	NA	0.328	0.336	0.336	NA	NA	NA	0.238	0.243	0.243	0.276
2nd Quintile	0.328	0.336	0.336	NA	0.238	0.243	0.243	0.276	NA	NA	0.178	0.182	0.182	0.207	0.250
3rd Quintile	0.319	0.319	0.362	0.238	0.182	0.182	0.207	0.250	NA	0.178	0.182	0.182	0.207	0.250	NA
4th Quintile	0.285	0.324	0.391	0.222	0.222	0.252	0.304	NA	0.178	0.182	0.182	0.207	0.250	NA	NA
5th Quintile	0.453	0.547	NA	0.285	0.324	0.391	NA	NA	0.222	0.222	0.252	0.304	NA	NA	NA

MP Proportion	D1D	D1O	D1U	D2D	D1D	D2O	D1U	D2U	D3D	D2D	D1D	D3O	D1U	D2U	D3U
1st Quintile	NA	0.319	0.681	NA	NA	0.174	0.373	0.453	NA	NA	NA	0.115	0.246	0.299	0.340
2nd Quintile	0.174	0.373	0.453	NA	0.115	0.246	0.299	0.340	NA	NA	0.085	0.182	0.221	0.251	0.262
3rd Quintile	0.278	0.338	0.384	0.115	0.182	0.221	0.251	0.262	NA	0.085	0.182	0.221	0.251	0.262	NA
4th Quintile	0.301	0.342	0.357	0.198	0.241	0.274	0.286	NA	0.085	0.182	0.221	0.251	0.262	NA	NA
5th Quintile	0.489	0.511	NA	0.301	0.342	0.357	NA	NA	0.198	0.241	0.274	0.286	NA	NA	NA

Table 2.13 Target Propensities when Distance Biases Fail for 232 or Fewer Games

Game Count	D3D	D2D	D1D	O	D1U	D2U	D3U	
1st Quintile	NA	NA	NA	0.276	0.270	0.263	0.192	
2nd Quintile	NA	NA	0.276	0.270	0.263	0.192	NA	
3rd Quintile	NA	0.276	0.270	0.263	0.192	NA	NA	
4th Quintile	0.276	0.270	0.263	0.192	NA	NA	NA	

MP Game Count	D4D	D3D	D2D	D1D	O	D1U	D2U	D3U	D4U
1st Quintile	NA	NA	NA	NA	0.286	0.255	0.260	0.190	0.010
2nd Quintile	NA	NA	NA	0.286	0.255	0.260	0.190	0.010	NA
3rd Quintile	NA	NA	0.286	0.255	0.260	0.190	0.010	NA	NA
4th Quintile	NA	0.286	0.255	0.260	0.190	0.010	NA	NA	NA
5th Quintile	0.286	0.255	0.260	0.190	0.010	NA	NA	NA	NA

Account Age	D4D	D3D	D2D	D1D	O	D1U	D2U	D3U	D4U
1st Quintile	NA	NA	NA	NA	0.226	0.240	0.232	0.180	0.123
2nd Quintile	NA	NA	NA	0.226	0.240	0.232	0.180	0.123	NA
3rd Quintile	NA	NA	0.226	0.240	0.232	0.180	0.123	NA	NA
4th Quintile	NA	0.226	0.240	0.232	0.180	0.123	NA	NA	NA
5th Quintile	0.226	0.240	0.232	0.180	0.123	NA	NA	NA	NA

Playtime Forever	D4D	D3D	D2D	D1D	O	D1U	D2U	D3U	D4U
1st Quintile	NA	NA	NA	NA	0.178	0.182	0.182	0.207	0.250
2nd Quintile	NA	NA	NA	0.178	0.182	0.182	0.207	0.250	NA
3rd Quintile	NA	NA	0.178	0.182	0.182	0.207	0.250	NA	NA
4th Quintile	NA	0.178	0.182	0.182	0.207	0.250	NA	NA	NA
5th Quintile	0.178	0.182	0.182	0.207	0.250	NA	NA	NA	NA

MP Proportion	D4D	D3D	D2D	D1D	O	D1U	D2U	D3U	D4U
1st Quintile	NA	NA	NA	NA	0.085	0.182	0.221	0.251	0.262
2nd Quintile	NA	NA	NA	0.085	0.182	0.221	0.251	0.262	NA
3rd Quintile	NA	NA	0.085	0.182	0.221	0.251	0.262	NA	NA
4th Quintile	NA	0.085	0.182	0.221	0.251	0.262	NA	NA	NA
5th Quintile	0.085	0.182	0.221	0.251	0.262	NA	NA	NA	NA

At D1, the first three variables were more likely to choose someone who was part of a group below them, in comparison to the whole network where they would either choose their own or someone above. For the two game counts variables (total and MP), the first quintile showed a higher preference towards choosing someone from their group versus someone in a group above (second quintile). At D2 for the total game count, all groups show a higher preference towards the first quintile over all other options. As suggested by these probabilities,

when it comes to all distance biases failing to occur (Table 2.13) for both game counts, all groups have a higher preference towards choosing the first quintile.

When it came to *Playtime Forever*, gamers overall had a preference towards others of higher-ranked groups at all three distances, with some exceptions (see second quintile D1, preferred their own group over others). This is similar to what was shown in the whole network results. The main difference being that the dynamics within the whole network showed the first quintile had a higher propensity towards their own group from D1-D3, and the next two quintiles had a higher preference towards the first quintile over the other options. In the subnet, starting at D3, we observe that each group prefers the highest possible ranked group over all others, and when all distance bias events fail to occur the fifth quintile was the preferred group of choice. Overall, the whole network seems to suggest a higher preference towards similar others than the subnet. When considering all distances and failure of all distance biases, there were 30 occasions in which a quintile would have a higher propensity towards their own group in comparison to the subnet with 21 situations that prompted targeting similar others.

DISCUSSION

Throughout this chapter, I explored the structure and tie forming tendencies within a randomly sampled Steam (large-scale gaming based OSN) friendship network. The analysis is limited to the data that is publicly available through their API. Thus, it would be wrong to assume that there are no unknown dynamics behind the scenes at play. However, interesting trends were identified and compared to previous studies of similar networks. Additionally, bias net models were employed in order to observe the propensity of ties forming across groups at different levels of similarity/dissimilarity.

In general, most groups (i.e., continuous variables aggregate into quintiles) showed preference towards similar others when considering the differential inbreeding models (Tables 2.5 and 2.10). However, when considering the whole network, the top quintile (first quintile in *MP Game Prop*) had substantially higher bias than all other categories. As discussed in the results section, this quintile contained many ties among their own group, populated by game collectors. When it came to the only categorical variable, i.e., continental region, a more balanced distribution of propensity towards one's own group was observed.

Overall, homophily effects were identified throughout the network at different characteristics and distances. As mentioned above, we are limited by the available data and cannot assume that these are the only player characteristics at play that rule over the formation of friendships in this network. Future research should focus on identifying gamers and their network of friends that would be willing to offer extra information regarding their socio-cultural characteristics, and community memberships (the Steam API only offers the ID for the primary community group joined by each profile). Additionally, keeping journals or finding a way of tracking interactions between dyads would be beneficial in measuring the meaningfulness of a relationship between two gamers. In the next sections of this multifaceted project, I present a look at how online gamers compare their offline contacts with their online contacts.

REFERENCES

Baumann, F., Emmert, D., Baumgartl, H., & Buettner, R. (2018). Hardcore Gamer Profiling: Results from an unsupervised learning approach to playing behavior on the Steam platform. *Procedia Computer Science, 126*, 1289-1297. Retrieved from http://www.sciencedirect.com/science/article/pii/S1877050918313565. doi:https://doi.org/10.1016/j.procs.2018.08.078

Becker, R., Chernihov, Y., Shavitt, Y., & Zilberman, N. (2012, 14-17 Nov. 2012). *An analysis of the Steam community network evolution.* Paper presented at the 2012 IEEE 27th Convention of Electrical and Electronics Engineers in Israel.

Blackburn, J., Kourtellis, N., Skvoretz, J., Ripeanu, M., & Iamnitchi, A. (2014). Cheating in Online Games: A Social Network Perspective. *ACM Trans. Internet Technol. ACM Transactions on Internet Technology (TOIT), 13*(3), 1-25.

Blau, P. M. (1977). A Macrosociological Theory of Social Structure. *American journal of sociology, 83*(1), 26-54. Retrieved from http://www.jstor.org/stable/2777762.

Bui, T. (2019). Steam - 2018 Year in Review. *Steamworks Development.* Retrieved from https://steamcommunity.com/groups/steamworks/announcements/detail/1697194621363928453

Crawford, G., Gosling, V. K., & Light, B. (2011). The social and cultural significance of online gaming. In G. Crawford, V. K. Gosling, & B. Light (Eds.), *Online gaming in context: the social and cultural significance of online games* (pp. 3-22). London; New York: Routledge.

Csardi, G., & Nepusz, T. (2006). The igraph software package for complex network research. Retrieved from https://igraph.org/r/

Drachen, A. (2015). Behavioral Telemetry in Games User Research. In R. Bernhaupt (Ed.), *Game User Experience Evaluation* (pp. 135-165). Cham: Springer International Publishing.

Drachen, A., Sifa, R., Bauckhage, C., & Thurau, C. (2012, 11-14 Sept. 2012). *Guns, swords and data: Clustering of player behavior in computer games in the wild.* Paper presented at the 2012 IEEE Conference on Computational Intelligence and Games (CIG).

El-Nasr, M. S., Drachen, A., & Canossa, A. (2013). *Game Analytics: Maximizing the Value of Player Data*: Springer London.

Entertainment Software Association. (2019). *2019 Essential Facts About the Computer and Video Games Industry*. Retrieved from https://www.theesa.com/wp-content/uploads/2019/05/ESA_Essential_facts_2019_final.pdf

Fire, M., & Guestrin, C. (2019). The rise and fall of network stars: Analyzing 2.5 million graphs to reveal how high-degree vertices emerge over time. *Information Processing & Management*, undefined-undefined. Retrieved from https://browzine.com/articles/311521945. doi:10.1016/j.ipm.2019.05.002

Handcock, M. S., Hunter, D. R., Butts, C. T., Goodreau, S. M., Krivitsky, P. N., Bender-deMoll, S., & Morris, M. (2014). statnet: Software tools for the Statistical Analysis of Network Data: The Statnet Project. Retrieved from http://www.statnet.org

Huckfeldt, R. R. (1983). Social Contexts, Social Networks, and Urban Neighborhoods: Environmental Constraints on Friendship Choice. *American journal of sociology, 89*(3), 651-669. Retrieved from http://www.jstor.org/stable/2779008.

Karpiński, Z. (2017). Advances in the attraction model for inter-group relations. *Mathematical Social Sciences, 89*, 109-118. Retrieved from http://www.sciencedirect.com/science/article/pii/S0165489616301111. doi:https://doi.org/10.1016/j.mathsocsci.2017.04.006

Karpiński, Z., & Skvoretz, J. (2015). Repulsed by the "Other": Integrating Theory with Method in the Study of Intergroup Association. *Sociological Theory, 33*(1), 20-43. Retrieved from https://doi.org/10.1177/0735275115572687. doi:10.1177/0735275115572687

Lanier, L. (2019, April 30th). Steam Now Has One Billion Accounts (And 90 Million Active Users). *Variety*. Retrieved from https://variety.com/2019/gaming/news/steam-one-billion-accounts-1203201159/

Lazarsfeld, P. F., & Merton, R. K. (1954). Friendship as a social process: A substantive and methodological analysis. *Freedom and control in modern society, 18*(1), 18-66.

Magno, G., Comarela, G., Saez-Trumper, D., Cha, M., & Almeida, V. (2012). *New kid on the block: exploring the google+ social graph*. Paper presented at the Proceedings of the 2012 Internet Measurement Conference, Boston, Massachusetts, USA.

Marsden, P. V. (1987). Core Discussion Networks of Americans. *American Sociological Review, 52*(1), 122-131. Retrieved from http://www.jstor.org/stable/2095397. doi:10.2307/2095397

McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a Feather: Homophily in Social Networks. *Annual Review of Sociology, 27*(1), 415-444. Retrieved from https://www.annualreviews.org/doi/abs/10.1146/annurev.soc.27.1.415. doi:10.1146/annurev.soc.27.1.415

O'Neill, M., Vaziripour, E., Wu, J., & Zappala, D. (2016). *Condensing Steam: Distilling the Diversity of Gamer Behavior*. Paper presented at the Proceedings of the 2016 Internet Measurement Conference, Santa Monica, California, USA.

Ooka, E., & Wellman, B. (2006). Does social capital pay off more within or between ethnic groups? Analyzing job searchers in five Toronto ethnic groups. *Inside the mosaic*, 199-226.

Pirker, J., Rattinger, A., Drachen, A., & Sifa, R. (2018). Analyzing player networks in Destiny. *Entertainment Computing, 25*, 71-83. Retrieved from http://www.sciencedirect.com/science/article/pii/S1875952117301350. doi:https://doi.org/10.1016/j.entcom.2017.12.001

R Core Team. (2019). R: A Language and Environment for Statistical Computing. Vienna, Austria: R Foundation for Statistical Computing. Retrieved from http://www.R-project.org/

Sifa, R., Bauckhage, C., & Drachen, A. (2014, 26-29 Aug. 2014). *The Playtime Principle: Large-scale cross-games interest modeling.* Paper presented at the 2014 IEEE Conference on Computational Intelligence and Games.

Sifa, R., Drachen, A., & Bauckhage, C. (2015). *Large-scale cross-game player behavior analysis on steam.* Paper presented at the Eleventh Artificial Intelligence and Interactive Digital Entertainment Conference.

Skvoretz, J. (1983). Salience, Heterogeneity and Consolidation of Parameters: Civilizing Blau's Primitive Theory. *American Sociological Review, 48*(3), 360-375. Retrieved from http://www.jstor.org/stable/2095228. doi:10.2307/2095228

Skvoretz, J. (1990). Social Structure and Intermarriage: A Reanalysis. In C. Calhoun, M. W. Meyer, & W. R. Scott (Eds.), *Structures of power and constraint : papers in honor of Peter M. Blau* (pp. 375-396). Cambridge: Cambridge University Press.

Skvoretz, J. (1991). Theoretical and methodological models of networks and relations. *Social Networks, 13*(3), 275-300. Retrieved from http://www.sciencedirect.com/science/article/pii/037887339190009I. doi:https://doi.org/10.1016/0378-8733(91)90009-I

Skvoretz, J. (2013). Diversity, Integration, and Social Ties: Attraction versus Repulsion as Drivers of Intra- and Intergroup Relations. *American journal of sociology, 119*(2), 486-517. Retrieved from http://www.jstor.org/stable/10.1086/674050. doi:10.1086/674050

Ugander, J., Karrer, B., Backstrom, L., & Marlow, C. (2011). The anatomy of the facebook social graph. *arXiv preprint arXiv:1111.4503*.

CHAPTER 3 QUESTIONNAIRE

INTRODUCTION

This study traces the boundaries of online-based social networks and its possible extensions and intersections with offline social networks. It seeks to comprehend social ties in online gaming communities, specifically Massive Multiplayer Online Games (MMOGs), and the process of identity management/self-presentation for those who are avid members of said communities. Most online gaming community studies have focused on the virtual aspect without seriously considering the intersection between the online and offline lives of the participants. Researchers have mainly focused on conducting most of their work in the virtual world (i.e., primarily via the use of virtual ethnographic methods), and have not paid much attention to the implications on the other side of the screen.

The over-arching inquiry that guides this study addresses the differences and similitudes between online gamer's offline and online networks, which is condensed into two main research questions. What is the difference between online gamers' top three online gaming social ties and their top three offline friendship ties? How do both ego networks (online and offline) relate to social relationship management techniques (e.g., the frequency of contact, desire or willingness to interact, sharing personal matters and information, asking for advice and/or support, and quality of relationship)?

In the last decade, gaming has become more popular, including gaming consoles, personal computers, and mobile devices. It is safe to assume that "gaming forms an important part of (at least some) peoples' everyday lives and identities, and is important and worthy of academic consideration"(Crawford, Gosling, & Light, 2011, p. 66). This is evident when we look at millennials, those of us who came of age with digital technologies for learning, primarily gaming (Franetovic, 2012), that gave us access to the World Wide Web. Gaming has been studied as a key activity in the process of growing up in a digitized society and as a potential tool for enhancing learning (Martin & Ewing, 2008; Westman & Bouman, 2006). With over a decade of research, others have examined the development of the self in the digital age (Davis, 2014; Hogan, 2010; Robinson, 2007) but have not engaged with gaming among millennials. This work brings these two lines of research together. It examines how MMO gamers, mostly millennials, manage their digital and non-digital interactions and relationships as a critical component of their friendship social networks.

The MMO community is of particular importance when considering that some players go beyond the game-scape by participating in extraneous activities (e.g., communicating with fellow players outside the game's interface; having a blog or forum; and meeting physically with other players). This group of gamers, those that play collaborative MMOs, is of interest due to the high requirement of social interaction evoked by these virtual spaces. That is, online gaming usually requires that players seek out help, get organized, and work together on a common goal or objective (Zhu, Huang, & Contractor, 2013). Also, these interactions occur in real-time and fast-paced scenarios, quite the opposite of other online interactions most of us take part in (e.g., e-mails, social media that in most cases allow for a more reflective reaction.

