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From dictators to avatars: Furthering social and personality psychology through game methods

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Abstract

From football to the ultimatum game to chess to *World of Warcraft*, games have been used in social and personality psychology research for decades. Games are a unique and powerful method: They are engaging and have the potential to both manipulate and measure psychological constructs. In fact, researchers have used physical games, board games, behavioral economics games, and digital games to study a range of individual differences, interpersonal processes, and social cognitive processes. Furthermore, researchers have the opportunity to create their own games that can be targeted directly toward their topic of interest. Our review provides a primer for social and personality psychologists interested in using existing games or creating new games for their research as a method for understanding attitudes, behaviors, emotions, cognitions, and perceptions.

1 | INTRODUCTION

Games allow social and personality psychologists to understand how individuals think about and interact with the world around them. Not only do games have a rich history of being used in social and personality psychology, they also hold the promise of pushing the field forward. Racial biases, affective forecasting, competitiveness, empathy, and power are just a few of the topics that have been successfully explored using game methods. Whether games are used as measures, manipulations, or contexts in laboratory experiments and field studies, their incorporation into psychological science has allowed for research that may not otherwise have been conducted. More broadly, games are an important and growing paradigm in social and personality psychology, and knowledge of how to effectively craft them will allow researchers to stay on the cutting edge.

Recently, multiple reviews have highlighted the impact of games on psychological states and behaviors (Ferguson, 2010; Granic, Lobel, & Engels, 2014; Greitemeyer & Mügge, 2014); however, reviews have not yet considered the ways in which games can be used as research methods in their own right. Unlike some methods in the psychology methods toolbox, games can be used as measures, manipulations, and experimental contexts for many different populations: they are a universal form of engagement and interaction with far-reaching applications. By this we mean, games can be used to collect data (i.e., games can be used as instruments), but they can also be used as a way of altering a participant's cognitive state, emotional experience, or social situation. For instance, if participants play a trivia game in a study, their answers could be the measure if the researcher is interested in how a previous

manipulation impacts some type of knowledge. That same trivia game could also be used as a manipulation by exposing players to questions that present different social norms (e.g., 80% of college students do which of the following?), the effect of which could be tested in a later measure (see Table 1 for further examples).

Games have been used across a variety of materials and media to examine individual differences such as self-efficacy (Conmy et al., 2013), need for cognition (Mussel, Göritz, & Hewig, 2013), and kindness (Thielmann & Hilbig, 2015); interpersonal processes such as power (Handgraaf et al., 2008; van Dijk & Vermunt, 2000), stereotype threat (Beilock et al., 2006; Stone & McWhinnie, 2008), and conformity (Tubbs, 1971); and social cognitive processes such as attributions (Lau, 1984; Lau & Russell, 1980; Pierce et al., 1998), hindsight bias (Bonds-Raacke, Fryer, Nicks, & Durr, 2001; Leary, 1981; Roese & Maniar, 1997), and illusion of control (Fleming & Darley, 1990). In the present review, we consider why games are particularly useful tools for psychological research, how various types of games have been used previously, and how researchers can create their own games to diversify their methodological toolbox.

2 | WHAT IS A GAME?

To consider how games can be used as methods in psychology, it is important to first consider what makes something a game. A game can broadly be defined as a situation with rules that require individuals to make judgments or decisions (Costikyan, 2002; Flanagan, 2009). Unlike many laboratory methods, games are designed to be engaging

TABLE 1 Examples of game functions

Category	Game	Game function	Independent variable(s)	Dependent variable	Reference
Sports	Baseball	Independent variable	Half inning type (offense vs. defense)	Emotions experienced	Yen, Chao, and Lin (2011) and Tesler and Alker (1983)
	Golf	Dependent variable	Stereotype threat	Putting accuracy	Beilock, Jellison, Rydell, Mcconnell, and Carr (2006)
	Football	Context	1. Race of player 2. Celebration status	Trait perception and monetary compensation	Hall and Livingston (2012)
Behavioral economics	Ultimatum and dictator	Independent and dependent variables	Type of game (ultimatum vs. dictator)	Amount offered in the game	Handgraaf, Van Dijk, Vermunt, Wilke, and De Dreu (2008)
	Ultimatum	Dependent variable	Emotion induced	Offers accepted and rejected	Harlé and Sanfey (2007)
Tabletop	*Taboo*	Independent variable	1. Race of partner 2. Quality of confederate performance	Judgments of confederate and mood	Biernat, Vescio, and Billings (1999)
	Mastermind	Dependent variable	Group type (individual, competitive, cooperative)	Number of trials to solve the puzzle	Georgas (1985)
	Backgammon	Context	1. Type of player 2. Who rolled	Illusion of control	Fleming and Darley (1990)
Digital	*Mortal Kombat*	Independent variable	Type of game (*Mortal Kombat* vs. *Top Spin Tennis*)	Dehumanization	Bastian, Jetten, and Radke (2012)
	Frogger and *Slot Machine*	Dependent variable	1. Type of reward (immediate vs. delayed) 2. Type of game (*Frogger* vs. *Slot Machine*)	Amount of time played	Hitt, Marriott, and Esser (1992)
	Neverwinter Nights 2	Context	1. Gender 2. Big 5 3. Self-esteem	Discrepancy between created avatar and self	Dunn and Guadagno (2012)

experiences with which individuals would voluntarily choose to interact. Games are characterized by creating situations in which players can make meaningful choices when faced with uncertain outcomes. For example, in the popular board game *Settlers of Catan* (Kosmos, 1995), players must decide where to place settlements and how to allocate their resources. Similarly, in the massively multiplayer online role playing game *World of Warcraft* (Blizzard Entertainment, 1994), players decide what role to play (e.g., mage, warrior, or monk).

