



Comparison of the influence of participation in screen golf on self-esteem, loneliness, depression, social isolation, and life satisfaction between people with and without disabilities in Republic of Korea

Authors' contribution:

- A) conception and design of the study
- B) acquisition of data
- C) analysis and interpretation of data
- D) manuscript preparation
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Abstract

Screen golf is a product of the combination of modern technology and leisure. This new form of sport can provide people with disabilities opportunities for positive life experiences through sport participation. This study aimed to investigate differences in the effect of screen golf participation on psychosocial factors (self-esteem, isolation, depression, loneliness, and life satisfaction) in people with and without disabilities. With 293 survey respondents in this study, the Multi-variate Analysis of Variances (MANOVA) was performed twice to measure differences between groups after ensuring the validity and reliability of the instrument. Participation in screen golf demonstrated a positive effect for all factors for people with disabilities. Results also showed a more positive effect on self-esteem and life satisfaction for people without disabilities with screen golf experience than for those without any screen golf experience. This study demonstrated that screen golf, as a physical leisure activity, was helpful to all study participants, with greater positive effects observed for participants with disabilities. This finding suggests that ubiquitous leisure activities such as screen golf made possible by advancements in modern technologies offer desirable benefits to many. This study is highly meaningful since it demonstrated how technologies could be helpful to people with disabilities who historically have less access to leisure activities than able-bodied people.

Key words: Physical disability, depression, life satisfaction, loneliness, self-esteem, social isolation

Introduction

The development of information technology (IT) in the fourth industrial revolution has an impact on sports leisure activities. In this environment, screen golf recently attracts people's attention. 'Screen golf' is a popular technology-based sport and uses a computer-based golf simulator (Kim, Seo, Kim, & Chang, 2014). A computer, a simulator, and multiple digital cameras display images that look similar to real golf environments and situations on a high-definition (HD) screen. These technologies allow users to enjoy golf in a virtual environment (Lee, Chung, & Lee, 2013) in lieu of playing golf outdoors in the traditional sense.

Playing a typical round of golf outdoors at a course (actual golf) can be expensive, requires travel time, and expends energy. Since screen golf is relatively less costly and burdensome than actual golf, this virtual participation setting was met with enthusiasm from people who had experienced difficulties playing actual golf due to

environmental and circumstantial restrictions (Lyu, 2015). This likely includes people with disabilities. It appears that ubiquitous leisure activities can offer potential benefits to people with disabilities as well as to able-bodied people who are too busy to dedicate time or lack the financial resources to visit traditional golf courses.

The estimated number of people with disabilities in the Republic of Korea is approximately 2.67 million, or 5.39% of the total Korean population (Park, 2018). Similar to the able-bodied population, people with disabilities benefit both physically and psychologically from participation in leisure activities (Park, 1999; Park & Yu, 1997). In response to this, researchers continue to make efforts to identify variables that have positive psychological effects for people with disabilities. Existing studies reported that psychosocial factors such as self-esteem, depression, loneliness, and social isolation can be improved through participation in leisure activities (Janisse, Nedd, Escamilla, & Nies, 2004; Melin, Fugl-Meyer, & Fugl-Meyer, 2003). Achieving psychological well-being through leisure activities can have a significant positive effect on the quality of life for people with disabilities (Richardson, Smith, & Papathomas, 2017).

This study aimed to investigate the effect of participation in screen golf – a ‘ubiquitous’ technology – on the psychological health of people with and without disabilities. The findings of this study will offer valuable information on the potential benefits of leisure activities which integrate highly advanced IT technologies and sports.

Self-esteem

Self-esteem is perceived as an important personal psychological component (Bano, Anjum, & Pasha, 2015; Wagnsson, Lindwall, & Gustafsson, 2014) because it is defined as an essential evaluation of oneself (Rosenberg, 1990). Self-esteem is also an important factor for understanding the value of oneself (Fox & Corbin, 1989), and an effective index indicating a healthy life (Shek & McEwen, 2012). Factors such as education, financial status, social reputation, and social support are considered important variables for developing, expanding, and improving self-esteem (Logel, Holmes, Anthony, Wood, & Cameron, 2006).

Researchers found that while people with positive self-esteem generally perceived themselves as valuable individuals (Sonstroem, 1997), those with low self-esteem experience negative circumstances, such as weak physical status, aggressive behavior, and limited economic activity (Trzesniewski et al., 2006). People with disabilities often experience low self-esteem due to the constraints of their disabilities, and the negative prejudices and stigmas about disability placed on them by others (Johnson & Yarhouse, 2013).

Loneliness

Loneliness develops owing to various personal or circumstantial factors in an individual’s life and ‘is the unpleasant experience that occurs when a person’s network of social relationships is sufficiently deficient in either quality or quantity’ (Perlman & Peplau, 1984, p. 15). Loneliness is a negative feeling human experience, and usually involves sadness or anxiety (Rubenstein, Shaver, & Peplau, 1979). Individuals who live with chronic loneliness have been found to experience pessimism, mental illnesses, depression, addiction, and lethargy (Qualter, Quinton, Wagner, & Brown, 2009).

Existing studies found that people with disabilities struggle with negative social perceptions of disability as well as a lack of social support (Lee, 2002). In sum, people with disabilities experience loneliness due to various social, physical, and psychosocial factors (Hairi, Bulgiba, Cumming, Naganathan, & Mudla, 2010). In turn, loneliness increases physical and psychological stress, variables that negatively impact quality of life.