In online gaming, each particular situation can alter the tone (e.g., work environment – working together to achieve a common goal; socializing – hanging out with friends/acquaintances) which can be a similar experience to everyday face-to-face social interactions. On the other hand, interactions on Online Social Networks Sites (OSNSs), like Facebook, are paused, depict ephemeral snapshots, and most responses are well thought out. These types of real-time interactions, in MMO related scenarios, prompt individuals to be more reactive in their identity management.

It is assumed that these terms, offline/online, are not opposites or entirely independent of each other. They are part of a continuum of self-negotiation. This perspective is even more salient when gamers consume and participate in the production of the virtual world, a process Jenkins (2006, p. 33) calls "participatory culture." Thus, offline/online are intricately connected. Symbolic interactions and meaning-making can sway back and forth wittingly or unwittingly, but they are tied to the individual.

Although some scholars have argued that the online self is an extension of the offline self and that there is no clear distinction (Boellstorff, 2008; Castronova, 2005; Crawford et al., 2011; Meredith, 2014; Taylor, 2006); in-depth studies regarding the implications of managing online/offline social networks and negotiating the gamers actual-virtual selves are lacking.

LITERATURE REVIEW

GAMING RESEARCH

MMOs are widespread, with hundreds maybe thousands of virtual worlds with active communities throughout the globe (MMOSite, 2017), which are inhabited by millions of people (see MMOdata, 2014) from different sociocultural backgrounds. SuperData, a research organization that provides a market analysis of video games, reported that during 2016, MMOs

earned $19.8B worldwide (SuperData-Research, 2016). This is worthy of academic attention, mainly when MMO gamers engage their virtual presence with a part-time job work ethic by committing about 22 hours per week (McGonigal, 2010). On the other hand, looking at the market research, SuperData reports that adult (average age 33; average income $56k; and the population is 39% female and 61% male) MMO players spend about 10 hours in-game per week (SuperData-Research, 2016).

As video gaming has become more accepted, media scholars have started looking at sociological concepts within video games interaction as motivation, social capital, and social support (Hau & Kim, 2011; Hsu & Lu, 2007; Snodgrass et al., 2012; Tseng, 2011; Yee, 2006). However, most research has focused on the online side of the spectrum, providing a fertile exploration niche for understanding better the dynamics between the gamers offline and online worlds.

Virtual worlds are here to stay, and every year, their complexity increases. They have the advantage of offering new places of sociocultural and socio-spatial interactions without leaving your seat. Thus, we can assume that there are sociocultural exchanges and dynamics in play, as Boellstorff (2008, p. 54) suggests: “it is clear that concepts and practices from the actual world are being brought into them.” That is, players, bring with them their sociocultural baggage (MacCallum-Stewart, 2011), thus solidifying the virtual as a dynamic sociocultural field worthy of scholarly attention. Several studies suggest that social dynamics in online gaming are remarkably robust and similar to real-world communities (Jiang, Zhou, & Tan, 2009; Johnson et al., 2009; Szell & Thurner, 2010). Others have suggested that the way ad hoc groups form in-game is similar to the way project teams are assembled offline (Zhu et al., 2013). Therefore, for players to fully enjoy the online experience, “individuals must either make friends with people in

the game or bring existing relationships into the game" (Beyer, 2014, p. 84). This leads us towards the literature on friendships, in particular, those that compare online and offline environments.

ONLINE & OFFLINE FRIENDSHIPS

Computer-mediated communication (CMC) has been in the crosshair of research since the Internet started becoming an accessible service to households in the mid-90s. Several theories regarding how relationships form and develop through CMC suggest that this happens at a slower rate than in an offline environment (Walther, 1995, 1996). This not necessarily entails that CMC relationships cannot become as meaningful as face-to-face. Instead, research has found that it just slows down the process (Antheunis, Valkenburg, & Peter, 2012; Chan & Cheng, 2004). Still, as we will see, most of these studies have been done in Social Network Sites (SNSs) like Facebook, which not necessarily cover how MMO relationships are experienced.

In general, several impact factors determine the quality of friendships, which stem from offline friendship studies (Antheunis et al., 2012), can be applied to online relationships. First, we have *proximity*, as seen in Hays (1985). *Proximity* refers to the physical distance between egos (refers to the individual being studied) and alters (refers to ego's ties). Then we have *similarity*, which refers to how similar two people are considering their interests and attitudes. *Similarity* seems to be one of the most critical factors, especially when it comes to online relationships (Antheunis et al., 2012) and when there is an exposure effect (i.e., the amount of interaction). The stronger the *similarity* between social ties the more meaningful the relationship (Mesch & Talmud, 2007; Reagans, 2005); and the more exposure, the higher the feeling of *proximity* is even when there is a geographical separation between the individuals. The last factor

is *social attraction*, which entails how the potential tie is perceived to fit in with the current lifestyle of the ego (McCroskey & McCain, 1974).

Several studies have examined the notion of friendship online and how networks develop over time, but most of these studies scratch the surface: they focus on a single OSNS service by collecting publicly available data on social ties. For example, Valafar, Rejaie, and Willinger (2009) looked at the evolution of ties on Flickr, a photo-sharing OSNS. They collected network data regarding photo ownership (i.e., the person who posted the photo and the photo itself) and the person who liked or became a fan of these pictures. The limitation with this type of approach is that the concept of friendship becomes somewhat malleable; we cannot safely claim that declared fans are friends of the owners or vice versa. These interactions, although valuable in the sense of understanding OSNSs' network patterns, structures, and for producing prediction models (Lee & Lim, 2016), lack valuable information regarding friendship ties and what they mean to the actors. Others have followed similar approaches to study interactions on more dynamic networks such as gaming OSNS XFire (Shen & Iosup, 2011) and Twitter (Yuan et al., 2016).

Few studies attempt to address this gap (i.e., the meaningfulness of online friendships), primarily when ties are developed and sustained online. One of the most recognized articles, regarding this topic, seems to be a study conducted by Chan and Cheng (2004) in Hong Kong with a sample of 162 Internet users. Their objective was to elicit information about two friendly relationships from each participant's network, one a face-to-face, and the other online. Using self-reported data, the authors looked at and compared connections using the current duration of each (i.e., relationships were groups by 1-4 months, 5-12 months, and over one year). Their findings suggest that time is the essential factor when it comes to online or offline friendships,

but they make note that online friendships take more time to develop. Another significant finding from their study is that online cross-sex friendships seem to be of higher quality than their offline counterparts. One thing we must consider is that this research was conducted in the early 2000s, which means that the Internet was not as ubiquitous as it is now (e.g., smartphones and affordable mobile data networks). Online communication becomes more fluid and accessible every year; thus, it would be safe to say that online friendship dynamics have changed and if a similar study were to be conducted today it would render different results.

A frequent discussion in the online vs. offline relationship literature is the difference in quality and engagement. Studies (Chan & Cheng, 2004; Mesch & Talmud, 2006) suggest that online relationships spend less time together and consequently participate in fewer activities than their offline counterparts. As aforementioned, technological advances in the last decade have revolutionized the online landscape (i.e., there are more ways of interacting online, including group activities, that were not readily available a couple of years back). One such niche that has the potential for fostering meaningful social connections can be found in online gaming, MMOs in particular. These type of games favor collaborative play, and gaming with friends usually translates to better team performance (Mason & Clauset, 2013) and possibilities of enriching offline social connections (Nardi & Harris, 2006).

There has been a handful of studies regarding online and offline social networks with OSNSs (e.g., Facebook). These type of websites provide the users with a more controlled way of projecting themselves to their peers (boyd & Ellison, 2007), in a sense they "type oneself into being" (Sundén, 2003, p. 3). Another problematic concept when studying these types of social networks is how the user defines friendship. Having a tie with someone on Facebook not necessarily means that connection has the same weight as someone you call friend offline (boyd,

2006). People connect on these websites for different reasons. Thus, there is a need to understand the meaningfulness of those ties better. Ellison, Steinfield, and Lampe (2007) found that OSNSs, like Facebook, are mainly used to keep or to strengthen offline relations, it is also used to form weak ties with friends of friends or people that the user has met face-to-face but does not interact with on a daily basis. Users rarely search for strangers (Lampe, Ellison, & Steinfield, 2006; Steinfield, B., & Cliff, 2008; Subrahmanyam, Reich, Waechter, & Espinoza, 2008).

These studies suggest that the user experiences on these OSNSs are not tailored towards meeting new people, i.e., at least that is not how members are using them. Instead, the focus is on maintaining strong ties (current friendship circle) and weak ties (the periphery of your friendship circle). A noteworthy aspect of having access to online communication with current and new ties is the easiness of keeping in contact. OSNSs are likely to increase the meaningfulness of social ties (Subrahmanyam et al., 2008) and also serve as a predictor of bonding social capital between individuals (Ellison, Steinfield, & Lampe, 2011; Ellison et al., 2007).

Moving on to social ties in online gaming, there is a handful of studies that have attempted to address the gap of in-game and in-real-life relationships (e.g., Mason & Clauset, 2013; Nardi & Harris, 2006; Xu, Cao, Sellen, Herbrich, & Graepel, 2011). Although these articles discuss to some extent the topic at hand, it is not their primary objective. The main discussion is focused on gameplay experience and overall performance when playing or not playing with friends. Still, they provide helpful information. For example, Mason and Clauset (2013) found that if a pair of gamers considered themselves both online and offline friends, they played together the most in comparison to the pairs that just reported being friends in an online environment. They also highlighted that gamers preferred to play with friends over playing alone. Thus, online gaming presents itself as a platform for socialization, where users “reinforce

their real life relationships" (Xu et al., 2011, p. 205) and form new relationships online, by maintaining both weak and strong ties through the shared experience of gameplay (Nardi & Harris, 2006; Taylor, 2006).

When addressing World of Warcraft in her book *Expect Us: Online Communities and Political Mobilization*, Beyer (2014, p. 76) suggests that the type of relationships we see developing in MMOs are mostly "individual-level social relationships." Thus, these ties have more of a chance of becoming meaningful connections for gamers and transcending the online environment. On the other hand, Yee (2007) found that around 70% of WoW members play with someone they know offline, they have developed meaningful friendships with other online gamers, and they similarly qualify these as offline relations. The online gaming environment not only helps in maintaining offline ties, but it is also a place to find new relations, ties that can transcend and become online-offline mixed-mode relationships.

Also, most, if not all, of the discussed works look at social interactions in a single game (e.g., Halo Reach – a Multiplayer First Person Shooter; and World of Warcraft – a popular MMO RPG), and mostly focus on how social ties affect the gameplay experience. What is of particular interest for this study is understanding both the online and offline relational aspects of these social ties (Shklovski, Barkhuus, Bornoe, & Kaye, 2015). Moreover, inquiring about online ties seeping offline and offline ties flowing online, by paying close attention to the negotiation process (both personal and shared).

FRAMEWORK AND DEVELOPMENT OF ANALYTICAL CONCEPTS

SYMBOLIC & SOCIAL BOUNDARIES

The discussion in the previous section brings us to the notion of liminality between the outside and the game-scape mentioned in the introduction. It is essential to note the social

boundaries, and how they interact, converge, diverge, and get translated between two distinct spheres of socio-cultural interaction. Hence, there is an essential aspect of being an active gamer, which seems to be lacking in the current literature, of looking at this schism between worlds. One way of addressing this gap is by taking a glance at social boundaries.

Lamont and Molnár (2002) identified two specific categories of boundaries that encompass the method of organization, i.e., differentiation, in the cultural process. First, "symbolic boundaries," which are described as the ways social actors define and interpret reality, their motives for their worldviews. Symbolic boundaries are essential in creating subcultures or specialized groups, in which people share common motivations and orientations towards their actions in the social world. The second category is that of "social boundaries." This category presents itself as a more concrete set of boundaries. These limits are tied to the level of access individuals have to specific resources, which can hinder or expand sociocultural opportunities. Both categories are highly intertwined, and each can influence the other.

This concept of boundary work serves as a useful analytical category for the topic at hand since I am looking at individuals' social networks both online and offline, and how they traverse between the spheres of their online lives and their offline lives. This implies being aware of the production, reproduction, and translation of symbolic and social boundaries. These limits rely on somewhat rigid, yet malleable, sociocultural structures that guide how we perceive and interpret the world. Applying them might give us a better understanding of the social dynamics in virtual worlds, and how these interactions can be influenced by and at the same time, influence our actual lived experiences.

Examples of these boundary transferences between online and offline can be observed when players partake of real money transactions (e.g., selling player-created content), when

offline life stereotypes are employed (e.g., racial, ethnic, and/or gender biases), and when common social practices are acted/reciprocated upon (e.g., the nature of obligation and gift-giving, courtship, and making friends).

SOCIAL CAPITAL ONLINE-OFFLINE

Bourdieu's (1984) concept of social capital is of utmost significance when considering social networks of individuals. Mainly, we ought to pay attention to Putnam's (2000) expansion of social capital, in which he includes the concepts of bonding and bridging. Bonding encompasses the benefits received from close social relationships, including but not limited to "emotional support, physical succor, or other large benefits" (Ellison et al., 2011). Therefore, this would translate to sharing personal information, asking for support and/or advice, and providing the same for their friends. The concept of bridging takes into account the notion of "the strength of weak ties" developed by Granovetter (1973). These two similar concepts address the benefits of lower-level relationships like acquaintances. These lesser leveled relationships provide the individual access to a broader view and to different information to what he/she is used to (Ellison et al., 2011). This becomes an essential aspect of online relationships since our access to technology multiplies our reach, thus, making us able to connect to others throughout the world and breaking out of our close-knit geographical, social networks.

DATA AND METHODS

Data for this study comes from an online questionnaire created by the author. Participants (18 years or older) were recruited through several online mediums (e.g., forums, subreddits, gaming communities). Aside from collecting basic demographic data, participants were asked to name the top six ties they interact with the most (excluding family members), three stemming from an online gaming environment and three from offline interactions. One participant only

mentioned two ties for the online category; all others provided a total of six connections. Once entered, the respondents were prompted to answer several name interpreter items regarding each relation. Participants were able to report the same person as both online and offline, 113 out of 1452 (7.70%) alters fell under this category. As opposed to previously mentioned studies regarding OSNSs, the data suggest that when in an online gaming environment respondents' networks are mostly composed of online ties. Since this mixed-mode ties represent a small section of the sample, they were not considered for the analyses that follow. The aim is to compare online and offline relations, although mixed-mode relationships are an essential concept, the lack of data does not allow for fair statistical comparison.

A total of 242 gamers completed the survey. For analytical purposes, two datasets were created. The first one contains the 242 participants as cases, and the second, which most analyses were based on, has the alters (n = 1339) as cases. Both datasets included the same information. The purpose of this transformation was to be able to run regression models to test how different aspects affect the meaningfulness of relationships, either online or offline. See Table 3.1 for a condensed descriptive composition of the sample.

Of interest were the variables that measured interaction time and asked participants to qualify each relationship. An acceptable variable reliability (Cronbach's $\alpha = 0.74$) was found between weekly interaction hours and voice chat, relationship type (from acquaintance to very good friends), importance of relationship (from not at all important to extremely important), personal knowledge of tie (1 to 7), and ranking (from least significant = 1 to most significant = 6).

As we can see from Table 3.1, there are some similarities with previously cited works (see SuperData-Research, 2016) regarding the gamer population (i.e., average age and the

distribution of male and female). Age ranged from 18 to 76. About 27% of the participants had a bachelor's degree, and 29% had some college, but no degree, about 65% had a paying job, most were single (60.30%), and regarding household income, most were distributed among the first four choices. When it comes to time spent playing MMOs per week, about 40% said they play every day, 42% play two to six days, 9.5% stated they play once a week and 8.7% less than once per week (see Table 3.2).

Table 3.1 Descriptive Statistics of Sample

Variables & Categories	Mean or %	(SD)	Variables & Categories	Mean or %
Age (in year)	32.64	-12.67	***Employment Status***	
Gender			Full-time	48.30%
Male	64.00%		Part-time	14.00%
Female	34.70%		Unemployed - looking for work	6.60%
Other	1.20%		Unemployed – not looking for work	0.40%
Race/Ethnicity			Student	18.20%
White non-Hispanic	70.70%		Retired	3.70%
Black non-Hispanic	9.10%		Homemaker	5.00%
Latino/Hispanic	7.40%		Self-employed	2.90%
Asian	9.50%		Unable to work	0.80%
Middle Eastern	1.20%		***Marital Status***	
Other	2.10%		Single, never married	60.30%
Education			Married or domestic partnership	34.30%
Less than a high school diploma	2.10%		Widowed	0.40%
High school degree or equivalent	17.40%		Divorced	4.10%
Some college, no degree	29.30%		Separated	0.80%
Associate degree	15.30%		***Household Income***	
Bachelor's degree	26.90%		Less than $20k	12.80%
Master's degree	8.30%		$20k to $34,999	22.30%
Professional degree	0.40%		$35k to $49,999	14.90%
Doctorate	0.40%		$50k to $74,999	19.80%
			$75k to $99,999	9.10%
			Over $100k	9.90%
			Prefer not to say	11.20%

Table 3.2 MMO Related Descriptive Statistics

Variables & Categories	Percent
Play MMOs per Week	
Every day	39.80%
Two to six times	41.90%
Once	9.50%
Less than once	8.70%
Time playing MMOs	
Less than a year	4.60%
One to three years	19.90%
Four to six years	26.10%
Seven to 10 years	20.70%
11 years or more	28.60%

Most collected variables were either ordinal or nominal, except age and a computed variable which added the self-reported general knowledge of each alter from a seven-item list (zero minimum and seven max). Several chi-square analyses using crosstabs were conducted to gain a basic familiarity with the data. Afterward, regression and interaction models were constructed. A *p-value* of 0.05 was considered significant. Statistical analyses were conducted in SPSS 25 (IBM Corp., 2017).