3 | THE ADVANTAGE OF GAMES AS METHODS

As an interactive mass media form, most games are designed and built to be engaging and intrinsically motivating to play (Lazzaro, 2008; Malone, 1981). Because games are designed to attract players and maintain engagement (Lazzaro, 2008; Malone, 1981), they may have certain advantages over other methods. Namely, if attrition is reduced because the game is engaging, there will be fewer instances of missing data.

Furthermore, games may be particularly useful in laboratory studies because in a game "the player can abandon himself to the process, acting without self-consciousness" (Csikszentmihalyi & Bennett, 1971, p. 46). That is, a game can create a space in which players concern themselves only with the task at hand—not the artificial setting of the laboratory—stepping into the magic circle of a game (Huizinga, 1955). This concept of the magic circle of a game has the powerful potential to alleviate two problems with laboratory studies, depending on how the game is used. First, the magic circle may be able to decrease demand characteristics: If participants are immersed in a game, they may be less likely to change their behavior because of the laboratory setting. Second, games may be able to increase external validity if they are used as a proxy for behavior that would occur outside a laboratory, such as shopping (van Herpen, van Den Broek, van Trijp, & Yu, 2016) and monetary donations (Shariff & Norenzayan, 2007). Taken together, games can be a useful addition to social and personality psychology due to their engaging nature and their ability to voluntarily mentally remove a person from his or her surroundings.

4 | TYPES OF GAMES USED IN SOCIAL AND PERSONALITY PSYCHOLOGY

To understand the idea of using games as a method in social and personality psychology, it is useful to examine the ways in which a wide range of game types and genres have been used. The following section reviews topics that have been explored using physical games (sports), behavioral economics games, board games, and digital games (for further examples, see Table 2). An important point of consideration in using all of the game types listed below in psychology research is the role of an adequate control condition. One advantage to using games as a manipulation is that participants can all play the game, but those in the control condition could play a version without the key variable. For example, in a study on the impact of cooperative team play on subsequent trust and cooperative behavior, participants were randomly assigned to play a game either in a single-player mode or a cooperative-player mode (Greitemeyer & Cox, 2013). Thus, all participants experienced the same game with the same game mechanics, and the difference in experience was due only to whether they played cooperatively or not (Greitemeyer & Cox, 2013).

4.1 | Physical games (sports)

Social psychologists have used sports in their experiments and field studies since the 19th century with Triplett's (1898) studies on social facilitation and bicycling. Two of the seminal studies that followed in the tradition of sports as methods examined the phenomena of selective perception (Hastorf & Cantril, 1954) and basking in reflected glory (Cialdini et al., 1976) using football games. As might be expected, sports have also been particularly useful for examining constructs such as hostility and aggression (Arms et al., 1979; Bensimon & Bodner, 2011; Frank & Gilovich, 1988; Larrick et al., 2011; Patterson, 1974). In addition, the predictive elements associated with sports have lent themselves to social cognitive topics such as affective forecasting (Hoerger et al., 2008; Verner-Filion et al., 2012)