Depression

According to the World Health Organization (n.d., para. 1), ‘Depression is a common mood disorder characterized by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness and poor concentration’. Many people have lived and continue to live with depression (American Academy of Family Physicians, 2018). Depression continuously influences a person’s psychological state, and usually has considerable negative impact on health (Nimrod, Kleiber, & Berdychevsky, 2012). In addition, lethargy, due to the physical constraints in daily life or secondary medical conditions increased the frequency of depression (Hairi et al., 2010; Rimmer, Padalabalanarayanan, & Malone, 2017). Various interventions can be implemented to treat depression, including psychological and psychosocial treatments as well as antidepressant medications (World Health Organization, 2018). Previous research reported, however, that the outcomes of such interventions may not fully meet people’s expectations (Wasserman, 2006).

Recently, there is a growing desire for self-help treatments as alternatives to medical interventions such as pharmacological treatments (Nydegger, 2008). In this light, leisure activity is attracting a great deal of attention since

it is largely helpful for maintaining positive psychological health and well-being (Daley, 2008; Fullagar, 2008; Iwasaki, MacKay, & Mactavish, 2005). Specifically, leisure activities can play a more significant role in improving psychosocial health than medical treatment (Paluska & Schwenk, 2000) and could play a role in reducing depression in people with disabilities in order to improve the quality of their lives.

Social isolation

Social isolation is caused by the disconnection of social bonds. It is perceived as one of the decisive factors of an individual's well-being (Klinenberg, 2016; Zavaleta, Samuel, & Mills, 2017). Social isolation is classified into (a) objective isolation: 'tangible aspects of social isolation represented by physical separation from and an absence or deficiency of interaction with other people' (Taylor, Taylor, Nguyen, and Chatters, 2018, p. 232) and (b) subjective isolation: cognitive aspects of social isolation associated with relationships with social members or perceived involvement in a society (Valtorta, Kanaan, Gilbody, & Hanratty, 2016). Some scholars suggest that social isolation occurs due to "inadequate quality and quantity of social relations with other people" (Zavaleta et al., 2017, p. 370). Here, (a) the quantity of social relations is associated with the frequency of meeting people, and (b) the quality of social relations is associated with an individual's satisfaction with social relationships. Various approaches explain social isolation, and high social isolation is consistently detrimental to the psychological health of individuals (Klinenberg, 2016).

Studies indicate that quite a large number of people have negative thoughts about or attitudes toward disabilities (Livneh, 1982; UNICEF, 2012). This line of thinking builds on prejudices that socially isolate people with disabilities. Various studies reported that people with disabilities living in isolation may even go so far as to make extreme decisions such as self-injury and suicide (Cacioppo & Hawkley, 2009; Paul, Ayis, & Ebrahim, 2006). Social interactions that occur during recreational activities can enhance feelings of acceptance for individuals with disabilities, which in turn can reduce feelings of social isolation (Mahar, Cobigo, & Stuart, 2013; Veselinova, 2013).

Life satisfaction

Life satisfaction is a multidimensional concept that represents the degree of psychological well-being which one subjectively feels about his or her own life (Cummins, Gullone, & Lau, 2002). Researchers observed that leisure activities are closely associated with psychological happiness in able-bodied people, and these activities have a significant effect on satisfaction with life (Bowker, Gadbois, & Cornock, 2003).

Park (1999) argued that participation in leisure activities is highly important for people with disabilities as it not only increases the opportunity for exchange with others, but also helps with preventing functional decline and contributes to positive physical development as a means of rehabilitation. Park and Yu (1997) highlighted that leisure activity means much more than just having a good time for people with disabilities. Participation is an opportunity to perceive, develop, and express themselves. With respect to this, researchers reported that the participation by people with disabilities in leisure activities has a positive effect on their satisfaction with life (Fine, 1996; Mahar et al., 2013; Petryshen, Hawkins, & Fronchak, 2001; Rudnick, 2005; Veselinova, 2013).

Study significance and research questions

People with disabilities are in many ways able to lead typical lives, but there is a significant lack of leisure facilities and services to support their participation in physical activities. Participation in physical and leisure activities can function as a life stimulant for people with disabilities and help develop a positive mindset just as it does for people without disabilities (Janisse et al., 2004; Melin et al., 2003). Recent technological advances allow people to enjoy golf in a virtual fashion known as 'ubiquitous screen golf' without actually having to physically travel to a golf course (Choi, Greenwell, Hums, & Hambrick, 2019). This offers great opportunities and possibilities for people with disabilities to be more active. Therefore, this study aimed to investigate differences in the effect of screen golf participation on the psychosocial factors of self-esteem, isolation, depression, loneliness, and life satisfaction in people with and without disabilities. Results of the study also suggest a direction to improve the psychological health of people with disabilities.

Method

Participants and data collection

This study was conducted using non-probability purposive sampling in South Korea. The overarching research question in this study was 'does participation in screen golf have different effects on the psychological health (e.g.,

self-esteem, depression, loneliness, social isolation, and satisfaction with life) of people with and without disabilities?’ Survey respondents were first categorized into a group with disabilities and a group without disabilities, and each group was sub-categorized into participants and non-participants of screen golf based upon previous screen golf experience. Therefore, respondents were organized into four groups: (a) individuals without disabilities without screen golf experience, (b) individuals without disabilities with screen golf experience, (c) individuals with disabilities without screen golf experience, and (d) individuals with disabilities with screen golf experience.