FINDINGS

The primary interest of this work is to examine the differences between offline and online networks of MMO gamers. Going from simple to more sophisticated analyses, first, I look at the results from a chi-square test regarding the significance of each relationship for the respondent and using the "type of tie" (offline or online) as an independent variable. The test suggests that there is a significant difference ($p < 0.001$) between online and offline ties when it comes to the importance mentioned by the respondent. In this case, offline ties, in general, are considered more important than online (see Table 3.3). There is a marked difference at both ends of the spectrum, the bottom two options ("Not at all important" and "Slightly important") for online ties have approximately double the proportion of those for offline and at the top option ("Extremely important") there is about a 13% difference in favor of offline ties. The middle

options (“Moderately important” and “Very important”) do not show much of a difference. It was expected that the difference in importance of relationships would be less noticeable. This assumption was mainly constructed, considering that we are continuously online via a plethora of devices.

Table 3.3 Importance of relationship by type of tie Offline/Online Crosstabulation

			Type of tie		
			Online	Offline	Total
Importance of relationship	Not at all important	Count	56	27	83
		% within Type of tie	8.5%	4.1%	6.3%
	Slightly important	Count	104	61	165
		% within Type of tie	15.8%	9.2%	12.5%
	Moderately important	Count	179	143	322
		% within Type of tie	27.1%	21.5%	24.3%
	Very important	Count	153	180	333
		% within Type of tie	23.2%	27.1%	25.2%
	Extremely important	Count	168	253	421
		% within Type of tie	25.5%	38.1%	31.8%
Total		Count	660	664	1324
		% within Type of tie	100.0%	100.0%	100.0%

χ^2 44.70 p<.001

In a previously cited work (Chan & Cheng, 2004), they found the length of the relationship to be a determining factor for meaningfulness. Thus, we move on to look to add an extra layer to our analysis (time known tie). A caveat, there was a limitation during the distribution of the questionnaire, length of relationship was not recorded for all offline ties. This makes it somewhat challenging to make a fair comparison. Still, looking at the available data, the length of the relationship does impact meaningfulness for the online ties. When controlling for length of relationship “four years or more,” the difference observed in Table 3.3 disappears. The difference between the online and offline categories that fall under “Extremely important” is not statistically significant (see Table 3.4).

When it came to categorizing type of relationship with each tie, there was no significant difference between female and male participants. For gender, both had similar distribution when it came to play-time per week, with the exception that there was a larger group of males that played less than once a week (15.5% males vs. 9.5% females).

Table 3.4 Importance of relationship by type of tie Offline/Online Crosstabulation Known Online for Four Years or More

			Type of tie		
			Online	Offline	Total
Importance of relationship	Not at all important	Count	8	27	35
		% within Type of tie	2.5%	3.8%	3.4%
	Slightly important	Count	21	61	82
		% within Type of tie	6.5%	8.5%	7.9%
	Moderately important	Count	92	155	247
		% within Type of tie	28.3%	21.6%	23.7%
	Very important	Count	89	199	288
		% within Type of tie	27.4%	27.7%	27.6%
	Extremely important	Count	115	277	392
		% within Type of tie	35.4%	38.5%	37.5%
Total		Count	325	719	1044
		% within Type of tie	100.0%	100.0%	100.0%

χ^2 **0.213**

Considering all online ties mentioned by all participants, about 47.9% of those ties had met the respondent face-to-face (n=316). Regarding those they have not yet met face-to-face (n=344), most participants (n=219, 63.7%) reported that they would be willing to meet with their counterparts.

It is more likely that offline ties are identified as more important than online relations (see Table 3.5). When it comes to the two extreme options in the relationship importance variable, online links are more likely to be considered “not important at all” and less likely to be “extremely important.”

The final question of the questionnaire asked participants to order their ties from most significant to least significant. There is a significant difference between online and offline ties

when it comes to how they were ranked. The polar items are the ones that show the most difference (least significant having more online ties and most significant having more offline ties). More than half of the offline ties (55.3%) were in the top three, while 43.3% of all online ties were considered to be on the top category (see Table 3.6). As expected, a logistic regression of these variables showed that offline ties were more likely to be considered for a position on the respondents top three ranks with an odds ratio of 1.776 at a p-value <.001.

Table 3.5 Logistic Regressions for Relationship Dummy Variables and Type of Tie

Not Important at all					Extremely Important				
	B	S.E.	Sig.	Exp(B)		B	S.E.	Sig.	Exp(B)
Online tie	0.793	0.273	**	2.210	Online tie	-0.544	0.138	***	0.580
Constant	-3.135	0.223	***	0.043	Constant	-0.528	0.092	***	0.590

**p<.01 ***p<.001

Table 3.6 Top three ties * Type of Tie

			Type of tie		
			Online	Offline	Total
Top three ties	No	Count	379	300	679
		% within Type of tie	56.7%	44.7%	50.7%
	Yes	Count	289	371	660
		% within Type of tie	43.3%	55.3%	49.3%
Total		Count	668	671	1339
		% within Type of tie	100.0%	100.0%	100.0%

χ^2 19.373 p<.001

When it came to the overall knowledge of each tie, a computed variable was used. This variable added one point for each specific information participants knew about their ties. It includes location, gender, age, race/ethnicity, education/occupation, marital status, and if the individual had any children or not. Overall, participants knew more about their offline ties than their online ones. For offline relationships, 72% scored the max (7) while only 39.8% of online ties had that same score. Gender and race did not influence knowledge; both men and women

reported a similar quantity of knowledge for their connections. Having shared personal matters, life events, and asked for advice or support increases the likelihood of knowing more specific information about a tie (see Table 3.7).

Table 3.7 Linear Regression Model for Added Knowledge

	Unstandardized Coefficients		
	B	S.E.	
Constant (knowledge)	3.841	0.131	***
Online tie	-0.809	0.115	***
Asked for advice or support	0.438	0.127	**
Discussed personal matters	1.211	0.128	***
Discussed life events	1.336	0.121	***

**p<.01 ***p<.001

Similar results were observed when the variable "friendship level" is used (Acquaintance/Friend and Good/Very good friend). The difference between online and offline ties is not significant when considering interaction time and knowledge of tie (see Table 3.8). For the third model in Table 3.8, variables were entered using a conditional drop method. Thus, non-significant variables (i.e., they did not improve the model) were not considered at the end. Interaction hours per week have a stronger effect on online ties than offline ties. As hours of interaction increase, online ties have a higher likelihood of being considered very important than offline ties. Still, online ties start at a disadvantage with a negative coefficient. As observed in previous tests, offline ties are more likely to be considered "good or very good friends."

When comparing intercepts, there is a coefficient difference of 2.207. However, if we consider the mentioned variables of interaction, that difference goes down to 0.395. As we move through the three models, the gap shrinks in comparison to the initial start point for both groups.

Table 3.8 Logistic Regressions for online and offline subsets: constant relationship type, hours of interaction, hours of voice chat (online only), personal knowledge of tie, asking for advice or support, and discussing personal matters and life events

Model 1					Model 2					Model 3				
Online ties														
Variable	B	S.E.		Exp(B)	Variable	B	S.E.		Exp(B)	Variable	B	S.E.		Exp(B)
Constant	-2.221	0.301	***	0.108	Constant	-3.833	0.430	***	.022	Constant	-3.689	0.443	***	0.025
Interaction	0.374	0.075	***	1.453	Interaction	0.354	0.081	***	1.425	Interaction	0.301	0.084	***	1.351
Voice chat	0.725	0.148	***	2.064	Voice chat	0.646	0.159	***	1.908	Voice chat	0.506	0.166	**	1.658
					Knowledge	0.382	0.057	***	1.465	Knowledge	0.273	0.061	***	1.313
										Personal matters	1.373	0.254	***	3.946
Offline Ties														
Constant	-0.014	0.168		0.986	Constant	-3.027	0.434	***	0.048	Constant	-3.666	0.470	***	0.026
Interaction	0.225	0.054	***	1.253	Interaction	0.199	0.059	***	1.220	Interaction	0.177	0.060	**	1.194
					Knowledge	0.521	0.066	***	1.683	Knowledge	0.404	0.068	***	1.498
										Advice/support	0.541	0.245	*	1.718
										Personal matters	0.760	0.251	**	2.138
										Life events	0.704	0.242	**	2.022

**p<.01 ***p<.001

The first model has a difference of 0.911, the second 0.144, and the third 0.157. Overall, we can observe that interaction time plays a more prominent role when it comes to online ties.

Although online ties start at a disadvantage, it seems interaction hours between individuals in this sample and their online ties is more meaningful for them than their offline counterparts. Even when considering that interaction time per week was less with online ties, it was still more impactful than with offline ties. The means for each group were significantly different (2.49 online and 2.89 offline at the $p<0.001$ level). Another noteworthy finding on the third model was that discussing personal matters with online ties showed to have a stronger effect than discussing with offline relationships. Both asking for advice/support and discussing life events did not have a significant impact on online contacts.

On the third model, we observe that by adding the statistically significant coefficients, online ties are 0.302 less likely than offline relationships to be considered higher on the "friendship level" variable. Playtime per week (not included in the models) was not a significant factor for predicting friendship level. Voice chat and interaction hours, which are tied to each particular tie, are the leading predictors. Then as we add specific knowledge of ties and types of interaction, you get a clearer picture. The results suggest that online and offline relationships, at least those stemming from MMOs, are not that different when it comes to meaningfulness. Still, offline hold a slight edge over online relationships.

DISCUSSION

The findings in this work represent one-third of a larger research project, which includes follow-up interviews with some of the participants. There is still some data exploration to be done in conjunction with cross-referencing quantitative and qualitative data. Although respondents classified most of their online relationships as important, their offline counterparts,

in general, were statistically more meaningful. As mentioned in the previous section, the length of association is an essential factor when it comes to qualifying personal ties online. Granting that respondents were not asked to provide the time they have known their offline ties, we can only assume that it would also benefit. Hence, there would be a need to address this moving forward. Does the length of a relationship increase the significance at a higher rate for offline ties than online ties as the previous literature suggests? Still, we must consider that interaction time has a more significant effect on online ties, more so if that interaction is spent mostly through voice chat.

Circling back to the concept of proximity (Hays, 1985) not as a function of geographical distance but as a function of the "exposure effect" and "similarity" (Antheunis et al., 2012), we can assume that virtual presence is as or more important than physical presence, at least for this sample. Interactions with individuals that share common interests (e.g., the game itself) and are working towards a common goal, the primary objective of MMOs, have a stronger effect in the development of significant ties. Hence, proximity and similarity can be used to understand better why the coefficient for interaction hours (including voice-chat, not applicable to offline) is significantly higher than offline.

Bonding social capital (Ellison et al., 2011) appears to have a stronger effect on online ties, at least when it comes to time spent together and sharing personal matters. Surprisingly, asking for advice or support and sharing life events was not significant in online ties. Here lies a limitation of the current research. There is no way to tell how respondents interpreted the prompts regarding these items. Albeit, all three of them were a significant predictor for offline ties. The willingness of most of the respondents, to meet their online friends supports the notion of boundary-crossing. This applies to both social and symbolic boundaries (Lamont & Molnár,

2002), interacting with individuals of different backgrounds and creating communities online of shared interests. The notion that online quality time is more impactful when it comes to an online gaming environment is a novel topic. As discussed, previous studies suggest that online relationships play second to offline ties. However, their scope was on OSNSs like Facebook (Ellison et al., 2011; Ellison et al., 2007) or e-mail conversations (Chan & Cheng, 2004), where communication dynamics do not try to emulate offline interactions.

These results agree with previous research. As Antheunis et al. (2012) suggest, online relationships that migrate from text to offline communication (e.g., phone calls, meeting face-to-face) were qualified similarly to offline connections. Their study was done with users of OSNSs, as explained before, communication on these platforms tends to be slower paced. Thus, when considering voice chat as a pivotal part of MMOs communication patterns, the gap between offline and online relationship meaningfulness is almost non-existent. Our access to online cue-laden communication modalities (e.g., live webcams, live voice chat) provide us with a higher likelihood to meaningfully connect with others online. More so for MMOs, where fast-paced and constant communication is vital to be successful in-game.

In this sense, the level and/or type of interactivity plays a role in creating and maintaining relationships online. Communication in social media is responsive, meaning that a sender provides particular information and the receiver has the ability to react to the given statement, an interaction where the participants take turns between sender and receiver (Ariel & Avidar, 2015; Dyer, 2017). Social media spaces are then interaction locales where communication is "reactive to the information that is given" (Dyer, 2017, p. 85) and turn-based. On the other hand, when considering voice chat, prominent in online gaming environments, there is an "interactive communication" (Ariel & Avidar, 2015; Dyer, 2017), which offers a free-flowing two-way (or

more) communication between participants — allowing for immediate responses and accumulation of continuous interaction.

Although gamers are less likely to share advice, support, or life events with their online ties, meaningful interactions online are happening. As shown in Table 3.8, there are stronger predictor effects for online ties when it comes to interaction hours per week, voice chat per week, and discussing personal matters. There is an interesting dynamic occurring in how the participants qualified their two social networks. Further research is required in this area, but some assumptions could be made. The time spent with online relationships stemming from online gaming and a cooperative environment may be more likely to be considered higher quality time. As results from follow-up interviews suggest, this might be due to sharing of interests. From the participants' perspectives, it is easier to find other people with similar interests online, since geographic proximity does not bind them.

Finally, this study provides insights into how MMO gamers, mostly those brought up in the advent of the digital age (e.g., millennials and post-millennials), construct and maintain social ties through distinct but interconnected mediums, which gives way to new conceptualizations of friendship, social interactions, multi-modal social networks, and their meaningfulness.

REFERENCES

Antheunis, M. L., Valkenburg, P. M., & Peter, J. (2012). The quality of online, offline, and mixed-mode friendships among users of a social networking site. *Cyberpsychology Cyberpsychology, 6*(3).

Ariel, Y., & Avidar, R. (2015). *Information, Interactivity, and Social Media* (Vol. 23).

Beyer, J. L. (2014). Expect us: online communities and political mobilization.

Boellstorff, T. (2008). *Coming of age in Second Life: an anthropologist explores the virtually human*. Princeton: Princeton University Press.

Bourdieu, P. (1984). *Distinction: a social critique of the judgement of taste*. Cambridge, Mass.: Harvard University Press.

boyd, d. (2006). Friends, Friendsters, and Top 8: Writing community into being on social network sites. *2006*. Retrieved from http://journals.uic.edu/ojs/index.php/fm/article/view/1418. doi:10.5210/fm.v11i12.1418

boyd, d. m., & Ellison, N. B. (2007). Social Network Sites: Definition, History, and Scholarship. *Journal of Computer-Mediated Communication, 13*(1), 210-230.

Castronova, E. (2005). *Synthetic worlds: the business and culture of online games*. Chicago: University of Chicago Press.

Chan, D. K.-S., & Cheng, G. H.-L. (2004). A Comparison of Offline and Online Friendship Qualities at Different Stages of Relationship Development. *Journal of Social and Personal Relationships, 21*(3), 305-320. Retrieved from http://journals.sagepub.com/doi/abs/10.1177/0265407504042834. doi:10.1177/0265407504042834

Crawford, G., Gosling, V. K., & Light, B. (2011). The social and cultural significance of online gaming. In G. Crawford, V. K. Gosling, & B. Light (Eds.), *Online gaming in context: the social and cultural significance of online games* (pp. 3-22). London; New York: Routledge.

Davis, J. L. (2014). Triangulating the Self: Identity Processes in a Connected Era. *Symbolic interaction*, n/a-n/a. Retrieved from https://dx.doi.org/10.1002/symb.123. doi:10.1002/symb.123

Dyer, H. T. (2017). Interactivity, social media, and Superman: How comic books can help us understand and conceptualize interactivity online. In J. Daniels, K. Gregory, & T. M. Cottom (Eds.), *Digital sociologies* (pp. 77-102). Bristol, UK: Policy Press.

Ellison, N., Steinfield, C., & Lampe, C. (2011). Connection strategies: Social capital implications of Facebook-enabled communication practices. *New Media & Society, 13*(6), 873-892.

Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The Benefits of Facebook Friends: Social Capital and College Students Use of Online Social Network Sites. *Journal of Computer-Mediated Communication, 12*(4), 1143-1168.

Franetovic, M. (2012). *A higher education case: Millennial experience toward learning in a virtual world designed as an authentic learning environment.* Wayne State University, Retrieved from https://www.learntechlib.org/p/116457

Granovetter, M. S. (1973). The Strength of Weak Ties. *American Journal of Sociology American Journal of Sociology, 78*(6), 1360-1380.