TABLE 2 Examples of games used in social and personality psychology research

Game category	Example topics researched	Games used	References
Sports	Affective forecasting	Football; soccer	Hoerger, Quirk, Lucas, & Carr (2008); Verner-Filion, Lafrenière, and Vallerand (2012)
	Attributions	Football; baseball	Lau (1984); Lau and Russell (1980); Pierce et al. (1998)
	Basking in reflected glory	Football	Cialdini et al. (1974, 1976)
	Hindsight bias	Football	Bonds-Raacke et al. (2001); Leary (1981); and Roese and Maniar (1997)
	Hostility and aggression	Wrestling; ice hockey; swimming; football; baseball	Arms, Russell, and Sandilands (1979); Bensimon and Bodner (2011); Frank and Gilovich (1988); Larrick et al. (2011); Patterson (1974); Reifman, Larrick, and Fein (1991)
	Power	Football	Tesler and Alker (1983)
	Racial biases	Football	Hall and Livingston (2012)
	Regulatory focus	Baseball	Yen et al. (2011)
	Selective perception	Football	Hastorf and Cantril, (1954); Mann (1974)
	Social facilitation	Bicycling	Triplett (1898)
	Stereotype threat	Golf	Beilock et al., (2006); Stone and McWhinnie (2008)
	Terror management theory	Soccer	Dechesne, Greenberg, Arndt, and Schimel (2000)
Behavioral economics games	Affect and emotion	Ultimatum game; trust game; dictator game	Harlé and Sanfey (2007); Seip, Van Dijk, and Rotteveel (2014); Tan and Forgas (2010)
	Competitiveness	Ultimatum game; dictator game; trucking game	Baumert, Schlösser, and Schmitt (2014); Deutsch and Krauss (1960, 1962); Gallo (1966); Shomer, Davis, and Kelley (1966)
	Conformity	Trust game	Tubbs (1971)
	Construal level theory	Ultimatum game	Giacomantonio, De Dreu, Shalvi, Sligte, and Leder (2010)
	Deception	Trust game	Levine and Schweitzer (2015)
	Emotion sharing	Trust game	Peters and Kashima (2007)
	Fairness	Ultimatum game	Handgraaf, van Dijk, Wilke, and el Vermunt (2003); Nelissen, van Someren, and Zeelenberg, (2009); Zhou and Wu (2011)
	Gratitude	Trust game	Drążkowski, Kaczmarek, and Kashdan (2017)
	Kindness	Trust game	Thielmann and Hilbig (2015)
	Morality	Ultimatum game; dictator game; trust game	Clark et al. (2017); Eriksson, Strimling, Andersson, and Lindholm (2017); Lönnqvist, Rilke, & Walkowitz (2015); Q. Yang et al. (2013)
	Need for cognition	Ultimatum game	Mussel et al. (2013)
	Power	Ultimatum game; dictator game	Handgraaf et al. (2008); van Dijk and Vermunt (2000)
	Prosocial behavior	Trust game; dictator game	Clark et al. (2017); Franzen and Pointner (2013); Levine and Schweitzer (2015); Yamagishi et al. (2013); Zhao, Ferguson, and Smillie (2017)
	Regulatory focus	Ultimatum game	Gu, Bohns, and Leonardelli (2013)
	Reputation	Trust game	Stiff (2008)
	Risk taking	Trust game; dictator game	Josef et al. (2016); Leder and Betsch (2016)
	Stress and coping	Trust game	Koranyi and Rothermund (2012)
	Terror management theory	Ultimatum game; dictator game	Zaleskiewicz, Gasiorowska, and Kesebir (2015)
	Trust	Trust game; dictator game	Dunning, Anderson, Schlösser, Ehlebracht, and Fetchenhauer (2014); Evans and Krueger, (2010); Hahn et al. (2015); Kiyonari, Yamagishi, Cook, and Cheshire (2006); Koranyi and Rothermund (2012);

(Continues)

TABLE 2 (Continued)

Game category	Example topics researched	Games used	References
			Pillutla, Malhotra, and Murnighan (2003); Slonim and Garbarino (2008); Tubbs (1971); Zarolia, Weisbuch, and Mcrae (2017)
	Values	Ultimatum game; dictator game; trust game	Cornelissen, Dewitte, and Warlop (2011); Lönnqvist, Verkasalo, Wichardt, and Walkowitz (2013)
	Victim insensitivity	Trust game	Maltese, Baumert, Schmitt, and MacLeod (2016)
Tabletop games	Coalition formation	*Parcheesi*; laboratory games	Cole (1969), Miller (1980); Wilke, Meertens, and Steur (1973); Wilke and Mulder (1974)
	Flow	Chess	Abuhamdeh and Csikszentmihalyi (2012)
	Group influences on performance	*Mastermind*	Georgas (1985)
	Illusion of control	*Backgammon*	Fleming and Darley (1990)
	Social judgment	*Taboo*	Biernat et al. (1999)
	Status	Chess	Mazur, Booth, and Dabbs (1992)
	Stereotypes	Chess	Maass, D'ettole, & Cadinu (2008)
Digital games	Aggression	*Tetris Classic*; *Unreal Tournament*; *Motocross Madness*; *Condemned 2*; *Call of Duty 2*; *The Club*; *S3K Superbike*; *Dirt 2*; *Pure*; *Saints Row 2*; *Pop Life*; *Carmageddon*; *Duke Nukem*; *Mortal Kombat*; *Future Cop*; *Glider Pro*; *3D Pinball*; *3D Munch Man*; *Tetra Madness*; *Street Fighter II*; *Oh No! More Lemmings*; *Counterstrike*; *Trooper Assassin*; *Super Bubbles*; *Penguin*	Anderson and Murphy (2003); Arriaga, Monteiro, and Esteves (2011); Carnagey, Anderson, and Bushman (2007); Greitemeyer (2014a); Hasan, Bègue, and Bushman (2012); Hollingdale and Greitemeyer (2013); G. S. Yang, Huesmann, and Bushman, (2014)
	Cooperation	*Mario Kart: Double Dash!!*	Greitemeyer and Cox (2013)
	Dehumanization	*Mortal Kombat*	(Bastian et al., 2012)
	Emotion regulation	*Starcraft II*	Lobel, Granic, and Engels (2014)
	Empathy	*Dstroy*; *Die Siedler*; *New Super Marios Bros.*; *Lemmings*; *Tetris*	Greitemeyer (2013); Greitemeyer, Osswald, and Brauer, (2010)
	Endowment effect	*Runescape*	De Sousa and Munro (2012)
	Flow	*Pacman*	Peifer, Schächinger, Engeser, and Antoni (2015)
	Gender	*Neverwinter Nights 2*; *World of Warcraft*	Dunn & Guadagno (2012); Pearce (2017)
	Goal pursuit	*Overload*	Kappes and Shrout (2011)
	Guilt	*Operation Flashpoint*	Grizzard, Tamborini, Lewis, Wang, and Prabhu (2014); Hartmann, Toz, and Brandon (2010)
	Identity	*World of Warcraft*	Bessière, Seay, and Kiesler (2007)
	Intergroup attitudes	*Call of Duty: Black Ops*; *Super Smash Bros*; *Call of Duty 2*; *Flipper*	Adachi, Hodson, Willoughby, Blank, and Ha (2016); Besmann and Rios (2012); Greitemeyer (2014b)
	Intrinsic motivation	*Frogger*; *Slot Machine*	Hitt et al. (1992)
	Morality	*Mass Effect*; *Fallout 3*	Boyan, Grizzard, and Bowman (2015); Weaver and Lewis (2012)
	Mood	*Star Trek*; *Pacman*	Isen, Clark, Shalker, and Karp (1978); Rieger, Frischlich, Wulf, Bente, and Kneer (2015)

