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Abstract

Even though the relationship between presence and game enjoyment has been explored, there are unsolved theoretical questions regarding the degree to which social presence may be generated in games. Drawing on (social) presence theory, this study investigated the effects of the perceived risk of player death on game enjoyment. Specifically, the current study examined whether there is a relationship between the perceived risk of player death and communication between players; if this communication will serve as a trigger for a social presence; and if social presence will increase game enjoyment. Results from a self-report survey (N = 128) indicated that the perceived risk of player death has no direct relationship with game enjoyment. However, this result unfolds in a different way when social presence is activated. The results of path analysis showed that the higher the players' perceived risk of death, the more players communicate with teammates. Moreover, communication positively influenced players' social presence, and social presence was positively associated with game enjoyment. The study's theoretical findings were discussed regarding the concept of social presence. The appropriate challenge level and user experience in mobile first-person shooting (FPS) games were discussed as practical implications.

Keywords: challenge, perceived risk of player death, in-game communication, social presence, game enjoyment, mobile game

THE HARDER THE BATTLE, THE MORE WE TALK: THE EFFECTS OF PERCEIVED
RISK OF PLAYER DEATH ON SOCIAL PRESENCE AND ENJOYMENT IN MOBILE FPS
GAME

by

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Thesis

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Chapter 1. Introduction

Multiplayer online games are rapidly growing forms of social activity, with over 47 million active subscribers (Ratan et al., 2010). According to market research (Limelight Networks, 2019), mobile is more popular with gamers than other devices such as computers and consoles. The mobile game app is the most downloaded app in the App Store in 2021 (Ceci, 2022). The revenue generated by mobile games is 135.9 billion dollars in 2021 (Clement, 2021). This makes up a huge part considering that total gaming industry revenue is 150 billion dollars worldwide (Statista, 2020). There are more than 1.75 billion active monthly players, and they are spending \$90.7 billion on their game across the world (Geysler, 2022).

Worthy of note, first-person shooting (FPS) games were found to be the most popular game genre with a revenue of \$146 million (Hancock, 2019). Especially, *Call of Duty Mobile* is the most popular FPS game in 2019 and 2020 (Gadgets 360, 2020). Because of the popularity of FPS games, game companies have begun to develop various types of games (e.g., small-group team match, massive scale survival match) to meet players' demands. Each game has different characteristics of challenge, and players have to invest much effort to get satisfactory achievements from the game (Denisova et al., 2020). Challenge is related to the concept of player death. Player death is one of the punishments given to players when they fail to overcome challenges. With the development of various FPS games, players can now explore different challenges, which leads them to face a different level of player death risk.

Even though the concept of challenge has been actively examined in video games, there is a lack of research about the effects of the perceived risk of player death in mobile FPS games, which presumably affects the communication (e.g., conversation) between players. Previous studies explored how challenges and enjoyment are associated with video games. However, there

are mixed results in the relationship between challenge and enjoyment. Also, there are unsolved theoretical mechanisms of how risk perception in mobile games could lead to enjoyment. For example, experiencing a challenging situation (i.e., player death) in a shooting game might not be directly connected to game enjoyment but generate communication to complete the goal, and the feeling of being together with other players could, in turn, increase enjoyment. Based on this premise, the current online survey study explored the role of the perceived risk of player death as one of the factors that might impact communication, social presence, and game enjoyment.

For many people, communicating with teammates is not only a strategy to overcome challenge (Griffiths et al., 2011) but also one of the appealing factors of playing games (Kahn & Williams, 2016; Griffiths et al., 2004; Sherry et al., 2006). Unlike traditional computer-mediated communication environments where text is the dominant medium for communication, mobile games allow people to use multiple media (e.g., text message, voice chat) to communicate (Ratan et al., 2010). Along with the growing popularity of the massive-multiplayer online game, the significance of social interaction in the game has grown as well (Williams, 2006; Ratan et al., 2010). Indeed, the ease of communication is often suggested to explain the popularity of the mobile game (Ducheneaut et al., 2004).

The importance of social presence (i.e., a sense of being there with another) has largely increased with the functional support for communication between players in the game. It is because gaming technology provides an environment for communicating with others at a distance in co-located settings (de Kort et al., 2007). This study focused on the role of social presence in mobile games. With advances in interactive and immersive technologies for the simulation of realistic experiences (Shin, 2019), an enhanced sense of social presence exists

along with virtual experience and elicits users' enjoyment of interactive media (Lombard & Ditton, 1997; Jin, 2011).

Taken together, as an attempt to address the gap in existing knowledge of game studies, this study explored how the perceived risk of player death influenced communication between players, and how that communication is associated with players' sense of social presence as well as game enjoyment.

Chapter 2. Literature Review

This chapter presents the concept and relationship of each variable. Specifically, the concepts of the perceived risk of player death, communication between teammates, social presence, and game enjoyment are discussed. Guided by the previous studies, the current chapter argues the associations between variables and explains their rationale. Taken together, hypotheses and a research model have been proposed.

Challenge in Games

In most digital games, a challenge is considered a key component of gameplay (Feil & Scattergood, 2005; Denisova et al., 2017). A challenge in game studies can be defined as a stimulating task, a problem, or a form of competition (Vahlo & Karhulahti, 2020; Iversen, 2012). In relation to this notion, the challenge is determined by players' skills, abilities, motives, and past experience with the game (Iversen, 2012). Adams (2014) also reveals that goals (i.e., players have to achieve in the game) and the tasks (i.e., something players have to complete in order to continue the game) are factors that determine the challenge. These findings imply that adaptive challenge mechanisms should be implemented considering each game player's various skills for their user experience (Cechanowicz et al., 2014). For example, when the challenge level is relatively high in relation to the player's skill level, the player would fail to achieve the goal or be removed from the game (Petalito et al., 2017). Being removed from the game is known as player (i.e., avatar) death and one of the most significant results of the in-game consequence as it can be found in almost every FPS genre (Carter et al., 2013; Copcic et al., 2013). The concept of challenge and player death have theoretical implications in game studies because they could make players' success more significant which may impact user experience (Petalito, et al., 2017).

Player Death: Punishment of Failure Against Challenge

Failure in a game refers to being unsuccessful at particular tasks and receiving punishment as a result. There are four categories of punishment for player failure: (a) energy punishment, (b) life punishment, (c) game termination punishment, and (d) setback punishment. Energy punishment can be defined as a reduction of energy which takes the player closer to life punishment. Next, life punishment refers to loss of a life, moving the player closer to game termination. Game termination punishment refers to the end of a game session in which the player's progress is lost. Lastly, setback punishment is described as a failure that requires a player to replay a portion of the game. (Lyons, 2015).

In FPS games, life punishment (i.e., player death) is the most common punishment and a necessary constituent of the game (Carter et al., 2013). When a player's energy is completely depleted, he or she will be temporarily removed from the battle ground (Klastrup, 2006). However, dying is usually not the termination of the game as the players can die several times (Klastrup, 2006). Dying and being reborn in the game is a repeated process for players regarding pursuing the goal, regaining control after death, and eventually mastery of a certain area such as skill (Flynn-Jones, 2015). This penalty mechanism forces players to repeat and incrementally improve their skills (Flynn-Jones, 2015). In other words, death is a means of training players to improve their play and rethink their strategies (Juul, 2009), whether they are playing solo or with teammates (Klastrup, 2008). Therefore, failure and player death are frequently presented in games as a necessary part of the learning process (Petalito et al., 2017).

Player Death and Player Communication

From a game design perspective, there are two types of challenges that players need to overcome: (a) physical kinesthetic challenge and (b) cognitive non-kinesthetic challenge.