Hau, Y. S., & Kim, Y.-G. (2011). Why would online gamers share their innovation-conducive knowledge in the online game user community? Integrating individual motivations and

social capital perspectives. *Computers in Human Behavior Computers in Human Behavior, 27*(2), 956-970.

Hays, R. B. (1985). A longitudinal study of friendship development. *Journal of Personality and Social Psychology Journal of Personality and Social Psychology, 48*(4), 909-924.

Hogan, B. (2010). The Presentation of Self in the Age of Social Media: Distinguishing Performances and Exhibitions Online. *Bulletin of Science, Technology & Society, 30*(6), 377-386. Retrieved from https://dx.doi.org/10.1177/0270467610385893. doi:10.1177/0270467610385893

Hsu, C.-L., & Lu, H.-P. (2007). Consumer behavior in online game communities: A motivational factor perspective. *Computers in Human Behavior Computers in Human Behavior, 23*(3), 1642-1659.

IBM Corp. (2017). IBM SPSS Statistics for Windows (Version 25.0). Armonk, NY: IBM Corp.

Jenkins, H. (2006). *Convergence culture: where old and new media collide*. New York: New York University Press.

Jiang, Z. Q., Zhou, W. X., & Tan, Q. Z. (2009). Online-offline activities and game-playing behaviors of avatars in a massive multiplayer online role-playing game. *Europhys. Lett. Europhysics Letters, 88*(4).

Johnson, N. F., Zhao, Z., Xu, C., Hui, P. M., Ducheneaut, N., Yee, N., & Tita, G. (2009). Human group formation in online guilds and offline gangs driven by a common team dynamic. *Phys. Rev. E Stat. Nonlinear Soft Matter Phys. Physical Review E - Statistical, Nonlinear, and Soft Matter Physics, 79*(6).

Lamont, M., & Molnár, V. (2002). The Study of Boundaries in the Social Sciences. *Annual Review of Sociology, 28*(1), 167-195.

Lampe, C., Ellison, N., & Steinfield, C. (2006). *A face(book) in the crowd: social Searching vs. social browsing*. Paper presented at the Proceedings of the 2006 20th anniversary conference on Computer supported cooperative work, Banff, Alberta, Canada.

Lee, K.-W. R., & Lim, E.-P. (2016). *Friendship Maintenance and Prediction in Multiple Social Networks*. Paper presented at the Proceedings of the 27th ACM Conference on Hypertext and Social Media, Halifax, Nova Scotia, Canada.

MacCallum-Stewart, E. (2011). Conflict, thought communities and textual appropriation in MMORPGs. In G. Crawford, V. K. Gosling, & B. Light (Eds.), *Online gaming in context: the social and cultural significance of online games* (pp. 40-59). London; New York: Routledge.

Martin, J., & Ewing, R. (2008). Power up! Using Digital Gaming Techniques to Enhance Library Instruction. *Internet Reference Services Quarterly, 13*(2-3), 209-225. Retrieved from https://doi.org/10.1080/10875300802103874. doi:10.1080/10875300802103874

Mason, W., & Clauset, A. (2013). *Friends ftw! friendship and competition in halo: Reach.* Paper presented at the Proceedings of the 2013 conference on Computer supported cooperative work.

McCroskey, J. C., & McCain, T. A. (1974). The measurement of interpersonal attraction. *Speech Monographs Speech Monographs, 41*(3), 261-266.

McGonigal, J. (Producer). (2010). Gaming Can Make a Better World. *TED2010*. Retrieved from http://www.ted.com/talks/lang/eng/jane_mcgonigal_gaming_can_make_a_better_world.html

Meredith, A. (2014). *The presentation of self in Massively Multiplayer Online games.* (Doctoral), Nottingham Trent University, Nottingham. Retrieved from http://irep.ntu.ac.uk/id/eprint/240/

Mesch, G., & Talmud, I. (2006). The Quality of Online and Offline Relationships: The Role of Multiplexity and Duration of Social Relationships. *The Information Society, 22*(3), 137-148.

Mesch, G. S., & Talmud, I. (2007). Similarity and the Quality of Online and Offline Social Relationships Among Adolescents in Israel. *JOURNAL OF RESEARCH ON ADOLESCENCE, 17*(2), 455-465.

MMOdata (Producer). (2014). Total MMORPG Subscriptions and Active Accounts listed on this site. Retrieved from http://users.telenet.be/mmodata/Charts/TotalSubs.png

MMOSite. (2017). Gamelist. Retrieved from http://gamelist.mmosite.com/game/search.shtml

Nardi, B., & Harris, J. (2006). *Strangers and friends: collaborative play in world of warcraft*. Paper presented at the Proceedings of the 2006 20th anniversary conference on Computer supported cooperative work, Banff, Alberta, Canada.

Putnam, R. D. (2000). *Bowling alone : the collapse and revival of American community*. London: Simon & Schuster.

Reagans, R. (2005). Preferences, Identity, and Competition: Predicting Tie Strength from Demographic Data. *manascie Management Science, 51*(9), 1374-1383.

Robinson, L. (2007). The cyberself: the self-ing project goes online, symbolic interaction in the digital age. *New Media & Society, 9*(1), 93-110. Retrieved from https://dx.doi.org/10.1177/1461444807072216. doi:10.1177/1461444807072216

Shen, S., & Iosup, A. (2011). *The xfire online meta-gaming network: Observation and high-level analysis.* Paper presented at the 2011 IEEE International Workshop on Haptic Audio Visual Environments and Games.

Shklovski, I., Barkhuus, L., Bornoe, N., & Kaye, J. J. (2015). *Friendship Maintenance in the Digital Age: Applying a Relational Lens to Online Social Interaction*. Paper presented at

the Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing, Vancouver, BC, Canada.

Snodgrass, J. G., Dengah, H. J. F., Lacy, M. G., Fagan, J., Most, D., Blank, M., . . . Wintersteen, B. (2012). Restorative Magical Adventure or Warcrack? Motivated MMO Play and the Pleasures and Perils of Online Experience. *Games and Culture, 7*(1), 3-28. Retrieved from http://gac.sagepub.com/content/7/1/3.abstract. doi:10.1177/1555412012440312

Steinfield, C., B., E. N., & Cliff, L. (2008). Social capital, self-esteem, and use of online social network sites: A longitudinal analysis. *Journal of Applied Developmental Psychology Journal of Applied Developmental Psychology, 29*(6), 434-445.

Subrahmanyam, K., Reich, S. M., Waechter, N., & Espinoza, G. (2008). Online and offline social networks: Use of social networking sites by emerging adults. *Journal of applied developmental psychology., 29*(6), 420.

Sundén, J. (2003). *Material virtualities : approaching online textual embodiment*. New York: P. Lang.

SuperData-Research. (2016). The MMO & MOBA Games Market Report, 2016. Retrieved from https://www.superdataresearch.com/market-data/mmo-market/

Szell, M., & Thurner, S. (2010). Measuring social dynamics in a massive multiplayer online game. *Social Networks Social Networks, 32*(4), 313-329.

Taylor, T. L. (2006). *Play between worlds: exploring online game culture*. Cambridge, Mass; London: MIT Press.

Tseng, F.-C. (2011). Segmenting online gamers by motivation. *Expert Systems With Applications, 38*(6), 7693-7697.

Valafar, M., Rejaie, R., & Willinger, W. (2009). *Beyond friendship graphs: a study of user interactions in Flickr*. Paper presented at the Proceedings of the 2nd ACM workshop on Online social networks, Barcelona, Spain.

Walther, J. B. (1995). Relational Aspects of Computer-mediated Communication: Experimental Observations over Time. *Organization science : a journal of the Institute of Management Sciences., 6*(2), 186.

Walther, J. B. (1996). Computer-Mediated Communication: Impersonal, Interpersonal, and Hyperpersonal Interaction. *Communication Research, 23*(1), 3-43.

Westman, C., & Bouman, P. (2006). *Gamers go to college*. Washington, DC: American Association of Collegiate Registrars and Admissions Officers.

Xu, Y., Cao, X., Sellen, A., Herbrich, R., & Graepel, T. (2011). *Sociable killers: understanding social relationships in an online first-person shooter game.* Paper presented at the Proceedings of the ACM 2011 Conference on Computer Supported Cooperative Work.

Yee, N. (2006). Motivations for play in online games. *Cyberpsychology & behavior: the impact of the Internet, multimedia and virtual reality on behavior and society, 9*(6), 772-775.

Yee, N. (2007). Making Friends. *The Daedalus Project.* Retrieved from http://www.nickyee.com/daedalus/archives/001586.php

Yuan, N. J., Zhong, Y., Zhang, F., Xie, X., Lin, C.-Y., & Rui, Y. (2016). *Who Will Reply to/Retweet This Tweet?: The Dynamics of Intimacy from Online Social Interactions*. Paper presented at the Proceedings of the Ninth ACM International Conference on Web Search and Data Mining, San Francisco, California, USA.

Zhu, M., Huang, Y., & Contractor, N. S. (2013). Motivations for self-assembling into project teams. *Social Networks, 35*(2), 251-264.

CHAPTER 4 INTERVIEWS

INTRODUCTION

The main objective of this work is to comprehend the social dynamics within the social networks (offline and online) of Massive Multiplayer Online Games (MMOGs/MMOs) players. Throughout this work, gamers' perspectives on how they characterize their offline and online ties will be discussed. This study provides a look into avid gamers' social networks, their development and management, and insight on the way gamers negotiate their self-concepts throughout their interactions with their offline and online ties.

Social actors are assumed to be *relational beings* (Gergen, 2009); i.e., they co-construct their personal narratives through their interactions with others. This concept plays a significant role in how gamers manage and negotiate their sociocultural baggage between the offline and online aspects of their lives, which is in direct opposition to the notion of the individual as the center of social interaction. There is fluidity and a constant negotiation (i.e., relational) when it comes to the co-construction of our self-concepts. At the same time, we need to consider how identities might be structured in hierarchical manners, and how particular salient aspects of the self might be invoked over others during an encounter (Owens, Robinson, & Smith-Lovin, 2010). That is, they might wittingly or unwittingly juggle and/or manage different characteristics of their offline self-concepts within the context of a specific online interaction. Thus, the social structure of a gaming environment could influence the way gamers portray themselves to others. For example, the type of game (e.g., cooperative versus competitive) being played can affect the

way one presents their self to others. There is a need to focus on the social structures that influence gamers' self-definitions (Stets & Serpe, 2014), including those aspects that are more salient in offline settings versus those that might surface during online interactions.

By focusing on the sociocultural internalities and externalities of these offline/online individuals, we can come closer to understanding how they navigate and construct their identities via an inter-semiotic translation (i.e., from one medium to another; from offline to online, and vice versa). By paying close attention to the blurring of social boundaries (Lamont & Molnár, 2002), how sociocultural information gets translated, and what is lost or gained in the process. The boundaries can be transcended, but they can also be solidified and reflected through our actions in the online world. Hence, to better understand the potentials and impacts of these virtual fields, there is a need to tackle these complex exchanges between the offline and online environments.

Taking into consideration these conceptual narratives and the scope of the study, the work addresses the following three guiding research questions. First, how do individuals who are avid gamers negotiate their identity/ies in their online and offline lives? The objective here was to gather detailed descriptions of how gamers see themselves and balance their self-concepts within the offline-online continuum. In other words, to what extent, if at all, do their online presence differ from their offline when it comes to social interaction/networking? Second, how meaningful are the social ties they develop and manage online? This question considers the frequency and quality of interactions by eliciting participants to disclose how much they share with their online network (e.g., sharing personal matters and sharing personal information like age, location, occupation, community memberships, video games) and reflecting on how meaningful their online relationships are, to the extent that they may consider extending or have

extended them to their offline network. Third, how do online friendship interactions compare to their offline counterparts? This question aimed to ascertain the quality of the participants' interactions with their two networks. Thus, participants were encouraged to think about how they present themselves to and interact with others online and offline.

The participants' perspectives were recorded through in-depth semi-structured interviews, which was based on a previously completed online questionnaire (see Chapter 3 for discussion on the questionnaire's findings).

FRIENDSHIPS ONLINE & OFFLINE

Previous research focused on studying online friendships has mostly examined popular online social network sites (OSNSs). Measuring friendships is a hard endeavor due to the subjective nature of relationships, more so when interactions are gathered from OSNSs. These types of networking sites present a problematic conceptualization of friendship. One such example is Valafar, Rejaie, and Willinger (2009), they examined the development of connections in the popular photo-sharing OSN Flickr. The network ties, in their case, were links between the original posters of an image and the people who became fans of or liked the pictures. Although these are valuable interactions for studying the development, evolution, structures, and trends of OSNSs (e.g., prediction models in Lee & Lim, 2016), they lack in qualitative data and in how the actors themselves qualify these online ties. Several others have researched more hands-on and dynamic OSNSs like Twitter (Yuan et al., 2016) and Online Meta-Gaming Networks like XFire (Shen & Iosup, 2011). Even though these last two studies work with substantially more interaction data than the Flickr analysis, their analyses are devoid of the subjective significance of those actions for the actors involved.

At least one study in the early 2000s undertook the aim of addressing the meaningfulness of online friendships and its development (Chan & Cheng, 2004). With a sample of 162 cybernauts from Hong Kong, Chan and Cheng (2004) collected self-reported information about an offline and an online friendly relationship in order to compare the evolution of each one. Their main finding was that time is the most important aspect of any relationship (offline or online). Still, since interactions online were more sporadic, the development of online friendships was slower than their offline counterparts. It has been over a decade and a half since they conducted this research. Thus we must consider the technological advances in online communication and the increased access to the Internet. As communication technologies stride forward, the users have to adapt to their new reaches and potentials. The online social dynamics have changed substantially since the early 2000s, especially with the increased adoption of OSNSs and smartphones in the latter half of the decade.

Quality time and exposure take the leading role when discussing the differences between relationship types. Several studies have suggested that online relationships have a limitation when it comes to the two aforementioned aspects, since overall less time is spent co-participating in activities online than offline (Chan & Cheng, 2004; Mesch & Talmud, 2006). However, technology has transformed the way we communicate and interact online, including, but not limited to, group activities (e.g., accessible virtual chat room, OSNSs, co-op/multi-player gaming) and ways of meeting/reaching people around the world.

MMOs offer a potential virtual place where meaningful social relationships can be developed. The collaborative nature of this type of game provides ample space for interacting with others while enjoying the unfolding action. Studies have found that engaging in collaborative gameplay with friends leads to increased enjoyment and performance within the

game (Mason & Clauset, 2013). Online gaming does not only affect social ties online, but it can also lead to the enrichment of existing offline relationships (Nardi & Harris, 2006) by meaningfully interacting despite physical distance.

A handful of studies attempt to compare in-game and in-real-life relationships by focusing on overall performance and user experience (e.g., Mason & Clauset, 2013; Nardi & Harris, 2006; Xu, Cao, Sellen, Herbrich, & Graepel, 2011). Gamers, in general, prefer to play with friends than alone, and friendships that crossed boundaries between online and offline interaction were more likely to play online together than relationships based solely online (Mason & Clauset, 2013). The online gaming virtual field offers a space where players can maintain and strengthen relationships that began offline (Xu et al., 2011), while at the same time providing new potential connections through the shared experience of the game (Nardi & Harris, 2006; Taylor, 2006).

As of the writing of this work, the current literature is missing comprehensive accounts of the development and maintenance of online relationships, in particular when it comes to MMOs. Due to scope, reachability, and scalability most studies in this area, focus on behavioral analytics (Drachen, 2015; El-Nasr, Drachen, & Canossa, 2013) or social interactions within a single game. Their main objective is to analyze the interactions between the players and the software's code and to produce reports on user/gameplay experience. What is missing is a robust look at relational aspects (Shklovski, Barkhuus, Bornoe, & Kaye, 2015) of both online and offline social ties.

FRAMING & KEYING ONLINE-OFFLINE IDENTITIES AND SOCIAL TIES

ONLINE IDENTITIES

Identity and the process of identification are upheld as an essential aspect of our activities in the digital world, how we decide to portray ourselves, and how others choose to read that portrait. The concept of identity is a somewhat contested term in the social sciences. With help from Vincent Miller (2011), the concept of identity or identities could be described as psycho-social relational constructs (how we categorize, classify, and order our relationships with others). Identities are bounded by language, which in turn, mediates ways of making distinctions. That is, through language, we communicate by comparing and/or contrasting (i.e., defining what it is not). At the same time, they are bound by time and place.

Moreover, since we are referring to them in the plural sense, they are malleable, in flux, and "often contradictory" (Miller, 2011, p. 161). Does this formula also apply to how identities are express online in a digital form? It seems so, although being online might intensify our ability to juggle our self-concepts more consistently. Sherry Turkle's (1996) metaphor of *windows* is of importance when discussing the process of constructing the self, specifically in the virtual-scape Turkle's metaphor entails that our technological devices allow us to rapidly change from one context to another, at the same time juggling our identities. For example, we could partake in multiple conversations with different people and portray ourselves differently in each one of those instances.

