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*Full Length Research Paper*

# From virtual reality to reality: Examining the relationship between sport video gaming and sport consumption behaviors

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Insufficient attention has been given to the relationship between sport video games and sport consumer behaviors even though sports and sport video games are popular, multi-billion dollar industries. The purpose of this study is two-fold. First, examine the effects of sport video gamer identification on sport consumption behaviors. Second, investigate the extent which sport fan identification moderates the relationship between identifying as a sport video gamer and sport consumption behaviors. A structural equation modeling (SEM) technique was employed to test the hypothesized relationships. The results indicated that sport video gamer identification had a positive impact on sport consumption behaviors, but sport fan identification did not moderate the relationship between sport video gamer identification and sport consumption behaviors. Though the results were mixed, connecting sport organizations with sport video gamers does appear worthwhile because playing sport video games and identifying as a sport video gamer may lead to sport consumption behaviors.

**Key words:** Sport video gaming, sport consumption behaviors, sport fan identification.

## INTRODUCTION

Sport video games are hugely popular throughout much of the world. Electronic Arts' Fédération Internationale de Football Association (FIFA) video game, for example, has sold over 100 million copies since it launched in 1993 (Badenhausen, 2014).

Madden, Electronic Arts' National Football League (NFL) video game series, also has sold over 100 million copies and generated over \$4 billion in revenue since it

was launched over 20 years ago (Gaudiosi, 2013). Interestingly, though sport video games are both popular and profitable, a comparatively small amount of sport-focused video game research has been conducted over the past several decades.

Sport researchers have focused on several areas, such as motives (Kim and Ross, 2006) and brand recall using sport video games (Nelson, 2002). Minimal attention has

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been given to the effects of playing sport video games on sport consumption behavior. Indeed, much of the research about sport video games has centered on the benefits of video games to corporations via branding and in-game advertising (Cianfrone et al., 2009; Clavio et al., 2009; Kim and Ross, 2015; Nelson, 2002; Yang et al., 2006) rather than psychological and consumptive behaviors.

Sport consumer behaviors, such as purchasing sport merchandise, watching sport events, and attending sport events, are of the utmost interest to sport organizations (Funk et al., 2016), and yet a crucial gap in knowledge exists about the potential for an important relationship to occur between sport video games and sport consumer behaviors. A variable that may help to explain the relationship between sport video games and sport consumer behaviors is identification. Identification can strongly influence sport consumption behaviors (Fisher and Wakefield, 1998; Madrigal and Chen, 2008), and just as individuals can become connected to athletes, sport teams, and sport leagues, so too can they become connected to video games (Konijin et al., 2007; Schneider et al., 2004). What is more, individuals who identify as sport video gamers may engage in sport consumption behaviors because identification with the virtual players and teams may act as a proxy for the actual identification with players and teams in real life (Kim and Ross, 2006; Kim et al., 2008).

Accordingly, the purpose of this study is two-fold. First, examine the effects of sport video gamer identification on sport consumption behaviors, such as sport attendance, sport media consumption, and purchasing sport merchandise. Second, investigate the extent which sport fan identification moderates the relationship between identifying as a sport video gamer and sport consumption behaviors.

## LITERATURE REVIEW

Social Identity Theory (SIT) (Tajfel and Turner, 1979; Tajfel, 1981), which benefits from widespread usage and acceptance in the sport management discipline, offers a strong notional rationale as to why sport video gamers who self-identify as sport fans may engage in sport consumption behaviors that uphold a perceived positive social identity and association to a focal point of sport attachment (for example, sport team).

According to SIT, identification with an entity (for example, team or organization), can influence how individuals think, act, and feel because a key function of the entity is providing members a strong sense of who they are based on their membership with the entity. That is, from the perspective of SIT, social identities represent something much more than just an individual's cognitive knowledge as a member of a certain group, social category, or organization. Instead, social identity

represents socially shared conceptions among members, which can then produce shared perspectives and affective consequences.

Individuals with strong social identification toward a particular social group are expected to define themselves in terms of their group membership and engage in behaviors that support and reinforce their identity as a group member (Hogg and Terry, 2001).

In the context of the present study, individuals who are sport video gamers may perceive that part of their identity (their sense of self) is connected to being a sport video gamer and that this identity can be reinforced through sport consumption behaviors. Put simply, individuals may play sport video games and engage in sport consumption behaviors such as watching football or basketball on television.

Further, sport video gamers may form social identities that include sport fan identification. When that occurs, sport video gamers who highly identify with being a sport fan may engage in more sport consumption behaviors than sport video gamers whose sense of self has only a minor connection to sport fandom.