Typically, these two types of challenges occur simultaneously (Adams, 2014; Vahlo & Karhulahti, 2020; Karhulahti, 2013). Physical kinesthetic challenge refers to the challenge that requires nontrivial psychomotor effort to overcome (e.g., players' accuracy, motoric reaction, or endurance). Cognitive non-kinesthetic challenge refers to the challenge that solely requires nontrivial cognitive effort to overcome (e.g., players' memory, problem-solving skills, or comprehensive planning) (Karhulahti, 2013; Epstein, 2021). Players often experience both physical kinesthetic and cognitive non-kinesthetic challenges in multiplayer FPS games, because they have to guess the location of the enemy, co-work with teammates, and shoot fast against the enemies (Denisova et al., 2017; Denisova et al., 2020). It includes the players' ability to analyze their opponents, predict their actions, and make instant but accurate decisions (Denisova et al., 2017).

Overcoming physical kinesthetic challenges depends on players' individual physical ability, however, in-game communication could be one of the methods of controlling cognitive non-kinesthetic challenges. For example, communication may help to discuss strategies and tactics, and exchange information (Wright et al., 2002). For this reason, communication has high value as a tool for success in the game among game players (Williams et al., 2007). While players are in the battle, they have to kill enemies to achieve victory. When the players' death means elimination from a game, players would have higher perceptions of the risk of their death (Denisova et al., 2020). Player communication is defined as interaction through text and voice between game players (Williams et al., 2007). Communication with teammates could be one of the ways to win the game while avoiding death. Several studies (e.g., Kanawattanachai & Yoo, 2007; Paulraj et al., 2008) have suggested that communication among team members is one of the main factors for better performance. It is because additional information exchange channels,

such as audio, and text-based chat might reduce uncertainties and bring efficient communication (Daft & Lengel, 1984; Ratan et al., 2010). In addition, Sallnäs (2002) proves a video and audio's communication value in terms of task accomplishment (Ratan et al., 2010).

To illustrate, when a player faces risky and time-sensitive situations (i.e., kill or die), the exchange of information (e.g., sharing the enemy's location with teammates through a microphone) is one of the strategies to overcome the challenge (Griffiths et al., 2011). Functionally, mobile FPS games support players to communicate with other players during the task in a format of voice chat and a quick message. Against the challenge of the game, in this case, killing opponents without a character's death, players would think about several ways to complete the goal without harm, and one of the ways could be communication among teammates. Therefore, this study posited that players would communicate more with each other players when they perceive they could die.

H1. A higher level of the perceived risk of player death will induce a greater amount of communication between players.

Player Death and Player Experience

Previous studies highlight the differences between the experience of dying in the offline world and the online environment (Klastrup, 2006). The most significant distinction is that in the physical world, death is final and irreversible (Klastrup, 2006). Accordingly, individuals are cautious about what they do with their bodies, knowing that bodily life can never be revived once it ends. On the other hand, death in the virtual world is free of physical risk since the player's physical (real) body remains unaffected. This lack of risk could elicit various emotions in players. Even though the player could die while exploring a game environment, the feeling of

being free of risk might generate a wide range of emotional experiences such as fun, explorative, humorous, or irritation (Klastrup, 2006).

Usually, there are two types of death in mobile FPS games; one in which people can restart (i.e., respawn) the game when their character dies temporarily within the game, and the other one where people have to end the game after their character's death. In this regard, the experience of in-game death can be categorized as either trivial or non-trivial depending on the situation (Klastrup, 2006). Previous studies (e.g., Carter et al., 2013; Allison et al., 2015) investigate the form of death called "permadeath" which is the highly consequential death mechanism in a game like *DayZ*. In this type of non-trivial death, the players are forced to restart the game from the beginning every time their avatar dies. The results of the study indicate that consequentiality causes players to invest more effort in their avatar, raises their moral concerns, and stimulates social interactions among players (Carter et al., 2013).

However, if a player's death has no serious consequence, it may reduce the significance of the player's actions since the player could not learn lessons from previous mistakes (Bartle, 2004). In a similar vein, Juul (2009) shows that players prefer feeling accountable for the in-game failure; in other words, players tend to feel negative emotions such as boredom about the game if there are no significant consequences for failing. It indicates that the non-consequentiality of the player's death could cause the game to become totally uninteresting (Klastrup, 2006).

This result implies that a consequential death mechanism may or may not enhance the awareness and permanent effect that player death has, heightening the level of arousal and game engagement, as well as the thrill of the possibility of danger (Allison et al., 2015). In other words, differences in the consequences of players' death may impact the sense of risk that the

player perceives (Van den Hoogen et al., 2012). When people think that their opportunities to play the game are limited (e.g., FPS game), they might perceive the risk of player death as higher compared to situations when people believe that they have several chances (e.g., role playing game). In sum, player experience may differ from the consequence of death.

Player Death and Game Enjoyment

The concept of enjoyment has been identified as a central component of the player experience (Mekler et al., 2014). Enjoyment is a core concept in human-computer interaction research in the context of technology and content and is often examined as one of the dimensions of user experiences (Vorderer et al., 2004; Blythe & Hassenzahl, 2003; Mekler et al., 2014). Especially, Vorderer et al. (2004) state that media enjoyment includes physiological, affective, and cognitive components. It may be displayed in a variety of ways such as excitement, peace, humor, or sadness (Trepte & Reinecke, 2010).

Game enjoyment refers to a pleasurable response to the game (Hopp & Fisher, 2017). Much scholarly work has focused on the importance of enjoyment as the most essential goal for digital games. It is because players will not play a game if they do not enjoy it (Sweetser & Wyeth, 2005). Previous studies have proposed game-related variables to explain the mechanism of game enjoyment such as challenge, and death (Weibel et al., 2008; Weber et al., 2009; Petralito, 2019; Denisova et al., 2017).

Resolving the tasks in the game is a key component of game enjoyment (Klimmt et al., 2009). Suggested by the attribution theory, Klimmt et al. (2009) found that easy tasks would elicit boredom rather than enjoyment. It is because players may find it hard to feel the necessity of investing their effort in the game. In contrast, a high level of difficulty showed a negative association with positive emotions (Weiner, 1985; Klimmt et al., 2009). It is because repeated

failure might trigger negative emotions like frustration, and sadness. As presented, there are conflicting arguments that player death may (or may not) be related to game enjoyment.

Specifically, one stem of studies (e.g., Van den Hoogen et al., 2012; Juul, 2013; Denisova et al., 2017) found that player death is actually one of the sources of game enjoyment.

Intriguingly, Van den Hoogen et al. (2012) suggests that a player death event itself might not be an enjoyable event, but it may play a role as a trigger for game enjoyment. It is because death stimulates players to tackle challenges by training them how to overcome failure (Juul, 2013). Consequently, death and failure become a repeated learning process that is essential for video game enjoyment (Flynn-Jones, 2015; Koster, 2013; Petralito et al., 2017). The rationale for this mechanism derives from an informative learning process of how to overcome failure (Flynn-Jones, 2015; Juul, 2013). It is because the risk of player death may positively affect the self-efficacy of the player in the process of regaining control of the game. Although at the micro-level, the risk of player death (i.e., task) is considered negatively, however, at the macro-level, it is a part of a positive process to gain control of the game (Van den Hoogen et al., 2012). Keeker et al. (2004) show that players are experiencing negative emotions due to the repeated failure; however, positive emotion is experienced when they overcome the challenge. In addition, Klimmt et al. (2009) found that suspense and feelings of challenge elicited by a perceived risk of player death might positively influence enjoyment (Van den Hoogen et al., 2012).

Another stem of studies suggests that player death would not induce game enjoyment. Depending on the severity of the players' punishments, player death may result in an instant negative experience. (Petralito et al., 2017). It is because dying often results in the damaging of the avatar's weapon, geographical displacement, the reduction of the player's experience points (Klastrup, 2008; Carter et al., 2013), or the end of the game. For example, when players perceive

high consequentiality of death (i.e., a death that forces the player to restart the game), they would likely to experience negative emotions that their actions may cause aversive results along with their recognition of the huge investment (e.g., high-quality weapons) in the avatar (Allison et al., 2015). In alignment with these previous findings, Petralito et al. (2017) has found that players perceive the high consequentiality of death to be frustrating despite the fact that the repetition of 'death and mastery of the skill' process is an essential part of the game enjoyment (Petralito et al., 2017). Given the conflicting previous research, this study raised the following research question to explore the relationship between perceived risk of player death and game enjoyment in FPS games.

