



Received: November 14, 2022
Revised: February 17, 2023
Accepted: February 21, 2023

Corresponding Author:

Seung Ock Jang, DSW
Department of Social Welfare, College of
Social Science, Keimyung University, 1095
Dalgubeol-daero, Dalseo-gu, Daegu 42601,
Korea
Tel: +82-53-580-5958
Fax: +82-53-580-5313
E-mail: jseung@kmu.ac.kr

© 2023 Keimyung University School of Medicine
© This is an Open Access article distributed under
the terms of the Creative Commons Attribution
Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted
non-commercial use, distribution, and reproduc-
tion in any medium, provided the original work is
properly cited.

The Trajectory of Loneliness among Adolescent Game Players

Zexi Su, Seung Ock Jang

Department of Social Welfare, College of Social Science, Keimyung University, Daegu, Korea

The purpose of this study is to explore the change trajectory of loneliness in adolescent game users by utilizing the "game player panel data" of the Korea Creative Content Agency. A latent growth model was used to explore changes in youth game players. The results of this study are as follows. Loneliness of adolescent game users changes nonlinearly. Loneliness among adolescent game players increases over time and then decreases as they enter adolescence. The study result suggests that loneliness in adolescence requires different interventions at different ages.

Keywords: Game player, Latent growth model, Loneliness, Trajectory

Introduction

According to a survey conducted by the Korea Creative Content Agency in 2018, the gaming usage rate of Korean youth was 91.9%, and video games have become the number one leisure activity [1]. Although video games have become widespread and famous, the potential negative impact of video games as a leisure activity on the player base has been a concern for the general public. Numerous studies have pointed to an inverse association between video games and adolescent mental health [2]. The most direct effect of the time adolescents spend on video games is away from real-life interpersonal interactions, which can exacerbate social relationships and lead to feelings of isolation [3]. Therefore, the development of loneliness is expected in adolescents who enjoy playing games.

Loneliness in adolescence can be defined as distress brought about by one's own frustrated need for social and emotional interaction with others and negative evaluations of social relationships [4]. Some studies have shown that loneliness is high among Korean adolescents [5]. Moreover, adolescents with high levels of loneliness are likely to experience various maladaptive problems such as depression, anxiety, suicide, smoking, drinking, and failure in school due to feelings of despair, misanthropy, and powerlessness [6].

While most previous research has focused on the causes and mechanisms that may underlie the development of loneliness, the trajectory of change in loneliness has been less studied within Korea, especially among high-risk groups such as game players. Adolescence is a time of dramatic physical and psychological change, and loneliness may exhibit a high degree of instability [7]. Therefore, there is a need to explore the trajectory of adolescent game players' loneliness over time to understand the mental health of adolescents. The research question in this study is, how does loneliness among adolescent game players change over time?

Materials and methods

Data

This study used Game Players Panel data from Korea Creative Content Agency to explore loneliness changing trajectory in adolescent game players. The survey included adolescents in the fourth grade of primary school, first grade of middle school and first grade of high school in Seoul and the metropolitan area. This study analyzed the response data of adolescents who participated in the first half of the study's third/fifth/seventh/ninth responses. The total number of participants was 778, of which 381 (49%) were male and 397 (51%) were female.

Measurement

The Korean Creative Content Agency's Game Players Panel Data measured loneliness using ten items from the UCLA Loneliness Scale. Of these, eight were negative questions, and two were positive questions. We reverse-scored the two positive questions to create a total score for loneliness. The Cronbach's alpha for loneliness is 0.912, 0.912, 0.909, and 0.916.

Analysis strategy

All research questions in this study were analyzed using a latent growth model based on structural equation modelling. Specifically, this study conducted a longitudinal data analysis in two steps. First, descriptive statistics and correlation analyses were performed on the main variables. Second, no-change, linear growth and quadratic growth models were developed to fit the change in the data, and the model with the best fit index was selected. Model fit was tested using chi-square (χ^2), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA).

Descriptive statistics and correlation analyses between the main variables in this study were performed using SPSS 26.0, and latent growth models were analyzed using Amos 24.