(Continues)

TABLE 2 (Continued)

Game category	Example topics researched	Games used	References
	Prosocial behavior	*Free Rice*; *Counter Strike*: *Condition Zero*; *Lemmings*; *City Crisis*; *Tetris*; *Lamers*	Greitemeyer and Osswald (2010); Martela and Ryan (2016); Stenico and Greitemeyer (2014)
	Schadenfreude	*Lemmings*; *Tetris*	Greitemeyer et al. (2010)
	Self-efficacy	*Madden NFL 08*	Conmy, Tenenbaum, Eklund, Roehrig, and Filho (2013)

and hindsight bias (Bonds-Raacke et al., 2001; Leary, 1981; Roese & Maniar, 1997). For example, in a study on predicting the outcome of the Super Bowl, researchers found that even students who were aware of the concept of hindsight bias still exhibited it when indicating whether or not they were surprised by the outcome (Bonds-Raacke et al., 2001). More recently, sports such as golf have provided an important context in which to examine the process of stereotype threat (Beilock et al., 2006; Stone & McWhinnie, 2008). In one study that used the sport as the dependent variable, White women needed to take more strokes to putt the ball into the hole when the task was framed as a gender-relevant task, but not when it was framed as a race-relevant task (Stone & McWhinnie, 2008).

When sports are used as methods, they often take one of two forms: the context for studying a behavior (e.g., selective perception; Hastorf & Cantril, 1954) or as the manipulation for a particular construct (e.g., regulatory focus; Yen et al., 2011). That is, selective perception was examined by having students watch a football game and recall what had occurred: There was no measure or manipulation within the sport itself; it was merely a context (Hastorf & Cantril, 1954). In the case of regulatory focus though, the researchers used the baseball game half inning type to manipulate whether participants were in a promotion or prevention state (Yen et al., 2011). In both cases, sports are a particularly advantageous method for studying how individuals interact with, and perceive, their social world because sports are often a common currency: Participants are likely to have seen or participated in various sports, and they can be easily introduced into a study. Furthermore, sports can be an excellent context for field studies (e.g., Cialdini et al., 1976; Hastorf & Cantril, 1954; Tesler & Alker, 1983) and for archival research (e.g., Frank & Gilovich, 1988; Larrick et al., 2011) due to the social interactions that naturally occur in the playing and viewing of sports. For example, research on pitchers and hitters in baseball has provided further evidence for the link between heat and aggression, specifically showing that retaliatory strikes against hitters are more likely at higher temperatures (Larrick et al., 2011). In these cases, the game is the method, not the object of study. That is, there is a broader social psychological question (e.g., what is the relationship between heat and aggression) that is being addressed using a game (e.g., baseball): The game (baseball) is not the topic of interest; it is the tool.

4.2 | Behavioral economics games

Perhaps the most well-known games in psychological research are behavioral economics games. One of the first behavioral economics games used in psychological research was the trucking game (Deutsch & Krauss, 1960). In the trucking game, players try to make the most money by completing a trip around the game track as fast as possible. However, the players can block each other's paths on the one-lane portion of the road. Since the creation of the trucking game, more games have been added to the category of behavioral economics games including the more well-known ultimatum game, trust game, and dictator game (Murnighan & Wang, 2016). In these games, two individuals are making decisions about money allocation with each person knowing that the decisions made during the game will influence the amount of money acquired by the end of the study session. For instance, in the ultimatum game, Player 1 offers an amount of money to Player 2. Player 2 then decides to either accept the money, which will then be evenly split between them, or reject the money, in which case neither player gets any money (Murnighan & Wang, 2016).

The common element across these games is that psychological variables can be measured based on the way that individuals play out their choices. For example, the amount of money allocated to the other player in the ultimatum game can be used to measure fairness perceptions. Similarly, the trust game can be used to understand individual differences and interpersonal processes (Murnighan & Wang, 2016). Unsurprisingly, a key interpersonal process examined in the trust game is trust and its associated behaviors. For example, in a study on the impact of stress on trust, researchers found that increased relationship stress in a committed romantic relationship, caused by threat to the relationship (i.e., imagining a long period of physical separation), increases trust of a stranger in the trust game (Koranyi & Rothermund, 2012). The trust game, in this situation, was used as the measure: The researchers were able to examine the influence of relationship stress on general levels of trust by having participants play the trust game with a stranger following a threat to their romantic relationship. In addition, behavioral economics games have been used to examine a range of individual differences such as kindness (Thielmann & Hilbig, 2015), competitiveness (Baumert et al., 2014; Deutsch & Krauss, 1960, 1962; Gallo, 1966; Shomer et al., 1966), and risk taking (Josef et al., 2016; Leder & Betsch, 2016). For example, in a study on trustworthiness, researchers found that individuals' levels of the honesty–humility trait predicted their behavior as the trustee in the trust game (i.e., their level of trustworthiness; Thielmann & Hilbig, 2015).