This study applied the intercept data collection technique conducted at pre-assigned locations, where target population will be likely to congregate. Regardless of disability for individuals with previous screen golf experience, data was collected from five screen golf locations based in Seoul, and two public golf country clubs in the suburbs of Seoul. As for individuals with disabilities without previous screen golf experience, data were additionally collected from local community welfare centers providing welfare services for people with disabilities. Finally, data for people without disabilities and screen golf experience were collected in front of a major shopping mall in Seoul. Data were collected for three weeks in June 2018. All survey respondents were asked about previous experience with screen golf (i.e., have you played screen golf before?) and disabilities (do you have any physical disabilities?). The answers were important standards for assigning each respondent to one of the four groups established for this study. Individuals with intellectual disabilities were excluded from the survey for reasons including study purpose and objective, and ability to answer the questionnaire.

Instruments

Self-esteem was measured using the scale developed by Rosenberg (1965, 1989). The scale’s acceptable internal consistency ranged from .77 to .88 (Nunnally & Bernstein, 1994) and was used for the first time in 1965. The single-factor scale consisting of ten items (4-point Likert scale) measures one’s positive or negative thoughts or attitude toward oneself. The questionnaire is composed of five positive and five negative questions, and the negative ones were reverse-coded after the survey. A higher score indicates a higher level of higher self-esteem.

Depression was measured using the BDI-2nd Edition (Beck, Steer, & Brown, 1996) which was developed based on the Beck Depression Inventory (BDI) (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). This inventory has been used for over 30 years to measure depression symptoms with excellent internal consistency greater than .92 (Beck et al., 1996). It consists of 21 items, and a higher score means a higher degree of depression.

Loneliness was measured using a scale first developed by Russell, Peplau, and Ferguson (1978) with high reliability (internal consistency coefficient alpha ranging from .89 to .94), and later amended and complemented by Russell, Peplau, and Cutrona (1980), and Russell (1996). The scale consists of 20 questions. Scores are calculated using the following conversion of how frequently one experienced loneliness (O = 3, S = 2, R = 1, N = 0). Here, ‘O’ = often, ‘S’ = sometimes, ‘R’ = rarely, and ‘N’ = never. Therefore, a higher score means a higher degree of loneliness.

Social isolation was measured using the tool ‘Social Isolation’ developed to measure the concept of human isolation by Dean (1961) (internal consistency coefficient alpha = .84). This tool consists of five questions on a 5-point Likert scale (1 point = ‘I strongly agree’, 3 points = ‘neutral’, and 5 points = ‘I strongly disagree’). A higher score means a higher level of social isolation.

The Satisfaction with Life Scale (SWLS) developed by Diener, Emmons, Larsen, and Griffin (1985) was used to measure satisfaction with life, showing high internal consistency with a value of 0.87. This instrument consists of five questions in total on a 7-point Likert scale (1 = ‘I strongly disagree’, 4 = ‘neither’ and 7 = ‘I strongly agree’). A higher score means a higher level of satisfaction with life.

Data analysis

First, exploratory factor analysis (EFA) was performed to ensure factor structure of the data utilized in this study. Reliability analysis was conducted using Cronbach’s alpha in order to test the consistency of questions using the variables tested with the EFA. According to Nunnally and Bernstein (1994), questions are considered to be internally consistent when Cronbach’s alpha is .70 or higher. A Multivariate analysis of variance (MANOVA) was conducted to investigate the difference of the effect of screen golf on the psychological health of people with and without disabilities according to five psychosocial factors (self-esteem, depression, loneliness, isolation, and satisfaction with life). For example, changes in self-esteem in the group without disabilities (i.e., individuals without disabilities with previous screen golf experience and those without any screen golf experience) were compared with each other after the experience of screen golf. Changes in self-esteem in the group with disabilities (i.e., individuals with disabilities with previous screen golf experience and those without any screen golf experience) were also compared with each other according to screen golf experience. In sum, MANOVAs were conducted twice.

Results

Socio-demographic statistics

A total of 350 survey questionnaires were distributed, and 302 copies were collected (response rate approximately 86%). After eliminating nine incomplete questionnaires, a total of 293 questionnaires consisting of 228 (77.8%) males and 65 (22.2%) females were retained. In terms of age, 33.8% ($n = 99$) of the sample was between the ages of 40 and 49 years old, followed by 50s ($n = 85$, 29%), 30s ($n = 48$, 16.4%), over 60 ($n = 43$, 14.7%) and 20s ($n = 18$, 6.1%). In terms of disability acquisition, 85% of respondents with disabilities ($n = 114$) had acquired disabilities, and 15% ($n = 20$) had congenital disabilities. Finally, the composition of the four groups according to disability and screen golf experience was: (a) individuals without disabilities without any screen golf experience ($n = 77$), (b) individuals without disabilities with previous screen golf experience ($n = 82$), (c) individuals with disabilities without any screen golf experience ($n = 62$), and (d) individuals with disabilities with previous screen golf experience ($n = 72$). Detailed information for socio-demographic information is presented in Table 1.