RQ1a. What is the relationship between perceived risk of player death and game enjoyment in FPS games?

RQ1b. Does communication mediate the relationship between perceived risk of player death and game enjoyment in FPS games?

Presence

The term presence was first defined by Minsky (1980) in the context of teleoperation that when high-quality sensory is supported, people can feel their own sensors in a remote location (Lombard et al., 2015) (p.16). Since then, the concept of presence has been defined as a subjective experience in a remote location that can be created when mediated communication resembles unmediated communication in the physical world. (Shin, 2019). Explicated by numerous scholars, the definition of presence could be classified into five categories of framework whether they concern the issue of (a) technology (e.g., ISPR, 2000), (b) property (e.g., Steuer, 1992; Schloerb, 1995; Lee, 2004), (c) source of stimuli (e.g., Steuer, 1992; Lombard & Ditton, 1997), (d) perception of technology (e.g., Minsky, 1980; Lombard & Ditton,

1997; Lee, 2004), and (e) aspects of the phenomenon (e.g., Minsky, 1980; Lee, 2004) (Lombard et al., 2015).

A number of scholars have attempted to define the experience of presence. Steuer (1992) defined presence as “the experience of one’s physical environment.” Similarly, Schloerb (1995) defined presence as “the existence of an object in some particular region of space and time.” Lombard and Ditton (1997) defined presence as “the perceptual illusion of non-mediation when an operator fails to perceive the existence of an artificial medium in their communication environment and reacts as if the medium were absent.” In 2000, the international society for presence research (ISPR) defined presence as “a psychological state or subjective perception in which some or all of an individual's current experience is generated by technologies, but in which individual's perceptions fail to recognize the role of technology in the experience.” Similarly, Lee (2004) defined presence as “a psychological state in which the virtuality of experience is unnoticed.” In sum, previous studies argued that presence is a complex of psychological state that explains what is being felt, engaged with, perceived, acted upon, and sensed in a non-physical (i.e., virtual) world (Lombard et al., 2015) (p.14).

Social Presence in Games

Presence consists of three distinct dimensions: (a) spatial, (b) social, and (c) self-presence (Biocca, 1997; Lee, 2004). This study focused on the aspects of social presence and its role in the context of game studies. Previous research suggested that presence plays a key role in playing games because it helps players’ feelings of engagement in the mediated environment (Konijn & Bijvank, 2009; Bachen et al., 2016). Specifically, since presence is the perception that nothing is between the user (i.e., game player) and the virtual world (Lombard & Ditton, 1997), it should be

noted that how the game player perceives space, others, and themselves in the virtual environment (Bachen et al., 2016).

In a virtual environment, social presence is defined as the sense of being together with another (Biocca et al., 2003; Hudson & Cairns, 2016). Kahn and Williams (2015) suggested that social presence occurs when individuals can share mental states in virtual experiences. Previous studies demonstrated that social presence occurs in the team-based online game, during experiencing competitiveness and challenge (Hudson & Cairns, 2016). In light of this fact, mutual awareness and collaborative tasks are constituents of social presence in a virtual gaming environment (Schroeder, 2002). Unlike traditional computer-mediated communication environments where the text is the dominant medium for communication, mobile games allow people to use voice to communicate (Ratan et al., 2010), making it more comfortable to share their states.

Player Communication and Social Presence

Schouten (2014) argues that social presence is the result of the social settings in digital games. Specifically, more extensive social interaction would like to lead higher degree of social presence (Hudson & Cairns, 2016). In a similar vein, Schroeder (2002) argues that factors that make up the game, such as mutual awareness, the focus of attention, or task are constituents of social presence in games (Hudson & Cairns, 2016). Social presence occurs when players are able to share their mental states with others (Kahn & Williams, 2016). It is because, in online games where game players are mutually aware of other players or artificial intelligence tends to cooperate or communicate to solve the task (Frostling-Henningson, 2009; Hudson & Cairns, 2016).

With advances in telecommunications technology, the mobile game now offers a variety of channels for communication. Through microphone (i.e., verbal communication), and text message (i.e., non-verbal communication), game players feel the sense of being there together (de Kort et al., 2007), which is a necessary condition of social presence (Kahn & Williams, 2016). Considering that communication is necessary to achieve a goal in the game, players should be mutually aware of the teammate's existence and understand their intentions (Kahn & Williams, 2016). Also, social interactions are a critical factor for game enjoyment. Chen et al. (2006) stated that enjoyment is significantly increased when the game offers the chance to have social interactions for its players. Specifically, engaged players value social interactions within the game and evaluate interaction itself as an essential and enjoyable factor.

H2a. A greater amount of communication between players will induce a higher level of perceived social presence.

H2b. A greater amount of communication between players will induce higher game enjoyment.

Social Presence and Game Enjoyment

Players tend to enjoy the experience more when they feel a more robust social presence in the game (Heeter, 1995). It is because the concept of social presence fits mediated interaction (Biocca et al., 2003; de Kort et al., 2007). The presence of others generates more positive emotions toward the gaming experience (Gajadhar et al., 2008). These positive emotions would then increase the satisfaction of playing the game (Yee, 2006). Thus, players who experience higher social presence are likely to engage much more intensively in the game (Quandt & Kröger, 2013). Related studies explore the effects of social settings on player enjoyment as mediated by the social presence (e.g., Gajadhar et al., 2008), suggest a model that explains the

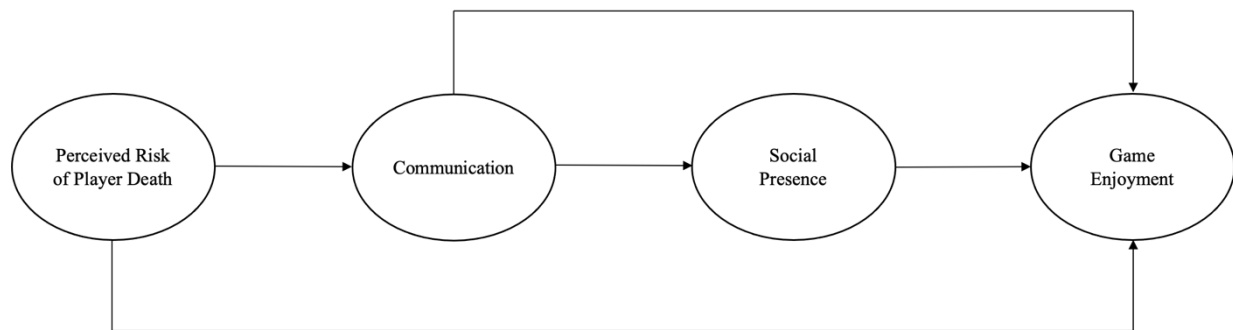
relationship between social processes in games and how these processes affect player enjoyment (e.g., de Kort & IJsselsteijn, 2008; Schroeder, 2002; Hudson & Cairns, 2016). Based on empirical findings of previous studies the current study postulated that social presence is not only associated with game enjoyment but also mediates the relationship between communication and game enjoyment. Accordingly, the current study posited the below hypotheses.

H3a. Social presence will positively influence game enjoyment.

H3b. Social presence will mediate the relationship between communication and game enjoyment.

Figure 1

Proposed Conceptual Framework



Chapter 3. Methodology

This chapter explains the methodology adopted to test hypotheses. It includes the sampling strategy, sample size, and data collection procedure. Next, the operationalization of each variable which consists of a research model, and a survey questionnaire are presented.