A key advantage of behavioral economics games, which have a long history of use in psychology, is that they are relatively easy to incorporate into laboratory and online studies. Behavioral economics games do not require specific tools or technology and are quick and easily understandable. However, these games are often not very immersive and involve one-shot interactions that may not represent human interactions in an ecologically valid manner (Murnighan & Wang, 2016). In addition, with the proliferation of online data collection, many individuals are now familiar with these games, and it may be more difficult to find naïve participants (Chandler, Mueller, & Paolacci, 2013).

4.3 | Board games

The incorporation of board games into psychology research dates back over a century: early-20th-century studies on intelligence used chess in their methods (e.g., Cleveland, 1907). Within social psychology, chess has continued to be used to examine a diverse array of topics from stereotypes (Maass et al., 2008)[1] to status (Mazur et al., 1992) to flow (Abuhamdeh & Csikszentmihalyi, 2012). For example, research on testosterone levels in chess winners and losers following a chess tournament found that, as in other contexts, testosterone levels in men predicted status: Chess winners exhibited higher levels of testosterone following the chess tournament than those who did not win (Mazur et al., 1992).

Beyond chess, commercially available games such as *Mastermind* (Invicta Plastics, 1971), *Backgammon* (first played about 5,000 years ago), and *Taboo* (Parker Brothers, 1989) have been used to examine group influences on performance (Georgas, 1985), illusion of control (Fleming & Darley, 1990), and social judgment (Biernat et al., 1999; see Table 1). For instance, to understand the role of in-group identification on mood and social judgments of in-group and out-group members, Biernat et al. (1999) arranged a game of *Taboo* with participants and confederates of the same or different race. By using the game *Taboo* as a manipulation, the researchers were able to set up situations in which in-group and out-group members either confirmed or violated expectations regarding quality of performance. They found that in-group members who perform poorly are perceived more negatively and cause negative moods more than out-group members who perform poorly (Biernat et al., 1999). In the case of group influences, Georgas (1985) used *Mastermind* as a dependent variable to examine the influence of group type (collaborative, competitive, or individual) on game performance. Illusion of control was examined using *Backgammon* as the context for the study: Participants read about individuals playing *Backgammon* and made judgments about control based on the characters' thoughts and whether the characters had rolled the dice themselves (Fleming & Darley, 1990).

In addition to the use of existing board games, social psychology and sociology have a long history of creating new games for laboratory research to study cooperation and coalition formation (Cole, 1969; Miller, 1980; Vinacke & Arkoff, 1957; Vinacke, Lichtman, & Cherulnik, 1967; Wilke et al., 1973). The basic premise of these coalition formation

games is that individual players will often benefit if they form a coalition. In a basic setup of the game, three players are moving around a board, each trying to reach the end first. The number of spaces moved depends on a roll of a die multiplied by an assigned number. Therefore, if no coalitions are formed, the person with the highest assigned number will win. To prevent this, other players will likely form a coalition and combine their moves (Vinacke & Arkoff, 1957). In the case of the coalition games, the experimenter will use the behavior in the games as a measure—that is, the data in these experiments are often the choices that a player makes in terms of when and with whom to form a coalition. Experiments using these laboratory-made games illustrate the option of psychologists creating their own games to study social processes if an existing game does not meet their research requirements.

Despite the numerous advantages of board games including their ability to model social interactions in an engaging way, there are two key disadvantages to board games: Other players are often required, creating a more cumbersome experiment, and gameplay data are not automatically recorded. Furthermore, there is more flexibility for players to disobey board game rules, whereas the rules are often enforced in other types of games (e.g., behavioral economics games and digital games).

4.4 | Digital games

Although all types of games are popular, digital games have emerged to become a leading entertainment form, with revenue figures far higher than Hollywood box office ticket sales (SuperData Research and Unity Technologies, 2017). It is perhaps unsurprising that digital games have found their way into an increasing number of psychology studies. Researchers have studied a range of topics from dehumanization and hostility (Ballard & Wiest, 1996; Barlett, Harris, & Bruey, 2008; Bastian et al., 2012) to identity (e.g., Bessière et al., 2007). In research on topics such as dehumanization or hostility, digital games are generally used as manipulations, for instance, often comparing the impact of a game that includes violence (e.g., *Mortal Kombat*, Midway Games, 1992) to a game that does not (*Top Spin Tennis*, Microsoft Game Studios, 2003) or comparing games that differ on a particular variable (e.g., amount of blood shown) on responses to a questionnaire or physiological arousal (Ballard & Wiest, 1996; Barlett et al., 2008; Bastian et al., 2012). Work on identity uses games in a slightly different manner: by manipulating or measuring the way that individuals construct avatars and how that relates to self-perception. For example, research has examined self-avatar discrepancy by having participants indicate how different they are from the avatars they have created in various games (Bessière et al., 2007; Dunn & Guadagno, 2012).

In terms of the impact of gameplay on social processes, aggression and prosocial behavior are the two most commonly studied social psychological topics using digital games. A great deal of the social psychological literature on digital games has focused on whether various computer and video games negatively or positively impact players (Greitemeyer & Mügge, 2014). However, digital games are not just the subject of research but can also be used as a manipulation beyond the game itself. For example, to examine the impact of guilt on morality, one study placed participants in different roles in a video game—terrorist or United Nations soldier—and found that engaging in guilt-inducing virtual behavior made participants more sensitive to the moral issues of caring about others and behaving fairly (Grizzard et al., 2014).