Table 1. Frequency distributions for demographic variables

Variables	Categories	Frequency (N)	Percentage (%)
Gender	Male	228	77.8
	Female	65	22.2
Age	21–29	18	6.1
	30–39	48	16.4
	40–49	99	33.8
	50–59	85	29.0
	60+	43	14.7
	Without disabilities	159	54.0
Disability	With disabilities	134	46.0
	Congenital	20	15.0
	Acquired	114	85.0
Screen golf experience	Experienced	154	53.0
	Non-experienced	139	47.0

Exploratory factor analysis (EFA)

The exploratory factor analysis using the principal component analysis (PCA) with Varimax of depression (21 items), loneliness (20 items), self-esteem (10 items), life satisfaction (5 items), and social isolation (4 items) was conducted. The Kaiser Meyer-Olkin measure identified the sample adequacy for the analysis, KMO = .941 (Field, 2009). Barlett's test of sphericity ($\chi^2 = 13186.464$, $df = 1770$, $p < .001$) was statistically significant. Extracted 5 factors had eigenvalues greater than 1 and factor structure coefficients greater than .40. The factors accounted for 60.801% of the total variance.

Scale reliability

Alpha coefficient for the five mental health variables ranged from .832 to .954, including self-esteem ($\alpha = .866$), loneliness ($\alpha = .957$), depression ($\alpha = .968$), social isolation ($\alpha = .922$), and life satisfaction ($\alpha = .971$). All Cronbach's alpha estimates exceeded the .70 cut-off for good internal consistency reliability (Nunnally & Bernstein, 1994).

Multivariate analysis of variance (MANOVA)

People without disabilities context. The multivariate test indicated statistically significant differences based on the experience of people without disabilities with screen golf on the dependent variables [Wilks' lambda = .410, $F(5, 153) = 44.078$, $p = 0.00$, partial $\eta^2 = .590$]. Based on the adjusted alpha level using the Bonferroni correction ($p = 0.05/5 = 0.01$), follow-up univariate tests for (a) Self-Esteem, $F(1, 157) = 149.071$, $p = 0.00$, partial $\eta^2 = .487$ and (b) Life Satisfaction, $F(1, 157) = 75.681$, $p = 0.00$, partial $\eta^2 = .325$ were statistically significant. However, the rest of the univariate tests were not statistically significant: (a) Social Isolation, $F(1, 157) = 1.337$, $p > .01$, partial $\eta^2 = .008$, (b) Depression, $F(1, 157) = 1.418$, $p > .01$, partial $\eta^2 = .009$, and (c) Loneliness, $F(1, 157) = .045$, $p > .01$,

partial $\eta^2 = .000$ (Table 2). As shown in Table 3, the two variables (i.e., self-esteem and life satisfaction) produced significant mean values in the group of individuals with screen golf experience, and the values were significantly higher than those of the group without screen golf experience.

Table 2. Results of MANOVA: Differences in five psychosocial factors of people without disabilities between experienced and non-experienced in screen golf

Source	DV	SS	df	MS	F	p	η^2
Screen golf	Self-esteem	11.640	1	11.640	149.071	.000*	.487
	Social isolation	.293	1	.293	1.337	.249	.008
	Depression	.074	1	.074	1.418	.235	.009
	Loneliness	.002	1	.002	.045	.832	.000
	Life satisfaction	139.392	1	139.392	75.681	.000*	.325

Note. * $p < 0.01$.

Table 3. Means and standard deviations for five psychosocial factors of groups for people without disability

Without disabilities	Self-esteem		Social isolation		Depression		Loneliness		Life satisfaction	
	M	SD	M	SD	M	SD	M	SD	M	SD
Experienced	3.462	0.268	1.573	0.535	1.555	0.221	2.372	0.212	5.507	1.064
Non-experienced	2.921	0.291	1.659	0.385	1.512	0.235	2.380	0.256	3.634	1.612

Note. Statistically significant mean differences between groups are in bold.

People with disabilities context. The multivariate test revealed statistically significant differences based on the experience of people with disabilities with screen golf on the dependent variables [Wilks' lambda = .430, $F(5, 128) = 33.985$, $p = 0.000$, partial $\eta^2 = .570$]. Based on the adjusted alpha level using the Bonferroni correction ($p = 0.05/5 = 0.01$), follow-up univariate tests for (a) Self-Esteem, $F(1, 132) = 75.023$, $p = 0.00$, partial $\eta^2 = .362$, (b) Social Isolation, $F(1, 132) = 34.154$, $p = 0.00$, partial $\eta^2 = .206$, (c) Depression, $F(1, 132) = 9.161$, $p < 0.01$, partial $\eta^2 = .065$, (d) Loneliness, $F(1, 132) = 20.464$, $p = 0.00$, partial $\eta^2 = .134$, and (e) Life Satisfaction, $F(1, 132) = 50.840$, $p = 0.00$, partial $\eta^2 = .278$, were statistically significant (Table 4). As shown in Table 5, individuals with disabilities with screen golf experience demonstrated high mean values in self-esteem and satisfaction with life, and low mean values in depression, isolation, and loneliness. However, depression, isolation, and loneliness are lower when depression, isolation, and depression scores are lower. Therefore, it can be interpreted that the experience of participating in screen golf had a positive effect on all five variables in individuals with disabilities.