Participants

This study adopted non-probability sampling, specifically convenience sampling was used for the researcher's convenience. The data was collected from July 31 to August 2, 2020. Suggested by the result of G*Power analysis, participants (N = 128) living in the United States were recruited. Using a Qualtrics (<https://qualtrics.com>) online survey, those who play *Call of Duty Mobile* were recruited from Prolific (<https://prolific.co>), an online panel audience service. Approximately 77% of the participants were male (N = 98), 23% were female (N = 29) and the average age of the participants was 28 years old ($SD = 8.6$), ranging from 18 to 68. 49.2% of the participants were Whites/Non-Hispanic, 19.5% were Asian, 14.8% were African American, 14.0% were Hispanic American, 2.3% were being reported Native American/Pacific Islander. Regarding the game rank, 8.5% were in the legendary rank (the highest rank), 6.2% were master rank, 18.7% were pro rank, 23.4% were elite rank, 30.4% were veteran rank, and 12.5% were rookie rank (the lowest rank).

Table 1

Demographic Information

Variable		N	%
Gender	Male	98	76.5
	Female	29	22.6
	Prefer not to respond	1	0.7

Age	$M = 28.0$ ($SD = 8.6$)		
Ethnicity	White/Non-Hispanic	63	49.2
	Asian	25	19.5
	African American	19	14.8
	Hispanic American	18	14.0
	Native American/Pacific Islander	3	2.3
Game Rank	Legendary (the highest rank)	11	8.5
	Master	8	6.2
	Pro	24	18.7
	Elite	30	23.4
	Veteran	39	30.4
	Rookie (the lowest rank)	16	12.5

Procedure

A prescreening survey was conducted to recruit individuals who played *Call of Duty Mobile*, a popular online multiplayer free-to-play shooting game, with a compensation of \$0.16. After completing the consent process, participants were asked to complete an additional survey assessing their perception and playing habits. Survey completion took approximately 10 minutes per participant. Participants were compensated \$1.10 for their participation.

Measures

Perceived Risk of Player Death was measured by a single item developed by the researcher. Using a 7-point scale ranging from “*Not at all*” to “*Extremely*,” participants were asked to answer how they perceive the risk of their death in the game ($M = 3.11$, $SD = 2.06$).

Perceived Amount of Communication was measured by a single item adapted from Interpersonal Interaction Questionnaire (Gorsic et al., 2019) to evaluate verbal interaction between game players. Using a 7-point scale ranging from “*No communication at all*” to “*Communicate a lot*,” participants were asked to answer how they evaluate the amount of game-related conversation ($M = 3.56$, $SD = 2.21$).

Social Presence was measured by ten items adapted from the Competitive and Cooperative Presence in Gaming Questionnaire (Hudson & Cairns, 2014). Using a 7-point scale ranging from “*Strongly disagree*” to “*Strongly agree*,” participants were asked to answer awareness, team identification, social action, and team value. This measure includes (a) I acted with my opponents in mind, (b) I reacted to my opponent’ actions, (c) I knew what my opponents were trying to achieve, (d) The actions of my opponents affected the way I played, (e) I felt I affect my opponents’ actions, (f) I was aware of my team, (g) I acted with teammates in mind, (h) I considered my teammates’ possible plans/thoughts, (i) I felt like I was part of a team, (j) I felt social connection to my teammates. Scores were averaged to create a single-item measure of presence (Cronbach’s $\alpha = .89$, $M = 4.83$, $SD = 1.16$).

Game Enjoyment was measured by five items adapted from Game Enjoyment Questionnaire (Skalski et al., 2011). Using a 7-point scale ranging from “*Strongly disagree*” to “*Strongly agree*,” participants were asked to answer how much they enjoyed the mobile shooting game. This measure is comprised with (a) Playing Call of Duty Mobile was fun, (b) I would like to play Call of Duty Mobile again, (c) Playing Call of Duty Mobile was exciting, (d) I enjoyed playing Call of Duty Mobile, (e) Playing Call of Duty Mobile gives me a lot of pleasure. Scores were averaged to create a single-item measure of game enjoyment (Cronbach’s $\alpha = .96$, $M = 5.68$, $SD = 1.26$).

Demographic Information measures such as gender, age, and ethnicity were adopted from Lardier et al. (2020). Using multiple-choice questions, participants were asked to provide this demographic information. Also, game rank information was obtained by asking participants to self-report their rank divisions. *Call of Duty Mobile* includes seven rank levels (see Table 1). To level up the rank, a player needs to play ‘ranked match mode’ with other players to increase their scores.

Chapter 4. Results

This chapter reports the results of the data analysis. First, the preliminary analyses (i.e., normality test, Spearman's Rho Correlation) are reported. Next, this chapter reports the results of the main analysis (i.e., path analysis) for the research model and hypothesis testing.

Preliminary Analysis

Normality Tests

As a preliminary analysis to test the normality of the data, the Kolmogorov-Smirnov test was conducted using RStudio (RStudio, Inc., Boston, MA). The result showed that the data did not pass the tests for normality of distribution (Table 2). Spearman rank order correlation, a nonparametric statistical technique, was used to test relationships between variables. Guided by a previous study (Hair et al., 2010), bootstrapping was conducted with a number of 10,000 samples to overcome this limitation in tests of the model. In addition, according to Pek et al. (2018), the sample size of the current study ($N = 128$) was sufficient to reduce the risk of non-normality which might impact regression results.

Table 2

Kolmogorov-Smirnov Test Results

	Statistic	df	Sig.
Perceived Risk of Player Death	.092	128	.047
Communication	.124	128	.001
Social Presence	.106	128	.010
Game Enjoyment	.089	128	.059

Spearman's Rho Correlation

Next, Spearman's Rho Correlation was used to investigate the statistical association between variables. The results showed a negligible relationship ($r_s = .03, p = .763$) between the perceived risk of player death and game enjoyment, and it was not statistically significant. However, the perceived risk of player death and the amount of communication showed a modest positive relationship ($r_s = .47, p < .001$). As expected, the amount of communication and social presence was in a moderate positive relationship ($r_s = .61, p < .001$), and the amount of communication and game enjoyment was in a negligible positive relationship ($r_s = .24, p < .01$). Lastly, the relationship between social presence and game enjoyment showed a modest and positive association ($r_s = .43, p < .001$). Detailed results have been presented in Table 3.

Table 3

Spearman's Rho Correlation Results

	1	2	3	4
1. Perceived Risk of Player Death	1			
2. Communication	0.47***	1		
3. Social Presence	0.35***	0.61***	1	
4. Game Enjoyment	0.03	0.24**	0.43***	1

** $p < .01$, *** $p < .001$

Model Fit

As the main analysis, path analysis was conducted with a bootstrapping estimation of 5,000 estimates. This study used following criteria to evaluate the model fit: A comparative fit index (CFI) $\geq .90$, a Tucker-Lewis index (TLI) $\geq .90$, a root-mean-square error of approximation (RMSEA) $\leq .08$, standardized root-mean-square residual (SRMR) $\leq .08$ (Kline, 2005). According to the model fit criteria, the fit indices in the model showed a goodness of fit:

$\chi^2(1) = 1.13, p < .001, RMSEA = .03$ (90% CI = [.000, .239]), CFI = .99, TLI = .99, SRMR = .02.

Hypotheses Testing

RQ1a investigated the relationship between the perceived risk of player death and game enjoyment. The results of RQ1a indicated that a greater level of perceived risk reduced a level of game enjoyment ($\beta = -.071, p = .194$), but not statistically supported. Next, H1 explored whether there is a relationship between the perceived risk of player death and the amount of communication between players. The results of H1 showed that the perceived risk of player death significantly and positively predicted the amount of communication between game players ($\beta = .517, p < .001$). Thus, H1 was supported. As for the mediating role of communication (RQ1b), the results showed that communication significantly mediated the effects of perceived risk perception of player death on game enjoyment ($b = .509, SE = .089, 95\% CI = [.328, .677]$). Hence, the current study concluded that if those who experience a high risk of death, will be more likely to enjoy games via communication.

This study also found that player communication contributed to an increase in social presence ($\beta = .298, p < .001$). Therefore, H2a was supported. However, there is no significant relationship between player communication and game enjoyment ($\beta = .034, p = .529$) (H2b). Lastly, social presence significantly predicted game enjoyment ($\beta = .485, p < .001$), suggesting that people who have the sense of being together with teammates are more likely to enjoy the game. Hence, H3a was supported. In terms of H3b, social presence significantly mediated the effects of communication on game enjoyment ($b = .301, SE = .047, 95\% CI = [.200, .386]$). Table 4 and Table 5 respectively show direct effects between variables and the results of the mediation analysis. The results of effect sizes were presented in Figure 2.

