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People, Place, and Pokémon: How Location-Based Games Enhance Well-Being

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Keywords

gaming, video games, positive gaming, play, well-being, high-quality connections, social ties, relationships, positive emotion, Pokémon Go, location-based technology, location awareness, community, place, public space, positive psychology

Disciplines

Communication Technology and New Media | Game Design | Other Psychology | Place and Environment | Social Psychology | Social Psychology and Interaction

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Social connections and relationships are a critical component of overall human flourishing and well-being. Over time, the structure of physical spaces and how we engage with each other has changed. This paper explores how social ties impact well-being and how advances in technology have shifted people's conception of public and private spaces and how we interact with each other in them It also examines both the positive and negative effects of video games on social connections and well-being with a focus on location-based games like Pokémon Go which blur the line between physical and virtual reality. It concludes with suggestions for how the disconnected disciplines of new media, place, and positive psychology can come together to explore the potential of location-based games to improve human well-being at scale.

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because of you. Lastly, to my **Sweet 16 MAPPily**, thank you for literally everything. I feel

humbled because of you. We crushed it.

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Advances in technology have changed how people interact with the world and each other. Much of the narrative in recent years has focused on all the ways technology is harming people and society, causing relationships to erode, pitting us more deeply into us-vs-them silos, allowing the spread of misinformation, and leading to feelings of isolation. What often gets lost, however, is all the ways technology can have a positive impact on human flourishing and well-being.

The hypothesis of this paper is that playing location-based games may enhance well-being by facilitating social ties and blurring the line between virtual and real. It will pull together previously disconnected literature from the positive psychology, place, and new media disciplines to examine how location-based technology, specifically location-based games, may facilitate connections between people and places, strengthen social ties, and enhance well-being. New media studies, particularly on video games, typically don't consider place or positive psychology. Similarly, there is little positive psychology research focused on the relationship of place and well-being. If researchers brought these areas together, they would find that location-based games, which bring people together in places, have the potential to improve human well-being in a way other media cannot.

The first section of this paper will give an introduction to the field of positive psychology and key constructs related to well-being. Next, it will explore literature about connections and social ties and how they are important to overall well-being. The next section will explore how humans conceptualize place and how people connect with each other in places. It will then examine how technology, specifically mobile devices and internet access, affect human interactions in public spaces. Then it will give an introduction to gaming, location-based games, and Pokémon Go before exploring the positive and negative outcomes associated with gaming in general and those outcomes specific to location-based games like Pokémon Go. Finally, it will

conclude with suggestions for how future research in new media and video gaming may benefit from an interdisciplinary approach to robustly examine how location-based games can be leveraged to increase social connections and improve human well-being.

Introduction to Positive Psychology

For thousands of years, philosophers and psychologists have wrestled with the human condition and what it means to live a good life. Aristotle suggested that *eudaimonia*−translated as happiness, well-being, or flourishing−is the highest good a human can achieve (Melchert, 2002). Positive psychology is the study of human flourishing and well-being. It is dedicated to understanding, through scientific research and evidence, how humans can capitalize on what's good and come to live well and truly flourish. It's the branch of psychology focused what can go right with people instead of what can go wrong with people. It's not enough just to eradicate what's wrong in our lives; we must also cultivate what's good. A gardener can pull out every weed that's in a garden, but all that will be left is dirt unless they plant desirables like flowers, vegetables, and other things that are beautiful and good (Seligman, 2011). Positive psychology is about cultivating desirable things such as positive emotions, engagement, relationships, meaning, accomplishment.

Positive psychology is a relatively young field. While many researchers had previously examined constructs that fit under the positive psychology umbrella, it wasn't established as its own discipline until Martin Seligman was president of the American Psychological Association in 1998. He argued that since the end of World War II, the field of psychology had "moved too far away from its original roots, which were to make the lives of all people more fulfilling and productive, and too much toward the important, but not all-important, area of curing mental illness" (Seligman, 1998). That distinction is important. Many critics of positive psychology

equate it with "happiology", vapid self-help claims, or a toxic always-look-on-the-bright-side

mentality. But positive psychology doesn't deny that the human experience is full of hardship

and suffering. Spend one minute scanning news headlines, and anyone can see the world is not

always a happy place. However, that doesn't mean it isn't worth exploring the scientifically-

backed ways people can enhance well-being and flourishing *in spite of* all the hardship that life

throws their way. Quite the contrary. People who experience high levels of well-being have

fewer physical and mental challenges, fewer absences from work, better relationships, longer

lives, increased work productivity, and lower suicide risk (Prilleltensky et al., 2015). These

outcomes are worth pursuing.

Well-being is a multi-faceted construct. Many psychologists and philosophers have

defined well-being in different ways over time, and these definitions typically include elements

that are both individual and relational in nature. Seligman (2011) offered the PERMA theory

which consists of five constructs that can be measured independently and are each pursued for

their own good: positive emotions, engagement, (positive) relationships, meaning, and

accomplishment. Underpinning these elements are twenty-four character strengths, or positive

personality traits, that all humans have available at their disposal (Peterson & Seligman, 2004).

While traditional medicine and psychology had long used the International Classification of

Diseases (ICD) and Diagnostic and Statistical Manual of Mental Disorders (DSM) to classify

and outline assessment strategies for mental and physical diseases and disorders, until 2004 there

was no classification by which to assess and measure what is *right* about people. The

classification of character strengths filled that gap. There are numerous empirical studies that

demonstrate the relationship between character strengths and PERMA, including a recent study

that combines both self-report and informant-report data to suggest that all character strengths

are related to all dimensions of PERMA, though with varying relationships sizes (Wagner et al., 2020). There are also empirical studies that suggest leveraging signature strengths is a central pathway to engagement across several domains of life: within organizations, relationships, and individuals (Niemiec, 2018). While not yet a research-backed addition to the PERMA framework, Emilia Zhivotovskaya suggests that the concept of vitality be added to PERMA to create PERMA-V, with vitality covering physical activity, sleep, other behaviors that support a healthy body and mind (O'Brien, 2014).

Prilleltensky (2015) also sought a framework to encompass physical, economic, and occupational well-being measures in addition to individual and relational elements, so he established the I COPPE framework. I COPPE outlines six domains that comprise well-being: interpersonal, communal, occupational, physical, psychological, and economic. Holistic well-being must account for all of these factors, and he recognizes that access to well-being is largely a matter of equity proclaiming "there is no wellness without fairness" (Prilleltensky, 2013).

Positive psychology is not just concerned about defining well-being and human flourishing; the point is finding research-backed ways to *improve* it. One way is through positive psychological interventions (PPI). PPIs are activities undertaken intentionally to increase well-being and move humans closer to the good life (Pawelski, 2020). They can help people increase positive emotions, build deeper relationships, find more engagement in daily activities, uncover a greater sense of meaning and purpose, and feel a strong sense of accomplishment. Improving well-being requires action and, often, *habitual* action. It takes practice. A well-designed PPI builds a person's sense of self-efficacy, or belief they can accomplish what they want to accomplish, and it helps them create positive habitual action in service of a goal they choose and feel capable of accomplishing. Its design carefully considers what will work best for an

individual based on their specific context. What makes PPIs particularly powerful is that, while they tend to operate on the individual level, they can bring people together in a shared experience that extends well-being into the collective.

The power of collective experiences, connections with others, the places they happen, and the activities and contexts that encourage them is a key focus of this paper. While well-designed, thoughtful positive interventions may be an important arrow in the quiver of well-being enhancing tools, I believe there is greater power in smaller activities and moments. Although the word "intervention"' is of Latin origin, *inter venire,* simply means "to come between", the word conjures up images of heavy, emotional sit-downs with friends or family members struggling with debilitating circumstances like addiction or abuse. Attaching the word "positive" to it does little to diminish the sense that it calls for a significant investment of time, energy, and effort. I believe there is magic when the burden of intention falls on those who design and create things that have the potential to enhance the well-being of others *without them even knowing it*.

There is a word for this phenomenon: affordances. The concept of affordances is introduced here because the paper will use the terms of affordances throughout. An affordance is the relational structure between an object and the functions that it enables or constrains (Davis & Chouinard, 2016). Affordances work through several mechanisms: request, demand, encourage, discourage, refuse and allow. Requests and demands refer to bids that an object places on a subject. Encouragement, discouragement, and refusal refer to how the object responds to bids placed upon it by a subject. Allow refers to bids placed upon both the subject and the object and, while the other mechanisms push or pull toward certain behaviors or outcomes, is multidimensional and neutral. For example, a speed bump requests that drivers slow down at a

given point, but it doesn't demand it. Certain items in online surveys demand a response before

the subject can move on to the next item. Twitter's retweet function encourages interaction

between subjects, while the dating app Bumble's feature where women make the first move

discourages unsolicited messages from men. Some websites refuse to let you create an account if

your password doesn't meet a very precise set of conditions. The speed bump from the first

example, while requesting that drivers slow down and discouraging speeding, still allows

vehicles to pass. Looking at features of location-based games through the lens of affordances

may help explain how they may contribute to, and detract from, well-being.