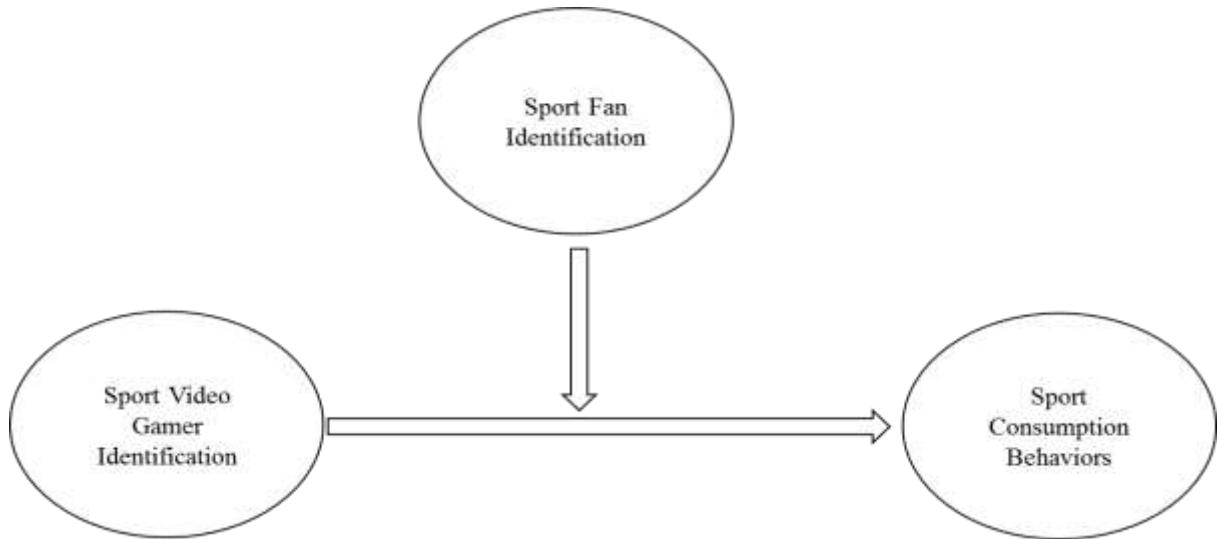
## Research model and hypotheses development

The proposed research model is provided in Figure 1. In the model, individuals' sport consumption behaviors are influenced by the extent to which they identify as sport video gamers. Individuals who are active gamers and highly identify as sport video gamers will be more likely to engage in sport consumption behaviors than their less identified video gamer counterparts. Also proposed is that sport fan identification moderates the relationship between being a sport video gamer and sport consumption behaviors. Individuals high in sport fan identification, and who also are sport video gamers, will be more likely to engage in sport consumption behaviors than sport gamers who are low in sport fan identification.

## The relationship between sport video games and sport consumer behaviors

Although little to no research has investigated the direct link between sport video gaming and sport consumption behaviors, the available body of research about identification is quite clear. Identification can influence consumption behaviors.

Identifying with a sport team, for example, is expected to increase sport attendance behaviors, media consumption, and purchasing behaviors (Fisher and Wakefield, 1998; Kim et al., 2013; Madrigal and Chen, 2008; Matsuoka et al., 2003; Swanson et al., 2003; Trail et al., 2003). Individuals who identify as sport video gamers also may engage in sport consumption behaviors because identification with virtual players and teams may



**Figure 1.** Proposed model of the relationships between sport video gaming, identification, and sport consumption.

act as substitutes for player and team identification in real life (Kim and Ross, 2006; Kim et al., 2008).

Identification with athletes and sport teams in real life may satisfy the psychological needs of individuals to belong to a particular social group. These individuals, as a result of their levels of identification with material athletes and sport teams, may then engage in sport consumption behaviors (Funk et al., 2016).

Similarly, actively playing sport video games and identifying as a sport video gamer may fulfill the psychological needs of certain individuals to belong to a specific social group. These individuals, as a result of their levels of identification with virtual sports and sport video gaming, may then take part in sport consumption behaviors. For instance, EA Sports' FIFA video game has been shown to fuel interest in watching the World Cup on television (Badenhausen, 2014).

Accordingly, the following hypothesis is proposed:

H<sub>1</sub>: Identification as a sport video gamer will have a positive influence on sport consumption behaviors.

### Sport fan identification as a moderator

Identification represents "an orientation of the self in regard to other objects including a person or group that results in feelings or sentiments of close attachment" (Trail et al., 2000).

Individuals can identify with a player, coach, organization, community, or even sports in general (Robinson and Trail, 2005; Sutton et al., 1997). Level of identification with sport has been found to impact attitudes and behaviors (Kim et al., 2013; Magnusen et al., 2010; Madrigal and Chen, 2008), and there are several reasons why identifying as a sport fan may have

a significant impact on the relationship between identifying as a sport video gamer and sport consumption behaviors.

A considerable amount of sport consumer behavior research has documented that identification is one of the major constructs predicting sport consumption behaviors (James and Trail, 2008; Fink et al., 2002; Magnusen et al., 2010; Smith et al., 1981; Trail et al., 2003).