Table 4. Results of MANOVA: Differences in five psychosocial factors of people with disabilities between experienced and non-experienced in screen golf

Source	DV	SS	df	MS	F	p	η^2
Screen golf	Self-esteem	25.660	1	25.660	75.023	.000*	.362
	Social isolation	36.085	1	36.085	34.154	.000*	.206
	Depression	5.404	1	5.404	9.161	.003*	.065
	Loneliness	13.852	1	13.852	20.464	.000*	.134
	Life satisfaction	63.098	1	63.098	50.840	.000*	.278

Note. * $p < 0.01$.

Table 5. Means and Standard Deviations for Five Psychosocial Factors of Groups for People with Disability

With disabilities	Self-esteem		Social isolation		Depression		Loneliness		Life satisfaction	
	M	SD	M	SD	M	SD	M	SD	M	SD
Experienced	3.049	0.230	2.028	0.898	2.150	0.754	2.223	0.783	4.347	1.066
Non-experienced	2.171	0.824	3.069	1.161	2.552	0.784	2.868	0.867	2.971	1.168

Note. Statistically significant mean differences between groups are in bold.

Discussion

Modern technological developments achieved through computers have brought dramatic changes to our daily lives and greatly impacted leisure industries (Suh & Pedersen, 2010). Modern computer technologies minimize constraints existing in access to golf as a leisure activity through ‘screen golf’, and this digital form of the sport now enjoys great popularity (Kerr-Dineen, 2018). It holds great potential as it allows people of all abilities to enjoy golf.

Research indicates that 90% of people with disabilities in South Korea live with mild disabilities and can enjoy leisure activities on their own (Korea Institute for Health and Social Affairs, 2005). Considering the fact that anybody can experience permanent or temporary disabilities at any point in life, more attention and efforts are certainly needed to support people with disabilities to help them lead physically and emotionally healthy lives.

This study analyzed the comparative positive effects of participating in the leisure activity of screen golf on five psychosocial variables that represent psychological health including self-esteem, isolation, depression, loneliness, and satisfaction with life. In subjects without disabilities, the group with screen golf experience showed higher self-esteem and satisfaction with life than the group without screen golf experience, while no differences were observed in isolation, depression, and loneliness. In subjects with disabilities, all five variables exhibited positive results in the group with screen golf experience compared to the group without screen golf experience. These findings support the results of existing studies that participation in leisure activities helps maintain or increase psychological well-being generally (Nimrod et al., 2012; Slutzky & Simpkins, 2009) and for people with disabilities specifically (Mgulwa & Young, 2014).

This study investigated the effect of ‘ubiquitous leisure activity’ in the form of screen golf on the psychological health of participants. More specifically, it demonstrated the difference in the effect between the groups with and without disabilities. All variables had statistically positive significant differences in the group with disabilities different from the group without disabilities. In relation to this, Park (1999), Mahar et al. (2013), and Veselinova (2013) all posited that participation by people with disabilities in leisure activities creates opportunities for them to have more interactions with others. Further studies suggested that participation in leisure activities greatly impacts emotional stability since these activities are a simple means for entertainment which allow people to express and develop themselves (Fontaine, 2000; Landers, 1997; Park & Yu, 1997). The current study is significant as it showed that while the development of technology helps people without disabilities, more importantly, these technological advances and the opportunities they create have an even greater positive effect for people with disabilities.

Motivations of people with disabilities for participating in leisure activities are not significantly different from those of people without disabilities (Dinomais et al., 2010). People with disabilities are equally aware of the necessity and importance of leisure activities regardless of their disabilities (Ponchillia, Armbruster, & Wiebold, 2005). However, they participate less frequently in physical activity than people without disabilities, often due to practical reasons (Darcy, Lock, & Taylor, 2017) and physical and attitudinal barriers (Calder, Sole, & Mulligan, 2018).

Screen golf with its advanced technology will offer more opportunities for people with disabilities to enjoy golf as a leisure activity. It is encouraging that there are screen golf competitions for people with disabilities (Jung, 2018). Additionally, screen golf benefits people with disabilities beyond simply offering an outlet for physical activity. Participants can enjoy screen golf with friends and family in a social setting outside of the home (Choi et al., 2019). Others’ evaluation of an individual is a very important factor for emotional health (Macdonald & Leary, 2005), and screen golf offers the opportunity for social exchange.

It is crucial for every individual to maintain psychological health. Leisure activity alone cannot be a panacea for people with disabilities, but it is still important that sport be positioned as a highly effective tool to help (United

Nations, n.d.). As demonstrated in this study, screen golf can play an important role as an effective medium for people with disabilities to pursue emotional well-being and a better life.

This study analyzed comparative differences in the effects of participation by groups with and without disabilities in the ubiquitous leisure activity of screen golf on five psychosocial variables. While a longitudinal research design would be useful to further understand the results, that method was not feasible at this time. Therefore, it is necessary to conduct an in-depth cross-sectional study to address this weakness in the future. This study applied a non-probability sampling technique, thus making it difficult to generalize the results. Future studies should employ more varied sampling techniques to address these concerns.

Additionally, as clarified in the research design, the respondents of this study were limited to those with physical disabilities. More specifically, in addition to those with mental disabilities, those with severe physical disabilities and mobility difficulties were unable to participate in the survey. It should be acknowledged that there are limitations to the contribution of this study for those who cannot participate in new leisure activities by applying virtual reality due to severe disabilities. Therefore, despite meaningful results on physical activities and the health of the people with disabilities, we could not arrive at a generalized result that can be applied to all people with disabilities. Future researchers would greatly benefit from designing studies applicable regardless of the type of disability.