Other People Matter: Connections, Relationships, and Social Ties

The next section of this paper will explore different types of connections and explain why

social ties are important for human well-being. Positive interpersonal relationships feature

prominently in both the PERMA and I COPPE well-being frameworks. Seligman concisely

states "Very little that is positive is solitary" (2011, p. 20). Chris Peterson (2006) puts it even

more simply: "other people matter". Individual, relational, and collective well-being are highly

interdependent (Prilleltensky et al., 2015). The well-being of an individual depends on the well-

being of the collective they are part of, and vice-versa.

Defining Community and Social Ties

Community can be defined as "the network of supportive ties that exist between individuals"

(Hampton & Gupta, 2008, p. 2). Simply put, community is where people get social support,

tangible aid, and have people to talk to. Ties between individuals may be either strong or weak.

Strong ties are typically formed between family and close friends. Weak ties are those that are

formed between people we encounter in public or those who are several points removed from our

close network. Networks made up of strong ties tend to be more homogenous and lead to

"bonding social capital" which is characterized by highly reciprocal, generalized social support.

Networks made up of weak ties tend to be more diverse and lead to "bridging social capital"

which is characterized by special social support, novel information, and diverse resources

(Granovetter, 1973). People who have more bridging social capital reap a variety of well-being

outcomes such as increased trust of others, greater social tolerance, the ability to better cope with

daily challenges, and better physical health (Cohen et al., 1997).

Consequential Strangers

One type of relationship that constitutes a weak-tie and is relevant in the context of this paper

is the consequential stranger. In general, relationships can be placed on a continuum from

stranger to intimate, and people can move along that continuum during different phases of life.

Perhaps someone a person spent nearly every moment with during their college years is now

simply a line on a Christmas card list. Someone who was once intimate is now a consequential

stranger. Consequential strangers are individuals with whom people have peripheral relationships

that don't seem to matter but really do (Fingerman, 2009). People may have friendly exchanges

with the receptionist at the veterinarian's office or the person who delivers mail each day, but

they likely don't think of them outside of that specific context; however, they would probably

miss them if they were no longer there. This is the power of a consequential stranger. In fact,

these consequential strangers or acquaintances are often more critical to an individual's access to

opportunities and community integration than intimate connections, as Granovetter's (1973)

strength of weak ties theory suggests. Consequential strangers are the ties that connect people to

others who likely don't run in their typical circle which provides links to a broader diversity of

thought, opportunity, and resources.

Connections with consequential strangers may be categorized as high-quality connections

(HQC), a construct from positive psychology literature that helps define the nature of these

particular weak-tie connections. HQCs are characterized by a sense of vitality and energy,

mutual positive regard where both parties feel cared for in that moment, and mutuality, or the

sense that both people are fully participating in the interaction (Dutton & Heaphy, 2003). HQCs

don't require an intimate connection between people or a long interaction. Every point of contact

with another person has the potential to be an HQC. Emotion researcher Barb Fredrickson (2013)

expands on the impact of HQCs with the positivity resonance theory. This theory suggests that

there is a certain type of HQC that can occur between two or more people that is characterized by

three things: shared positive affect, mutual care and concern, and behavioral and biological

synchrony. In other words, when people experience something pleasant together and feel

invested in each other's well-being, even for just a moment, their nonverbal behaviors,

physiology, and neural firing sync up. This can lead to positive outcomes. A series of

correlational studies showed that perceived positivity resonance is associated with better mental

health, lower levels of depressive symptoms and loneliness, and fewer illness symptoms (Major

et al., 2018).

Social Ties and Well-Being

   Research supports the claim that other people matter. In one foundational study, healthy

adults were recruited to be given the common cold (Cohen et al., 1997). Each participant's

degree of social integration was measured by asking them about their close and casual relations.

Each participant was given one point for each type of relationship they noted; the experimenters

were interested not in the size of a network but its diversity. After this assessment, each

participant was given a dose of the common cold then asked to quarantine in a private floor of a

hotel. The experimenters gathered used tissues at the end of each day to assess who ended up

catching a cold, indicated by an increase in antibodies. Some participants didn't get sick at all. Participants who interacted with three or fewer types of relations over the two-week quarantine were more than four times at risk of coming down with a cold than those who were in touch with six or more types.

A diverse social network may also help us live longer. A meta-analytic review of social relationships and mortality risk looked at 148 studies all of which defined and measured "social relationships" in different ways (Holt-Lunstad et al., 2010). The authors found three common components of social relationships that were consistently measured across studies: 1) degree of integration in social networks, 2) the social interactions intended to be supportive, and 3) an individual's beliefs and perceptions about availability of support. The authors concluded that individuals' social relationships significantly predict mortality with an overall effect size that suggests people with adequate social relationships have a 50% increase in odds of survival compared to those with inadequate social networks. In fact, this effect is comparable to the mortality effect of quitting smoking. Despite robust data that demonstrates the association of social relationships with mortality, the authors point out that there is a lack of public policy or broad-scale interventions that seek to increase the number, strength, and/or diversity of social ties (Holt-Lunstad et al., 2010). Another study used public health records from a survey of almost 7,000 Alameda County, California residents to piece together respondents' social networks (Berkman & Syme, 1979). The researchers then followed up with the respondents and discovered that those who didn't have close ties were more likely to die nine years earlier than those with more extensive and diverse social connections.

There is much research that supports the role of social relationships in people's physical health and many social phenomena such as social network structure (Brissette et al., 2000),

support received from others (Cohen et al., 2000), quality and quantity of social interactions

(Kiecolt-Glaser & Newton, 2001), and feelings of isolation and loneliness (Cacioppo et al.,

2002), all of which are predictors of health and well-being (Cohen, 2004). Two key social

constructs important to well-being are social support—resources within someone's network that

help them cope with stress—and social integration, or engaging in a wide range of social

relationships (Brissette et al., 2000; Cohen, 2004). Cohen advocates for activities that help

individuals create and strengthen diverse social networks.

Another reason social ties matter is that they may promote a sense of belonging. A sense of

belonging is one of the primary pillars of a meaningful life, and lacking it can have dire

consequences (Smith, 2017). When people feel they belong, "each person feels loved and valued

by the other" and they have "frequent, pleasant interactions with other people" (Smith, 2017, p.

50). Smith summarizes a powerful study by René Spitz in 1945 in which children in an

orphanage were denied close contact with anyone. Those children languished and suffered

compared to children in a prison setting who were allowed to see their incarcerated mothers. In

some cases, chronic loneliness appeared to lead to early death. The severe impact of social

isolation is supported by research. One study found that social isolation was nearly as strong a

risk factor as traditional clinical risk factors such as smoking and high blood pressure (Pantell et

al., 2013). Increasing sense of belonging within a group may not only impact the psychological

well-being of its members, but it may increase physical well-being too.

Technology and Place

The previous section outlined how social ties and relationships are important to physical,

emotional, and social well-being. Those relationships are formed and exist in places. Some

researchers suggest that it is not possible to separate relationship from the places those

relationships exist (Brown et al., 2006). This section will explore the concept of place, the types

of relationships that occur in different kinds of places, and how technology impacts these

connections, particularly in public spaces.

The Importance of Place

First, it is important to define terms. While space and place appear to be simple words, they

are actually rather complex, and conceptions and definitions have varied over time and across

disciplines. The definitions most relevant to this paper come from humanistic geography and

consider the role of spaces and places in the human experience (Agnew, 2011). Spaces are

settings with discrete boundaries where social relations may occur while places are spaces that

have meaning, often contribute to a person's sense of identity, and are emergent (Duncan, 2009).

According to Robert Sack (1997, p. 16), "place differs from space in familiarity and time".

Much of how humans define place is less about the place itself and more about *relationship*

to place. People become attached and committed to places based on how much they perceive the

place fulfills a functional need (place dependency), how much a particular place aligns with their

self-image (place identity), the extent to which a place is woven into their daily routine (place

lifestyle), and the extent to which they accept a place's goals and values (place commitment)

(Rosenbaum et al., 2007). A space like a neighborhood park may become a place for a little

league team that regularly practices there. For those players, the park may carry a sense of

meaning and contribute to their identity as ballplayers.

How Place Impacts Social Ties

Homes are generally important places in an individual's life. The way homes and

neighborhoods are designed and situated in relation to each other has evolved over time, and this

has affected the structure of social ties and how community is conceptualized. Colonial-era

homes in the United States were small with multi-functional rooms housing multiple family

members and non-family members. People engaged with each other in the home and outside the

home by both necessity and design. Communities—which offer social support, tangible aid, and

people to talk to—were actual places typically centralized around a single social and physical

context (Hampton, 2016). Then in the mid-twentieth century, the suburban "ideal" changed the

structure of community. Homes and suburban neighborhoods were designed to be separate from

each other and from the city and its resources. This shift, along with technological advancements

like air conditioning and television, also changed and limited the potential for engagement

between households (Brown et al., 2006). People no longer needed to sit on their stoops (if they

still had stoops) to escape sweltering indoor summer heat. These shifts created a mismatch

between the physical places people inhabit and the social relationships they desire. To mitigate

this, urban and community planning movements have arisen to redesign or build new

neighborhoods that better facilitate social engagement by situating them near important services

like schools and shops or by making them more pedestrian friendly.