The notion of *windows* can be useful for understanding how we construct identity online and offline at the same time. Even in the offline world, we modify our attitudes, actions, and motives depending on the social context in which we are partaking (e.g., workplace, different groups of friends, and family). Technology intensifies that ability and allows us to connect with

other aspects of our self-concept more consistently. However, this does not mean that we are constantly making up new identities out of scratch. The main idea is that we intensify some aspects of our self and decrease others depending on the situation.

Miller (2011, p. 174) argues that the *windows* metaphor is not applicable. He concludes this by looking at the previous literature on MMOs, which suggests that gamers immerse themselves and consistently embody their avatar. That is, there is a consistency between how people act and roleplay through the character in the online world and the offline world. This may be accurate to some degree. However, what happens when the player immerses themselves in a new game or virtual world? This is where Turkle's metaphor comes into play. Most of the literature looks at the experience of players in specific scenarios (i.e., a single game), and does not consider social interactions that occur outside the game (e.g., communicating and strategizing with other players before, during and after participation in the virtual world). As they suggest, players might have several characters in a single game, and these avatars mainly serve specific needs of achieving in-game goals or experiencing the world from another perspective (Miller, 2011, p. 175). However, when dealing with individuals who are avid video gamers, we encounter the fact that they usually are immersed in more than one virtual world at a time. Thus, just as social actors juggle different aspects of themselves in actual social interactions, players also do it in their online lives. The identification process changes depending on the specific social context of these persistent universes.

Online identities can differ from offline identities, assuming that different attitudes and behaviors have different results in the online world (see discussion of the three types of identities in Owens et al., 2010, and how these can vary from one interaction to another). Often, no one can identify who you are outside of the Internet based on your online self. The online world

functions as an extension of our embedded identities, while at the same time, it can transform and influence our offline self. Hence, avatars become our embodied presence, “in text and/or graphic images,” in these virtual worlds (Nakamura, 2002).

This type of play with identities, and how actors interact with others could have significant socio-cultural implications. In the virtual world, individuals are usually physically separated from other participants. However, the same thing happens when observing social interactions in daily life, especially when digitized social networks and the devices that provide access to the virtual highway of communication dictate our lives. In this sense, digital culture has transformed the way we socialize by allowing us “to hide from each other, even as we are tethered to each other” (Turkle, 2011, p. 1). Our identities become somewhat ephemeral and diffused to others, while we as puppeteers control our online profiles and/or avatars.

ROLE-PLAYING DRAMA IN CYBERSPACE AND MMOs

MMOs fall upon the ideas and discourse attached to the notion of *roleplaying*. This innately dramatic concept entails that we, as social actors, can willingly embody different personas or characters. Thus, when we play video games, we are participating in the process of role transference. That is, we become, for a short time, the main character of a drama coded and set in motion by the user’s relationship with the virtual universe. The game’s logic and limitations vary from title to title. This means that some games may stringently limit the actions of the player. While others will exhort that the player takes part in the telling and unfolding of the story.

First, we have to consider our actions in cyberspace as part of our unending *reflexive project of the self* (Giddens, 1991), i.e., it is part of ours and others' identity work. In cyberspace, it is easier to shape how we present ourselves to others, interactions with others are not

necessarily direct or face-to-face (although we can communicate through live webcams, actual images can always be circumvented and designed to our liking). Goffman's (1959) theory of self-presentation serves as a starting point from which one could interpret identity work in cyberspace. Goffman delineates the intricate process of social interaction, the way we choose to communicate and express ourselves to others, and how others interpret our actions. These mediated actions go through a buffer of sociocultural notions that help us decipher others, which can be prone to misrepresentations. We have a finite set of tools to process and define how others present themselves. Thus, it is assumed that the person on the other side of the screen is presenting his/her offline self. As Goffman and others have suggested, the self is almost always brandished with ideal notions and is almost always presented appealingly to others (Goffman, 1959; Schlenker, 1980; Walther, 1996). This is not only evident in cyberspace, but we are also continually negotiating the self in both offline and online settings—who we think we actually are, who we would like to be, and who we ought to be (Higgins, 1987).

Another useful contribution that can serve as a way of reading social action and social order in cyberspace is Goffman's (1974) frame theory and his concept of *keying*. For Goffman, frames represent a specific way of making sense of and reading a particular occurrence. The frame is the lens or lenses which we use to understand the happenstances of social interactions; these are mediated through sociocultural *rules or premises* that are ingrained in us by being part of a *primary framework* (e.g., American culture; family; education). In other words, frames allow us to distinguish situations by organizing them categorically using specific conventions. Cyberspace gives its inhabitants an extra layer or frame—a cybernaut can assume and occupy distinct roles (offline self, online representation of the self, and/or a fabricated online presence/avatar) that may or may not significantly differ from his/her offline self (Humphreys &

Vered, 2014; Pargman & Jakobsson, 2008). On the other hand, *keys* or *keyings* are guiding elements of the action occurring inside a frame that helps us make a more accurate reading of what is going on.

Several researchers have applied Goffman's concepts to better understand how players/gamers position and present themselves inside the gamescape concerning their offline or primary frame. For example, Gary Alan Fine (1983) used a Goffmanian approach to study social interactions among players of fantasy role-playing board games (e.g., Dungeons & Dragons). For Fine, we can have multiple frames during any particular situation, and switching between frames usually occurs seamlessly, especially within the context of a game "where frames are voluntary" (Consalvo, 2009b, p. 414). This allows for quick shifting between frames that stem from a gaming session to outside events. Thus, frames are never completed disconnected from one another, which suggests that our online and offline identities cannot be separated or observed in a vacuum. Others have followed Fine's application of frame theory and have used it to understand the broader context of digital social gaming (Bergstrom, Fisher, & Jenson, 2014; Consalvo, 2009b). Researchers have not only looked at how gamers frame MMOs but have also explored how non-gamers and the media has framed the inhabitants of these persistent virtual universes (Bergstrom et al., 2014; Consalvo, 2009a; Shaw, 2012; Shay, 2013; Williams, Consalvo, Caplan, & Yee, 2009; Williams, Yee, & Caplan, 2008).

Goffman's *frames* are not standalone scenarios, i.e., we cannot isolate them— they are intricately interconnected. Social interactions are complex and are prone to different readings or interpretations. Using frame analysis in an online scenario, not only in MMOs, can help us better understand how social actors interact in complex environments. That is a frame that lends itself to instant manipulations of the self, without having to draw a line between the offline and the

conceptualization of online interaction (Consalvo, 2009b; Glas, Jørgensen, Mortensen, & Rossi, 2011). We should consider our online presence/s as another layer/s in an ever-expanding continuum of the self and its relation to the social contexts therein. Furthermore, we need to consider the *interactional* and *affective commitments* (Stets & Serpe, 2014) gamers display throughout their interactions online and offline. Thus, not only focus on how the actor perceives her/himself and thinks others perceive them but also the emotional investment that goes into each social relationship aligned to particular types of ties (e.g., friends, acquaintances, family, co-workers).

What follows is a look at how several avid MMO gamers manage and maintain social ties online and/or offline, which entails an exploration of how they *frame* and *key* their self-concepts among these relational mediums.

METHODS

RECRUITMENT AND DATA COLLECTION – SEMI-STRUCTURED INTERVIEWS

Semi-structured individual interviews were conducted with 14 participants who had responded to a previous online questionnaire regarding their online and offline ties. They were initially recruited through several online mediums (e.g., forums, subreddits, gaming communities). At the end of the survey, respondents were asked if they were interested in participating in a subsequent interview. Out of 242 questionnaire participants, 32 left their contact information. All 32 were contacted via e-mail with an invitation to take part in this study. A total of 14 respondents agreed to participate. At the time of the interview, participants were read and provided with a copy of the informed consent. After verbally agreeing to participate, they completed an in-depth interview.

The in-depth interviews provided an opportunity to examine their online and offline relationships' development through their own accounts (Miller & Glassner, 2004). During the interviews, participants were provided with a copy of their questionnaire answers, including the information for each of the ties they mentioned to elicit reflection.

The purpose of using visual props (an organized presentation of their questionnaire answers and social ties) was to get the participant to construct narratives— "meaning, history and dynamics of friendship" (Bellotti, 2015, p. 77) regarding their network without substantial interference from the researcher. Employing this combination of methods, using both previously collected quantitative/qualitative data from the questionnaire and the ensuing interviews, allowed for "observing and measuring at the same time the formal structures of networks and the content and dynamics of these structures" (Bellotti, 2015, p. 77). The resulting narratives and ego network data allowed the researcher to construct intricate social networks with meaningful descriptions of their local structures:

> Given the narrative texture of the unfolding process of identity formation, interviews seem to be by far the most suitable approach, in which actors reflexively discuss their perception of self-identity, the nature of their interactions and relationships with significant others, and the meaning and dynamics of their egocentric local structures (Bellotti, 2015, p. 69).

RESEARCH QUESTIONS

Both the questionnaire and the semi-structured interviews were constructed with the following research questions in mind:

RQ1: How do MMO gamers perceive and compare their online and offline social ties?
RQ2: How meaningful can online ties stemming from MMO interactions be?
RQ3: How do MMO gamers see their self-concept when interacting online with others?

PROTOCOL

The interviews consisted of open-ended questions. My presence as the researcher was to keep the conversation on track with the topic at hand without much intervention. Twelve

interviews were held face-to-face, and two were held through VOIP (real-time online voice chat), for a total of 14 interviews. Locations for the face-to-face interviews varied, all were held in places of the participant's choosing. Interviews were based on offline and online ties they had mentioned in a questionnaire they had previously completed. Each category of relationship contained three connections. Participants were elicited to talk about how those relationships developed in both mediums and to compare them.

All interviews were conducted by the researcher, digitally recorded, and later transcribed by a professional transcriber. Once transcriptions were completed, the researcher went through all of them while comparing and listening to the audio recording to check for any incongruencies and address possible misunderstood online-gaming verbiage or idioms. Interviews lasted between 30 minutes to one hour and 45 minutes, with an average time of 50.2 minutes. There were no identifiable data collected during the interviews, documents, and audio files were named using random id numbers. Once all transcripts were completed, they were assigned pseudonyms to help organize excerpts and mentions throughout the analysis.

The transcripts and audio were approached using an applied thematic analysis perspective (Guest, MacQueen, & Namey, 2012). Several themes stemming from the questionnaire and the interviews semi-structured script were used as starting points and structured codes to begin categorizing through the comparison phase of the transcripts. They served as global codes for which other exploratory themes were ordered, reviewed, and expounded.

THEMATIC ANALYSIS

The primary objective of thematic analysis is to identify themes and find patterns in the data that lend themselves to address specific research questions or issues (Braun & Clarke, 2006; Guest et al., 2012; Maguire & Delahunt, 2017). There are two main ways of approaching this

analytical tool, deductive and inductive (not mutually exclusive). The former approach themes as pre-determined, to an extent, by theory and research questions. On the other hand, the inductive approach is a "bottom-up" method "driven by the data itself" (Maguire & Delahunt, 2017, p. 3354).

This is a six-pronged process (Braun & Clarke, 2006), as with any other scientific method, the first step is to become familiar with the data. In the present case, this entailed reading and rereading the interview transcripts several times. NVIVO was used to analyze and code interviews. After becoming familiar with the data, initial or deductive codes were systematically assigned to corresponding interview sections. As codes were being generated, overarching themes/groups of codes that were previously identified or developed during the familiarization process were assigned to lower-leveled codes. These are topics that encompass significant patterns in the data that lead to the development of the findings' narrative at the final step. Once they were established, themes were reviewed and refined across all the interviews. All excerpts from the most common and significant themes relating to the research question were then extracted and reviewed for final analysis.

SAMPLE

Out of the 14 respondents, three identified as female, and eleven as male. Their ages ranged from 19 to 47, with 19 being the most common age among the participants, with a mean age of 23.79 and a median of 20. Most of the participants identified as "White non-Hispanic" (n = 8) followed by "Latino/Hispanic" (n = 2), "Asian" (n = 2), "Black non-Hispanic" (n = 1) and "Middle Eastern" (n = 1). About 78% of them reported having been playing MMOs for seven years or more, with only three reporting to have been playing for four to six years. The same

amount (n = 11) said they were part of an online gaming community (e.g., clan or guild). See Table 4.1 for a complete breakdown of the sample's composition.

Table 4.1 Descriptive Statistic – Interviewed Sample

Variables & Categories	Mean or %	(SD)	Variables & Categories	Mean or %
Age (in year)	23.79	7.82	Education	
Gender			High school degree or equivalent	28.60%
Male	78.60%		Some college, no degree	28.60%
Female	21.40%		Associate degree	14.30%
Race/Ethnicity			Bachelor's degree	14.30%
White non-Hispanic	57.10%		Master's degree	14.30%
Black non-Hispanic	7.10%		Employment Status	
Latino/Hispanic	14.30%		Full-time	21.40%
Asian	14.30%		Part-time	50.00%
Middle Eastern	7.10%		Unemployed – not looking	7.10%
Household Income			Student	21.40%
Less than $20k	28.60%		Playtime MMOs	
$20k to $34,999	14.30%		Every day	35.70%
$50k to $74,999	7.10%		2-6 times per week	57.10%
$75k to $99,999	7.10%		Less than once per week	7.10%
Prefer not to say	42.90%		Years playing MMOs	
Marital Status			4 to 6	21.40%
Single, never married	92.90%		7 to 10	35.70%
Married or domestic partnership	7.10%		11+ years	42.90%

FINDINGS & ANALYSIS

The primary objective of this project was to construct narratives around an online gamer's point-of-view when it comes to fomenting social ties, that is, possible friendships, online and offline. For the most part, interviewees talked about the ease of making new ties online, but in some cases, interviewees mentioned being extra cautious when disclosing information to online relationships. Some reasons that stood out were the lack of physical cues and the protection of being behind a screen. In this sense, participants would safeguard certain information and disclose other by diluting their offline frame when presenting their online frame as they deemed necessary.

Participants mentioned the transcendence of social and geographical boundaries as a benefit of online interaction. Conventional boundaries as maturity (driven mainly by age), gender, race, occupation, among others, did not matter since interaction was purely based on how ties expressed themselves online through text or voice chat. Connections always began with a common interest, a particular game, genre or MMOs in general. This meant that meeting people online had an advantage over offline, considering that potential offline ties did not necessarily include a safety net of shared interests.

Another advantage that was mentioned was that online you were required to play in groups if you wanted to advance. As previous research has mentioned, the formation of ad hoc groups played an important role, and it is similar to offline project teams (Zhu, Huang, & Contractor, 2013). This meant that participants had to interact, strategize, and get to know their groups in order to succeed in the game. Interactions like grouping for a specific in-game objective could lead and did lead down the road to the development of significant ties. The online gaming platform also became a way of maintaining offline ties that were no longer geographically close. Most participants were willing to meet their online ties face-to-face; some of them had already met.

The overarching theme of the interviews and the project itself was to see how MMO gamers compared their social ties, both online and offline. Participants discussed the process of getting to know someone online and offline.

THEME 1: EASE OF MAKING ONLINE CONNECTIONS

Most of the respondents mentioned that it was easier to meet potential friends online through MMOs. Mainly, because the people you may encounter in-game already had one interest

in common (e.g., the game itself, MMOs in general, gaming). For example, when asked about which environment would be easier to make a meaningful connection, Peter said:

> I would say it is more… Like, you do not have to… You have better odds of when you click with somebody that you will… That you will be friends later on down the line, and that you will have a common interest, and multiple common interests, um… Like, further on down the line, and it will happen a lot more frequent than it would offline (Peter 27, male).

For Peter, finding potential friends is more accessible online. He first mentions the sharing of common interests, and then he suggests that in an online environment, you have a higher frequency of encountering individuals with similar interests. Interaction online is very selective, and there are a plethora of options. Thus we venture into areas that interest us the most. At the same time, interactions can be more fleeting or ephemeral since we are endowed with the ability to block, ignore, or to disconnect from an exchange at a moment's notice.

> Before really… Like, you learn what you have in common with someone. Then you start hanging out with them, getting to know about them while there is… There is, like… For example, there is someone in my server that all I know about him is that he plays League [League of Legends – a popular Massive Online Battle Arena (MOBA)] with us and that he is an English teacher. I do not know where he is. I do not know his name or any of that. But, like when you are sitting, like, face-to-face with someone there is… It is much more personal (Harry 19, male).

The way we approach online actions with others might be considered less formal than their offline counterparts. Harry makes this point by providing an example of someone who forms part of his playgroup. In this case, Harry's connection is mostly focused on the gameplay and not necessarily in getting to know this other person outside the game. He also mentions and suggests that if the interaction were to be face-to-face, that would change the dynamic. Being face-to-face for Harry would require a more formal interaction, to avoid an awkward situation, the involved parties would have to engage in, at least, small talk. The primary type of game Harry plays, MOBAs, which are fast-paced and require much strategizing (i.e., competitive

gaming), which leaves little room for non-game interaction. For him, his online ties are less formal than his offline:

> [W]ith an offline relationship it is much more hanging out with them and getting to know them on a personal level […] Now if I played a game where there is a lot more group interaction over long periods of time then I would definitely get to know people better. But personally, for me, it has always been friends that I know in real life (Harry 19, male).