References

- American Academy of Family Physicians. (2018, February). *Nearly one in 12 U.S. adults reports having depression*. Retrieved March 2, 2019, from <https://www.aafp.org/news/health-of-the-public/20180219nchsdepression.html>
- Bano, H., Anjum, N., & Pasha, S. (2015). Differences in self-esteem of university students with and without disability. *Journal of Educational Research*, 18, 114–124.
- Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Manual for beck depression inventory – II*. San Antonio, USA: Psychological Corporation.
- Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, 4, 561–571. DOI: 10.1001/archpsyc.1961.01710120031004.
- Bowker, A., Gadbois, S., & Cornock, B. (2003). Sports participation and self-esteem: Variations as a function of gender and gender orientation. *Sex Roles*, 49, 47–58.
- Cacioppo, J. T. & Hawkley, L. C. (2009). Perceived social isolation and cognition. *Trends in Cognitive Sciences*, 13, 447–454. DOI: 10.1016/j.tics.2009.06.005.
- Calder, A., Sole, G., & Mulligan, H. (2018). The accessibility of fitness centers for people with disabilities: A systematic review. *Disability and Health Journal*, 11, 525–536. DOI: 10.1016/j.dhjo.2018.04.002.
- Choi, C., Greenwell, T. C., Hums, M. A., & Hambrick, M. E. (2019). Understanding consumer behaviors in virtual golf: Differences in leisure constraints. *Sport Marketing Quarterly*, 28, 46–57. DOI: 10.32731/SMQ.281.032019.04.
- Cummins, R. A., Gullone, E., & Lau, A. L. (2002). A model of subjective well-being. In E. Gullone & R. Cummins (Eds.), *The universality of subjective well-being indicators* (pp. 129–149). Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Daley, A. (2008). Exercise and depression: A review of reviews. *Journal of Clinical Psychology in Medical Settings*, 15, 140–147. DOI: 10.1007/s10880-008-9105-z.
- Darcy, S., Lock, D., & Taylor, T. (2017). Enabling inclusive sport participation: Effects of disability and support needs on constraints to sport participation. *Leisure Sciences*, 39, 20–41. DOI: 10.1080/01490400.2016.1151842.
- Dean, D. G. (1961). Alienation: Its meaning and measurement. *American Sociological Review*, 26, 753–758. DOI: 10.2307/2090204.
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49, 71–75. DOI: 10.1207/s15327752jpa4901_13.
- Dinomais, M., Gambart, G., Bruneau, A., Bontoux, L., Deries, X., Tessiot, C., & Richard, I. (2010). Social functioning and self-esteem in young people with disabilities participating in adapted competitive sport. *Neuropediatrics*, 41, 49–54. DOI: 10.1055/s-0030-1255118.
- Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). Thousand Oaks, USA: SAGE Publications.
- Fine, A. H. (1996). Leisure, living, and quality of life. In R. Renwick, I. Brown & M. Nagler (Eds.), *Quality of life in health promotion and rehabilitation: Conceptual approaches, issues, and applications* (pp. 342–354). Thousand Oaks, USA: SAGE Publications.