What these movements often miss, however, is that community hasn't gone away; it's

changed. Social relationships haven't necessarily declined; they've taken on different forms

(Wellman, 1979). There was a time when individual relationships were centered around a

particular institution like a church or an employer. People's social circles were largely pre-

determined by geographical location and the institutions they joined, and they often stayed in the

same place for their entire lives. While there are certainly some places where this is still the case

such as rural areas and small towns, it's largely not how things work anymore. Rather than

connections being rooted in a single place or institution, they are distributed in a network of a

few strong and many weak ties that are organized around multiple and varied activities

(Hampton, 2016). In his foundational study, Wellman (1979) used a social network analytical

approach to examine the network structure, tie density, and tie strength of the East York area of

Toronto. By looking at individuals' relationship structure and how activities and information

flow within those structures, this type of approach transcended the confines of location to get a

broader picture of where people get social support and aid. He found that people tend to maintain

a diverse set of relationships made up of strong and less strong ties organized in clusters of

networks rather than one densely knit network. Marking a change in how people conceptualize

community, he found that family and neighbors were not necessarily people's most intimate ties,

but those ties didn't go away. They were replaced, in many cases, by friends and co-workers.

How Technology Impacts Social Ties

Technological advances have changed how, and with whom, people create and maintain

social ties. As the structure of our cities and neighborhoods changed, the structure of our social

networks changed. People began to leave hometowns and change jobs more frequently leading to

more dispersed networks. As a result, people began to use various forms of media to maintain

and strengthen their ties to others (Haythornthwaite, 2005; Wellman, 1979).

Before the internet, writing letters and making telephone calls were the primary technologies

available to maintain social ties within a geographically-dispersed network. The availability of

internet connectivity has impacted how people communicate and connect with each other, and it

can paradoxically both engage and disengage, both disrupt and unite relationships. Early

researchers were concerned that the internet was moving people more toward privatism or a

tendency for personal networks to consist of more tightly-knit connections largely centered

around the home. If true, this would erode the availability and benefit of weak social ties

espoused by Granovetter (1973) and others. But later research suggested that the internet wasn't

necessarily replacing traditional ways of communication; rather, it was supplementing or

enhancing them. In fact, the internet seems to have increased overall communication which may

actually lead to larger social networks by allowing for both global and local communication and

activity, a feature captured by the term "glocalization (Hampton & Gupta, 2008; Hampton &

Wellman, 2003).

   The internet affords many ways to communicate. Email, social media, instant messaging,

and video calls are just a few of the media people can use keep in touch despite geographical

distance. In fact, the more forms of media an individual uses to communicate with another

person, the stronger that social tie likely is. This tendency for more strongly-tied pairs to use

more available media to communicate is called media multiplexity (Haythornthwaite, 2005). A

pair of studies examined the use of all media available to members of a group (as opposed to a

single medium) and not just who was online, but who was online with whom (Haythornthwaite,

2005). It also examined how media use varied depending on strength of tie between pairs. The

first study showed that pairs with stronger ties communicated more frequently with each other

and used more types of media to communicate than those with weaker ties (Haythornthwaite,

2005). The second study, which examined media use and tie strength of students in distributed,

distance learning classes, showed that the same types of interactions that happen with offline ties

also happen with online-only ties. Online-only friends socialized more and offered more

emotional support to each other than non-friends despite only occasional in-person meetings.

   While the Internet and mobile phones increased mobility of social relationships, they did not

fundamentally alter the structure of community; but new communication technologies,

particularly social media, may be generating an actual structural change in community by

affording relational persistence and pervasive awareness (Hampton, 2016). Relational

persistence refers to people's ability to maintain contact over time that, in the past, may have

been lost due to key life events. Facebook, for example, makes it easy to find, connect with, and

maintain social ties with friends from childhood who people otherwise may never have talked to

again. In this way, social media may enable the type of long-term relationships that were

common in pre-industrial society when people lived and worked together and mostly stayed in

one place. It allows for consistent and enduring communication across one's network without

significant time and effort. Pervasive awareness refers to the way digital communication

technologies allow for sharing of people's interests, opinions, activities, and locations. People

can be constantly aware of the availability and attentiveness of their social ties. New features of

social media and other technology allow all of these types of engagement. Users can share and

consume content in the form of words, pictures and video asynchronously, and they can share

and consume the same content synchronously through video calls, direct messaging, and

broadcasts like Instagram live. Pervasive-persistent community is likely to yield positive

outcomes such as increased bonding social capital—the result of strong and dense social ties—

and increased bridging social capital—access to resources through diverse, weak social ties; and

increased transgenerational relationships (Hampton, 2016).

The fact that new media, particularly digital communication technologies, is making it easier

to maintain connections across geographical distance raises an important question: is a

distinction between virtual and real social ties meaningful? The research examined earlier in this

paper shows that social ties are important for our well-being. Other people matter. The internet

has allowed a wide array of media that can be layered to strengthen social ties regardless of

where each individual is geographically located. People can find and maintain relationships that

are online-only, in-person, or a blend of the two. The locality of individuals seems less important

than the exchange of social and emotional support that characterizes strong social ties and

community. Technology, such as location-based games, that blurs the line between public and

private, online and offline, virtual and real are well-positioned to encourage new and strengthen

existing social ties that may enhance well-being. The next section will explore how technology

functions in public spaces and affects how individuals connect with each other in those spaces.

Technology in Public Spaces

Public spaces are bounded settings that are open to everyone, such as a city's streets,

parks, and public squares where social interactions can occur (Cattell et al., 2008). In urban

settings, they typically provide access to a diverse range of people of various races, ethnicities,

and genders with different beliefs and interests. Spending time in public spaces may lead to

positive outcomes such as an increased attachment to and sense of community, greater perceived

health, and reduced feelings of loneliness (Cattell et al., 2008; Kweon et al., 1998).

People use the internet in public in different ways and to different ends. In an

ethnographic study examining Wi-Fi use in internet cafes, Hampton and Gupta (2008)

differentiated "true mobiles" and "placemakers". True mobiles are people who use internet in

public space for private networked activities without engaging with those around them as an

escape from work or home, a concept called "networked individualism" (Wellman et al., 2006).

Placemakers are people who use internet in public space specifically to connect with those

around them doing the same thing, taking time to connect with others publicly.

True mobiles exemplify the phrase "public privatism" which refers to the idea that the

internet, and particularly mobile devices, are making public spaces less public. People can

wander around fully immersed in their private worlds, and this impacts how and with whom they

connect. Despite the fact that people seem to constantly be on their phones in public, one study

found mobile phone use in public tends to be low and is mostly limited to people who are not out in public with others (Hampton et al., 2015). These users tend to prioritize phone interactions versus those who are present with them, particularly if they don't know those who are present very well (Hoflich, 2006). In this way, individuals insulate themselves from those around them in public spaces which reduces both the individual's exposure to potentially diverse connections and the overall density of people available to interact with in the public realm (Hampton et al., 2010). It is striking to think that what seems like an entirely personal choice to engage in the private realm while in public actually takes opportunities away from others to experience the benefits of connections with strangers.

In one study of wi-fi use in public parks, plazas, and markets, only 5% of mobile phone users were observed interacting with a stranger in a public space compared to 13% people consuming print media and 10% of wi-fi users (Hampton et al., 2010). Overall, 28% of wi-fi users in the study reported meeting someone new in the specific wi-fi enabled public space they were interviewed in. One in six of those said they remained in contact with the new person they met. The authors observed that wi-fi users in public spaces tend to focus more on their screen than on activities going on around them, and this tendency is more pronounced when the wi-fi users are colocated with acquaintances (Hampton et al., 2010). This means urban public spaces, which would otherwise be prime places for people to engage in socially-diverse interactions, are stripped of this function as wi-fi and mobile phone users are less likely to attend to their surroundings.

When mobile phones *are* used in public with colocated others, it can create feelings of social vulnerability and ostracism that one observational study showed people mitigate in various ways (Humphreys & Hardeman, 2020). If two people are in public, and one takes a call or attends to a

notification, the second becomes socially vulnerable (mediated crosstalk). In response, the second can start to engage privately with their own phone (parallel mediated crosstalk), the second can talk to the first while the first engages with their phone (dual-front mediated crosstalk), or the first can share their phone with the second creating an inclusive triad (collective mediated crosstalk). Often, there is a flow between all three tactics.

These forms of crosstalk mediation make sense for typical scenarios when colocated people have to decide how to manage their mobile use to avoid making others feel socially vulnerable. But what happens when people *intentionally* use their mobile phones to engage in a shared activity with others, or when that mobile device facilitates gatherings in public spaces? This is what location-based games attempt to do. The next section will explore what they are and how they may contribute to people's ability to create and maintain a diverse social network.

Introduction to Video Games

Video games are a form of technology that people use for a variety of reasons including to spend time with others, compete, teach and learn new things, experience challenge and mastery, experiment with different identities, and experience curiosity, discovery and learning unbounded by the limitations of reality (Olson, 2010). This section will define gaming, location-based games, and introduce Pokémon Go. It will then examine the positive and negative outcomes associated with gaming in general and the well-being outcomes associated specifically with Pokémon Go as they relate to social connections and place.