Result

Correlation analysis and descriptive statistics among the main variables

The results of the descriptive statistics and correlation analyses of the variables are shown in Table 1. The analysis results show that the mean values of loneliness among adolescent game players show a trend of increasing and then decreasing. The results of the correlation analysis showed that the values

of loneliness at each time point were positively correlated.

Changes of loneliness

In order to analyze changes in loneliness among adolescent game players, no change models, linear growth models and quadratic growth models were developed. The fit of each model for unconditional potential growth is shown in Table 2. According to the the model fit, RMSEA less than 0.05 is a perfect fit, between 0.05 and 0.08 is a good fit, and bigger than 0.08 is a bad fit [8]. In contrast, the no-change model, RMSEA was 0.9, and the fit performed poorly. However, both the linear and quadratic growth models met the requirements.

A chi-square test ($\Delta \chi^2 = 19.36, \Delta df = 2$) showed p-value significant, indicating a significant difference between the two models. The quadratic growth model had a smaller chi-square value, so the quadratic growth model was chosen as the final model better to describe the change in loneliness among adolescent game players. In addition, the estimated means of the linear growth model were 15.82, 15.98, 16.15, and 16.31, while the estimated means of the quadratic growth model were 15.67, 16.14, 16.30, and 16.16. Combined with the sample means in Table 1, the difference between the estimates of the quadratic growth model is smaller than the difference between the sample means and the estimates of the linear growth model. It is shown in Fig. 1 and Fig. 2 Therefore, the quadratic growth model can better fit the trajectory of the data.

Table 1. Correlations and means for loneliness (N = 778)

	c3lone	c5lone	c7lone	c9lone
c3lone	1			
c5lone	0.595*	1		
c7lone	0.520*	0.628*	1	
c9lone	0.485*	0.522*	0.599*	1
Mean	15.73	15.97	16.37	16.11
Standard Deviation	5.447	5.591	5.162	5.781

* $p < 0.01$. lone, loneliness.

Table 2. Comparison of goodness-of-fit indexes in unconditional latent growth model for loneliness

	χ^2 (df)	RMSEA	TLI	CFI
No-change model	80.266 (11)	0.09	0.944	0.938
Linear growth	31.915 (6)	0.075	0.961	0.977
Quadratic growth model	12.555 (4)	0.052	0.981	0.992

RMSEA, root mean square error of approximation; TLI, tucker-lewis index; CFI, comparative fit index.

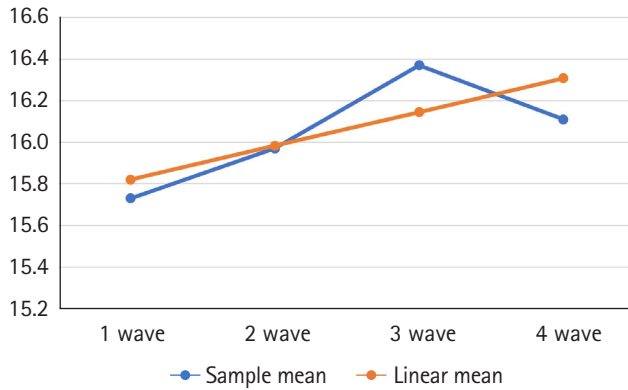


Fig. 1. Comparison of sample means and linear growth model estimates for loneliness.

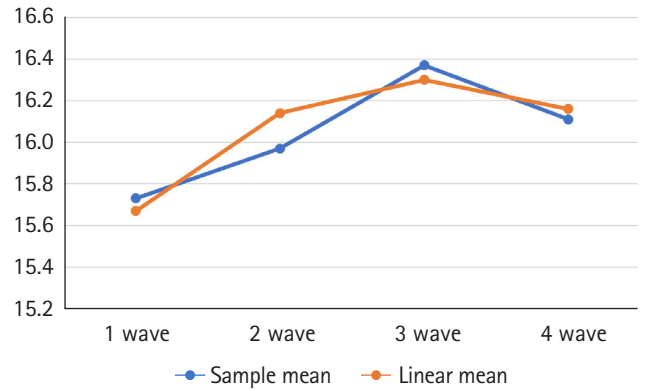


Fig. 2. Comparison of sample means and quadratic growth model estimates for loneliness.