Individuals who strongly identify as sport fans have reported distinctive attitudes and behavioral patterns from individuals who are weakly identified with sport teams (Cunningham and Kwon, 2003; Laverie and Arnett, 2000; Robinson et al., 2005; Wann, 1993).

For instance, highly identified sport fans are more likely to remain spectators, regardless of team performance, than less identified sport fans who may choose to not attend a sporting event or watch a sport team on television if the team is performing poorly (Wann and Branscombe, 1995). Therefore, the following hypothesis is proposed:

H<sub>2</sub>: Sport fan identification will moderate the relationship between sport video gamer identification and sport consumption behaviors.

## METHODOLOGY

### Participants

A paper-and-pencil survey was conducted. To maximize the response rate, the data were collected during the sport-based activity courses at two different Midwestern universities in the

United States. A total of 206 students participated in the study, which is above the minimum sample size of 200 that has been suggested for research involving structural equation modeling (SEM) (Weston and Gore, 2006). Of the participants, 130 were male (61.7%) and 76 were female (38.3%). The age of the all participants ranged from 18 to 27 years old. 89.9% of the male participants

played video games at least 1 to 2 h per week or more (48.9%: 1 to 2 h; 16.8%: 3 to 4 h; 13.5%: 5 to 6 h; 4.4%: 7 to 8 h; 2.2%: 9 to 10 h; 2.1%: 11 to 12 h; 2%: more than 13 h). Meanwhile, 14.8% of the female participants played video games at least 1-2 hours per week or more (10.1%: 1 to 2 h; 2.5%: 3 to 4 h; 2.2%: 5 to 6 h).

### Instrumentation

Several different instruments were used to evaluate the proposed relationships. Wann (2002) five-item Sport Fandom Questionnaire (SFQ) was used to measure the extent to which the participants identified as sport fans.

Wann (2002) developed the SFQ to differentiate identification as a sport fan from identification with a sport team because many sport consumers may simultaneously identify as sport fans but not identify with any particular player or team. The SFQ has repeatedly been shown to be an internally consistent, valid, and reliable assessment tool (Wann et al., 2008; Wann et al., 2001).

Next, to measure the extent to which study participants identified as sport video gamers, the SFQ was adapted to a sport video game context. Specifically, "sport fan" was changed to "sport video game fan" in order to assess study participants' levels of identification to being a sport video game player. Also, each independent variable was converted into a two level variable, with cases in the bottom half classified into the low group and cases in the top half classified into the high group.

Sport consumption behaviors were measured with a five-item scale by Fink et al. (2002). The scale developed by Fink et al. (2002) evaluates several different aspects of sport consumption, including sport attendance, sport media consumption, and sport merchandise consumption. Each of the three instruments utilized a 7-point Likert-type scale. Cronbach's Alpha was used to assess the reliability of the scale items, resulting in .951 for the original SFQ items, 0.947 for the modified SFQ items, and 0.906 for the sport consumption. Further, all coefficients exceeded the recommended benchmark of 0.70 (Nunnally and Bernstein, 1994).

### Data analysis

A confirmatory factor analysis (CFA) was completed to determine the best fit for the measurement model. Specifically, 15 different subscales were measured using the CFA technique with multiple fit indices: the Comparative Fit Index (CFI), the Tucker-Lewis index (TLI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR).

CFI and TLI values larger than 0.9 indicate reasonable fit (Bentler, 1990). RMSEA values less than 0.08 are considered reasonable fit (Browne and Cudeck, 1992; Hu and Bentler, 1999). SRMR values less than 0.10 are recommended (Kline, 1998). All Average Variance Extracted (AVE) values larger than 0.50 indicate that the items represent the construct well (Fornell and Larcker, 1981; Hair et al., 1998).

Next, SEM in Mplus 6.0 was used to test the structural relationships between sport video gamer identification and sport consumption behavior. SEM was also used to test the moderation effect of sport fan identification on the relationship between sport video gamer identification and sport consumption behavior.

## RESULTS

### Descriptive statistics

Table 1 presents the descriptive statistics for the 15

subscales of the latent constructs. The mean scores for each item ranged from 2.39 to 6.08, with a standard deviation of a range from 1.39 to 2.15. All AVE values were larger than 0.50, thus indicating the items represented the constructs well (Fornell and Larcker, 1981; Hair et al., 1998).

Mardia's coefficient was used to check the assumption of multivariate normality, resulting in a violation of the assumption. A violation of this assumption may result in the overestimate of chi-square as well as an underestimate of the fit indices and the standard error of parameter (Bentler, 2004; Bigné et al., 2005; Dubé et al., 2003; Hoyle, 1995). Accordingly, the Satorra-Bentler chi-square (1994) was used for the purposes of correction.

### Measurement model testing and model modification

Table 2 offers a presentation of the overall fit indices for the measurement model. The fit indices for the initial CFA model, with the exception of SRMR (0.05), were not above the recommended thresholds (Bentler, 1990; Hu and Bentler, 1999; Kline, 1998).