Defining Gaming

Gaming is the fastest growing form of entertainment worldwide. A report by the NPD Group (2021) revealed that there are 246 million total gamers in the U.S. and Canada who play an average of 15 hours/week. 238.7 million are mobile gamers, defined as games played on a cell

phone or tablet, who play mobile games for an average of 8 hours per week. Mobile gaming

revenue totaled $16.2 billion in 2020 which represented a 36% increase from the previous year.

For the purposes of this paper, "gaming" refers to playing a video game of any kind, whether on

a mobile device, computer, or console. "Gamer" refers to anyone who plays a video game an

average of one hour/day regardless of platform.

Location-Based Games

Location awareness is the property by which technological systems and applications take

user location into account (Schmidtke, 2020). Examples of location-aware technology, often

GPS-enabled, include maps, weather applications, and photo-geotagging. Location awareness

doesn't necessarily require that user location is shared. For example, a person can manually enter

their location into a weather app to see the local forecast instead of sharing their location with the

app. Some dating apps are location-aware, but don't require location sharing for use. Users have

the option of sharing precise location data to see who is close by for a potential meet-up, but the

app doesn't demand location sharing to function. Location-based services, on the other hand, are

services that require location sharing in exchange for a service. This paper will use the term

location-based to describe technology for which location sharing is a requirement.

Location-based games use location awareness to create playful experiences that occur in both

physical and digital, or hybrid, spaces (de Souza e Silva, 2017). These hybrid-reality games

(HRGs) have three main design elements: mobility, sociability, and spatiality (de Souza e Silva,

2009). Mobility refers to gameplay that requires players to move around. Sociability is the

game's social nature, often requiring cooperation with others. Spatiality is the expansion of

gameplay beyond the traditional bounds of board or home-based screen. Early HRGs like *Can*

You See Me Now? and *Mogi* encouraged players to engage and play simultaneously in digital and

physical spaces while catching other players or virtual objects and creatures. In terms of

affordances, location-based games afford users the ability to explore, to move, to meet new

people, to cooperate, to compete, and to learn new skills.

Pokémon Go

Pokémon Go is a location-based game that encourages users to explore unfamiliar

environments and interact with other players to reach achievements, namely to catch virtual

creatures called Pokémon. As noted above, one of the defining features of location-based games

is that, by requiring a player's location, they create a hybrid reality where the physical world and

virtual world intersect (Papangelis et al., 2017). Pokémon Go's design does, indeed, encourage

players to engage in physical *and* virtual reality, but it goes a step further by allowing a layer of

augmented reality. Players can use their mobile device's camera feature to project virtual

Pokémon into the physical environment (see Appendix for examples). Because the game sits on

Google's mapping technology, individual players or groups of players are drawn to real-world

locations such as parks, stores, or works of public art in order to acquire necessary materials by

spinning Pokéstops (virtual milestones linked to physical locations) or by battling in "gyms"

(virtual locations where players can fight for team ownership of the gym or cooperate to battle

high-level Pokémon in "raids"). Visitors to any urban space during the summer of 2016 likely

saw sudden, swarm-like gatherings of hundreds of people descending on a park or monument

with their faces in their phones. This phenomenon may have seemed like a sign of the

apocalypse, but really it was the earliest manifestation of one of Pokémon Go's most powerful

features, creating space and incentive for people to connect with each other in the physical

world.

Pokémon Go encourages both competition and cooperation. Once a player reaches a

certain level by acquiring experience points (XP), they must choose to join one of three teams:

Valor (red), Mystic (blue), or Instinct (yellow). The entire world of Pokémon Go players, over

150 million at the end of 2020, is divided into three teams (Iqbal, 2021). While there are

incentives for teams to work together, anyone can collaborate with anyone else. The game can be

played solo, but it would be nearly impossible to level up, catch high-level Pokémon, or

complete in-game research tasks without engaging with others, thus it both encourages

cooperation from casual players and demands it for players seeking proficiency.

Video Games and Well-Being

Research suggests that playing video games may lead to both positive and negative well-

being outcomes. Many of these outcomes relate directly to concepts and literature previously

discussed in this paper, primarily the importance of social ties. This section will explore positive

and negative outcomes of gaming in general and specific research on location-based games like

Pokémon Go.

How Video Games May Hurt Well-Being

Much of the media narrative has latched onto research suggesting that video games lead

to negative well-being outcomes. This narrative reached a fever pitch following the school

shooting tragedies of Columbine, Virginia Tech, and Sandy Hook because the shooters in all

three also happened to play first-person shooter video games (Markey et al., 2015). In the

combined aftermath of these events, nearly 5,000 newspaper articles were written discussing

violent video games in relation to these school shootings. Many of the articles implied that the

violent acts were brought on by or even caused by violent video game exposure. Video games

are defined as "violent" if a game character exhibits behavior that is intentionally harmful to

another character (Markey et al., 2015). It doesn't matter if the violence is graphic and realistic

or cartoonish. One study found that cartoonish violence has the same negative effects as realistic violence (Gentile et al., 2007).

Bandura's (1965) foundational study showed that children are more likely to imitate an observed act that is not punished, and that children copy unpunished aggression as much as aggression that is rewarded. Since many video games actively reward violent or aggressive behaviors, it is easy to assume that this might translate into real-world violence. One meta-analytic review of both experimental and observational studies concluded that exposure to violent video games increases aggressive behavior, thoughts, and feelings; physiological arousal; and decreased prosocial behavior in children and young adults (Anderson et al., 2010; Anderson & Bushman, 2001). There is also experimental evidence linking violence desensitization and subsequent increased aggressive behavior (Engelhardt et al., 2011). A two-year longitudinal study showed that pathological gaming or addiction, characterized by dysfunction that causes harm to a person's social, occupational, familial, scholastic, and psychological functioning, may lead to depression, anxiety, social phobias, and lower school performance (Gentile et al., 2011).

Despite these generally dismal findings, Anderson and Bushman (2001) concluded their paper with a decidedly optimistic question: can media companies shift from promoting violent and destructive content and use their marketing prowess and dollars to drive prosocial behavior? Gentile et al. (2009) define prosocial behaviors as "those intended to help others" and prosocial games as "games in which game characters help and support each other in nonviolent ways" (p. 753-754). In response to the studies showing deleterious effects of video games, Gentile et al. (2009) point out that most of those studies focus exclusively on content when video games can actually have effects on five different dimensions: amount, content, context, structure, and mechanics. Focusing on content alone is too narrow of a scope to draw conclusions. They also

note that aggression and prosociality are not mutually exclusive constructs, as someone can be highly aggressive toward enemies and highly prosocial toward friends.

One of the challenges in many of these studies is how violent or aggressive behavior is operationalized (Markey et al., 2015). For ethical reasons, it's difficult to conduct laboratory studies on violent or aggressive behavior so many of the measures assess aggressive behavior as likelihood to expose someone to a loud noise (Engelhardt et al., 2011) or to give someone too much hot sauce (Adachi & Willoughby, 2011). While they may cause discomfort, exposing someone to loud noises and hot sauce is not the same as shooting someone.

Markey et al. (2015) took another approach and examined how violent crime rates relate to violent video game sales. They found evidence that violent video games are not positively correlated with violent crime in the United States; in fact, much of the data suggested a *decrease* in violent crime related to violent video games. While this study was strictly correlational, it provides an interesting counterpoint to the violent-video-games-cause-violent-crime narrative. It is worth noting here that Pokémon Go avoids overt acts of violence. Players "catch" Pokémon in Pokéballs—this paper won't get into ethical debate about animal captivity here, tempting as it is—and Pokémon "faint" upon defeat. There is no death or injury in Pokémon Go. Overall, it is a non-violent game.

Adachi and Willoughby (2011) found that it might be competition rather than violence that drives aggression. In fact, men showed varied testosterone and cortisol responses across ingroup and outgroup competitions (Oxford et al., 2010). When competing between groups, high-ranking men on the winning team showed immediate testosterone increases; but when competing within groups, high-ranking men tended to show lower testosterone and higher cortisol. These findings may help explain the appeal of violent multiplayer videogames as they can replicate scenarios

that fuel men's evolutionary drive for male-male coalitions.

Studies of videogame effects haven't been limited to men. One study suggested that adolescent girls who played video games with their parents showed lower internalizing (which is associated with depression and anxiety) and lowered aggressive behavior (Coyne et al., 2011). It also led to heightened feelings of connectedness for both the girls and the parents. Interestingly, co-playing was not associated with any outcomes, positive or negative, for boys. The idea of co-playing as it relates to Pokémon Go is interesting since it is quite common to see multi-generational groups of players in parks. It's rare to see young children playing Pokémon Go alone, likely because the game requires a degree of mobility and access to a mobile device, both of which may be inaccessible to young children and adolescents on their own. Future research might explore how co-playing a prosocial game such as Pokémon Go impacts the sense of connectedness between parents and children, and whether or not this sense of connection is affected by the fact that, in many cases, the children *need* the support of the parent in order to play the game.