As shown in Table 3, the initial value of loneliness for adolescent game players was 15.67, with a variance of 19.954 ($p < 0.001$), which implies that there is individual difference in the change of loneliness over time. The slope of linear growth was 0.62 ($p < 0.01$), which suggests that loneliness increased 0.62 per year over time. The slope of the quadratic was -0.152 , which suggests that loneliness decreased by 0.152 per year in later years. In addition, there was a significant correlation between the linear and quadratic slope of change in loneliness. However, between the initial value of loneliness and the linear slope and between the initial value of loneliness and the quadratic slope, the correlation was not significant. In other words, the initial value of loneliness of adolescent game players did not affect the linear and quadratic slope of loneliness. This suggests that there may be other factors that influence the slope of adolescent game players.

Discussion

This study aims to analyze how loneliness among adolescent game players changes over time. The loneliness of adolescent game players shows a quadratic growth trajectory of change over time that increases and then decreases. There are significant individual differences in the initial values and rates of loneliness change. There are significant correlations between linear and non-linear rates but no statistically significant relationship between initial value and rate of change. This is not the same as most current researches showing that loneliness increases linearly through adolescence. The trajectory of change in loneliness of the participants in this study took the trend of increasing and then decreasing, possibly because the positive attitude towards being alone during adoles-

Table 3. Parameter estimates of quadratic growth model for loneliness

		Mean	Variance
Loneliness	ICEPT	15.670*	19.954*
	SLOPE	0.620**	6.931**
	QUAD	-0.152***	0.755*
	ICEPT <--> SLOPE	-0.198	
	SLOPE <--> QUAD	-0.899**	
	ICEPT <--> QUAD	0.065	

* $p < 0.001$, ** $p < 0.01$, *** $p < 0.05$. ICEPT, initial status; SLOPE, linear change; QUAD, quadratic change (nonlinear change).

cence increased with age [9]. Specifically, adolescent game players may be more affected by being alone in the early years, so loneliness is always on the rise. However, by late adolescence, when adolescence is no longer afraid of being alone and has learned to appreciate the positive aspects of being alone, playing alone does not feel as lonely as it used to. Thus, feelings of loneliness slowly begin to diminish. This is similar to the findings of van Dulmen and Goossens [10]. Adolescent game players are a high-risk group for loneliness, and social workers should develop intervention services based on the timing and characteristics of changes in their loneliness to improve their effectiveness.

Conflict of interest

All authors declare no conflicts-of-interest related to this article.

References

1. Korean Creative Content Agency. Game player panel 4th year study. Naju: Songseol publishing; 2018.
2. Tortolero SR, Peskin MF, Baumler ER, Cuccaro PM, Elliott MN, Davies SL, et al. Daily violent video game playing and depression in preadolescent youth. *Cyberpsychol Behav Soc Netw*. 2014;17:609-15.
3. Lemmens JS, Valkenburg PM, Peter J. Development and validation of a game addiction scale for adolescents. *Media Psychol*. 2009;12:77-95.
4. Seo Y, An S, Kim H, Ko S. Review on the conceptual definition and measurement of loneliness experienced among Koreans. *Korean J Psychol*. 2020;39:205-47.
5. Youm YS, Kim KM, Sung GH, Yoon ST. The 11th Korean Children and Youth Well-Being Index 2019: International Comparative Study Report. Seoul: Korea Bang Jeong-hwan Foundation; 2019.
6. Kang SH, Lee DH, Choi JH. Reactive aggression and loneliness among adolescents: a moderated mediation model of social isolation and perceived school climate. *J Educ Stud*. 2022;53:125-49.
7. Lucas RE, Donnellan MB. How stable is happiness? Using the STARTS model to estimate the stability of life satisfaction. *J Res Personal*. 2007;41:1091-8.
8. Kline RB. Principles and practice of structural equation modeling. 4th ed. New York: The Guilford Press; 2015.
9. Corsano P, Majorano M, Champretavy L. Psychological well-being in adolescence: the contribution of interpersonal relations and experience of being alone. *Adolescence*. 2006;41:341-53.
10. van Dulmen MHM, Goossens L. Loneliness trajectories. *J Adolesc*. 2013;36:1247-9.