- Fontaine, K. R. (2000). Physical activity improves mental health. *Physician and Sports Medicine*, 28, 83–84. DOI: 10.3810/psm.2000.10.1256.
- Fox, K. R. & Corbin, C. B. (1989). The physical self-perception profile: Development and preliminary validation. *Journal of Sport and Exercise Psychology*, 11, 408–430. DOI: 10.1123/jsep.11.4.408.
- Fullagar, S. (2008). Leisure practices as counter-depressants: Emotion-work and emotion-play within women's recovery from depression. *Leisure Sciences*, 30, 35–52. DOI: 10.1080/01490400701756345.
- Hairi, N. N., Bulgiba, A., Cumming, R. G., Naganathan, V., & Mudla, I. (2010). Prevalence and correlates of physical disability and functional limitation among community dwelling older people in rural Malaysia, a middle income country. *BMC Public Health*, 10, 492. DOI: 10.1186/1471-2458-10-492.
- Iwasaki, Y., MacKay, K., & Mactavish, J. (2005). Gender-based analyses of coping with stress among professional managers: Leisure coping and non-leisure coping. *Journal of Leisure Research*, 37, 1–28. DOI: 10.1080/00222216.2005.11950038.
- Janisse, H. C., Nedd, D., Escamilla, S., & Nies, M. A. (2004). Physical activity, social support, and family structure as determinants of mood among European-American and African-American women. *Women and Health*, 39, 101–116. DOI: 10.1300/J013v39n01_06.
- Johnson, V. R. F. & Yarhouse, M. A. (2013). Shame in sexual minorities: Stigma, internal cognitions, and counseling considerations. *Counseling and Values*, 58, 85–103. DOI: 10.1002/j.2161-007X.2013.00027.x.
- Jung, D. G. (2018, January). *Screen golf competition for people with disability*. Retrieved March 10, 2019, from <http://www.fnnews.com/news/201801221256394515>
- Kerr-Dineen, L. (2018, March). *This is a simulation (And it's still golf!)*. Retrieved April 5, 2019, from <https://www.golfdigest.com/story/this-is-a-simulation-and-its-still-golf-golf-simulators>
- Kim, T., Seo, H., Kim, M. C., & Chang, K. (2014). Customer productivity in technology-based self-service of virtual golf simulators. *International Journal of Sports Marketing and Sponsorship*, 16, 19–34. DOI: 10.1108/IJSMS-16-01-2014-B003.
- Klinenberg, E. (2016). Social isolation, loneliness, and living alone: Identifying the risks for public health. *American Journal of Public Health*, 106, 786–787. DOI: 10.2105/AJPH.2016.303166
- Korea Institute for Health and Social Affairs. (2005). *The survey of disabled people in 2005*. Retrieved April 10, 2019, from <http://www.korea.kr/common/download.do?tblKey=EDN&fileId=181932>.
- Landers, D. M. (1997). The influence of exercise on mental health. *PCPFS Research Digest*, 2, 1–8.
- Lee, H., Chung, S., & Lee, W. (2013). Presence in virtual golf simulators: The effects of presence on perceived enjoyment, perceived value, and behavioral intention. *New Media and Society*, 15, 930–946. DOI: 10.1177/1461444812464033.
- Lee, J. Y. (2002). *A study on the relation between independent living of the disabled and depression*. Unpublished master's thesis, University of Incheon, Incheon, South Korea.
- Livneh, H. (1982). On the origins of negative attitudes toward people with disabilities. *Rehabilitation Literature*, 43(11–12), 338–347.
- Logel, C., Holmes, J. G., Anthony, D. B., Wood, J. V., & Cameron, J. J. (2006). *Defining the sociometer: Self-esteem and perceived and actual social value* [Unpublished doctoral dissertation]. Waterloo, ON, Canada: University of Waterloo.
- Macdonald, G. & Leary, M. R. (2005). Why does social exclusion hurt? The relationship between social and physical pain. *Psychological Bulletin*, 131, 202–223. DOI: 10.1037/0033-2909.131.2.202.
- Lyu, S-O. (2015). An analysis on screen golf cafe preferences using a choice experiment: A comparison between conditional logit and mixed logit models. *Journal of Tourism Sciences*, 39, 31–45. DOI: 10.17086/JTS.2015.39.9.31.45.
- Mahar, A. L., Cobigo, V., & Stuart, H. (2013). Conceptualizing belonging. *Disability and Rehabilitation*, 35, 1026–1032. DOI: 10.3109/09638288.2012.717584.
- Melin, R., Fugl-Meyer, K. S., & Fugl-Meyer, A. R. (2003). Life satisfaction in 18 – to 64-year-old Swedes: In relation to education, employment situation, health and physical activity. *Journal of Rehabilitation Medicine*, 35, 84–90. DOI: 10.1080/16501970306119.
- Mgulwa, N., & Young, M. (2014). University sports administrators' perceptions on campus recreation services for students with physical disabilities [Online Special Edition]. *Journal of Community and Health Sciences*, 9. Retrieved March 1, 2019, from <http://jchs.epubs.ac.za/index.php/jchs/article/view/105#.XLaaM2Z7mM8>
- Nimrod, G., Kleiber, D. A., & Berdychevsky, L. (2012). Leisure in coping with depression. *Journal of Leisure Research*, 44, 419–449. DOI: 10.1080/00222216.2012.11950272.
- Nunnally, J. C. & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York, USA: McGraw-Hill.
- Nydegger, R. (2008). *Understanding and treating depression*. Westport, USA: Praeger.