It's important to note that many of the studies looking at the effects of playing video games analyze data along a male-female gender binary which, while statistically simpler, is decidedly exclusive. Future research into gaming should broaden its concept of gender, or, at the very least, broaden its design and language to account for individual gender expression. There also seems to be little to no research looking at the effects of gaming on transgender and non-binary youth, specifically. Given that rates of mental health issues and suicidality are very high within this population, it would be interesting to study both the positive and deleterious impacts of gaming on their well-being (*The Trevor Project National Survey,* 2020).

Negative Outcomes of Location-Based Games

Pokémon Go launched in 2016 and experienced rapid success and positive acclaim, but that was met with warnings, largely from the medical community, about the dangers of distraction. A review of social media data and news media reports revealed that, over the course of ten days in July 2016 (when the game launched), 33% of reviewed Tweets indicated distraction of a driver, passenger, or pedestrian by Pokémon Go, and fourteen car crashes were attributed to Pokémon Go in the same period (Ayers et al., 2016). A case report from a trauma center explored two simultaneously-presenting cases: one, a 19-year old male driver who lost control of his vehicle while hunting Pokémon, rolled it, and ejected three passengers; two, a 58-year-old woman who swerved into a utility pole to avoid hitting a pedestrian who wandered into the street to catch a Pokémon (Joseph & Armstrong, 2016). Another case report told of a 13-year-old male who rode his bike into a busy intersection while focused on Pokémon Go (Raj et al., 2016). He suffered a mild-to-moderate traumatic brain injury that landed him on a concussion protocol for 10 days. This same case report points out that Pokémon Go bridges outdoor play with screentime, two seemingly opposed variables in the well-being of the pediatric population. It recognizes that while there are benefits to exercise and being outside, it's important for all players, especially children, to be aware of the potential for real-world harm.

While these cases are specific to Pokémon Go, they illustrate the risks associated with location-based games in general. While Pokémon Go discourages playing while driving by demanding a player click an "I'm a Passenger" button if the game detects speeds over 15 miles-per-hour, it doesn't refuse play. Similarly, it uses in-game messaging to discourage trespassing and encourage players to remain aware of their surroundings, but it is up to the players to play safely.

How Video Games May Help Well-Being

The previous section reviewed literature showing that playing video games may be associated with negative outcomes like aggressive behavior, thoughts, and feelings; physiological arousal, decreased prosocial behavior and that pathological gaming can cause harm in multiple facets of life including psychological functioning (Anderson et al., 2010; Gentile et al., 2011). Yet, much like the media's tendency to focus on the negative aspects of gaming, and in parallel with the field of positive psychology, the majority of research into gaming has focused on its negative effects. This section will review literature on some of the positive outcomes associated with playing video games.

Gaming is a form of play, and play has been linked to increased cooperative skills, social competence, and peer acceptance in children (Connolly & Doyle, 1984). Play also benefits adults. It can lead to increased positive emotion, increased performance, and increased communication (Celestine & Yeo, 2021). In an organizational context, play may lead to positive outcomes such as increased creativity, collaborative relationships, and intrinsic motivation (West et al., 2016). Various studies suggest that gaming, specifically, can lead to positive cognitive, motivational, emotional, and social effects (Engelhardt et al., 2011; Granic et al., 2014).

One study explicitly connects the benefits of gaming to Seligman's (2011) PERMA model of well-being (Jones et al., 2014). It cites several studies that show how gaming may lead to increased positive emotion, a high sense of engagement or flow states, enhanced social connections and relationships, a sense of meaning or belonging to something bigger than oneself, and a sense of competence and accomplishment (McGonigal, 2011; Russoniello et al., 2009; Ryan et al., 2006; Snodgrass et al., 2011; Yee, 2006). Gamers who play moderately demonstrate fewer maladaptive psychological symptoms, including significantly lower depressed mood, than those who play excessively or who don't play at all (Durkin & Barber, 2002; Jones et al., 2014).

There is also data that supports how gaming may benefit tactical and cooperative skills and persistence. What's fascinating is that shooter games, the very games demonized by much of the research on violent games and aggression, also lead to increased attention allocation and visual spatial resolution with results comparable to formal skill training (Green & Bavelier, 2012; Uttal et al., 2013). Some research showed that gamers are more inclined to persist in the face of failure even in non-gaming contexts such as when solving difficult anagram-riddle tasks (Ventura et al., 2013). Another study revealed a significant relationship between young children who played prosocial video games and their ability to cooperate, share, and sustain good relationships outside of the game (Harrington & O'Connell, 2016). Other studies showed a causal link between playing preferred video games, improved mood, increased positive emotion, and emotional stability (Przybylski et al., 2011; Russoniello et al., 2009; Ryan et al., 2006). Adolescent boys use violent video games to regulate their emotions, help them relax, take their minds off their problems, or to feel less lonely (Olson et al., 2008). Self-regulation is a process that allows us to alter our responses to control our thoughts, feelings, and impulses (Baumeister et al., 2006). Feeling in control of our thoughts, emotions, behavior, and environment is critical for a sense of psychological well-being.

Gamers often report feeling a sense of flow or a deeply immersive state that leads to increased mental flourishing (Snodgrass et al., 2011). When someone can apply their skills to a situation of sufficient challenge, they may enter a state of "optimal experience" or "flow" (Csikszentmihalyi, 1990). Flow states are characterized by full absorption in the moment, a distorted sense of time, and a loss of conscious awareness of the present moment and oneself (Csikszentmihalyi, 1990). Flow experiences in adolescents have been linked to higher self-esteem, less anxiety, and better high-school achievement (Csikszentmihalyi et al., 1997;

Nakamura & Csikszentmihalyi, 2009). Building on the concept of flow, Brockmyer et al. (2009)

developed a psychometrically-sound measure of engagement called the Game Engagement

Questionnaire (GEQ) which measures an individual's potential to become engaged in a video

game at different levels. They developed the GEQ specifically to provide a scale that would be

useful for future research, especially looking the outcomes of playing violent video games

related to various levels of engagement. The idea is that deeper engagement may lead to greater

impact on the player, both positively and negatively.

Flow experiences are not the only ways to lose sense of self. Escapism, or the practice of

finding ways to escape from the self, tends to have negative connotations, and it can, indeed, be

used for harmful ends. But Stenseng et al. (2012) propose that people engage in activities they

enjoy for many reasons, one of which is to "unwind from a constant monitoring of the self" (p.

17). People engage in escapist activities for either self-expansion, which promotes positive

emotional outcomes, or for self-suppression, which is related to negative emotional outcomes.

Individuals likely engage in video games for escapist reasons, but whether engagement in the

game will help or harm largely depends on if a person is seeking to expand their sense of self or

suppress it (Stensent et al., 2012).

In addition to individual well-being benefits, gaming also has many social benefits.

Gamers are not the stereotypical, isolated, socially-inept people many imagine when they hear

the word. A report by the Entertainment Software Association (2020) revealed that 65% of

gamers play with others, whether online or in-person. 70% of men and 55% of women in the 18-

34 age range report that video games help them stay connected with friends and family. These

findings are supported by research that shows gamers report more closeness to family, less risky

networks of friends, and higher attachment to school than non-gamers; that college-aged men

game as a source of socialization, relaxation, and stress reduction; and that gamers who play

Massively Multiplayer Online Role Playing Games (MMORPG)s like *World of Warcraft* engage

in highly social relationships that often lead to life-long friends and partners (Cole & Griffiths,

2007; Durkin & Barber, 2002; Snodgrass et al., 2011; Wack & Tantleff-Dunn, 2009).

Video games may also promote physical well-being which align with the PERMA-V and

I COPPE frameworks discussed earlier in this paper. Physical activity benefits both physical and

mental health and contributes to overall well-being. The "feel good" function of physical activity

may improve psychological well-being of the general population including improving positive

affect and helping people cope with stress (Faulkner et al., 2015). One randomized-controlled

trial showed that exercise was equally effective as anti-depressants after sixteen weeks

(Blumenthal et al., 1999). Individuals who participated in both acute and regular bouts of aerobic

physical activity reported significantly higher levels of positive affect when compared with

control (Reed & Buck, 2009; Reed & Ones, 2006). Physical *inactivity*, on the other hand,

contributes to multiple health problems, including heart disease, type 2 diabetes, and certain

types of cancer (I.-M. Lee et al., 2012). Despite the positive effects of physical activity and the

harmful effects of physical inactivity, it is still difficult to get people to start physical activity and

keep up with it. Faulkner et al. (2015) suggest that people need to enjoy what they're doing for it

to be effective. The most effective "dose" of physical activity is the one that an individual enjoys

and will keep up with.

This is where gamified physical activity may help. One study showed that people who

played an interactive cycling video game exercised at a higher intensity and reported similar

levels of enjoyment and *perceived* effort compared to conventional cycling (Monedero et al.,

2015). In another study, patients suffering from chronic lower back pain reported significant

improvement in low-back pain, buttock pain, and pain self-efficacy after eight weeks of playing

the Nintendo exergame Ring Fit Adventure (Sato et al., 2021). The next section will examine

positive outcomes of location-based games, particularly how they are well-positioned to

encourage increased physical activity.