So, because the initial CFA did not demonstrate adequate model fit, the research model was further screened to determine if there were problematic items. Upon review, modification indices revealed that FAN1 and FAN2 were highly correlated with other FAN indicators. Additionally, VIDEO1 and VIDEO2 were highly correlated with other VIDEO indicators. Thus, in an effort to create a model with better fit, the FAN1, FAN2, VIDEO1, and VIDEO2 items were removed.

A modified CFA, which is displayed in Table 2, was conducted after the removal of FAN1, FAN2, VIDEO1, and VIDEO2. The modified CFA model revealed reasonable fit because the CFI (0.953), the TLI (0.938), the RMSEA (0.095), and the SRMR (0.037) were all above the recommended thresholds (Bentler, 1990; Hu and Bentler, 1999; Kline, 1998).

Further, as displayed in Table 3, all AVE values exceeded 0.50. AVE values above 0.50 indicate that the items represented each construct well (Fornell and Larcker, 1981; Hair et al., 1998).

### Test of structural model and moderating effect

The path coefficient between sport video gamer identification (VIDEO) and sport consumption (CON) was found to be significant ( $\gamma=0.30$ ,  $p<0.001$ ), supporting  $H_1$ . To examine the second assumption which is the identification of sports fans (FAN) moderated the relationship between the playing sports video games (VIDEO) and sport consumption behaviors (CON), we tested the moderated model by using SEM technique. The path coefficient from the interaction term (FAN AND VIDEO) to CON found to be insignificant ( $\gamma=-0.004$ ,  $p>0.05$ ). This result indicated

**Table 1.** Means (M), standard deviations (SD), factor loadings ( $\beta$ ), standard errors (SE), t-values, average variance extracted (AVE), and correlations for the initial model (N=206).

Factor	Item	M	SD	$\beta$	SE	t	AVE	Correlations		
								Fan	Video	CON
Fan	Item 1	6.13	1.50	0.90	0.015	60.21	0.79	1.00	0.44	0.92
	Item 2	5.84	1.79	0.92	0.011	80.81				
	Item 3	4.96	1.78	0.87	0.018	47.86				
	Item 4	5.33	1.82	0.86	0.020	42.34				
	Item 5	5.30	1.74	0.89	0.015	57.92				
Video	Item 1	3.59	2.15	0.95	0.011	84.75	0.75	0.44	1.00	0.43
	Item 2	3.25	2.04	0.96	0.008	120.76				
	Item 3	2.41	1.61	0.75	0.040	18.77				
	Item 4	2.55	1.79	0.85	0.019	45.24				
	Item 5	2.40	1.60	0.80	0.028	28.33				
CON	Item 1	5.13	1.72	0.81	0.033	24.66	0.65	0.92	0.43	1.00
	Item 2	5.03	1.95	0.83	0.028	29.53				
	Item 3	6.04	1.39	0.82	0.036	23.16				
	Item 4	5.34	1.69	0.85	0.022	39.53				
	Item 5	4.73	1.80	0.71	0.042	16.88				

**Table 2.** Summary of overall fit indices for the measurement models.

Model	Chi-square	Df	CFI	TLI	RMSEA	SRMR
Initial model	343.742	87	0.885	0.862	0.133	0.052
Modified model	102.688	41	0.953	0.938	0.095	0.037

**Table 3.** Means (M), standard deviations (SD), factor loadings ( $\beta$ ), standard errors (SE), t-values, average variance extracted (AVE), and correlations (N=206) for the modified model.

Factor	Item	M	SD	$\beta$	SE	T	AVE	Correlations		
								Fan	Video	CON
Fan	Item 3	4.96	1.78	0.86	0.024	35.93	0.83	1.00	0.35	0.86
	Item 4	5.33	1.82	0.91	0.019	47.54				
	Item 5	5.30	1.74	0.96	0.011	86.49				
Video	Item 3	2.41	1.61	0.79	0.045	17.53	0.78	0.35	1.00	0.28
	Item 4	2.55	1.79	0.94	0.024	39.35				
	Item 5	2.40	1.60	0.91	0.025	35.59				
CON	Item 1	5.13	1.72	0.81	0.034	23.73	0.65	0.86	0.28	1.00
	Item 2	5.03	1.95	0.83	0.029	28.94				
	Item 3	6.04	1.39	0.81	0.036	22.51				
	Item 4	5.34	1.69	0.86	0.022	39.02				
	Item 5	4.73	1.80	0.72	0.043	16.75				

that FAN did not moderate the relationship between VIDEO and CON. Moreover, the path coefficient between VIDEO AND CON was found to be insignificant ( $\gamma = -0.024$ ,

$p > 0.05$ ) while the path coefficient between FAN and CON was significant ( $\gamma = 0.80$ ,  $p < 0.001$ ). These results indicated that fan identification had a positive direct effect

on sports consumption behaviors but did not impact on playing sport video games. In other words, the level of fan identification would be a significant cause of determining the level of sports consumption behaviors.