Table 4*Direct Effects Between Variables*

Paths	Estimated β	SE	p
Perceived Risk of Player Death → Game Enjoyment	-.071	.055	.194
Perceived Risk of Player Death → Communication	.517	.089	.000***
Communication → Social Presence	.298	.044	.000***
Communication → Game Enjoyment	.034	.055	.529
Social Presence → Game Enjoyment	.485	.120	.000***

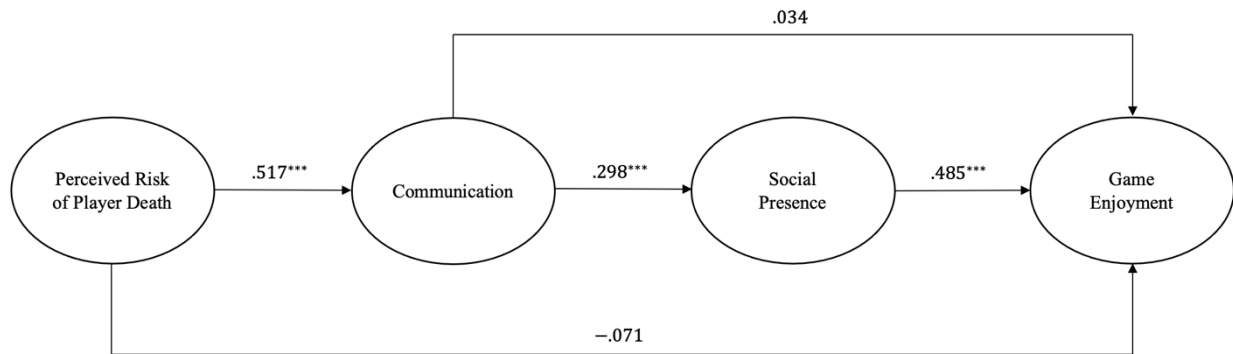
*** $p < .001$

Table 5*Indirect Effects Between Variables*

Mediation Paths	b	SE	95% Confidence Interval	
			Lower CI	Upper CI
PRPD → C → GE	.509	.089	.328	.677
C → SP → GE	.301	.047	.200	.386

Note. PRPD = Perceived Risk of Player Death, C = Communication, SP = Social Presence, GE =

Game Enjoyment

Figure 2*Path Analysis Results*

*** $p < .001$

Chapter 5. Discussion

This chapter discusses the results of data analysis and its implications. Drawing on previous studies, the current chapter explains the reason why proposed hypotheses were supported (or not supported). Next, theoretical implications are discussed in relation to the concept of social presence, practical implications are presented regarding the appropriate challenge level for user experience in game design. Lastly, limitations are discussed for future studies.

Discussion of Findings

This study investigated the effects of the perceived risk of player death on game enjoyment in mobile FPS games. Furthermore, this study also examined how the player's feeling of social presence and the amount of communication would also be affected by the perception of the risk of player death. In accordance with previous literature, the perceived risk of player death enhances communication in the game (Van den Hoogen et al., 2012), which in turn, increases a sense of social presence and game enjoyment.

The current study found no relationship between the perceived risk of player death and game enjoyment (RQ1a). The nonsignificant association between two variables contradicts previous research (Van den Hoogen et al., 2012; Keeker et al., 2004). A reasonable explanation could be that the experience of death is not a pleasurable experience. A certain degree of challenge may create positive tension which leads to enjoyment (Van den Hoogen et al., 2012), however, the experience of death itself would be frustrating. Instead, the experience of winning may have a more critical influence on game enjoyment than the risk of player death.

As there are few empirical findings on the amount of communication in the mobile game, this study adds to the body of research that the higher perceived risk of player death positively

contributed to the amount of player communication while playing the game. Generally, the goal of playing FPS games is to achieve victory by eliminating the enemy. Studies have shown that communication between teammates' is one of the key elements for better game performance (Kanawattanachai & Yoo, 2007; Paulraj et al., 2008). Also, Griffiths et al. (2011) state in their study that the exchange of information is one strategy to overcome the challenge, especially when facing risky and time-sensitive situations. H1 may support the idea that the higher perceived risk of player death increases the amount of communication. In other words, the higher risk of player death may well induce more active information exchange during the game. Moreover, results from a mediation analysis showed that communication can play a role as a trigger for game enjoyment (RQ1b). This illustrates the importance of communication in games by demonstrating that even though players might not enjoy playing a difficult game, the interaction between users may serve a pivotal role as a factor for enjoyment.

In addition, even though it was not hypothesized, this study examined whether characteristics of the participants could affect the amount of communication while playing games. First, the current study looked at the gender differences in the amount of communication. According to a previous study, the engagement patterns between male and female game players may differ (Ogletree & Drake, 2007). However, in this study, there was no significant difference in the amount of communication between male and female participants even though the gender of participant samples in this study was significantly imbalanced. Compared to male participants, there was a small number of female participants. In relation to H1, both male and female players are likely to have more communication with their teammates when they perceive a higher risk of death.

Next, we examined whether there were any differences in the amount of communication based on players' expertise or game rank. According to the results of an ANOVA analysis, there were significant differences between game ranks in the amount of communication. It demonstrates that players in different ranking groups communicate to varying degrees. According to Post-Hoc (Tukey) test, there are the mean differences between the lowest and highest rank players. This might be because the highest-ranking players (i.e., Legendary) are more relaxed with the game as they have more experience compared to the lowest-ranking players (i.e., Rookie), therefore, they communicate more.

Similar to prior research findings (Kahn & Williams, 2016), a significant positive relationship between the perceived amount of communication and social presence was found. Based on the significant positive relationship between communication and social presence, players experience higher social presence via communication. As Kahn and William (2012) suggested, players' desire for communication affects mutual awareness of the existence of teammates. By using messages and microphones, players try to share information with teammates (e.g., the location of the enemy or what they intend to do). It indicates that those who try to communicate with others are conscious of their teammates. Thus, H2a could explain why players have a higher social presence when they actively engage in communication. Our study also found that communication between players itself may not enhance game enjoyment (H2b). This result contradicts with the previous findings (Chen et al., 2006) that social interaction is not a waste of time but provides a pleasurable experience to engaged players.

Adding to the existing literature (Gajadhar et al., 2008; de Kort & IJsselsteijn, 2008), this study also provided empirical evidence of a relationship between social presence and game enjoyment. The result of H3a supported that the presence of teammates could increase players'

enjoyment. One possible explanation is that the feeling of being co-located with teammates may engender fun and perceived competence, as compared to the setting when they are apart. In sum, social play could directly bring enjoyment to game players. Lastly, communications were a critical factor for game enjoyment when they are mediated by the social presence (H3b). Chen et al. (2006) stated that enjoyment is significantly increased when the game offers the chance to have social interactions for its players. Specifically, players who engaged with other players value social interactions within the game and evaluate interaction itself as an essential and enjoyable factor of the game.

Limitations and Suggestions for Future Direction

As with all studies, this paper does not come without limitations. First, even though *Call of Duty Mobile* is the most popular mobile FPS game in the world, there are possibilities that this result may not be applicable to the other mobile FPS games. Future research is recommended to apply the mechanism being used in this study to other mobile FPS games for the generalization of the proposed conceptual framework.

Second, due to the COVID-19 pandemic, the current study used a self-report survey to collect the data. The data obtained from observation or offline experiments (e.g., live game playing sessions) may give accurate information to measure key variables. For example, topics of communication (i.e., game-related communication vs. small talk) could be measured through observation or offline experiments. In addition to the topics of communication, the format of communication (i.e., text vs. voice) may influence social presence in a different way. For example, auditory communication might elicit a higher social presence than short text-based visual communication. Measuring the type and the format of the communication might suggest in-depth implications about the role of communication in games.