Positive Outcomes of Location-Based Games

According to Pokémon Go's parent company, Niantic, 70% of Pokémon GO players feel

motivated to walk more, 47% of Pokémon GO players feel motivated to connect with others, and

in 2019 there were 173 million friendship connections made (*Social Impact*, n.d.). Billions of

kilometers have been walked, and 16.3 billion were walked by players in 2019 alone. Within a

year of the game's launch, Niantic started hearing from people who had lost significant weight

from moving more, made real friends, gotten over their social anxiety, met partners, and even

parents of autistic children ecstatic that their children were getting outside and socializing (Y.

Solheim, personal communication, February 1, 2021). Given that Niantic has a vested interest in

promoting Pokémon Go, it's important to question the reliability and veracity of these figures

and accounts. This section will examine how much of the literature examining the positive

outcomes of Pokémon Go support these claims.

One of the most compelling potential well-being benefits of location-based games is that they

encourage, and in some cases demand, physical activity. Pokémon Go does this in several ways.

First, Pokémon are more likely to appear in more densely populated areas, and they don't appear

continuously. A player will encounter more Pokémon while out walking and exploring than they

will staying in one place. Second, the game includes tasks that demand walking such as placing

certain Pokémon in eggs that will only hatch after walking two, five, seven, ten, eleven, or

twelve kilometers. I found this feature so motivating that in 2018 I cancelled my gym

membership and reallocated that money toward purchasing the incubators required to hatch eggs.

Also, certain Pokémon can only be evolved into higher forms by walking with them as an in-

game "buddy". To "catch 'em all", players have to walk. Lastly, the game issues weekly rewards

based on distance walked. Players earn different rewards at the five, 25, and 50 kilometer

distances, including eggs with very rare Pokémon.

Research suggests that these features designed to encourage physical activity work. One

study examined large-scale data from wearable activity trackers combined with search activity to

assess the potential of Pokémon Go as a broad public health intervention (Althoff et al., 2016).

They identified 1420 Microsoft Band users who were also likely Pokémon Go players and

compared their physical activity over the course of 30 days to a control group of a random

sampling of 50,000 Microsoft Band users. They noted that the control group had a higher

average activity level than the Pokémon Go group suggesting that the game may attract users

who are generally less active than average. The study also found that playing Pokémon Go

significantly increased physical activity at the group and individual level with players increasing

their activity by 1479 steps a day. The authors suggest that if this kind of activity is sustained,

Pokémon Go and other games that encourage physical activity have the potential to increase U.S.

life expectancy.

Another retrospective study found that playing Pokémon Go increased moderate to

vigorous physical activity by 50 minutes per week and reduced sedentary behaviors like

watching TV and surfing the internet by 30 minutes per day (Nigg et al., 2017). This finding is

supported by another study that found Pokémon Go was most likely to benefit players who were

used to being sedentary more than players who were already active (Wong, 2017). Yet another

study analyzed the health behaviors of adult, dog owning Pokémon Go players (Kogan et al.,

2017). They found that playing Pokémon Go led 43.2% of respondents to spend more time with household members and 52.3% to spend more time with their dog. Comparing pre- and post-game activity levels showed a statistically significant increase in the amount of player exercise.

The well-being benefits of location-based games aren't limited to physical activity. By bringing people together and blurring the line between virtual and physical reality, location-based games may facilitate connections and strengthen social ties. Pokémon Go encourages this in several ways. First, Pokémon Go is a form of infrastructure that makes connections technically available. Its design encourages people to visit public spaces to catch Pokémon, spin Pokéstops, and battle in gyms. In this way, it functions as a virtual triangulator, or external stimulus in a public environment that links people and prompts conversation (Whyte, 1980). Second, certain high-level Pokémon can only be caught by collaborating with others in raids. While many players have established raiding groups where they live, the game encourages interaction with strangers particularly in new places. For example, spending an hour with five strangers from five different countries raiding around Notre Dame on my last visit to Paris is one of my favorite Pokémon Go memories (see Appendix for photos). Third, Pokémon Go's parent company, Niantic, hosts regular events that bring people together in public spaces. Each month, there is a "community day" that features a Pokémon. On community days, players can take advantage of in-game bonuses, and people often maximize their time by visiting parks where they are likely to encounter other players. Niantic also hosts larger, localized events in cities around the world. Players travel to these events to experience event-specific features including special Pokémon, research tasks, and to play with thousands of others in a Pokémon-fueled weekend of positivity resonance. In this way, Pokémon Go acts as social activator, forging connections between people where none existed before.

Research supports the social benefits of location-based games like Pokémon Go. In one study, players reported that playing Pokémon Go helped them strengthen ties with family and friends, served as an icebreaker to facilitate conversation with strangers, and led to a sense of belonging both with other players and with their physical place (Vella et al., 2019). Respondents in the Kogan et al. study (2017) reported feeling less anxious about leaving the house, talking to strangers, and visiting new places after starting to play Pokémon Go. In a powerful case study, a Japanese psychiatrist reported that children suffering from severe social withdrawal, known as *hikikomori*, were able to leave their houses for the first time in months as a result of playing Pokémon Go (Tateno et al., 2016). A qualitative study examined behavior changes beyond physical activity and found that Pokémon Go players felt more social, found more meaning in their routines, felt and expressed more positive emotions, and were more motivated to explore (Kari et al., 2017). Players reported stronger social bonds, enhanced social routines, and a sense of lowered social barriers.

Location-based games also encourage exploration which may have well-being benefits. Re-visiting parks and other places close to home is one way to play Pokémon Go, but the positive emotions that come with discovering a new place, meeting a new person, or catching a new Pokémon may contribute to players' overall well-being (Kari et al., 2017). Novel stimuli lead to increased dopamine, the neurotransmitter associated with pleasure and our motivation-reward system, and novel experiences are associated with increased creativity (Lee et al., 2012). Discovery is exciting, it makes people feel good, and it activates their reward-seeking system. Catching a new Pokémon sends a shot of the brain's happy chemical coursing through players' systems, ensuring they'll continue to try to "catch 'em all".

Looking to the Future

This paper has examined research from new media, place, and positive psychology to illustrate how location-based games may enhance human well-being, particularly by facilitating social connections. While there is already considerable research looking at the effects of video games on social interaction and well-being and research looking into how technology affects how humans connect in public spaces, there is an opportunity to further explore the intersections of all three, particularly through the lens of location-based games like Pokémon Go. This section will explore some of the social limitations and place-based affordances of Pokémon Go that future location-based game designers may want to consider. It will conclude with ideas for future lines of research.

Social Limitations of Pokémon Go

While Pokémon Go meets the three main criteria of a hybrid reality game (mobility, sociability, and spatiality), it lacks some elements of sociability that are present in earlier HRGs such as *Ingress* (de Souza e Silva, 2017). Pokémon Go players do not interact with each other directly in the game. Other players do not appear on an individual's screen, there is no in-game chat feature on which players can communicate, and players cannot create in-game content (de Souza e Silva, 2017). Since this article was written, Niantic added features to Pokémon Go like the ability to make in-game friends, exchange digital gifts, battle together in raids, and request the creation of new Pokéstops and gyms, but true in-game social interaction and content creation remains highly limited. Instead, players have turned to other communication and virtual community-building tools such as Discord, Facebook, and WhatsApp to talk about in-game activities and coordinate meetups with other players. Players may use Discord, a collaboration tool designed for people with shared interests to talk, hang out, and feel like they belong, to connect with other local Pokémon Go players. Dedicated and committed Pokémon Go players in

cities around the world formed Discord groups to connect with others, ask questions, coordinate

trades, and arrange "raid trains", among other game-related tasks.

This lack of in-game messaging raises an interesting question related to media

multiplexity. Is Pokémon Go a form of media that directly factors into the strengthening of social

ties? Players may meet face-to-face in a park and become online-only in-game friends with no

communication after that, other than the passive act of sending each other in-game gifts. While

these gift exchanges and seeing familiar names attached to Pokémon in gyms around town may

provide a dose of familiarity, do these wordless interactions do anything to strengthen a tie

between people? It's an interesting question for future research. On the other hand, if these same

players spend several hours playing together face-to-face (medium one), perhaps they will

exchange phone numbers and begin a texting relationship (medium two). Over time, that

connection might evolve from a weak to a strong tie. In another scenario, players may meet

online first via a Facebook or Discord group (medium one) then coordinate to meet face-to-face

(medium two). If these interactions continue over time, players may exchange phone numbers

(medium three) and eventually make non-Pokémon-related plans (medium four).

While Pokémon Go is not technically a form of communication media, it is a form of

media on which players can interact and maintain awareness of a tie to each other, and it may

lead people to connect on other forms of communication media. For example, several years ago,

I met a colleague at my company's headquarters in Greensboro, North Carolina (medium one).