Participants described several factors that can affect how an online connection is developed. Communication and genre of the MMO were two of the most prominent topics respondents discussed. A previous phase of this project found that voice communication plays a vital role when it comes to the development of meaningful relationships online (see Chapter 3). It seems that any factors (e.g., voice chat, webcam) that make social interactions online closer or similar to offline interactions will have a positive effect on the formation of these ties. This is something that Robert a 47-year-old male alluded to when comparing his relationships:

> It depends on the quality of the interaction and the MMO. So, if you are not having quality interactions in the MMO or you are not in a voice channel then, I think it could take longer. But I have with Carl, once we were in voice chat the whole friendship between, he and I and Mary we were able to… We developed much faster because we were able to talk through voice. And when you had to type or whisper or whatever you know tell in the MMO it is a little bit of a slower interaction and you cannot always hear the inflection and you do not always know the sincerity. So, with the newer technology, I would say it is, I feel like it if you utilize that technology, I feel like that it is it can just be that fast (Robert 47, male).

Robert suggests that text-based communication is of less quality and can hinder the growth of a relationship. Voice chat has become a ubiquitous feature of MMOs, and several third-party communication applications have been developed with multiplayer gaming in mind (e.g., TeamSpeak, Discord, XFire). Interacting in this manner does not only affect cooperative play; it also helps form stronger bonds between the players. This is a pivotal aspect that makes MMO interactions stand out when comparing them to text-based online social networks (e.g., Facebook, Reddit). Voice chat is not exclusive to MMOs, but since the underlying objective of

these games is cooperation and teamwork, it can be assumed that relationships born out of these activities might hold a higher importance than those based only on online text chats.

Other interviewees highlighted some of the affordances of online contacts. Being in their comfort zone allowed some respondents to be more open and be themselves without having the restraints of their physicality and/or the perceptions of others. Physical appearance, body language, distance, and monetarily restraints are some of the obstacles one could bypass by maintaining online relationships. These were considered favorable aspects of the online environment, particularly among the respondents that identified as shy or introverted.

> I feel like it is cheaper to have an online relationship cause… I do not know. Offline, people always wanna go out. I do not really like going out. I do not wanna spend money. And, that is just what they like. And, it is nice when I can go online. I have somebody there online that can do something that I like. Like, we can play video games. We can still be together and talking as if we were in person doing what we would rather do instead of going out. A lot more in common. It is just… I feel a lot more open with them, I… a lot easier... opening up to them (Jill 23, female).

In general, most respondents stated that meeting and creating meaningful connections are easier online than offline. This is due to particular factors and affordances that are heightened online. For example, when meeting new people over the Internet via a shared MMO, the individuals are assured that they have at least one interest in common (i.e., the game). Thus, social interactions that arise from this type of specific situation are more likely to easily cut through the tension of making initial contact with a potential new acquaintance. This is not solely an online social trait. However, having access to the Internet has its advantages when trying to find others with similar interests. This does not entail that people are completely open about their selves when it comes to their online presence or self-presentation. As it would be expected of any social interaction, they do employ privacy tactics and might be extra cautious when meeting others over the Internet.

THEME 2: VEIL OF PRIVACY – SELF-PRESENTATION

Related to what Jill mentioned in the previous excerpt, several respondents mentioned that being online protected their interactions to some extent. Interactions were more secure online than offline, which prompted some to come out of their shell and focus on socializing instead of dwelling in physical or personal factors that may hinder interaction in an offline environment. Thus, one of the pros of online interaction was this veil or layer of privacy that provided a buffer zone when making new connections. Female participants were more inclined to address these issues, in particular, when it came to physical appearance.

> I think it is easier...definitely way more easier online because neither party has to worry about, like, appearance... It is just what you are talking about, like, how you are saying things. And, um… online, you can send a message like at any time. Anyone can respond back at any time. In person, you kind of have to...you have to have their attention at the time you are saying something. Or, you...you... Your schedules are conflicting with each other (Emily 18, female).

Even though they offer these statements about the separation between physically meeting someone and making online ties (privacy veil), throughout their interviews, the three female interviewees mentioned feeling more comfortable being themselves online, to the extent that they foster meaningful relationships online. They stated that their approach to online relationships is conducted in a more safeguarded manner than it would offline, but once the getting to know each other phase has passed, they felt more connected and comfortable online. This generally boils down to what was discussed throughout the first few excerpts in this section. It is easier to find people with similar interests, values and tastes online than it is offline. Hence, it makes sense for them to form deeper connections with their online peers. On the other hand, they have offline ties they interact with daily, due to factors that cannot be controlled, which participants did not consider as significant. For example, these could be roommates, coworkers, neighbors, and family members.

> I had the mentality of, like, this is the internet do not talk about yourself. But, like, after a while, like, I am getting to know everyone… Like, I feel like I can be myself more on the internet than in real life, sometimes. [L]ast semester I was really stuck inside a lot because it was, like, my first semester here, so I was like, "OK." I go to class, and I might come home and play video games, but this semester, I have definitely been, like, more outside. But I would say I am more comfortable talking online than outside… Just because I feel like I am close to my online...Or, online friends (Sarah 18, female).

In her interview, Sarah talked about her current roommate. She mentions that if they were not living together, she would not have any interest in meeting her roommate. They get along well, but their relationship is purely based on sharing a living space and not due to shared interests. Jill also shares this train of thought when it comes to how she presents and handles herself online:

> [O]nline I can be myself more. And, I… It is hard for me to meet people that like my interests offline, because I am always online, and, like, the other people are always online if I… So, that is, like, how, like, I had a feeling that I would meet my boyfriend online… Because, I do not meet guys, like, outside of my computer. And so, it is just I have gotten used to this, making friends online […] (Jill 23, female).

Considering the scale of the Internet and the access it offers to others, the interviewees showed a degree of caution and uncertainty when taking part in online relationships. Although these risks (i.e., willfully lying about themselves in order to gain personal information) can apply to face-to-face interactions, some respondents expressed that online relations might require a heightened sense of awareness. That is, they would be more cautious when sharing personal information (e.g., location) by offering general details and avoiding being specific. As mentioned, online relationships take longer to develop than offline, increased caution might be one of the main reasons that affect growth in tandem with lack of body language cues and exposure time. For example, in Tom's case, he alludes to maintaining a sense of privacy by willfully withholding specific details:

> [F]or the most part there's still a little bit of, like, um, caution I exercise with discussing things with people online. Uh, my...my parents did definitely raise me on the, like, you

> know, "Be careful with who you interact with online" you know? So even if I did make a good friend there would be specific details, notably like location related details... You know, I would mention I lived in Florida or something, right? That's pretty generic. Tampa area. It's pretty...pretty large. It's too large for people to really know. But, like, I would find ways to exclude those sorts of details and maybe not...not divulge all of my...my life (Tom 21, male).

The veil of privacy also protects against a potential loss of meaningful relationships. Since online relationships, initially, are approached with heightened caution, this safety net provides a slower development and less investment from both parties than an offline relationship would require. Thus, initially, online social ties in MMOs are primarily based on in-game achievements and goals attainment (Zhu et al., 2013). If, for some reason, a particular connection erodes, the effect of the loss would be minimal, and it would be easier to move on (see the excerpt from Lance).

> And just, you know, like you can meet this person and they don't know you...much about you. You don't know much about them. So, like, there's a... You know, there's a comfort in knowing that, well, you know, should this person and I not work out, you know there's no loss (Lance 19, male).

According to the participants, it is not only easier to meet new contacts online, but it is also not difficult to let those that are not deemed necessary go. It appears that initial contacts online are less important than face-to-face interactions, especially when taking into account the ability we have online to ignore or discard relationships discretely. Not having to deal with a possible face-to-face confrontation when a relationship goes sour, makes the initial social investment lower online than it would be offline. This is one of the main affordances of making ties online, i.e., the ease of finding people with shared/similar interests while at the same time offering a safety net that allows us to quickly remove, ignore or block without any direct confrontation. Offline we are tied to our physical locality, thus wholly avoiding or removing someone from our immediate social environment is not always possible.

THEME 3: TRANSCENDING SYMBOLIC, SOCIAL, AND GEOGRAPHICAL BOUNDARIES

Interactions online, aside from providing a safety net and, to some extent, explicit privacy, offer a way to circumvent some of the social cues that are only present in face-to-face scenarios. The socially constructed identities (e.g., gender, race, ethnicity, social class attributes, maturity) we bestow on others when meeting them for the first time, and the socio-cultural implications contained therein, are not readily discernible online. As the participants expressed, the most common type of communication for online gaming communities is through voice chat. Thus, the assumption is that online gaming relationships are initially built and maintained by shared interests and not necessarily affected by ascribed, perceived, or self-assigned identities. The veil of privacy, as mentioned earlier, also provides possibilities of transcending symbolic and social boundaries (Lamont & Molnár, 2002) and connecting with individuals you might not have approached face-to-face.

Considering that social interactions in MMOs initially stem from a common interest in the game and participants are focused on its live-action, it provides a unique context where personal details/information unrelated to the action is sidelined. Thus, a gamer is just interacting with other players that are either helping to achieve goals or competing against them. This particular focus circumvents the necessity or execution of ordinary social interaction conventions that one would be required or expected to consider when interacting face-to-face. This was highlighted in the previous excerpt from Harry above, where his primary reason for interacting with others in-game was a way of reaching objectives. Peter (below) echoes Harry to some extent, with the difference that he goes into more detail and does not express the competitiveness behind Harry's interactions:

> I would say the difference is in, like, focus, where online or, like… Even on, like, a game, you have… You're already focused on what's going on in the game. So, you're not really…

> You're not really worrying, or paying attention, or thinking about other certain things that, if say you were meeting the person face-to-face… That might put you off. Uh, like, you might not like, say, how the cologne the person's wearing, or the clothes they're wearing […] Online, you're only hearing… You're only hearing the voice, how they're pacing it, and, like, the words they're saying. And, you can only get a general picture from that, and you're really judging the person on that, versus all the other, uh… all the other little body signs, and stuff like that that you would look for if you were, like, meeting somebody for the first time face-to-face (Peter 27, male).

Online the initial reading of another individual relies on verbal communication, either through voice or text chat, and how that person presents themselves throughout the interaction. Face-to-face, there might be particular physical cues that can affect how one approaches social interactions. As Peter mentions, put off by odors or their general appearance. This might affect a potentially meaningful relationship by relaying decision making to these cues. Not relying on the appearance of the individual we are interacting with, prompts us to rely heavily on the character and content of their social actions. This can circumvent ascribed or visual traits that may lead one to deduce who a person is, i.e., social boundaries are set aside, at least during that initial interaction. Another example of this sidestepping of social boundaries is the way Robert expressed how age seems not to play a vital role when you have already shared lived experiences online:

> [Talking about age difference] it plays a factor I think face to face for me when I meet someone, their age does. Because there is something that you can immediately identify with someone who is closer to your own age. But when you've already formed a connection with someone online without knowing that much about them. Uhm I've found that it transcends that...and when you meet them...you know it transcends the whole like age gap when you meet them in person. Because you really don't think about it in the same way, because you already know them (Robert 47, male).

For Robert, when initiating interactions offline, you tend to gravitate towards people who share similar traits, age in this case. However, he mentions that online you are focused on what is going on in the game, and you get to know your counterparts through your shared experiences. He goes on to add that when he has met in person some of his online ties, he is able to transcend

common traits we usually seek to identify ourselves with others since he has spent countless hours interacting with them online. This allows Robert and other MMO gamers to encounter individuals that they might have initially discounted offline due to their perceivable qualities. Thus, this type of multiplayer/co-op games provides the benefit of expanding one's social network outside your usual and possibly restrictive friendship circle. Not only does it offer a more varied selection, but it also allows individuals to come out of their shells and explore their self-concepts and how they express them (e.g., see excerpts from Jill and Sarah above).

> There's so many people I've met like just by playing games, that I would never have met in my life if I didn't. Like Jay is from [AZ]. I mean, I was born and raised in [CT]. I would have never met somebody from [AZ], or like Troy is in [CA]. It's like I never would have met him if I didn't play video games. There's a ton of people that it's like you know. That's why I guess the online connections are a little more, they're more impactful to me. Because that's something that people that don't do stuff like that... That's something that they're missing out on. It's like their like group, their social circle is extremely limited to their location. And for a lot of people that game, that's not really a problem (Colin 19, male).

Colin expands on the affordance of being able to meet people outside of his geographical constraint. He highlights that the connections he has made online are "more impactful," alluding to the ability to grow his network by finding like-minded individuals online. He goes on to add that people who do not partake in MMOs are missing out of the extended possibilities of finding meaningful relationships online. His ties are not bound by geographical location, but by his personal interests and the people who share them.

THEME 4: PLAYING IDENTITY AND PROJECTING PERSONALITY

Throughout the interview, participants were asked to frame themselves and key their social interactions within two different stages (offline and online). Most of the previously shown excerpts show to some extent how they act and conduct themselves in these mediums. Considering that relationships online, in general, develop at a slower pace (Antheunis, Valkenburg, & Peter, 2012; Chan & Cheng, 2004), gamers employ different tactics when

interacting with others. Some cautiously approached online ties by withholding personal details (see *Theme 2*), while others described being more of themselves online than offline. The participants that identified as female, as seen in the excerpts above, were more adamant in describing how they felt more comfortable being themselves online than offline. When prompted to explain further how Sarah handled her self-presentation online, she said the following:

> I'd say I present myself, like, more honestly online, but also, like… In a real life, like, I… Like, I maintain my cool, you know. I'm, like, collected. I'm calm. But, like, online I'm just like, "Hey, guys. What's up? Ah." Like, excited, crazy, loud, and, like… Like, that is, like, who I am, but, like, I feel like, online, like, it's less, like, restrained. Like, I just, like, say whatever I want. Like, it doesn't matter. Whatever (Sarah 18, Female).

By reading Sarah's excerpts, we can understand how her self-representation evolves in tandem with the development of her online relationships. At first, she is cautious and might employ a veil of privacy when engaging with new contacts. As the relationship develops, she starts feeling more comfortable, and considering there is a safety net (see discussion in *Theme 2*), she begins opening up more. The relationship reaches its pinnacle when she states that she can be more honest and more of herself online. Later during the interview, she makes the distinction between feeling extroverted online and introverted offline. According to Sarah's account, having this space online allows her to express the most honest version of herself. Tony echoed this same sentiment:

> I would say I am more open online with them than like in person […] When getting to know people, I am more reserved than in person. But, after I get to know them, I am more open [online] (Tony 19, Male).

Although Tony mentions that he feels more comfortable opening up online, he does mention that when meeting new people online, he is more guarded than in face-to-face interactions. However, once those relationships further develop, he feels more like himself online than offline. While several participants claimed to be more open online than offline, others found

it difficult making a comparison between the two audiences. For example, Gene (below) describes this particular situation when asked to compare how much of himself he shares with his online and offline contacts.

> I don't know if there's much of a distinction between, like, how quickly you...I share my personal life information. Um, with people online versus offline. I would guess, um...So, yeah, I don't know. […] So, um, obviously I talk about, you know, concerns about work or teaching or something with my real-life colleagues instantly. […] My fellow gamers, um, I, you know, like, my anxiety about writing a paper or something. But, uh, uh... [Interviewer: different audiences, right?] yeah, and the same thing goes... my anxieties about some aspect of the video game, I would talk with them.... So, it's more, uh, related to topic and it's a... where a personal life comes up is whether if it's applicable to the individual. So, I think I'm going to tell them... you know, some people will ask me, you know, like, "Oh, what do you do? Like, I'll, um, "Ph.D., student in philosophy." Like I'll share that with people online instantly. I don't care. I don't think I'm...I'm not worried disclosing information. Um, but, you know, uh, what's your... like, if they say, you know, "What's your fiancé's name and what's your address?" Right? Like, […] I wouldn't have any need...It wouldn't be necessary (Gene 28, Male).

For Gene, what makes a difference between sharing personal matters is the context in which the interaction is happening. The interaction depends on the current frame and audience he is socializing with at a particular moment. It is not a matter of how important one type (online or offline) of relationship is versus the other, instead it depends on how appropriate a message is within the relational context of a specific situation. In this sense, Gene does not make a distinction between being more of himself in either environment by just presenting or sharing whatever he deems necessary during an interaction.

DISCUSSION

According to this study's sample, in general terms, there does not seem to be a strict difference between what they consider a meaningful relationship when it comes to online or offline social ties. There were participants on both sides of the spectrum. One side considered their online contacts more meaningful due to their ability to look for and find others with similar interests with more ease, while the other side made a case for their offline ties. An aspect that

played a role in the deciding factor was the affordances that each medium provided. Most of the participants did agree that meeting others online was more accessible and more conducive to developing a meaningful relationship. Offline ties were slightly more likely to be considered more significant than their online counterparts. See Table 4.2 for the distribution of ranks among online and offline ties.