## DISCUSSION

This study yields several interesting findings about sport video gamers. Identification influences sport consumer behaviors. Even though a variety of studies (Kim et al., 2013; Madrigal and Chen, 2008; Swanson et al., 2003) have demonstrated a link between sport team identification and sport consumer behaviors, the link between sport video games and sport consumption behavior has been largely overlooked by sport scholars.

This study expands upon previous sport consumption research and sport video game research (Kim and Ross, 2006; Kim et al., 2008) by providing evidence that sport video gamers may do more than just play games about sports, they may actually watch and attend sport events.

Specifically, in support of  $H_1$ , a relationship was demonstrated between identifying as sport video gamers and overall sport consumption. Active sport video gamers appear to be more likely to report higher levels of overall sport consumption than less active sport video gamers who do not identify as sport gamers. This result also broadens the focus of sport video game research, which traditionally has focused on motives, in-game advertising, and brand awareness. For example, in a study by Clavio et al. (2009), branding and product placement in the Professional Golf Association (PGA) Tour/Tiger Woods golf video game were tracked for nearly a decade. No brands or products were placed in the video game from 1997 to 2003, but by 2006, the PGA Tour/Tiger Woods golf video game included 13 brands and 916 products. Nike was the most prominent brand, and also had the most diversified assortment of products.

Sport video games hold clear value to video game developers and corporation, such as Nike, who use the platform to increase product sales and improve brand equity. By extension, the study of sport video games in connection to branding, in-game advertising, and sponsorship holds great values to corporations and video game developers (Cianfrone et al., 2009; Nelson, 2002).

In comparison, this particular line of scholarship is not as beneficial to actual sport organizations (for example, professional sport teams) because it does not sufficiently address how sport consumer behaviors are influenced by sport video games.

The current study benefits sport organizations because the results show that playing sport video games and identifying as a sport video gamer contributes to sport consumption behaviors rather than distract from sport consumption. Consider how sport websites have been touted as simple and helpful tools for retaining existing fans (Evans and Smith, 2004) and connecting with new and potential sport consumers (Seo and Green, 2008).

Rather than be viewed as a deterrent from sport consumption, such as game attendance, sport websites are widely viewed by sport industry professionals as a way to attract and engage consumers. Sport video games may offer similar, if not greater, benefits for sport organizations than sport websites. The realistic and interactive features of sport video games offer immersive experiences that can elevate sport knowledge and enhance connectivity between the gamer and actual sport players, teams, and leagues, all of which have the potential to increase sport gamer consumption behaviors.

Although  $H_1$  was supported,  $H_2$  was not supported. This result is unexpected because, according to SIT, social identity is "that part of individual's self-concept which derives from knowledge of his membership of a social group together with the value and emotional significance attached to that membership" (Tajfel, 1981). Thus, in line with SIT, sport gamers who self-categorize themselves as sports fans are expected to engage in actions that will preserve a positive identity and connection to a focal point of social attachment (Mael and Ashforth, 1992).

The preservation of identity may happen through sport consumption behaviors, with the magnitude of the relationship between sport video gaming and sport consumption behaviors varying according to sport fan identification. That is, as identification levels grow stronger, the strength of the relationship between sport video gaming and sport consumption behaviors is expected to increase.

The lack of support for  $H_2$ , though unexpected, is explainable. A possible reason that  $H_2$  was not supported is the measurement tool. In this study, the extent to which an individual identifies as a sport video gamer was measured using a slightly modified version of Wann's (2002) SFQ. This was done in part because no original scales to measure various aspects of sport video gamer identification are presently available. Although a variety of video game attachment/identification scales have been developed, they are not appropriate for use with studies focused on sport video.

The Character Attachment Scale (Lewis et al., 2008), for example, was written for character attachment in role-playing video games (for example, "I enjoy pretending my character is a real person"). Thus, to better understand the relationship proposed in  $H_2$  in the future, the development of a scale devoted to better understanding sport video game identification may be required.

## Applied considerations

Outside of sports, varying levels of connectivity to video games have been linked to influencing cognitive processes and behaviors. A relationship between sport video gaming and sport consumption behaviors was demonstrated in the current study. This sort of dynamic holds importance for both sport organizations and sport video game developers.

Sport video games should be viewed by sport organizations as tools that can increase sport-specific spending by consumers. Accordingly, sport organizations (for example, professional sport teams, leagues) should seek to (a) better understand why consumers who are sport gamers play sport games and (b) better understand how a connection to sport video games can lead to sport consumption behaviors.

For instance, in terms of motives, individuals tend to play video games because of arousal, competition, challenge, diversion, entertainment, and social interaction (Kim and Ross, 2006; Sherry et al., 2006). These motives are similar to the reasons individuals often attend live sport events (Kim et al., 2013; Trail et al., 2003). Thus, sport organizations could host sport video game tournaments at their sport facilities and allow tournament participants to attend an actual sport event. This sort of event may help to create a scenario in which the divide between gaming and sport consumption behaviors is crossed because gamers realize that many of the reasons they enjoy sport video gaming are also reasons they enjoy actually attending and watching sport events.