We discovered we both play Pokémon Go and immediately became in-game friends (medium

two). She also knew of several other Greensboro-based colleagues who play, so we summoned

an impromptu gathering of about five people. We all became in-game friends, and many of us

continue to connect in the game by sending gifts. A few of us have an ongoing Facebook

Messenger group where we chat about the game and invite each other to remotely battle high-level Pokémon in raids (medium three). It is a reliable form of connection that makes me feel closer to my friends and colleagues. I also communicate with the original colleague-friend using text message (medium four), Microsoft Teams chat (medium five) and video calling (medium six), and Instagram (medium seven). Based on the concept of media multiplexity, and personal observation, she is my strongest social tie in this particular group. There is plenty of literature about the value of workplace friendships, and it would be interesting to study nuances of workplace friendships associated with a location-based game like Pokémon Go.

Despite, or perhaps because of, the lack of an in-game communication function, Pokémon Go can present challenges for navigating in-person social interactions. It can be the focus of social interaction, an accessory to social interaction, or a distraction from social interaction. If the purpose of meeting up is to play the game, there is minimal risk of crosstalk, or interruption of a face-to-face encounter (Goffman, 1971). Players are there to play, and socializing is secondary. Sometimes players will discover that others in their social group also play. Even though socializing is primary, Pokémon Go may remain part of the social interaction, and it is typically acceptable to keep mobile phones out since the game is an accessory to the in-person interaction. In these cases there is no crosstalk to be mediated since crosstalk implies an interruption to a face-to-face encounter. Pokémon Go is something in the middle of the interaction that people can engage with both separately and together. In mixed company or with non-players, I've experienced and observed players explaining the game and demonstrating the AR functionality to non-players as a form of collective mediated crosstalk. People are often fascinated when they see a Pokémon "appear" in the real world (see Appendix). In these situations, research tells us there is a risk of making others feel socially vulnerable by remaining engaged in the game, so it

may be best to put the phone away (Humphreys & Hardeman, 2020).

Location-based games blur the line between virtual and real which also presents interesting considerations for in-person interaction. By overlaying key gaming points on a map of the physical world, the game encourages players to explore and to interact with points of interest. Some of these, like murals, signs, and other static landmarks, are not gathering places; but others, like parks, restaurants, airports, and even specific benches, are. Based on personal observation and informal conversations with other players, in these gathering spaces it is common for players to look around for the tell-tale signs of other players: mobile device in-hand (often with a cord connecting to a pocketed battery pack), thumb furiously tapping in battle or making the circular motion required to throw a curve Pokéball. Players will typically acknowledge each other with actions ranging from a silent, knowing head-nod to a question about the day's catches to a bid to become in-game friends and join up to play together for a while. These moments of connection may be short, but they can provide a sense of mutual regard, of being seen and united in a shared experience.

Further blurring the line between virtual and real is the fact that Pokémon Go now affords simultaneous online and offline connection with others. One of the key activities in the game is raiding, or teaming up with other players to battle high-level Pokémon. Before the pandemic, the only way to raid was in-person. Players would coordinate meetups in parks or malls to maximize the likelihood of raiding victory. In response to the social distancing requirements of the pandemic, Niantic released a remote raiding feature that allows in-game friends to remotely raid together. It became possible to battle in raids around the world, and maintain social ties, from the comfort of home. As pandemic-related restrictions lift and players return to in-person locations to play, it is possible to visit a public space where other players are physically present yet be

engaged with a group of players remotely, an interesting display of public privatism that contradicts the game's objective to encourage connections with people in public. It is also possible to engage with co-located others and remote others at the same time. It would be interesting to explore how the remote features of Pokémon Go impact player tendency to engage with others in public as things open up post-pandemic.

Place-Based Affordances of Pokémon Go

As a location-based game, place is an essential element of Pokémon Go, but the game also has several design features that play into sense of place, or the emotional attachment people feel toward places and their experiences in them. The caught-location of a Pokémon is displayed as part of its description. Knowing the caught-location serves a functional purpose because several in-game tasks offer better rewards when Pokémon were caught farther away from a player's location. What's more powerful, however, is the emotion attached to Pokémon caught in certain locations which contributes to the concept of place attachment described earlier (Oleksy & Wnuk, 2017). That attachment can be simple; for example, I named my first Oshawott "Asbury Park" after the beautiful seaside location where I caught it. Every time I see "Asbury Park" in my collection, it reminds me of being at the beach and strolling the boardwalk (see Appendix for a photo). In that way, my Oshawott serves as a prompt to remember and savor a particular moment and place which can lead to increased positive emotions (Bryant, 1989).

Pokémon Go affords opportunities for savoring in several ways, particularly by playing into a sense of exploration and nostalgia. This aligns with research about what motivates people to play augmented reality games. An empirical study found that Pokémon Go players scored highest on the recreation, outdoor activity, nostalgia, and boredom dimensions of the revised motives for online gaming questionnaire (MOGQ) (Demetrovics et al., 2011; Zsila et al., 2018). While

nostalgia, in the study, was meant to tap into many players' long-held commitment to the

Pokémon franchise and childhood memories, I believe it may also afford a sense of nostalgia

related to memories of people and place.

Suggestions for Future Research

Pokémon Go is one of the most successful mobile games of all-time, and the most

successful location-based game (*Deconstructing Mobile and Tablet Gaming*, 2021); but what

happens if it goes away? What does the future of location-based games look like then? How

might other location-based services leverage particular affordances that make Pokémon Go

successful to enhance well-being for their users?

One line of research might compare location-based applications both to each other and to

analog triangulators. Studies might compare location-based games like Pokémon Go with other

location-based applications like "check-in" based apps like Foursquare, the beer-tracking social

app Untapped, and Snap Maps to identify the particular features that most impact social

connections. Studies might also compare location-based games with analog public meeting

spaces like dog parks, particularly looking at how they affect frequency, duration, and strength of

social connections. Similar studies could compare geocaching−a global GPS-coordinate based

physical treasure hunt− with Pokémon Go, which is essentially a virtual treasure hunt, to assess

well-being effects, effects on social interaction, and effects on individuals' relationship to place.

Some Pokémon Go-specific research questions may illuminate how the game impacts

social connections. For example, how frequently do Pokémon Go users engage in interactions

with strangers? Is this mediated or moderated by personality traits? What does this frequency

look like in different contexts (e.g., small neighborhood parks, big urban parks, indoor locales,

etc.)? Are there cross-cultural differences in how Pokémon Go players engage in public spaces

and/or with each other?

Another line of research might explore how location-based games impact a person's sense of place and the subsequent effect on well-being. There are several studies that explore Pokémon Go and place attachment (e.g., (Oleksy & Wnuk, 2017; Wang & Hsieh, 2020), but since location-based games are a relatively new technology, there is a lot of room for discovery. New media and place research could benefit from an interdisciplinary approach pulling in questions and methods from positive psychology to pursue a holistic understanding of how to optimize the well-being benefits of technology and place.

The field of new media may also benefit from more research into the positive and negative effects of video games in general, particularly by considering place and positive psychology concepts. The study of the positive effects of gaming is relatively new, and there have been methodological limitations in the research to-date such as few longitudinal studies and few studies that examine both the positive and negative effects of the same game in the same study (Granic et al., 2014). More longitudinal studies are needed to see how varying amounts of gameplay, and various types of games, might impact outcomes over time. Experimental video game studies could help isolate specific features of games or constructs to assess directional impact. However, it's also important to remember that the lab isn't the real world. Just because someone is more likely to give someone more hot sauce after playing a violent video game doesn't mean they will go out and commit a violent crime. Study designs also have to ensure a player's sense of autonomy and choice remain intact. Most gamers play games because they want to and choose to, so a lab study about something very specific could impact results. Also, the majority of the studies into well-being effects of video games are based on self-report surveys. Mixed-method designs could give a more nuanced read on what's happening.

There are also unanswered questions in the realm of social ties and connections. What, precisely, is a consequential stranger? How frequently do we encounter them and in what circumstances? How do these interactions impact our well-being? How do we increase the likelihood of chance encounters which, along with people watching, is an important subset of the kinds of interactions that happen in public spaces (Hampton et al., 2015)? How do these chance encounters affect us? How often do online connections translate into in-person connections? How does the strength of these friendships compare to friendships based solely in the "real" world?

Lastly, the scale and popularity of Pokémon Go suggests that location-based games have the potential to positively impact public health and multiple dimensions of well-being. Hold-Lunstad et al. (2010) point out a lack of public policy and broad scale interventions to help people create and strengthen social ties, and Althoff et al. (2016) suggest that location-based games could be used as a broad public health intervention with potential to increase life expectancy. Positive psychology researchers are also searching for ways to create large-scale positive psychological interventions to enhance well-being. A line of interdisciplinary research assessing the impact of location-based games as public health intervention could lead to transformational, scaled global well-being.

Conclusion

Other people matter to human physical, social, and psychological well-being. While the structure of social networks has changed over time along with the physical orientation of homes and neighborhoods, community−those people turn to for social support, tangible aid, and companionship−still exists. People aren't engaging with others less, just differently. Technology, particularly the internet and mobile devices, impacts interactions with others and the spaces they

inhabit, in both positive and negative ways. There are more media that allow people to make, maintain, and strengthen social ties than ever before, yet these same technologies can also pull people out of the public realm and diminish opportunities to interact with strangers and form the weak social ties that provide diversity of thought and resources (Granovetter, 1973) .