Table 4.2 Distribution of how participants ranked ties by their significance

	First	Second	Third	Fourth	Fifth	Sixth
Online 1	4 (28.6%)	4 (28.6%)	2 (14.3%)	1 (7.1%)	2 (14.3%)	1 (7.1%)
Offline 1	5 (35.7%)	4 (28.6%)	2 (14.3%)	2 (14.3%)	1 (7.1%)	
Online 2	1 (7.1%)	2 (14.3%)	2 (14.3%)	2 (14.3%)	4 (28.6%)	3 (21.4%)
Offline 2	1 (7.1%)	1 (7.1%)	3 (21.4%)	4 (28.6%)	2 (14.3%)	3 (21.4%)
Online 3		1 (7.1%)	2 (14.3%)	2 (14.3%)	4 (28.6%)	5 (35.7%)
Offline 3	3 (21.4%)	2 (14.3%)	3 (21.4%)	3 (21.4%)	1 (7.1%)	2 (14.3%)

In offline interactions, you are more exposed, which provides an advantage in getting to know others by their physical appearance and body language. On the other hand, online interactions are usually devoid of visible physical cues that may hinder or facilitate interaction. Exposure is a critical factor for developing relationships, due to the essence of each frame of interaction, we are more likely to spend time interacting with offline contacts (e.g., schoolmates, workmates, neighbors, roommates). As previously discussed, this provides an advantage to the speed at which a potential relationship can progress. Still, for shy or introverted individuals that like to spend most of their time away from social hubbubs, online interaction offers an avenue for expanding one's social network.

The motivation for playing MMOs was another factor that affected how participants defined and ordered their relationships. Although this work does not focus on gaming motivation, I argue that gamers who mostly engage in competitive and fast-paced titles are less

likely to form meaningful relationships with their teammates (see Harry's excerpts under *Theme 1*).

When it came to self-presentation, all interviewees claimed to be honest and present themselves in a very similar way in both scenarios. They mentioned privacy practices for safeguarding their interactions online. That is, they would initially approach new interactions online in a more shielded manner than offline. However, once the relationship developed out of its initial stages, some of the participants felt more of themselves online than offline.

The modality by which one interacts with others is not as important as the content of the interaction. Offline interaction does present a more precise approach to forming ties, due in particular to the exposure factors; however, as telecommunication technologies become more advanced and ubiquitous, the smaller the difference between online and offline. Interactions in MMOs shows a marked difference between other online social media (e.g., Facebook and Twitter), in the sense that exchanges in MMOs can be continuous and allow for faster development of rapport in a shared joyful environment.

REFERENCES

Antheunis, M. L., Valkenburg, P. M., & Peter, J. (2012). The quality of online, offline, and mixed-mode friendships among users of a social networking site. *Cyberpsychology Cyberpsychology, 6*(3).

Bellotti, E. (2015). *Qualitative networks: mixed methods in social research*: Routledge.

Bergstrom, K., Fisher, S., & Jenson, J. (2014). Disavowing 'That Guy': Identity construction and massively multiplayer online game players. *Convergence: The International Journal of Research into New Media Technologies*.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology*(2),* 77.

Chan, D. K.-S., & Cheng, G. H.-L. (2004). A Comparison of Offline and Online Friendship Qualities at Different Stages of Relationship Development. *Journal of Social and Personal Relationships, 21*(3), 305-320. Retrieved from http://journals.sagepub.com/doi/abs/10.1177/0265407504042834. doi:10.1177/0265407504042834

Consalvo, M. (2009a). *Hardcore casual: Game culture Return (s) to Ravenhearst.* Paper presented at the Proceedings of the 4th International Conference on Foundations of Digital Games.

Consalvo, M. (2009b). There is No Magic Circle. *Games and Culture, 4*(4), 408-417.

Drachen, A. (2015). Behavioral Telemetry in Games User Research. In R. Bernhaupt (Ed.), *Game User Experience Evaluation* (pp. 135-165). Cham: Springer International Publishing.

El-Nasr, M. S., Drachen, A., & Canossa, A. (2013). *Game Analytics: Maximizing the Value of Player Data*: Springer London.

Fine, G. A. (1983). *Shared fantasy: role-playing games as social worlds*. Chicago: University of Chicago Press.

Gergen, K. J. (2009). *Relational being beyond self and community*. Oxford; New York: Oxford University Press.

Giddens, A. (1991). *Modernity and self-identity: self and society in the late modern age*. Cambridge: Polity Press.

Glas, R., Jørgensen, K., Mortensen, T., & Rossi, L. (2011). Framing the game: Four Game-related approaches to Goffman's Frames in "Online Gaming in context". In G. Crawford, V. K. Gosling, & B. Light (Eds.), *Online gaming in context: the social and cultural significance of online games* (pp. 141-158). London; New York: Routledge.

Goffman, E. (1959). *The presentation of self in everyday life*. Garden City, N.Y.: Doubleday.

Goffman, E. (1974). *Frame analysis: an essay on the organization of experience*. New York: Harper & Row.

Guest, G., MacQueen, K. M., & Namey, E. E. (2012). *Applied thematic analysis*. Thousand Oaks, CA: SAGE.

Higgins, E. T. (1987). Self-Discrepancy: A Theory Relating Self and Affect. *Psychological Review, 94*(3), 319-340.

Humphreys, S., & Vered, K. O. (2014). Reflecting on Gender and Digital Networked Media. *Television & New Media, 15*(1), 3-13.

Lamont, M., & Molnár, V. (2002). The Study of Boundaries in the Social Sciences. *Annual Review of Sociology, 28*(1), 167-195.

Lee, K.-W. R., & Lim, E.-P. (2016). *Friendship Maintenance and Prediction in Multiple Social Networks*. Paper presented at the Proceedings of the 27th ACM Conference on Hypertext and Social Media, Halifax, Nova Scotia, Canada.

Maguire, M., & Delahunt, B. (2017). Doing a Thematic Analysis: A Practical, Step-by-Step Guide for Learning and Teaching Scholars. *AISHE-J: The All Ireland Journal of Teaching & Learning in Higher Education, 9*(3), 3351-33514.

Mason, W., & Clauset, A. (2013). *Friends ftw! friendship and competition in halo: Reach.* Paper presented at the Proceedings of the 2013 conference on Computer supported cooperative work.

Mesch, G., & Talmud, I. (2006). The Quality of Online and Offline Relationships: The Role of Multiplexity and Duration of Social Relationships. *The Information Society, 22*(3), 137-148.

Miller, J., & Glassner, B. (2004). Chapter 7: The "inside" and the "outside": Finding realities in interviews. In S. David (Ed.), *Qualitative research: theory, method and practice* (2nd ed ed., pp. 125-139). London: Sage Publications.

Miller, V. (2011). *Understanding digital culture*. London; Thousand Oaks, Calif.: SAGE Publications.

Nakamura, L. (2002). *Cybertypes: race, ethnicity, and identity on the Internet*. New York: Routledge.

Nardi, B., & Harris, J. (2006). *Strangers and friends: collaborative play in world of warcraft*. Paper presented at the Proceedings of the 2006 20th anniversary conference on Computer supported cooperative work, Banff, Alberta, Canada.

Owens, T. J., Robinson, D. T., & Smith-Lovin, L. (2010). Three faces of identity. *Annual Review of Sociology, 36*, 477-499.

Pargman, D., & Jakobsson, P. (2008). Do you believe in magic? Computer games in everyday life. *European Journal of Cultural Studies, 11*(2), 225-244.

Schlenker, B. R. (1980). *Impression management: the self-concept, social identity, and interpersonal relations*. Monterey, Calif.: Brooks/Cole Pub. Co.

Shaw, A. (2012). Do you identify as a gamer? Gender, race, sexuality, and gamer identity. *New Media & Society, 14*(1), 28-44.

Shay, H. L. (2013). *I Am My Character: Role-playing Games as Identity Work.* (Ph.D.), North Carolina State University, Ann Arbor. ProQuest Dissertations & Theses Full Text database.

Shen, S., & Iosup, A. (2011). *The xfire online meta-gaming network: Observation and high-level analysis.* Paper presented at the 2011 IEEE International Workshop on Haptic Audio Visual Environments and Games.

Shklovski, I., Barkhuus, L., Bornoe, N., & Kaye, J. J. (2015). *Friendship Maintenance in the Digital Age: Applying a Relational Lens to Online Social Interaction*. Paper presented at

the Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing, Vancouver, BC, Canada.

Stets, J. E., & Serpe, R. T. (2014). Identity Theory. In J. DeLamater & A. Ward (Eds.), *Handbook of social psychology* (2nd ed., pp. 31-60). Dordrecht: Springer.

Taylor, T. L. (2006). *Play between worlds: exploring online game culture*. Cambridge, Mass; London: MIT Press.

Turkle, S. (1996). *Life on the screen: identity in the age of the Internet*. London: Weidenfeld & Nicolson.

Turkle, S. (2011). *Alone together: why we expect more from technology and less from each other*. New York: Basic Books.

Valafar, M., Rejaie, R., & Willinger, W. (2009). *Beyond friendship graphs: a study of user interactions in Flickr*. Paper presented at the Proceedings of the 2nd ACM workshop on Online social networks, Barcelona, Spain.

Walther, J. B. (1996). Computer-Mediated Communication: Impersonal, Interpersonal, and Hyperpersonal Interaction. *Communication Research, 23*(1), 3-43.

Williams, D., Consalvo, M., Caplan, S., & Yee, N. (2009). Looking for gender: Gender roles and behaviors among online gamers. *Journal of communication, 59*(4), 700-725.

Williams, D., Yee, N., & Caplan, S. E. (2008). Who plays, how much, and why? Debunking the stereotypical gamer profile. *Journal of Computer-Mediated Communication, 13*(4), 993-1018.

Xu, Y., Cao, X., Sellen, A., Herbrich, R., & Graepel, T. (2011). *Sociable killers: understanding social relationships in an online first-person shooter game.* Paper presented at the Proceedings of the ACM 2011 Conference on Computer Supported Cooperative Work.

Yuan, N. J., Zhong, Y., Zhang, F., Xie, X., Lin, C.-Y., & Rui, Y. (2016). *Who Will Reply to/Retweet This Tweet?: The Dynamics of Intimacy from Online Social Interactions*. Paper presented at the Proceedings of the Ninth ACM International Conference on Web Search and Data Mining, San Francisco, California, USA.

Zhu, M., Huang, Y., & Contractor, N. S. (2013). Motivations for self-assembling into project teams. *Social Networks, 35*(2), 251-264.

CHAPTER 5 THE ENDGAME

As the Internet and the devices that allow us to navigate it become more accessible across the globe, the more intertwined our daily lives are with the online world (e.g., working remotely, gaming, social networking sites, discussion boards, and forums). Thus, it is evident that online spaces and dynamics, in which social interactions are abundant, merit our attention (Crawford, Gosling, & Light, 2011) as a field of social action and social order. The literature reviewed in the previous chapters and data analyzed aimed to provide the reader with a general overview of video gaming research, MMOs in particular, and several approaches to address gaps in the literature regarding offline and online friendship relationships. The literature discussed throughout, focused on several topics that are seminal to the study of MMOs and other applicable digital realms. However, this does not represent the totality of all research done on this topic. The three data chapters (2-4) had a more focused coverage of specific literature regarding the three approaches that were implemented for collecting and analyzing data.

The project, as a whole, was to elucidate and address the offline-online aspects of gamers' lives. Especially when we consider that these individuals interact with each other within and outside the immediate virtual space of a particular MMO, that is, social ties born through online gaming interactions can and do, in some cases, migrate outside the game's boundaries. As with this study, future research should focus on both aspects of a gamer's life, by trying to understand how these individuals traverse with all their socio-cultural baggage through these, sometimes, very distinct social realms (offline and online).

I assume the position that the online and the offline are not opposites nor entirely independent of each other. That is, we should visualize them as a continuum where the individual negotiates his/her presence between the offline and the online. More so, when we take into account that these media users or gamers are actively consuming and participating in the production of the virtual world itself, a process Jenkins (2006) calls *participatory culture*. Our purpose then is to describe how this process takes place. As it has been argued throughout this chapter, it seems impossible to separate online life from offline life; they are intricately connected. Actions, mannerisms, attitudes, and meaning creation can differ from one another (sometimes slightly, and some other times more prominently), but they are still tied to a specific individual behind the screen.

The individual behind the screen is continually negotiating his/her notions of socio-cultural interactions and participating wittingly or unwittingly in the construction of his/her self-concept. By focusing on the socio-cultural internalities and externalities of these offline-online individuals, we can come closer to understanding how they culturally navigate and construct their identities via an inter-semiotic translation (i.e., from one medium to another). Especially the blurring of social boundaries, how culture gets translated, and what is lost or gained in the process. The boundaries can be transcended, but they can also be solidified and reflected through our actions in the virtual world. Hence, to better understand the socio-cultural potentials and impacts of these virtual fields, there is a need for tackling these complex exchanges between offline and online life.

Even though the spaces which are created in these worlds are not physical, we should not consider them less than places. These are places similar to their offline counterparts, where social actors can interact meaningfully with others. Gamers can also develop particular emotional ties

towards the virtual world and its occurrences. These individuals can create vast social networks, gain social capital, and support that sometimes may trespass the boundaries between the actual and the virtual. Just as different places in actual life let us embody various aspects of our identities (e.g., being in public; hanging out with friends; being at work), these virtual worlds give us the opportunity of embodying our avatar/s in new, distinct and captivating worlds.

Throughout this dissertation, I presented three approaches to understanding how friendship ties form and are managed in an online gaming environment. Each data analysis chapter (2-4) provides a look into three separate approaches of gathering data, each with its limitations and strengths.

Chapter 2 provides a baseline for online social networks within game-centric communities. In this chapter, I used publicly available data from the popular game distribution platform Steam to discuss the overall structure and topology of said network. This approach provided an unaltered glance at the intricacies of online social networks (OSNs). That is, the data available is collected for all types of users within the complete network without any distinction. Thus, through this approach, we can be more precise about the accuracy of the information that is being provided. Also, it provides access to a vast OSN that has worldwide coverage (see Bui, 2019), which is instrumental for the study of social network analysis, in general, and for the better understanding of the dynamics therein (Becker, Chernihov, Shavitt, & Zilberman, 2012; O'Neill, Vaziripour, Wu, & Zappala, 2016; Sifa, Bauckhage, & Drachen, 2014; Sifa, Drachen, & Bauckhage, 2015).

However, there were some limitations. First, we are unable to request any content that is not available through their API. For example, concerning the general research inquiry of this project, the Steam API does not provide interaction data between users aside from when a

particular dyad became friends. One can infer potential measures for weighting friendships, but the reality is that we cannot be entirely sure of the quality of each relationship with the currently available information. Still, there are aspects that are backed up by prominent social network analysis theories, for example, homophily (see McPherson, Smith-Lovin, & Cook, 2001 for an overview of the concept) as a leading predictor of tie formation and continuance of a relationship. Chapter 2 considered the notion of homophily and tackled several avenues from which this could be expressed through the available data points from the Steam API. The focus of the analysis in this chapter was the attraction of similar others and the repulsion of dissimilar others, based on the biased net model framework (Karpiński, 2017; Karpiński & Skvoretz, 2015; Skvoretz, 1983, 1990, 1991, 2013; Skvoretz, Fararo, & Agneessens, 2004). There was also a limitation regarding the scale of the network and capabilities of my PC's hardware to handle such intense load. This was evident in the preparation of the data for analysis, for example, computing new variables (e.g., list of games shared by dyads) from what is available through the API. Future research would require the implementation of large-scale database management systems (e.g., MYSQL, as seen in O'Neill et al., 2016) in conjunction with streamlined coding and processing power to provide a more robust picture regarding friendships ties in this type of OSN.

In Chapter 3, I used data gathered through a questionnaire of my design that aimed to provide insight into how online gamers qualify their top three offline and top three online relationships. This chapter considered the respondents' perspectives of these relationships by prompting them to provide information regarding their interactions with, knowledge of, and the significance of each friendship tie they mentioned. The aim was to compare offline with online relationships and see if there was a significant difference between the two. Overall, offline

friendships were considered slightly more important than online ties. However, the quality of online relationships was significantly affected more by the time spent interacting, both within the game and outside the game. The *exposure effect* and *similarity* (Antheunis, Valkenburg, & Peter, 2012) were more important than physical *proximity* (Hays, 1985). For these gamers, the importance of a relationship seemed to rely on the quality of interactions rather than what is more accessible. These findings suggest that virtual presence had more of an effect than physical presence when ranking relationships.

The data for this chapter was collected through a combination of random and convenient sampling. Most of the sample's participants (150) were recruited through Qualtrics Panel services, for which they use a random sampling of a population after controlling for specific characteristics (e.g., age, and location). Others were recruited through several postings on different online gaming forums and the University of South Florida Video Game Club. The sample's composition was compared to industry reports (SuperData-Research, 2016) to ascertain if it was representative of the population. At the point in time, the data was collected and the publicly available reports, the sample had similar distributions across basic demographic variables (e.g., age and gender). Ideally, a more extensive and racially diverse sample (70% identified as White) would be preferred for future research. There was a technical limitation when distributing the questionnaire, a prompt asking for the length of the relationship for each of the three offline friends was not included. This prevented a comparison analysis regarding the age of relationships between online and offline friendships. As suggested in previous studies, time is a crucial factor in the development of relationships, and it is of higher quality when there is a continuous and active interaction (e.g., Antheunis et al., 2012; Chan & Cheng, 2004).