The results of the current study are also beneficial for sport video game developers because they bring attention to a simple and straightforward strategy for increasing revenue from their products and services. Sport video games may do more than enhance brand awareness, they also increase sport consumption behaviors. The results of this study point to sport video games being a useful marketing communication tool to increase sport consumption. So, with that in mind, sport video game developers may be able to leverage the potential financial benefits of sport video games to sport organizations as a way to secure more advertising and sponsorship dollars from sport teams and leagues.

## RESEARCH LIMITATIONS AND FUTURE RESEARCH SUGGESTIONS

In addition to the findings of this study, there are several limitations. The sample (college students) used in this study may not be representative of the entire sport video gaming population. According to Entertainment Software Association (2015), the ages of under 18 years, 34 to 49, and 50 above represent 70% of the game-playing population. This limitation could be improved in future studies by including those ages.

Additionally, though a clear emphasis exists in the sport-based literature on the connection of sport video games to corporations, the study of sport video games can be extended to a variety of interesting and important areas. Indeed, as technology has improved, video games have become increasingly interactive and, in some cases, very physical demanding (for example, the Dance Dance Revolution games, Mario and Sonic at the Rio 2016 Olympic Games).

Such technological progressions have inspired contemporary researchers to explore how virtual exercise (often referred to as “exergaming”) and sport compares to real life activities, and whether or not the virtual activities are sustainable enough to actually improve physical activity and sport participation (Maddison et al., 2007; Madsen et al., 2007; Tan et al., 2001).

In 2007, for example, the University of South Florida even opened an interactive fitness research lab (the XRKade Research Lab) in partnership with the company iTECH Fitness to specifically study how interactive technology can help children improve their fitness levels. Though the long-term benefits of active video games to physical activity promotion are unknown, they have been shown to enable light to moderate physical activity (Biddiss and Irwin, 2010). Therefore, an area of scholarship for sport researchers to consider in the future is how sport video games can act as catalysts for physical activity and actual sport participation.

Fantasy sport participation, in addition to actual sport participation, is another area to consider studying in connection to sport video games. Fantasy sports are a multi-billion industry, with every major sports league in North America, for example, having a corresponding fantasy sport universe. Over 40 million people annually play fantasy sports in North America (Satariano, 2015). Still, even with that information and research evidence that fantasy sport players are much more likely to own video game systems (58%) when compared to both general sports fans (42%) and the general population (40%) (Fisher, 2008), little to no attention has been directed to better understanding if there is a connection between playing sport video games and fantasy sport participation. For instance, if sport video games provide individuals with a diversion and opportunity for social interaction (Kim and Ross, 2006), and fantasy sport leagues offer similar benefits (Hur et al., 2007; Seo and Green, 2008), then sport video gamers may become fantasy sport participants.

A final area worth examining in the future is the process by which individuals who enjoy playing sport video games, but who are not sport fans per se, become sport fans. Consider how an individual may enjoy playing a basketball game such as NBA 2K16, but not actually play basketball or watch basketball. However, in time, these individuals may come to transfer a connection with virtual players and teams to actual players and teams (Kim and Ross, 2006).

Identification with players and teams can lead consumers to attend sport events (James and Trail, 2008; Magnusen et al., 2010; Matsuoka et al., 2003; Trail et al., 2003). So, if sport video gamers pursue associations between their gaming experiences and real-life sport experiences, and such pursuits result in heightened levels of identification with actual sport teams, then by way of team identification, playing sport video games could result in non-sport fans becoming sport fans and engaging



in sport consumption behaviors.

In closing, video games hold value to both game developers and corporations because of their potential to enhance brand equity and grow product sales. Even though sport video games are popular, inadequate attention has been given to establishing a clear connection between sport video games and sport consumption behaviors. Hence, given the importance of consumer behaviors to sport organizations, the contribution of the present study is that it provides evidence of a relationship between sport video game identification and sport consumption behaviors.

## CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

## REFERENCES

- Badenhausen K (2014). EA Sports' FIFA video game helps fuel interest in the World Cup. *Forbes*. Retrieved from <http://www.forbes.com/sites/kurtbadenhausen/2014/07/13/ea-sports-fifa-video-game-helps-fuel-interest-in-the-world-cup/#3d28e1fe1c74>
- Bentler PM (1990). Comparative fit indices in structural models. *Psychol. Bull.* 107:238-246.
- Bentler PM (2004). EQS 6 structural equations program manual. Encino, CA:Multivariate Software.
- Biddiss E, Irwin J (2010). Active video games to promote physical activity in children and youth: A systematic review. *Archives of Pediatric Adolescent Medicine*, 164:664-672.
- Bigné JE, Andreu L, Gnoth J (2005). The theme park experience: An analysis of pleasure, arousal and satisfaction. *Tour. Manage.* 26:833-844.
- Browne MW, Cudeck R (1992). Alternative ways of assessing model fit. *Sociol. Methods Res.* 21:230-258.
- Cianfrone B, Zhang J, Trailer G, Lutz R (2009). Effectiveness of in-game advertising in sport video games: An experimental inquiry on current gamers. *Int. J. Sport Commun.* 1:195-218.
- Clavio G, Kraft P, Pedersen P (2009). Communicating with consumers through video games: An analysis of brand development within the video gaming segment of the sports industry. *Int. J. Sports Market. Sponsorship* 10:143-156.
- Cunningham GB, Kwon H (2003). The theory of planned behavior and intentions to attend a sport event. *Sport Manage. Rev.* 6:127-145.
- Dubé L, Cervellon MC, Jingyuan H (2003). Should consumer attitudes be reduced to their affective and cognitive bases? Validation of a hierarchical model. *Int. J. Res. Market.* 20:259-272.
- Entertainment Software Association (2015). Essential facts about the computer and video game industry. Retrieved from <http://www.theesa.com/wp-content/uploads/2015/04/ESA-Essential-Facts-2015.pdf>.
- Evans DM, Smith A (2004). The Internet and competitive advantage: A study of Australia's four premier professional sport leagues. *Sport Manage. Rev.* 14:112-121.
- Fink JS, Trail GT, Anderson DF (2002). Environmental factors associated with spectator attendance and sport consumption behavior: Gender and team differences. *Sport Market. Quart.* 11:8-19.
- Fisher E (2008). Study: Fantasy players spend big. *Sports Business Daily*. Retrieved from <http://www.sportsbusinessdaily.com/Journal/Issues/2008/11/20081117/This-Weeks-News/Study-Fantasy-Players-Spend-Big.aspx>
- Fisher RJ, Wakefield K (1998). Factors leading to group identification: A field study of winners and losers. *Psychol. Market.* 15:23-40.
- Fornell C, Larcker DF (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *J. Market. Res.* 18:382-388.
- Funk DC, Alexandris K, McDonald H (2016). *Sport consumer behavior: Marketing strategies*. NY: Routledge.
- Gaudiosi J (2013). Madden: The \$4 billion video game franchise. *CNN Money*. Retrieved from <http://money.cnn.com/2013/09/05/technology/innovation/madden-25/index.html>
- Hair JF, Anderson RE, Tatham RL, Black WC (1998). *Multivariate data analysis* (5th ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Hogg MA, Terry DJ (2001). *Social identity processes in organizational context*. Philadelphia, PA.: Psychology Press.
- Hoyle RH (1995). *Structural equation modeling: Concepts, issues, and applications*. London: Sage.
- Hu L, Bentler PM (1999). Cutoff criteria in fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct. Equ. Modeling.* 6:1-55.
- Hur Y, Ko YJ, Valacich J (2007). Motivation and concerns for online sport consumption. *J. Sport Manage.* 21:521-539.
- James J, Trail G (2008). The relevance of team identification to sport consumption behavior intentions. *Int. J. Sport Manage.* 9:427-440.
- Kim Y, Ross S (2015). The effect of sport video gaming on sport brand attitude, attitude strength, and the attitude-behavior relationship. *J. Sport Manage.* 29:657-671.
- Kim Y, Ross S (2006). An exploration of motives in sport video games. *Int. J. Sport Market Sponsorship.* 8:34-46.
- Kim YK, Trail GT, Magnusen MJ (2013). Transition from motivation to behavior: Examining the moderating role of identification (ID) on the relationship between motives and attendance. *Int. J. Sport Market. Sponsorship* 14:190-211.
- Kim Y, Walsh P, Ross S (2008). An examination of the psychological and consumptive behaviors of sport video gamers. *Sport Market. Quart.* 17:44-53.
- Kline RB (1998). *Principles and practices of structural equation modeling*. New York: Guilford Press.
- Konijn E, Bijvank M, Bushman B (2007). I wish I were a warrior: The role of wishful identification in the effects of violent video games on aggression in adolescent boys. *Dev. Psychol.* 43:1038-1044.
- Laverie DA, Arnett DB (2000). Factors affecting fan attendance: The influence of identity salience and satisfaction. *J. Leis. Res.* 32:225-246.
- Lewis M, Weber R, Bowman N (2008). "They may be pixels, but they're my pixels." Developing a metric of character attachment in role-playing video games. *Cyber Psychol. Behav.* 11:515-518.
- Maddison R, Mhurchu CN, Jull A, Jiang Y, Prapavessis H, Rodgers A (2007). Energy expended playing video console games: An opportunity to increase children's physical activity? *Pediatr. Exerc. Sci.* 19:334-343.
- Madrigal R, Chen J (2008). Moderating and mediating effects of team identification in regard to causal attributions and summary judgments following a game outcome. *J. Sport Manage.* 22:717-733.
- Madsen K, Yen S, Wlasiuk L, Newman T, Lustig R (2007). Feasibility of a dance videogame to promote weight loss among overweight children and adolescents. *Arch. Pediatrics Adolesc. Med.* 161:105-107.
- Mael F, Ashforth BE (1992). Alumni and their alma mater: A partial test of the reformulated model of organizational identification. *J. Organ. Behav.* 13:103-123.
- Magnusen M, Rhee YC, Kim YK (2010). The effect of team identification and game satisfaction on revisit intention: A case of Korean Basketball League spectators. *Int. J. Hum. Movement Sci.* 4:23-47.
- Matsuoka H, Chelladurai P, Harada M (2003). Direct and interaction effects of team identification and satisfaction intention to attend games. *Sport Market. Quart.* 12:244-253.
- Nelson M (2002). Recall of brand placements in computer/video games. *J. Advert. Res.* 42:80-92.
- Nunnally JC, Bernstein IH (1994). *Psychometric theory* (3rd ed.). NY: McGraw-Hill.
- Robinson MJ, Trail GT (2005). Relationships among spectator gender, motives, points of attachment, and sport preference. *J. Sport Manage.* 19:58-80.
- Robinson MJ, Trail GT, Dick RJ, Gillette AJ (2005). Fans vs. spectators: An analysis of those who attend intercollegiate football games. *Sport*