Location-aware technology and location-based games, by blurring the line between physical and virtual reality, encourage people to explore, connect with others, and move, all of which can have a positive impact on well-being. Research shows that video games, in general, can have both a positive and negative impact on physical, social, and psychological well-being; but location-based games represent a frontier of exploration at the intersection of new media, place, and positive psychology. By coming together to examine the affordances and limitations of successful location-based games like Pokémon Go, researchers from these disconnected disciplines could identify ways that location-based games may improve human well-being in a way other media cannot. Findings from this research could inform broad public health policy, positive psychological interventions, new media development, and public space design to improve human well-being and flourishing at scale.

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Appendix

Giratina at Notre-Dame de Paris
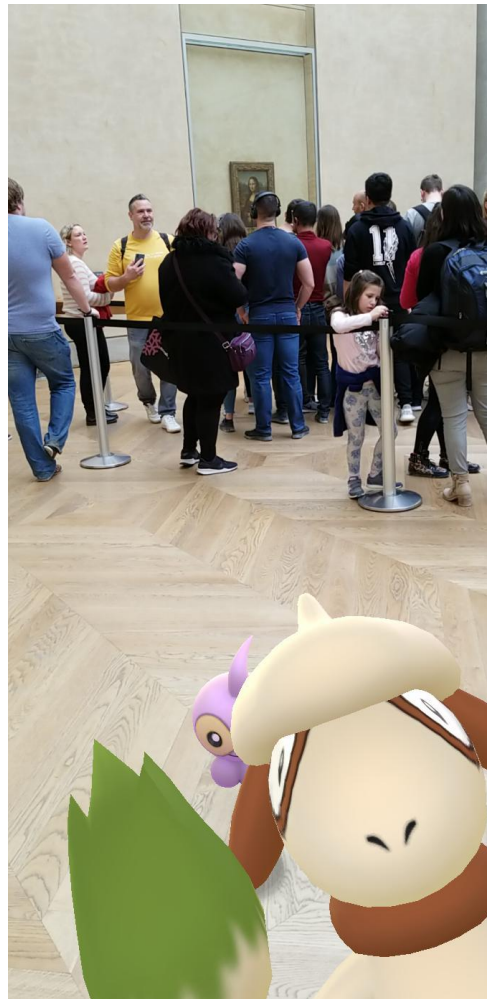
Smeargle enhancing the Mona Lisa experience

Relaxing with a shiny Slakoth
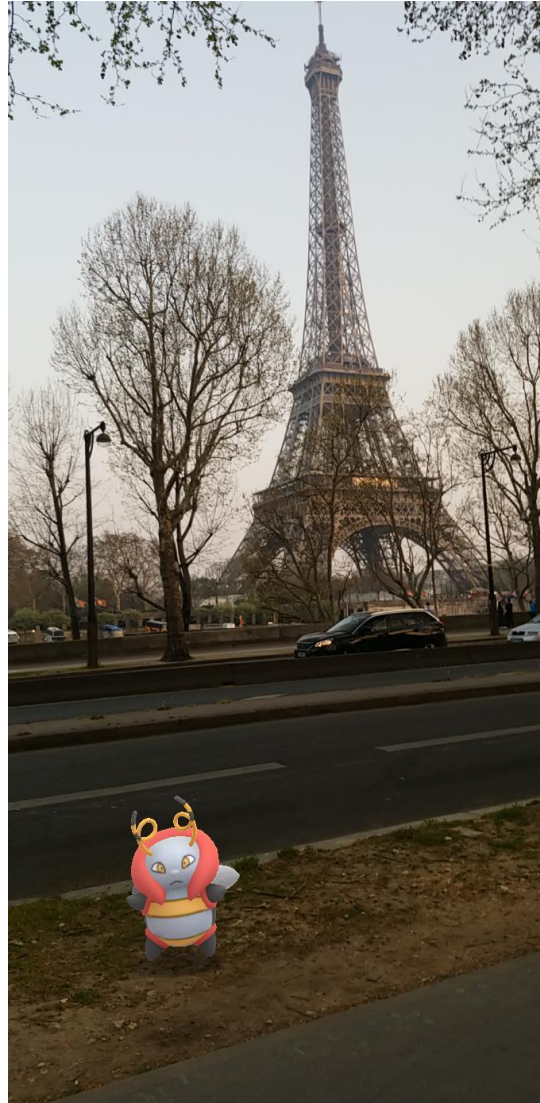

Elegant shiny Gardevoir outside a theater

Asbury Park, the Oshawatt, in Asbury Park, NJ
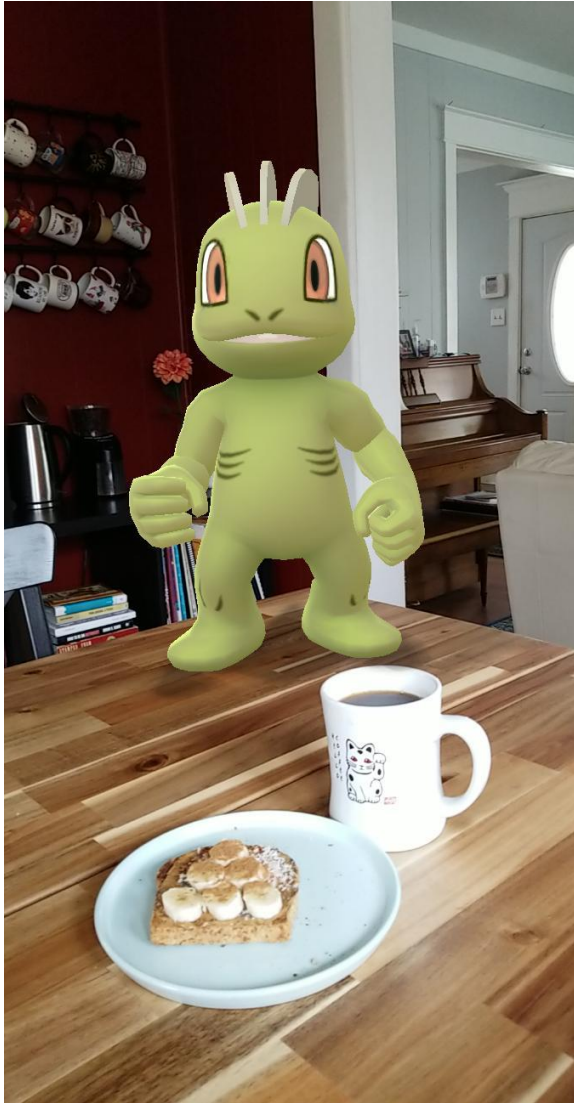

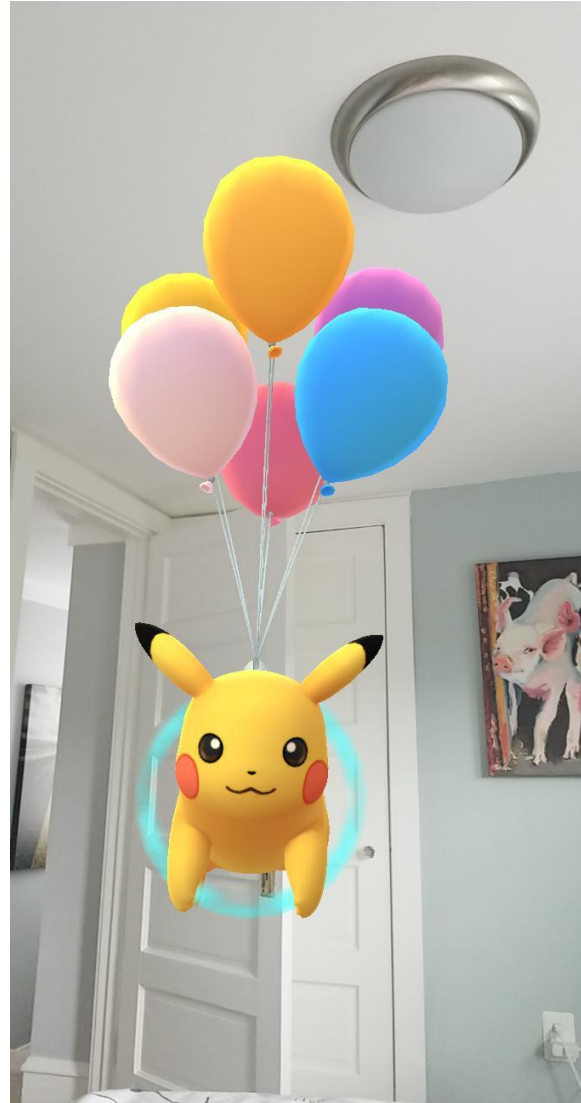Regional Pokémon, Tropius, in Kigali, Rwanda

Petting shiny Piplup on Community Day

Regional Pokémon, Volbeat, in Paris

Breakfast date with Machop

Morning greetings from Pikachu

A shiny Serperior lurking in the backyard

Snuggling with Rhyhorn on its Community Day