Another limitation is that the perceived risk of player death and the amount of communication were measured by a single item measurement. Even though the use of a single measure that has been carefully chosen may be as valid as multiple items measure (Bergkvist & Rossiter, 2007; Lee et al., 2022), some scholars are concerned about whether those users' perceptions of previous experience-related variables can be accurately evaluated with a single item. Taking this into account, future studies will employ multiple items when measuring people's perceptions of their experiences.

In addition, this study only focused on the role of social presence in the relationship between communication and enjoyment. However, communication might impact players' spatial and self-presence, leading to game enjoyment. Further examination of whether or how spatial and self-presence could be related to game enjoyment may expand knowledge about the role of presence in user experience.

Next, one of the limitations of this study lies in the lack of diversity in the samples. The majority of the participants were white males. This issue might limit the generalizability of the results. Although the result of the t-test found no significant gender differences in the amount of communication, this may be due to the small number of female participants. Future studies should consider recruiting a similar proportion of male and female players or following the demographics of that particular game.

Another limitation that might affect the generalizability of the research is the use of convenience sampling. As a non-probability sampling technique, convenience sampling has several disadvantages because of the subjective nature of its sample selection. Thus, it may not represent the population. Although a previous study found that online survey respondents could potentially be representative of the internet population (Palan & Schitter, 2018), workers from

crowd working platforms are more likely to be younger and have higher computer literacy than average Americans (Bergkvist & Rossiter, 2009). And these characteristics are found among online game players as well. Nevertheless, future research should consider employing a more representative sample to test the similar effects.

Gender difference in communication between male and female players is another limitation of this study. We examined the effect of the amount of communication but did not address a qualitative aspect of communication. Given that female game players may often be targeted for harassment, when they are recognized as female via voice chat (Ictech, 2021), future research could examine the gender differences in how male and female players communicate while playing games. Or in-depth interviews could be conducted to have a better understanding of female players' game-playing experiences.

Lastly, this study focused on testing the conceptual framework using the risk of player death and exploring the general role of player death risk. As a result, players' self-efficacy or skill level has not been controlled when assessing the model. Considering the possibility that each player's skill would induce a different amount of communication, controlling detailed skill-related variables need to be controlled in the future study.

Conclusion

Despite these limitations, this study found substantial evidence of how the perceived risk of player death affects player communication, social presence, and game enjoyment. The results highlighted that risk perception and communication activities were suggested to be influencing the outcome of the gameplay. By examining the validity of the conceptual framework, the current study offered the theoretical implications of the relationship between communication, social presence, and enjoyment of games. Induced by communication, social presence could

increase players' enjoyment of the game. Also, these results suggested practical implications for game designing of how to generate active communication between game players.

Appendices

Appendix A. Informed Consent

A study about mobile FPS games (IRB#: 20-208).

My name is Heejae Lee. I am a graduate student at S.I. Newhouse School of Public Communications, working under the guidance of Professor T. Makana Chock.

We are interested in learning more about game engagement in mobile FPS games. You will be asked to complete a survey about your gaming habits. You will be asked to tell us about your experiences of playing Call of Duty Mobile, your perceptions of risk of player death (game avatar killed by the opposing team), and your communication with other game players. You will also be asked to answer some demographic questions. Completing the survey should take approximately 10 minutes of your time.

You are invited to participate in a research study. Involvement in the study is voluntary. This means you can choose whether to participate and that you may withdraw from the study at any time without penalty. Participants in this study are entitled to earn monetary compensation of \$1.10 upon completion of tasks or withdrawal.

Whenever one works with email or the internet; there is always the risk of compromising privacy, confidentiality, and/or anonymity. Your confidentiality will be maintained to the degree permitted by the technology being used. It is important for you to understand that no guarantees can be made regarding the interception of data sent via the internet by third parties.

If you have any questions, concerns or complaints about the research please contact Heejae Lee (hlee95@syr.edu), or Dr. T. Makana Chock (tmchock@syr.edu).

I am 18 years of age or older, and I wish to participate in this research study.

By continuing I agree to participate in this research study OR by clicking here I agree to participate in this research study.

Appendix B. Survey Questionnaire

Survey Instruction: Now, you will be asked to answer the provided questionnaire. Please read all the instructions and questions carefully and choose the most appropriate answer that best describes your thoughts or feelings.

Section A (Game Identification)

1. Which mode do you usually play?

- (a) Rank Match in Multiplayer ()
- (b) Battle Royale ()

Please choose the most appropriate answer that best describes your experience when you play rank match in multiplayer.

2. Which play mode do you prefer the most?

- (a) Team Deathmatch ()
- (b) Domination ()
- (c) Hardpoint ()
- (d) Search & Destroy ()

3. If you play rank match, what rank are you in?

- (a) Rookie
- (b) Veteran
- (c) Elite
- (d) Pro
- (e) Master
- (f) Legendary

Section B (Perceived Risk of Player Death)

5. Here is a 5-point scale on which the perceived risk of player death (whether you can reborn or not after your death) that you experienced in Multiplayer Mode (1: I can reborn - Not at all risky, 5: I can't reborn - Extremely risky). Where would you place each game mode on this scale?

- (a) Team deathmatch
- (b) Domination
- (c) Hardpoint
- (d) Search & Destroy

Section C (Communication: Verbal Interaction Questionnaire)

Gorsic, M., Clapp, J. D., Darzi, A., & Novak, D. (2019). A brief measure of interpersonal interaction for 2-player serious games: Questionnaire validation. *JMIR serious games*, 7(3), e12788.

6. Please choose the most appropriate answer that best describes your experience. How much did you and other players talk to in (1: Not at all communicate, 5: Communicate a lot) (including quick message):

- (a) Team Deathmatch
- (b) Domination
- (c) Hardpoint
- (d) Search & Destroy

Section D (Social Presence: Competitive and Cooperative Presence in Gaming Questionnaire)

Riva, G., Waterworth, J., & Murray, D. (2014). 6 Measuring Social Presence in Team-Based Digital Games. In *Interacting with Presence* (pp. 83-101). Sciendo Migration.

7. Please choose the most appropriate answer that best describes your experience when you play Multiplayer mode (1: Strongly disagree, 5: Strongly agree).

Competitive Social Presence - Awareness

- (a) I acted with my opponents in mind.
- (b) I reacted to my opponents' actions.
- (c) I knew what my opponents were trying to achieve.
- (d) The actions of my opponents affected the way I played.
- (e) I felt I affected my opponents' actions.

Cooperative Social Presence - Team identification

- (a) I was aware of my team.
- (b) I acted with teammates in mind.
- (c) I considered my teammates' possible plans/thoughts.
- (d) I felt like I was part of a team.
- (e) I felt a social connection to my teammates (camaraderie).

Section E (Game Enjoyment)

Skalski, P., Tamborini, R., Shelton, A., Buncher, M., & Lindmark, P. (2011). Mapping the road to fun: Natural video game controllers, presence, and game enjoyment. *New Media & Society*, 13(2), 224-242.

Wu, J., & Liu, D. (2007). The effects of trust and enjoyment on intention to play online games. *Journal of electronic commerce research*, 8(2).