Although virtual reality has become an important method in social psychology with the possibility of creating immersive social situations without needing confederates (Blascovich et al., 2002; Blascovich & Bailenson, 2012), virtual reality *games* have not yet become prominent in social psychology research in part because there are simply fewer of them. As the technology becomes more accessible over time, virtual reality games have the potential to be used to study the impact of situational influences on social processes in an elegant way.

Digital games have key advantages including modeling interpersonal interactions without needing confederates and automatically recording data. It can be time-consuming and expensive to run studies that require confederates, and digital games can improve this process, especially considering the number of social interactions occurring in digital spaces (Perrin, 2015). Furthermore, games provide an important lens into online interactions and are successfully being used to understand attitudes, social cognitions, and behaviors. For example, economic behaviors that occur in

the real world have been mirrored in digital games that involve economic systems (Castronova et al., 2009), and social and gender roles and social networks have been examined using ethnographic and survey approaches in games such as *World of Warcraft* (Blizzard Entertainment, 1994) and *Guild Wars* (NCSOFT, 2005; Nickell et al., 2006; Rosier & Pearce, 2011).

In addition, digital games may be particularly useful given the proliferation of online studies using crowdsourcing platforms such as Mechanical Turk and Prolific Academic (Buhrmester, Kwang, & Gosling, 2011; Peer, Brandimarte, Samat, & Acquisti, 2017). In online studies, a key consideration is how to keep participants engaged in the task at hand (Oppenheimer, Meyvis, & Davidenko, 2009). Digital games can be used within online studies and may be more successful at engaging participants and keeping them focused on the study than more traditional methods. Further, games themselves can serve as an instrument, thus enabling studies to be conducted outside a research laboratory context; digital games can automatically record gameplay data (e.g., reaction time, conversation logs, and decision branches). For this reason, researchers will also use digitized versions of originally nondigital games. That is, a large category of digital games is composed of games that were first other types of games (e.g., physical games or tabletop games). For example, one of the most commonly used digital games in social psychology (Cyberball) was originally a physical ball-tossing game that was adapted to be a digital game (K. D. Williams, Cheung, & Choi, 2000). Similarly, digital chess has been used to understand the impact of gender stereotypes on performance (Maass et al., 2008) and digital *Battleship* has been used to examine the impact on incentives and game success on emotions and coping (Marsella, Gratch, Wang, & Stankovic, 2009). Finally, many psychology experiments rely on digital versions of behavioral economics games including the ultimatum game, trust game, and dictator game (Amir, Rand, & Gal, 2012).

On the other hand, computer and video games can be less intuitive to play than nondigital games: They require technological resources that may be unfamiliar to some populations. For instance, if a researcher decides to use a digital game played on a console (e.g., Xbox), the participants may have to learn how to work the controller if they are not familiar with that type of game. In addition, some data from commercial companies cannot be accessed. That is, if a commercial digital game is used in the laboratory, it is possible that the researcher would not be able to access in-game data such as choices made or response times.

5 | CREATING GAMES FOR SOCIAL AND PERSONALITY PSYCHOLOGY RESEARCH

Most of the research described above and in Table 2 involves studies that use preexisting games. That is, Hastorf and Cantril (1954) did not have to create football to be able to study selective perception in an ecologically valid manner. But what if a researcher is examining a topic that is ideal for a game method, but no existing game is a good fit? In such cases, researchers might consider crafting their own games or partnering with design groups. Much like a researcher might create new stimuli for a manipulation or create a new measure if the existing manipulations and measures do not work, a researcher can also create a game to manipulate or measure a construct.

5.1 | Technologies available for creating digital games

Perhaps the first stumbling block a researcher might encounter in creating a game for psychology research is the technology required, if a researcher wants to build a digital game. In general, one way to overcome the technology hurdle is to collaborate with an interdisciplinary group that includes programmers, but that is of course not always possible. Therefore, we describe four methods of creating a digital game that require varying amounts of programming expertise (see Table 3 for a direct comparison of the four methods).

TABLE 3 Platform strengths

Platform	Best for	Not good for	Platform	Interface	Notes
Twine	Text- and choice-based games	Games with animation or real-time elements	Web (computer/mobile)	Mouse Touchscreen	Free; requires no programming experience
GameMaker Studio	2D real-time games	3D games, choice-based games	Computer Web (computer/mobile) Mobile Console (Microsoft, SONY)	Mouse Keyboard Controller Touchscreen	$100–150 license; some programming is useful
Unity	2D or 3D real-time games	Games without real-time elements	Computer Web (computer/mobile) Mobile Console (Microsoft, ONY, Nintendo) Virtual reality (VR; Oculus Rift, Steam VR, Google Cardboard, PlayStation VR)	Mouse Keyboard Controller Touchscreen Motion controls (Kinect, Leap Motion, VR controller)	Free; requires a programming background; Asset Store has cheap or free art and plug-ins
HTML5/JavaScript	Text- or image-based games, choice-based games; games with typed input	Games that require physics or animation	Web (computer/mobile)	Mouse Keyboard Touchscreen	Knowledge of HTML5 and JavaScript