In Chapter 4, I focused on follow-up interviews with several questionnaire respondents to analyze further what these relationships meant to them and how they present their self-concepts, both online and offline. From these conversations, four general themes were identified. The identified interconnected themes were based on how the respondents made, managed, compared, and presented themselves to both their top three online and top three offline friends. There was no clear winner when considering the meaningfulness of relationships regarding the environment in which they developed. Some interviewees argued for one or the other as their preferred choice for making friendship connections. However, most did agree that searching and finding similar-minded people was easier online than offline. On a similar note, they agreed that they usually approach online relationships more cautiously than when meeting others offline for the first time. The lack of visual cues and body language plays a pivotal role, not knowing how honest the other person across the screen is. Still, some interviewees argued that once those online barriers are surpassed, they would consider their online relationships more impactful or meaningful and would be willing to transcend symbolic and social boundaries (e.g., substantial differences in age). Additionally, all participants claimed to be honest in the way they presented themselves online to others, albeit being cautious when sharing personal information.

Throughout the analysis of the data, some interesting dynamics became apparent. I had previously argued that games that are more focused on sharing a cooperative than a competitive experience would be more conducive to foster meaningful relationships. This seemed to be the case with the participants that were interviewed, those that played highly competitive games were more likely to focus on being successful in-game than finding people that they could develop good friendships. Thus, several factors could affect how one perceives online and offline social interactions, primarily when online interactions are based on a ludic environment. Lastly,

another dynamic that seemed apparent was that the three female participants were more adamant in discussing how they perceived their self-presentation online as a more accurate picture of who they are, in contrast with how they presented themselves offline. All of them identified as being shy or introverted during the interview.

The analysis of this data left several avenues open that could guide future research on this topic. Ideally, future research would have a more extensive and diverse pool of participants. In particular, a more balanced distribution of gender identities that could provide a more definite notion of some of the discussed dynamics. At the same time, it would help to have avid gamers of different genres of MMOs to understand better how game mechanics may affect the fostering or development of friendship ties. Lastly, follow-up research should also focus on discussing the potential negative aspects ascribed to meeting strangers on the Internet and how participants handle these types of situations, in a more comprehensive way than what is discussed throughout this work.

THE DARK SIDE OF THE INTERNET

The scope of this research project focused on the relatively positive aspect of the digital age, i.e., the development of meaningful friendship relationships among MMO gamers. However, the Internet provides a space for social action to anyone who has access regardless of their agendas, views, and values, and thus not everything on the World Wide Web is a positive example of social interactions. One could argue, at least to the extent of what is covered in mass media, that most of the Internet is filled with hateful critiques of dissimilar others, bad actors or trolls, and inciteful rhetoric. Thus, the Internet provides a space for like-minded individuals to come together and, in the worst cases, hate together. Common examples of these practices can be seen throughout social media with the use of memes as tools of spreading hate, disinformation,

and at the same time cementing a groups collective identity (DeCook, 2018; Zannettou et al., 2018)

Additionally, it has been successfully used to garner support for social movements that have had real-world (offline) repercussions. For example, positive collective actions as the protests in Egypt during the Arab Spring have been covered by scholars (see Eltantawy & Wiest, 2011; Lim, 2012) as examples of social movements heavily relying on social media. On the other hand, the public resurgence of hateful, racist, and bigoted groups online like the white nationalist movement, i.e., the alt-right, in the United States of America, have incited real-world events. One such example is the infamous 2017 Charlottesville march that ended with one death and 19 injuries (Daniels, 2018).

Although these topics are outside the scope of the research at hand, it is safe to assume that the ability to be anonymous and a disembodied voice online can lead to "toxic online disinhibition" (Lapidot-Lefler & Barak, 2012) and cyberbullying in online gaming scenarios (Kwak, Blackburn, & Han, 2015). As it was discussed, most participants did mention that they approach initial online interactions in a more distanced manner than they would offline, and those that were more interested in the competitive side of gaming mentioned not being too attached to their online ties when comparing them to their offline counterparts. Previous studies show that *toxic disinhibition* is mainly driven by anonymity and unidentifiability (Joinson, 2007; Lapidot-Lefler & Barak, 2012; Spears, Lea, & Postmes, 2012). However, as argued through this dissertation, when interacting synchronously with others in a gaming environment, more so when the interaction includes voice-chat, it would be counterproductive to alienate your teammates by incurring in toxic behavior. The discussed online environment also provides the option of

disclosing personal details due to the high-rate and quality of interaction between members of a particular gaming community.

Anonymity and disinhibition seem to play a huge part in how we interact with others online, especially when the Web allows for easy alterations of our self-presentation. The notion of being tricked by someone who is pretending to be someone they are not is commonly known as *catfishing*. This concept was popularized by the 2010 documentary Catfish (Joost & Schulman, 2010) and later the MTV docuseries by the same name (for additional information on catfishing and the docuseries see D'Costa, 2014; Fitzpatrick, 2016; McHugh, 2015). The popularization of anonymous trolling and/or catfishing has affected the way we approach others online. This is, to some extent, addressed in the interview chapter, in particular during the discussion of the *Veil of Privacy* theme. Future research on MMO gamers' social networks should attempt to address the experiences of participants and their willingness to take part in any of these online behaviors. Especially when considering that online, we can interact without the need for physical presence, cues, or constraints. Would they be more likely to present themselves inaccurately online than offline? Are they less likely to engage in meaningful interactions online due to the possibility of being catfished? What measures are taken to avoid such situations, and what is their overall approach to online relationships?

AIM & CONTRIBUTION

The resulting research project aims to propose and inform future research that considers the offline and online lives of MMO gamers. It seeks to expand the literature regarding online social ties and their offline counterparts in general (i.e., not only those that are associated with online gaming). As previously argued, research that looked at the relationship between online and offline social ties were either lacking in rigor or are currently out of date (this applies to the

studies from the late 90s and early 2000s). The main objective was to get a better understanding of how individuals manage their social networks in an age where digital technologies have become more accessible, we are always connected to the Internet no matter where we go, and online gaming has become a popular pastime.

Another vital aspect to consider was the capacity of translation and/or transference of seminal identity theories. Many of these theories were developed before the advent of the Internet (e.g., Blumer, 1969; Goffman, 1959, 1974; Mead, 1934), which to this day have a prominent status within and have been expanded upon through the lenses of the human-computer interactions field (e.g., Bainbridge, 2007, 2009; Bergstrom, Fisher, & Jenson, 2014; Chen, 2014; Glas, Jørgensen, Mortensen, & Rossi, 2011; Williams, Kennedy, & Moore, 2010), and structural symbolic interactionism (e.g., Serpe & Stryker, 2011; Stryker, 2008; Stryker, Serpe, & Hunt, 2005). These newer adaptations and configurations for understanding how social actors interact and live within a highly interconnected world, where both online and offline information and points of reference affect how interactions are handled, are pivotal to the comprehension of the social condition of the digital age, and its possible repercussions of how we perceived ours and others' self-concepts.

REFERENCES

Antheunis, M. L., Valkenburg, P. M., & Peter, J. (2012). The quality of online, offline, and mixed-mode friendships among users of a social networking site. *Cyberpsychology Cyberpsychology, 6*(3).

Bainbridge, W. S. (2007). The Scientific Research Potential of Virtual Worlds. *Science, 317*(5837), 472-476. Retrieved from http://www.sciencemag.org/content/317/5837/472.abstract. doi:10.1126/science.1146930

Bainbridge, W. S. (2009). *Online worlds: convergence of the real and the virtual / edited by William Sims Bainbridge*: New York; London: Springer, 2009.

Becker, R., Chernihov, Y., Shavitt, Y., & Zilberman, N. (2012, 14-17 Nov. 2012). *An analysis of the Steam community network evolution.* Paper presented at the 2012 IEEE 27th Convention of Electrical and Electronics Engineers in Israel.

Bergstrom, K., Fisher, S., & Jenson, J. (2014). Disavowing 'That Guy': Identity construction and massively multiplayer online game players. *Convergence: The International Journal of Research into New Media Technologies*.

Blumer, H. (1969). Symbolic interactionism: perspective and method.

Bui, T. (2019). Steam - 2018 Year in Review. *Steamworks Development.* Retrieved from https://steamcommunity.com/groups/steamworks/announcements/detail/1697194621363928453

Chan, D. K.-S., & Cheng, G. H.-L. (2004). A Comparison of Offline and Online Friendship Qualities at Different Stages of Relationship Development. *Journal of Social and Personal Relationships, 21*(3), 305-320. Retrieved from http://journals.sagepub.com/doi/abs/10.1177/0265407504042834. doi:10.1177/0265407504042834

Chen, C.-P. (2014). Forming digital self and parasocial relationships on YouTube. *Journal of Consumer Culture*, 1-23. Retrieved from http://joc.sagepub.com/content/early/2014/02/03/1469540514521081.abstract. doi:10.1177/1469540514521081

Crawford, G., Gosling, V. K., & Light, B. (2011). The social and cultural significance of online gaming. In G. Crawford, V. K. Gosling, & B. Light (Eds.), *Online gaming in context: the social and cultural significance of online games* (pp. 3-22). London; New York: Routledge.

D'Costa, K. (2014). Catfishing: The truth about deception online. *Scientific American, Anthropology in Practice*. Retrieved from https://blogs.scientificamerican.com/anthropology-in-practice/catfishing-the-truth-about-deception-online

Daniels, J. (2018). The Algorithmic Rise of the "Alt-Right". *Contexts, 17*(1), 60-65. Retrieved from https://journals.sagepub.com/doi/abs/10.1177/1536504218766547. doi:10.1177/1536504218766547

DeCook, J. R. (2018). Memes and symbolic violence: #proudboys and the use of memes for propaganda and the construction of collective identity. *Learning, Media and Technology, 43*(4), 485-504. Retrieved from https://doi.org/10.1080/17439884.2018.1544149. doi:10.1080/17439884.2018.1544149

Eltantawy, N., & Wiest, J. B. (2011). *The Arab Spring| Social Media in the Egyptian Revolution: Reconsidering Resource Mobilization Theory* (Vol. 5).

Fitzpatrick, M. (2016, February 23). A statistical analysis of all four seasons of 'Catfish'. *Splinter News*. Retrieved from https://splinternews.com/a-statistical-analysis-of-all-four-seasons-of-catfish-1793854917

Glas, R., Jørgensen, K., Mortensen, T., & Rossi, L. (2011). Framing the game: Four Game-related approaches to Goffman's Frames in "Online Gaming in context". In G. Crawford, V. K. Gosling, & B. Light (Eds.), *Online gaming in context: the social and cultural significance of online games* (pp. 141-158). London; New York: Routledge.

Goffman, E. (1959). *The presentation of self in everyday life*. Garden City, N.Y.: Doubleday.

Goffman, E. (1974). *Frame analysis: an essay on the organization of experience*. New York: Harper & Row.

Hays, R. B. (1985). A longitudinal study of friendship development. *Journal of Personality and Social Psychology Journal of Personality and Social Psychology, 48*(4), 909-924.

Jenkins, H. (2006). *Convergence culture: where old and new media collide*. New York: New York University Press.

Joinson, A. N. (2007). Chapter 4 - Disinhibition and the Internet. In J. Gackenbach (Ed.), *Psychology and the Internet (Second Edition)* (pp. 75-92). Burlington: Academic Press.

Joost, H., & Schulman, A. (Writers). (2010). Catfish. In Relativity Media/Rogue Pictures (Producer). United States of America: Universal Pictures.

Karpiński, Z. (2017). Advances in the attraction model for inter-group relations. *Mathematical Social Sciences, 89*, 109-118. Retrieved from http://www.sciencedirect.com/science/article/pii/S0165489616301111. doi:https://doi.org/10.1016/j.mathsocsci.2017.04.006

Karpiński, Z., & Skvoretz, J. (2015). Repulsed by the "Other": Integrating Theory with Method in the Study of Intergroup Association. *Sociological Theory, 33*(1), 20-43. Retrieved from https://doi.org/10.1177/0735275115572687. doi:10.1177/0735275115572687

Kwak, H., Blackburn, J., & Han, S. (2015). *Exploring Cyberbullying and Other Toxic Behavior in Team Competition Online Games*. Paper presented at the Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems, Seoul, Republic of Korea.

Lapidot-Lefler, N., & Barak, A. (2012). Effects of anonymity, invisibility, and lack of eye-contact on toxic online disinhibition. *Computers in Human Behavior, 28*(2), 434-443. Retrieved from http://www.sciencedirect.com/science/article/pii/S0747563211002317. doi:https://doi.org/10.1016/j.chb.2011.10.014

Lim, M. (2012). Clicks, Cabs, and Coffee Houses: Social Media and Oppositional Movements in Egypt, 2004–2011. *Journal of communication, 62*(2), 231-248. Retrieved from

https://doi.org/10.1111/j.1460-2466.2012.01628.x. doi:10.1111/j.1460-2466.2012.01628.x

McHugh, M. (2015, July 7). The Life of an Internet Catfish Is Rough These Days. *Wired*. Retrieved from https://www.wired.com/2015/07/catfish-2/

McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a Feather: Homophily in Social Networks. *Annual Review of Sociology, 27*(1), 415-444. Retrieved from https://www.annualreviews.org/doi/abs/10.1146/annurev.soc.27.1.415. doi:10.1146/annurev.soc.27.1.415

Mead, G. H. (1934). *Mind, self, and society*. Chicago: University of Chicago Press.

O'Neill, M., Vaziripour, E., Wu, J., & Zappala, D. (2016). *Condensing Steam: Distilling the Diversity of Gamer Behavior*. Paper presented at the Proceedings of the 2016 Internet Measurement Conference, Santa Monica, California, USA.

Serpe, R. T., & Stryker, S. (2011). The Symbolic Interactionist Perspective and Identity Theory. In S. J. Schwartz, K. Luyckx, & V. L. Vignoles (Eds.), *Handbook of Identity Theory and Research* (pp. 225-248). New York, NY: Springer New York.

Sifa, R., Bauckhage, C., & Drachen, A. (2014, 26-29 Aug. 2014). *The Playtime Principle: Large-scale cross-games interest modeling.* Paper presented at the 2014 IEEE Conference on Computational Intelligence and Games.

Sifa, R., Drachen, A., & Bauckhage, C. (2015). *Large-scale cross-game player behavior analysis on steam.* Paper presented at the Eleventh Artificial Intelligence and Interactive Digital Entertainment Conference.

Skvoretz, J. (1983). Salience, Heterogeneity and Consolidation of Parameters: Civilizing Blau's Primitive Theory. *American Sociological Review, 48*(3), 360-375. Retrieved from http://www.jstor.org/stable/2095228. doi:10.2307/2095228

Skvoretz, J. (1990). Social Structure and Intermarriage: A Reanalysis. In C. Calhoun, M. W. Meyer, & W. R. Scott (Eds.), *Structures of power and constraint : papers in honor of Peter M. Blau* (pp. 375-396). Cambridge: Cambridge University Press.

Skvoretz, J. (1991). Theoretical and methodological models of networks and relations. *Social Networks, 13*(3), 275-300. Retrieved from http://www.sciencedirect.com/science/article/pii/037887339190009I. doi:https://doi.org/10.1016/0378-8733(91)90009-I

Skvoretz, J. (2013). Diversity, Integration, and Social Ties: Attraction versus Repulsion as Drivers of Intra- and Intergroup Relations. *American journal of sociology, 119*(2), 486-517. Retrieved from http://www.jstor.org/stable/10.1086/674050. doi:10.1086/674050

Skvoretz, J., Fararo, T. J., & Agneessens, F. (2004). Advances in biased net theory: definitions, derivations, and estimations. *Social Networks, 26*(2), 113-139. Retrieved from

http://www.sciencedirect.com/science/article/pii/S0378873304000061. doi:https://doi.org/10.1016/j.socnet.2004.01.005

Spears, R., Lea, M., & Postmes, T. (2012). Computer-mediated communication and social identity. In A. N. Joinson, K. Y. A. McKenna, T. Postmes, & U.-D. Reips (Eds.), *Oxford Handbook of Internet Psychology* (pp. 253-269): Oxford University Press.

Stryker, S. (2008). From Mead to a Structural Symbolic Interactionism and Beyond. *Annu. Rev. Sociol. Annual Review of Sociology, 34*(1), 15-31.

Stryker, S., Serpe, R. T., & Hunt, M. O. (2005). Making Good on a Promise: The Impact of Larger Social Structures on Commitments. In S. R. Thye & E. J. Lawler (Eds.), *Social Identification in Groups* (pp. 93-123).

SuperData-Research. (2016). The MMO & MOBA Games Market Report, 2016. Retrieved from https://www.superdataresearch.com/market-data/mmo-market/

Williams, D., Kennedy, T. L. M., & Moore, R. J. (2010). Behind the Avatar: The Patterns, Practices, and Functions of Role Playing in MMOs. *Games and Culture*. Retrieved from http://gac.sagepub.com/content/early/2010/03/16/1555412010364983.abstract. doi:10.1177/1555412010364983

Zannettou, S., Caulfield, T., Blackburn, J., Cristofaro, E. D., Sirivianos, M., Stringhini, G., & Suarez-Tangil, G. (2018). *On the Origins of Memes by Means of Fringe Web Communities*. Paper presented at the Proceedings of the Internet Measurement Conference 2018, Boston, MA, USA. https://doi.org/10.1145/3278532.3278550