Please choose the most appropriate answer that best describes your experience (1: Strongly disagree, 5: Strongly agree)

- (a) This game was fun.
 - (b) I would like to play this game again.
 - (c) Playing online game is exciting.
 - (d) I enjoyed playing online games.
 - (e) Playing online game gives me a lot of pleasure.
-

Section F (Demographic)

18. Demographic

Age: ()

Sex/Gender

- (a) Male ()
- (b) Female ()
- (c) Prefer not to respond ()

Race/Ethnicity

- (a) White ()
- (b) Hispanic ()
- (c) Black/African American ()
- (d) Asian ()
- (e) Native American/Alaska Native ()
- (f) Pacific Islander/Native Hawaiian ()
- (g) Multiracial ()

(h) Other (Please Specify) _____

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Education

Ph.D. in Mass Communications (Anticipated in Spring, 2024)

S.I. Newhouse School of Public Communications, *Syracuse University*

Advisor: Dr. T. Makana Chock

M.A. in Media Studies (2022)

S.I. Newhouse School of Public Communications, *Syracuse University*

Thesis Topic: *The Harder the Battle, the More we Talk: The Effects of Perceived Risk of Player Death on Social Presence and Enjoyment in a Mobile FPS game*

Advisor: Dr. T. Makana Chock

M.A. in Digital Media Contents (2017)

Department of Communication, *Sogang University*

Thesis Topic: *A Study on Determinants of Smartphone Repurchase Intention*

Advisor: Dr. Daiwon Hyun

B.A. in Communications, Korean Language and Literature (2015)

Sogang University. Area of Study: Mass Communication, Korean Language and Literature

Research Interests

My research interests are in media psychology. I study the psychological effects of the changes in perceptions in extended reality and social media. My research centers on discovering the role of heuristics and presence in attitude change. Much of my research includes information processing, such as heuristic systematic processing.

Refereed Publications

Lee, S., Kim S. J., Lee, H., & Chock, T. M. (2022). Why People Became Hostile during the COVID-19 Pandemic: Exploring the Role of Social Media Information Exposure, Blame Attribution, and Collective Efficacy. *Mass Communication and Society*.

Lee, S., Yao, Z. M., Su, LYF., & Lee, H. (Under Review). The effect of brand favorability and climate of online forums on predicting negative product reviews. *Journal of Computers in Human Behavior*.

Refereed Conference Papers

Lee, H., Yao, S., Davis, E., Kim S. J., & Chock, T. M. (2022). *The Effects of Presence on Psychological Ownership, Product Involvement, and Intention to Rent in Apartment Advertising*. Accepted to the Communication and Technology Division of the annual conference of the ICA, Paris, France.

- Wongmith, N., & Lee, H. (2022). *The Effects of Psychological Empowerment in Twitter Microblogging: The Case of #StopAsianHate During the COVID-19 Pandemic*. Accepted to the Activism, Communication and Social Justice Interest Group of the annual conference of the ICA, Paris, France.
- Shin, M., Abeele, M. V., & Lee, H. (2022). *Are Physical Barriers to Smartphone Screen Time More Effective than Psychological Barriers in Improving Cognitive Performance, Sleep Quality and Well-Being?*. Accepted to the Division of the annual conference of the ICA, Paris, France.
- Lee, H., Kim, S. J., Lee, S., Yao, S., Wongmith, N., & Chock, T. M. (2021). *Confusion about the Coronavirus: The effects of uncertainty on information seeking behaviors*. Presented to the CT&M Division of the annual conference of the AEJMC, Virtual Conference.
- Yang, J., Chuentawong, P., Lee, H., & Chock, T. M. (2021). *Virtual or Real?: A Comparative Study on Virtual-influencer- vs. Celebrity- endorsed CSR Message*. Presented to the Advertising Division of the annual conference of the AEJMC, Virtual Conference.
- Kim, S. J., Lee, S., Lee, H., Yao, S., & Chock, T. M. (2021). *A study of how news use and credibility contribute to engaging in prevention behaviors in the COVID-19 pandemic: In the context of the Protection Motivation Theory*. Presented to the annual conference of the AEJMC, Virtual Conference (**Top Student Paper Award**).
- Lee, H., Kim, S. J., Yao, S., Lee, S., and Chock, T. M. (2021). *The Harder the Battle, the More We Talk: The Effects of Perceived Risk of Player-death on Game Enjoyment in a Mobile FPS Game*. Presented to the Game Studies Division of the annual conference of the ICA, Virtual Conference.
- Yao, S., Lin. T., Kim, S. J., Lee, H., & Chock, T. M. (2021) *Hesitating to use VR? How personal experience, risk perception and emotions shape the adoption of VR*, Presented to the Health communications Division of the annual conference of the ICA, Virtual Conference.
- Lin. T., Yao, S., Kim, S. J., Lee, H., & Chock, T. M (2021) *People's motivations for information seeking about the risks of virtual reality devices: An application of the risk information seeking and processing model*. Presented to the Health Communications Division of the annual conference of the ICA, Virtual Conference.
- Lee, S., Kim, S. J., Lee, H., & Chock, T. M. (2021). *Why People Became Hostile during the COVID-19 Pandemic?: Exploring the Role of Social Media Information Exposure and Blame Attribution*. Presented to the Mass Communication Division of the annual conference of the ICA, Virtual Conference.
- Lee, H., Kim, S. J., Yao, S., Lee, S., and Chock, T. M. (2020). *Are you engaging the game? The effect of the challenge and the interaction toward game engagement in mobile FPS game*.

Presented to the Communication Technology Division of the annual conference of the AEJMC, Virtual Conference.

Lee, H., Choi, D., and Kim, S. J. (2020). *Does humblebragging on Instagram enhance happiness?* Presented to the annual conference of the AEJMC, Virtual Conference (**Top Student Paper Award**).

Lee, S., Lee, H., Kim, S. J., and Kim, D. (2020). *Intention to Use Intelligent Personal Assistants in the context of Online Shopping: with Role of Performance Risk and Moderation Effect of Machine Heuristics*. Presented to the annual conference of NCA, Virtual Conference (**Top 3 Student Paper Award**).

Kim, S. J., Lee, H., Yao, S., and Chock, T. M. (2020). *The effects of virtual reality on the information processing of attitude change and its behavioral intention: In the context of gun control*. Presented to the Communication and Technology Division of the annual conference of the ICA, Virtual Conference.

Shin, M., Song, S., Lee, H., and Chung, D. (2020). *When the screen passes faster than I walk: An exploratory study examining users' psychological responses to screen speed in virtual exergame*. Presented to the Information Systems Division of the annual conference of the ICA, Virtual Conference.

Kim, S. J., Park, K., Buntain, K. N., Lee, H., Yao, S., and Chock, T. M. (2020). *The effects of virtual reality on the information processing of attitude change: In the context of nuclear weapons*. Presented to the Information Systems Division of the annual conference of the ICA, Virtual Conference.

Shin, M., Song, S., Lee, H., and Chock, T. M. (2019). *I don't trust your avatar: Uncanny valley effects on friendship decisions in SNS*. Presented to the Information Systems Division of the annual conference of the International Communication Association, Washington, DC.

Park, K., Kim, S. J., Lee, H., and Chock, T. M. (2019). *Effects of virtual reality experiences on activism*. Presented to the Information Systems Division of the annual conference of the ICA, Washington, DC.

Research Reports

Research on Trends and the Demand for Overseas Expansion of Korean ICT Companies (2021). Research on the trends and status of ICT (5G, healthcare, bigdata) in Thailand, Vietnam, and Indonesia.

Research on Strategies for Contents and Commerce to Value System for Mobile Ecosystem (2017).

Research on establishing ICT ecosystem as it relates to the potential of advancing six types of e-commerce services being serviced by Korea Telecom.

Research on Trends and Future Prospects of New ICT Convergence Industry (2016, 2017).

A series of forums for debating pertinent issues in areas encompassing IoT, autonomous driving, and fin tech, among others, by inviting experts in academia, industry and legal areas.

Research and Development of Wearables-Based Smart healthcare System and Services (2016).
A R&D program for recognizing athletic movement patterns for wearable health bands to establish care contents business model based on digital contents.

Collaborative Research on Marketing Project: Dance with Y (2016).
Researching and verifying the effectiveness of strategies for implementing corporate service marketing based solely on MCN (multi-channel network) and social media.

Research and Planning of the National Education Program on Global Contents for Virtual Reality and Augmented Reality (2015, 2016, 2017).
Research and development of VR and AR contents, in collaboration with a government agency, for college students to nurture talents for future-content were developed by launching official and unofficial curriculum.

Research Project on Nurturing Colleges that Lead in Academia-Industry Collaboration Tailored for Society (2015, 2016, 2017).
Planned, developed, a ran an educational research project to nurture high school students as future ICT talents-included managing educational programs for creating VR / AR contents and video filming techniques.