- Paluska, S. A. & Schwenk, T. L. (2000). Physical activity and mental health: Current concepts. *Sports Medicine*, 29, 167–180. DOI: 10.2165/00007256-200029030-00003.
- Park, S. (2018, November). *There is a difference in abilities, not in thoughts*. Retrieved April 10, 2019, from <https://www.joongdo.co.kr/main/view.php?key=20181125010010480>
- Park, S. K. (1999). *The relationships between the personal attributes of the physically handicapped and the participation in sports for all activities*. Unpublished Master's Thesis, University of Suwon, Suwon, South Korea.
- Park, Y. S., & Yu, Y. H. (1997). *Investigation on leisure activities for people with physical disabilities* (Translated) (pp. 81–101). Seoul, South Korea: Samyook Rehabilitation Center.
- Paul, C., Ayis, S., & Ebrahim, S. (2006). Psychological distress, loneliness and disability in old age. *Psychology, Health and Medicine*, 11, 221–232. DOI: 10.1080/13548500500262945.
- Perlman, L. A., & Peplau, D. (1984). Loneliness research: A survey of empirical findings. In L. A. Peplau & S. Goldston (Eds.), *Preventing the harmful consequences of severe and persistent loneliness* (pp. 13–46). Washington, USA: US Government Printing Office. DDH Publication (ADM) 84–1312.
- Petryshen, P. M., Hawkins, J. D., & Fronchak, T. A. (2001). An evaluation of the social recreation component of a community mental health program. *Psychiatric Rehabilitation Journal*, 24, 293–298. DOI: 10.1037/h0095083.
- Ponchillia, P. E., Armbruster, J., & Wiebold, J. (2005). The national sports education camps project: Introducing sports skills to students with visual impairments through short-term specialized instruction. *Journal of Visual Impairment and Blindness*, 99, 685–695. DOI: 10.1177/0145482X0509901107.
- Qualter, P., Quinton, S. J., Wagner, H. L., & Brown, S. L. (2009). Loneliness, interpersonal distrust, and alexithymia in university students. *Journal of Applied Social Psychology*, 39, 1461–1479. DOI: 10.1111/j.1559-1816.2009.00491.x.
- Richardson, E. V., Smith, B. M., & Papathomas, A. (2017). Disability and the gym: Experiences, barriers and facilitators of gym use for individuals with physical disabilities. *Disability and Rehabilitation*, 39, 1950–1957. DOI: 10.1080/09638288.2016.1213893.
- Rimmer, J. H., Padalabalanarayanan, S., Malone, L. A., & Mehta, T. (2017). Fitness facilities still lack accessibility for people with disabilities. *Disability and Health Journal*, 10, 214–221. DOI: 10.1016/j.dhjo.2016.12.011.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, USA: Princeton University Press.
- Rosenberg, M. (1989). *Society and the adolescent self-image* (revised ed.). Middletown, USA: Wesleyan University.
- Rosenberg, M. (1990). The self-concept: Social product and social force. In M. Rosenberg & R. H. Turner (ed.), *Social psychology: Sociological perspectives* (pp. 593–624). New York, USA: Basic Books.
- Rubenstein, C. M., Shaver, P., & Peplau, L. A. (1979). Loneliness. *Human Nature*, 2, 58–65.
- Rudnick, A. (2005). Psychiatric leisure rehabilitation: Conceptualization and illustration. *Psychiatric Rehabilitation Journal*, 29, 63–65. DOI: 10.2975/29.2005.63.65.
- Russell, D. W. (1996). *UCLA loneliness scale (Version 3): Reliability, validity, and factor structure*. *Journal of Personality Assessment*, 66, 20–40. DOI: 10.1207/s15327752jpa6601_2.
- Russell, D., Peplau, L. A., & Cutrona, C. E. (1980). The revised UCLA loneliness scale: Concurrent and discriminant validity evidence. *Journal of Personality and Social Psychology*, 39, 472–480. DOI: 10.1037//0022-3514.39.3.472.
- Russell, D., Peplau, L. A., & Ferguson, M. L. (1978). Developing a measure of loneliness. *Journal of Personality Assessment*, 42, 290–294. DOI: 10.1207/s15327752jpa4203_11.
- Shek, Y. L. & McEwen, M. K. (2012). The relationships of racial identity and gender role conflict to self-esteem of Asian American undergraduate men. *Journal of College Student Development*, 53, 703–718. DOI: 10.1353/csd.2012.0065.
- Slutzky, C. B. & Simpkins, S. D. (2009). The link between children's sport participation and self-esteem: Exploring the mediating role of sport self-concept. *Psychology of Sport and Exercise*, 10, 381–389. DOI: 10.1016/j.psychsport.2008.09.006.
- Sonstroem, R. J. (1997). The physical self-system: A mediator of exercise and self-esteem. In K. R. Fox (Ed.), *The physical self: From motivation to well-being* (pp. 3–26). Champaign, USA: Human Kinetics Publishers.
- Suh, Y. I. & Pedersen, P. M. (2010). Participants' service quality perceptions of fantasy sports websites: The relationship between service quality, customer satisfaction, attitude, and actual usage. *Sport Marketing Quarterly*, 19, 78–87.
- Taylor, H. O., Taylor, R. J., Nguyen, A. W., & Chatters, L. (2018). Social isolation, depression, and psychological distress among older adults. *Journal of Aging and Health*, 30, 229–246. DOI: 10.1177/0898264316673511.
- Trzesniewski, K. H., Donnellan, M. B., Moffitt, T. E., Robins, R. W., Poulton, R., & Caspi, A. (2006). Low self-esteem during adolescence predicts poor health, criminal behavior, and limited economic prospects during adulthood. *Developmental Psychology*, 42, 381–390. DOI: 10.1037/0012-1649.42.2.381.
- United Nations (n.d.). *Disability and sports*. Retrieved August 15, 2019, from <https://www.un.org/development/desa/disabilities/issues/disability-and-sports.html>

- UNICEF. (2012, December). *Changing attitudes towards people with disabilities*. Retrieved May 3, 2019, from https://www.unicef.org/disabilities/index_66543.html
- Valtorta, N. K., Kanaan, M., Gilbody, S., & Hanratty, B. (2016). Loneliness, social isolation and social relationships: What are we measuring? A novel framework for classifying and comparing tools. *BMJ Open*, 6, e010799. DOI: 10.1136/bmjopen-2015-010799.
- Veselinova, C. (2013). Understanding physical disability. *Nursing and Residential Care*, 15, 161–164. DOI: 10.12968/nrec.2013.15.3.161.
- Wagnsson, S., Lindwall, M., & Gustafsson, H. (2014). Participation in organized sport and self-esteem across adolescence: The mediating role of perceived sport competence. *Journal of Sport and Exercise Psychology*, 36, 584–594. DOI: 10.1123/jsep.2013-0137.
- Wasserman, D. (2006). *Depression: The facts*. New York, USA: Oxford University Press.
- World Health Organization. (2018, March). *Depression*. Retrieved April, 10, 2019, from <http://www.who.int/en/news-room/fact-sheets/detail/depression>
- World Health Organization. (n.d.). *Depression: Definition*. Retrieved March 14, 2019, from <http://www.euro.who.int/en/health-topics/noncommunicable-diseases/pages/news/news/2012/10/depression-in-europe/depression-definition>
- Zavaleta, D., Samuel, K., & Mills, C. T. (2017). Measures of social isolation. *Social Indicators Research*, 131, 367–391. DOI: 10.1007/s11205-016-1252-2.

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