5.1.1 | Twine

The first method is to use a program like Twine, a platform that can be used to create narratives and scenarios based on the earlier digital concept of hypertexts (see Table 4). Although Twine is often used for creating interactive fiction, it can also be used for creating interactive vignette studies (Freedman, Seidman, Flanagan, Green, & Kaufman, 2017) and it can be used to create games (Harvey, 2014). Twine allows researchers to quickly and easily create small-scale text-based games without having to learn a programming language. Using Twine, researchers would create a set of passages that are linked to each other based on decisions made by participants. If researchers choose to learn Twine's simple programming commands, Twine's functionality can be extended beyond simple linked hypertext games. In addition, Twine is free, open-source software that can either be downloaded to a specific computer or run through a browser. One advantage of using Twine is that there are many freely accessible examples of games and narratives that individuals have made in Twine for researchers to explore for inspiration. Finally, researchers can easily find written and video tutorials for using Twine and for specifically creating games in Twine, making it especially accessible.

5.1.2 | GameMaker Studio

GameMaker Studio is a proprietary software that allows individuals to create a variety of 2D games (see Table 4). As with Twine, researchers do not need to know how to program in order to use GameMaker Studio, but being able to program using the GameMaker Studio language will allow researchers to make a wider range of choices regarding game creation. Researchers can use the drag-and-drop features of GameMaker Studio to create their games; however, GameMaker Studio is not freely available. Most researchers would likely want to purchase the desktop license ($99), for laboratory studies, or the Web license ($149), for online studies.

TABLE 4 Suggested platforms for possible games that researchers might want to make

Game category	Example game[a]	Suggested platform
First-person shooter	*Call of Duty* (Activision, 2003)	Unity
Typing game	*Smorball* (Tiltfactor, 2015)	HTML5
Choose your own adventure	*Depression Quest* (The Quinnspiracy, 2013)	Twine
2D platformer	*Super Mario Bros*. (Nintendo, 1985)	GameMaker Studio
Trivia game	*Trivia Crack* (Etermax, 2013)	HTML5
2D role-playing game	*Undertale* (Toby Fox, 2015)	GameMaker Studio or Unity
Match 3 puzzle game	*Candy Crush* (King, 2012)	HTML5

[a]These games were not all made using the suggested platform. We recommend that researchers use the suggested platform to make games *like* the example games.

5.1.3 | Unity

Researchers who are more comfortable with programming or who are working with a technical team can use a platform like Unity, which is both a 3D game engine and a 2D game engine. Unity has a user interface and some drag-and-drop features, but researchers with some knowledge of the programming languages C# or JavaScript will be able to create a wide range of game manipulations and measures (see Table 4). Unity is not open source, but it is freely available for personal use. Unity also has official documentation and tutorials, as well as a large community of users who assist each other with development. One advantage of Unity is the availability of free or affordable plug-ins (i.e., the code for ready-made game features, such as health bars and leaderboards) and assets (e.g., 2D and 3D art) made by other users that researchers can incorporate into their projects. Unity can also be used to generate environments for studies that employ virtual reality headsets.

5.1.4 | HTML5/JavaScript

For researchers with some Web development experience, HTML5/JavaScript can be a good option for creating a wider range of text, image, and choice-based games than Twine. Because HTML5 games will often need to be coded from scratch, developing simple HTML5 games will take longer than making games in Twine but will provide more options to the researcher. HTML5 provides flexibility to add real-time elements, animation, and various types of inputs (e.g. typing and arrow key movement) to text- and image-based games, as well as a large amount of control over how the game looks. In addition, there are many useful JavaScript libraries that can simplify the process of making games in HTML5. Although simple 2D games with moving characters can be created in HTML5, we recommend using GameMaker Studio or Unity for these types of games (see Table 4).

5.2 | Game principles

Beyond the technology framework of creating a game, there are the broader issues related to how to make a game that will achieve one's research purposes. In our work in game design and in running psychology studies using games, we employ at least five principles to guide game creation for research purposes: using embedded design, crafting with rapid iteration, carefully deploying agency, choosing an appropriate medium, and aligning the experience with player expectations. In the following section, we review these principles and how they can be applied to games in the psychology setting.

5.2.1 | Using embedded design

A core principle of our approach to game design for research is that of embedded design, or the idea that games are more effective at shifting beliefs and biases when the manipulation is more subtle (Flanagan & Kaufman, 2016; Kaufman & Flanagan, 2015; Kaufman, Flanagan, & Seidman, 2015). The idea of embedded design was originally

developed for creating games to foster social change. For example, research on a game designed to reduce biases against women in science, engineering, technology, and math found that when the purpose of the game was obvious, participants were less likely to change their attitudes (Kaufman & Flanagan, 2015). Three of the principles of embedded design—intermixing, obfuscating, and distancing (Flanagan & Kaufman, 2016; Kaufman & Flanagan, 2015)—can help researchers create a game that can serve as an engaging manipulation of a particular emotion, attitude, or belief. The principle of intermixing involves using both relevant and irrelevant contents in the game (Flanagan & Kaufman, 2016; Kaufman & Flanagan, 2015): Intermixing is akin to creating a survey with distractor questions so that participants are less aware of the study's purpose. Similarly, obfuscating refers to the use of a game genre or setting that decreases suspicion that the game might be a psychological manipulation (Flanagan & Kaufman, 2016; Kaufman & Flanagan, 2015). Finally, distancing—a principle derived from the work on the impacts of psychological distance (Trope & Liberman, 2010)—is the idea that the use of fiction can increase participants' immersion into the game (Flanagan & Kaufman, 2016; Kaufman & Flanagan, 2015). Taken together, researchers interested in creating games as manipulations or measures can use these principles to increase engagement while minimizing the likelihood that participants will guess the study's purpose.