Research on Business Cooperatives for Academia-Industry Collaboration on Virtual Reality and Health ICT (2015, 2016).
Implementing a government research project that included establishing a government-academia-industry collaborative body to expand the underlying scope of Korea's VR, health, and ICT industries

Sina Weibo Importer Research & Development (2015).
Research and development of big data collection framework and tools for use within Sina Weibo.

Teaching & Research Experiences

Syracuse University, S.I. Newhouse School of Public Communications

2022	<u>Teaching Instructor</u> "Communications and Society"
2021	<u>Teaching Assistant</u> "Communications and Society"
2020	<u>Research Assistant</u> "The Effects of Virtual Reality on the Information Processing of Attitude Change and its Behavioral Intention: In the Context of Gun Control"
	<u>Research Assistant</u> "Effects of Virtual Reality Experiences on Activism"
2019	<u>Research Assistant</u> "I Don't Trust Your Avatar: Uncanny Valley Effects on Friendship Decisions in SNS"
	<u>Research Assistant</u> "The Effects of Virtual Reality on the Information Processing of Attitude Change: In the Context of Nuclear Weapons"
	<u>Research Assistant</u> "Worrying about Safety of Using VR? How Health Perceptions Affect Intention to Use VR Devices"

- Research Assistant "Perceptions of Virtual Reality Environments"
Supervisor: Prof. T. Makana Chock
- 2018-2019 Research Assistant "Research on Virtual Reality Environment to Teach and Meditation Focused on Exploring and Understanding the Neural Mechanisms of Mindfulness"
Supervisor: Prof. Mark Costa
- Sogang University, Department of Communication*
- 2017 Research Assistant "Research on Strategies for Contents and Commerce to Value System for Mobile Ecosystem"
Supervisor: Prof. Sooyoung Lee
- 2017 Teaching Assistant "VR Contents Planning and Production II"
- 2016-2017 Research Assistant "Research on Trends and Future Prospects of New ICT Convergence Industry"
Supervisor: Prof. Sooyoung Lee and Daiwon Hyun
- 2016 Research Assistant "Collaborative Research on Marketing Project: Dance with Y"
Supervisor: Prof. Sooyoung Lee
- 2016 Teaching Assistant "Information Entertainment Industry Theory"
- 2015-2017 Research Assistant "Research Project on Nurturing Colleges that Lead in Academia-Industry Collaboration Tailored for Society"
Supervisor: Prof. Daiwon Hyun
- 2015-2017 Research Assistant "Research and Planning of the National Education Program on Global Contents for Virtual Reality and Augmented Reality"
Supervisor: Prof. Daiwon Hyun
- 2015-2016 Research Assistant "Research on Business Cooperatives for Academia-Industry Collaboration on Virtual Reality and Health ICT"
Supervisor: Prof. Daiwon Hyun and Sooyoung Lee
- 2015 Research Assistant "Research and Development of Wearables-Based Smart Healthcare System and Services"
Supervisor: Prof. Daiwon Hyun
- 2015 Research Assistant "Sina Weibo Importer Research & Development"
Supervisors: Prof. Daiwon Hyun and Jihoon Yang
- 2015 Teaching Assistant "Contents Planning Theory", "Communications Center"

Certificate

Syracuse University

- 2021 Preventing Harrasment and Discrimination: Non-supervisors with Title IX/Clery Module
- 2020 Certificate of Advanced Study (CAS) in Data Science
School of Information Studies

Professional Experience

Korea Virtual and Augmented Reality Association

- 2015-2016 Principle Investigator, Specialization in Korean Virtual and Augmented Reality Market Research
Supervisor: Prof. Daiwon Hyun

Mirae Asset (Finance Company)

- 2013 Intern, Specialization in Chinese Market Research
Supervisor: Hongseop Kim

Service to Professional Associations

Syracuse University

- 2020-2022 Chair, Korean Student Association. Appointed Position.
2019-2020 Vice-Chair. Korean Student Association. Appointed Position.

Republic of Korea Air Force

- 2011-2013 Military Police. Department of Operation Control. Appointed Position.

Membership in Professional Organizations

- 2020-present Member, Association for Education in Journalism and Mass Communication (AEJMC)
2019-present Member, International Communication Association (ICA)

Grants, Awards, and Fellowships

Fellowships

- 2020-2021 Graduate Fellowship (\$25,200): Graduate Student Award
- 2019 Research Assistant Fellowship (\$1500): Research on Effects of Virtual Reality Experiences on Activism, Perceptions of Virtual Reality Environments.
- 2018 Research Assistant Fellowship (\$2200): Research on Virtual Reality Environment to Teach and Practice Meditation Focused on Exploring and Understanding the Neural Mechanisms of Mindfulness.
- 2017 Research Assistant Fellowship (\$2150): Research on Strategies for Contents and Commerce to Value System for Mobile Ecosystem. PI: Heejae Lee
- 2017 Communications Center (\$3300)
- 2016-2017 Research Assistant Fellowship (\$800): Research on Trends and Future Prospects of New ICT Convergence Industry.
- 2016 Research Assistant Fellowship (\$4500): Collaboration Research on Marketing Project: Dance with Y. PI: Heejae Lee
- 2016 Teaching Assistantship (\$1800): Planning and Productions for VR & Visual Contents and Smart Applications I.

- 2016 Teaching Assistantship (\$3300): Planning and Productions for VR & Visual Contents and Smart Applications II, Contents Planning Theory.
- 2016 Research Assistant Fellowship (\$950): Sina Weibo Importer R&D. Sponsored by Korea Ministry of SMEs and Startups.
- 2016-2017 Research Assistant Fellowship (\$6700): Research and Planning of the National Education Program on Global Contents for Virtual Reality and Augmented Reality. Sponsored by Korea Ministry of Culture, Sports, and Tourism (Korea Creative Content Agency). PI: Heejae Lee
- 2015-2017 Research Assistant Fellowship (\$950): Research Project on Nurturing Colleges that Lead in Academia-Industry Collaboration Tailored for Society. Sponsored by Korea Ministry of Education.
- 2015-2016 Research Assistant Fellowship (\$6000): Research and Planning of the National Education Program on Global Contents for Virtual Reality and Augmented Reality. Sponsored by Korea Ministry of Culture, Sports, and Tourism (Korea Creative Content Agency). PI: Heejae Lee
- 2015-2016 Research Assistant Fellowship (\$1100): Research and Development of Wearables-Based Smart Healthcare System and Services.
- 2015 Teaching Assistantship (\$1250), Sponsored by Korea Ministry of Education.
- 2015 Teaching Assistantship (\$1500): Planning and Productions for TV.
- 2015 Research Assistant Fellowship (\$950): Research on Business Cooperatives for Academia-Industry Collaboration on Virtual Reality. Sponsored by Korea Ministry of Education.

Grants

- 2021 Co-researcher (\$500): Research on Understanding causes for zoom fatigue using uncanny valley theory. Sponsored by S.I. Newhouse School of Public Communication. Syracuse University.
- 2021 Co-researcher (\$500): Research on Virtual vs. Real? An Exploration of Virtual Influencers as a CSR Communicator. Sponsored by S.I. Newhouse School of Public Communication. Syracuse University.
- 2021 Co-researcher (\$2500): Research on Trends and the Demand for Overseas Expansion of Korean ICT Companies. Sponsored by National IT Industry Promotion Agency (NIPA), Korea.
- 2015-2016 Co-researcher (\$1750): Research on VR Industry Trends and Status of the Companies in the Industry, Hosting the General Assembly for Founding the Association. Sponsored by Korean Virtual and Augmented Reality Association.

Scholarships

- 2020 Research (\$750): Research on Effect of the Challenge Level and the Interaction toward Game Engagement in Mobile FPS Game. Sponsored by S.I. Newhouse School of Public Communication. Syracuse University.
- 2016 Small Scholarship for Nurturing Future Talents (\$5050): Academic Merit Scholarship Designated by Professor Based on Corporate Sponsorship of Communication Dept., Sogang University.