- Market. Quart. 14:43-53.
- Satariano A (2015). How fake sports are turning man cave dwellers into millionaires. *Bloomberg*. Retrieved from <http://www.bloomberg.com/news/articles/2015-01-15/the-growing-world-of-moneymaking-fantasy-sports>
- Satorra A, Bentler PM (1994). Corrections to test statistics and standard errors in covariance structure analysis. In A. von Eye & C. C. Clogg (Eds.), *Latent variables analysis: Applications for developmental research*. Thousand Oaks, CA: Sage. pp. 399-419.
- Schneider E, Lang A, Shin, M, Bradley S (2004). Death with a story: How story impacts emotional, motivational, and physiological response to first-person shooter video games. *Hum. Commun. Res.* 30:361-375.
- Sherry JL, Lucas K, Greenberg B, Lachlan K (2006). Video game uses and gratifications as predictors of use and game preference. In P. Vorderer & J. Bryant (Eds.), *Playing computer games: Motives, responses, and consequences*. Mahwah, NJ: Lawrence Erlbaum. pp. 213-224
- Seo WJ, Green BC (2008). Development of the Motivation Scale for Sport Online Consumption. *J. Sport Manage.* 22:82-109.
- Smith GJ, Patterson B, Williams T, Hogg J (1981). A profile of the deeply committed sports fans. *Arena Rev.* 5:26-44.
- Sutton AW, McDonald AM, Milne RG (1997). Creating and fostering fan identification in professional sports. *Sports Market. Quart.* 6:15-22.
- Swanson S, Gwinner K, Larson B, Janda S (2003). Motivations of college student game attendance and word-of-mouth behavior: The impact of gender differences. *Sport Market. Quart.* 12:151-162.
- Tajfel H (1981). *Human groups and social categories*. Cambridge, England: Cambridge University Press.
- Tajfel H, Turner JC (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.), *The social psychology of intergroup relations*. Monterey, CA: Brooks-Cole.
- Tan B, Aziz A, Chua K, Teh K (2001). Aerobic demands of the dance simulation game. *Int. J. Sports Medicine*, 23:125-129.
- Trail GT, Anderson DF, Fink JS (2000). A theoretical model of sport spectator consumption behavior. *Int. J. Sport Manage.* 1:154-180.
- Trail G, Fink JS, Anderson DF (2003). Sport spectator consumption behavior. *Sport Market. Quart.* 12:8-17.
- Wann DL (1993). Aggression among highly identified spectators as a function of their need to maintain a positive social identity. *J. Sport Soc. Issues* 17:134-143.
- Wann DL (2002). Preliminary validation of a measure for assessing identification as a sport fan: The sport fandom questionnaire. *Int. J. Sport Manage.* 3:103-115.
- Wann DL, Branscombe N (1995). Influence of identification with a sport team on objective knowledge and subjective beliefs. *Int. J. Sport Psychol.* 26:551-567.
- Wann DL, Hunter JL, Ryan JA, Wright LA (2001). The relationship between team identification and willingness of sport fans to consider illegally assisting their team. *Soc. Behav. Pers.* 29:531-536.
- Wann DL, Martin J, Grieve F, Gardner L (2008). Social connections at sport events: Attendance and its positive relationship with state social psychological well-being. *North Am. J. Psychol* 10:229-238.
- Weston R, Gore PA (2006). A brief guide to structural equation modeling. *The Counseling Psychologist*, 34:719-751.
- Yang M, Roskos-Ewoldsen D, Dinu L, Arpan L (2006). The effectiveness of "in-game" advertising. *J. Advert.* 35:143-152.