5.2.2 | Crafting with rapid iteration

After the researcher determines the way in which the manipulation or measure will be embedded into the game, rapid iteration of prototypes that model or tackle the topic begins. Rapid iteration is the process of creating playable prototypes of the game and play-testing them. Play testing is the game analogue of pilot-testing a measure or manipulation; however, unlike pilot testing, play testing is not just about making sure that the stimulus evokes the desired emotion, attitude, or motivation, it is also about ascertaining whether the game is engaging and whether the game is working as intended. For example, do players understand the game? Is the game well suited for the intended audience? Are players eager to play again after a first round? How long does the game take? Through play testing, a researcher can tweak the game to make it both an effective game and an effective measure. Key to this is the rapid part of rapid iteration: A researcher could spend years tweaking a game and never reach a state of perfection because a game could always be improved. To create games for research purposes, it is necessary to go through prototypes quickly until a working one is reached that balances engagement or fun with a thoughtful treatment of the topic with the mechanical rules created for the game, not until the prototype is perfect.

5.2.3 | Carefully deploying agency

Unlike other forms of media that might be used in studies (e.g., video clips), games generally provide players with a sense of agency (Murray, 2006; Polman, de Castro, & van Aken, 2008). The potential to increase agency through games is an exciting one for research that examines agentic processes; however, if the goal of the research conflicts with agency, games can be problematic. For example, research on empathy for people living in poverty was examined using *Spent* (2011), a Web-based computer game in which players try to survive a month on a limited income (Roussos & Dovidio, 2016). The purpose of the game was to increase empathy, but the game backfired to a certain degree due to the agentic nature of games. Specifically, researchers found that players who believe in the notion of a meritocracy felt less empathy toward those living in poverty after playing the game, a sign that that games are not “magical empathy machines” but rather complex systems in which to explore attitudes and how they might shift for better or for worse. In other words, when a researcher is considering whether a game would be a helpful method, it is important to know whether an increase in agency might negatively impact the social process of interest. More broadly, if psychological principles are not considered when designing a game, the game is less likely to achieve its intended outcome. It is for this reason that the inclusion of social and personality psychologists in game design would be a step forward for both psychology and game design.

5.2.4 | Choosing an appropriate medium

As illustrated above in the description of types of games used in research, games can take many forms. In our work with games, we have learned that the game medium (e.g., digital vs. paper) is an important aspect of the research process. For example, in research on a game to promote positive attitudes toward vaccines, the same game played either on an iPad or on a physical board led to different outcomes in terms of attitudes as well as systems thinking (Kaufman & Flanagan, 2016). That is, when participants played the game on a physical board, they had more positive attitudes toward vaccines and were able to engage in more systems thinking compared to when they played the same game on an iPad (Kaufman & Flanagan, 2016). Therefore, it is important to consider not just the game mechanics and how individuals will feel about the game but also the small details such as the medium on which the game will be played.

5.2.5 | Aligning the experience with player expectations

Finally, a key consideration when using a game method relates to the expectations that accompany the word *game*. A common expectation is that games should be fun, despite the fact that games, across all media formats, can provoke a range of emotions including fear (e.g., *Rust* and *Letters from White Chapel*), sadness (e.g., *Gone Home* and *That Dragon Cancer*), anxiety (e.g., *Pandemic* and *Keep Talking and Nobody Explodes*), and guilt (e.g., *Papers Please* and *McDonald's Videogame*). However, if a researcher labels their method as a *game* to the participants or the potential participant pool, there may be a negative reaction by participants if the game does not feel fun or if the game seems like it is targeting them—for example, participants are unlikely to want to play a game that is described as one to "make you less racist." The expectancy violation may provoke a negative mood, which can be problematic if the topic of the study may be related to mood. Similarly, if the word *game* is used in the recruitment of participants, expectations regarding populations games are targeted toward may cause issues. The stereotypical image of a gamer is that of a young, White man (D. Williams, Yee, & Caplan, 2008), and individuals who do not identify in that manner may feel that the study is not for them. In other words, advertising a study as a game study can lead to sample selection biases, particularly in the direction of excluding women and minorities. These biases can of course be countered with careful use of language and images in recruitment materials that subtly highlight inclusivity.

6 | CONCLUSION

Games have enriched the science of social and personality psychology since the late 1800s, and the field can continue to be furthered through the inventive use and creation of games. Unlike other methodologies, games provide a way to manipulate and measure a range of psychological constructs without sacrificing participant engagement in the task. As researchers look toward games to examine specific social and personality processes, they may realize that they can best achieve their aims by creating their own games for research. By using embedded design and a rapid iteration process and carefully considering agency, medium, and expectations, researchers can help push their subfields forward through novel game methods.

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ENDNOTE

[1] We include digital versions of chess in this section, but the idea behind using a digital version of a board game is discussed more thoroughly in Section 4.4.

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