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Why do young people use fitness apps? Cognitive characteristics and app quality

Mijeong Park[1] · **Hana Yoo**[2] · **Jeongeun Kim**[3,4,5] · **Jisan Lee**[3,5]

Abstract This study examined the effects of young adults' social-cognitive characteristics and fitness apps' quality-related characteristics on users' intention to continue using apps. This study used a self-report questionnaire to collect data from 201 participants between November 29 and December 16, 2016. PASW/WIN 20.0 was used to perform Pearson's correlation analysis, and hierarchical multiple regression. Results showed that users' social-cognitive characteristics and the app' quality-related characteristics accounted for 39.3 and 1.6% of users' intention to continue using fitness apps, respectively. Social-cognitive characteristics included quality-related app characteristics, which explained 40.9% of users' intention to continue using the apps. Self-efficacy, innovative propensity, outcome expectations, and engagement were key variables affecting the intention to continue using apps. Therefore, it is suggested that researchers or healthcare providers who want to utilize fitness apps for young adults could invest time and effort in the selection of existing high-quality apps and design intervention programs to stimulate users' social-cognitive factors.

Keywords Young Adult · Mobile Applications · Physical fitness · Cognition · Intention

✉ Jisan Lee
saan2mari@gmail.com

[1] Department of Nursing, Hoseo University, Asan, Republic of Korea

[2] Department of Nursing, Korean Bible University, Seoul, Republic of Korea

[3] College of Nursing, Seoul National University, Seoul, Republic of Korea

[4] Research Institute of Nursing Science, Seoul National University, Seoul, Republic of Korea

[5] Interdisciplinary Program of Medical Informatics, Seoul National University, Seoul, Republic of Korea

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1 Introduction

The number of health, fitness, and medical apps on Google Play and the App Store (Apple) surpassed 100,000 in 2014 [1]. While < 50% of people used health-related apps, only 35% used iOS apps for 30 consecutive days [2]. Therefore, there is a need to identify factors affecting continuous app use to provide information for app development and establish strategies to manage apps' failure to enter the market. This study examined users' characteristics and quality-related app characteristics affecting intention to continue using fitness apps among college students, who are more concerned with weight control and fitness apps relative to other age groups [3, 4].

2 Method

2.1 Study design and participants

A descriptive survey was conducted. Participants were 201 college students from 3 universities in South Korea. The inclusion criterion was installation of ≥ 1 fitness-related app on a smartphone, regardless of current use or reason for use. G*power 3.1.9 was used to determine the sample size for multiple regression analysis with 10 predictors, a medium effect size (.15), significance of .05, and power of .95. In total, 173 participants were required [5]. Data from 201 questionnaires were analyzed; 9 had invalid answers and were excluded.

2.2 Measurements

We modified 3 items pertaining to app use intention [6]; Cronbach's α was .79 in the original study and .73 in the current study. Participants' concern about their health was measured as follows: "How much are you usually concerned about your health?" This was rated on a 5-point Likert scale ranging from 1 (not concerned at all) to 5 (very concerned). Four items on self-efficacy regarding smartphone application use were employed [6]. Cronbach's α was .82 in Chang's study [6]. Three items pertaining to innovative propensity regarding smartphone apps [6] were also used. Cronbach's α was .84 in Chang's study [6]. We modified 3 items pertaining to outcome expectations regarding medicine-related apps [7], to correspond to the purpose of the study. Cronbach's α was .89 in Shim's study [7]. In addition, we modified 4 items pertaining to social influence regarding medicine-related smartphone apps [7], to correspond to the objective of the study. Cronbach's α was .86 in Shim's study [7]. Moreover, quality-related app characteristics were measured using the simpler version of the Mobile App Rating Scale by Stoyanov et al. [8]. The tool consists of 20 items divided into 5 subscales: engagement, functionality, aesthetics, information, and subjective quality. Cronbach's α of the original version was .90 [8].

Ethical approval was granted by H University's Life Ethics Consideration Committee (no. KBUIRB-201611-SB-040-01). Data were collected between November 29 and December 16, 2016, using a self-report questionnaire, and analyzed using PASW/WIN 20.0. Differences in participants' intention to continue using fitness apps according to their characteristics were examined using correlations between factors. Hierarchical multiple regression analysis was used to examine effects of participants' social-cognitive characteristics and quality-related app characteristics on intention to continue to use apps.

3 Results

3.1 Characteristics of participants

Participants' mean age was 21.2 years; most were women (71.0%). Just over half used the android operating system (52.2%), and just under half used iOS (47.8%).

3.2 Score conversion results

Results were converted to a 5-point scale, to facilitate standardized comparison between variables. Regarding users' social-cognitive characteristics, the highest converted score was for health concerns (M = 3.72), while the lowest was for social influence (M = 2.18). Regarding quality-related app characteristics, the highest converted score was for functionality (M = 3.55), and the lowest was for subjective quality (M = 1.90). Participants' mean converted score for intention to continue using fitness apps was 3.06.

Table 1 Correlations between intention to continue using fitness application and cognitive social characteristics (N = 201)

Variables	Health concerns r (*p*)	Self-efficacy	Innovative propensity	Outcome expectations	Social influence
Intention to continue using fitness app	.23***	.57***	.47***	.32***	.14
Health concerns		.23***	.14*	.17*	− .07
Self-efficacy			.58***	.18*	.07
Innovative propensity				.0	.17*
Outcome expectations					.28***

*$p < .05$; ***$p < .001$

3.3 Correlations between intention to continue using fitness apps and social-cognitive characteristics

Table 1 shows intention to continue using fitness apps was significantly positively correlated with health concerns, self-efficacy, innovative propensity, and outcome expectations.

3.4 Effect of social-cognitive and quality-related app characteristics on intention to continue using fitness apps

In Model 1, participants' social-cognitive characteristics explained 39.3% of the variance in their intention to continue using fitness apps. In comparison, in Model 2, which included quality-related app characteristics, participants' social-cognitive characteristics explained 40.9% of the variance in participants' intention. In Model 2, self-efficacy, innovative propensity, outcome expectations, and engagement, in particular, had a statistically significant positive effect on intention to continue using fitness apps (Table 2).

Prior to data analysis, we examined assumptions regarding multicollinearity, error terms, and outlier tests regarding independent variables in regression analysis. Variance inflation factors were < 10 and ranged between 1.10 and 2.64; the Durbin-

Table 2 Cognitive social characteristics, quality-related app characteristics, and intention to continue using fitness apps (N = 201)

Variable	Characteristic	Model 1		Model 2	
		β	t (*p*)	β	t (*p*)
Social-cognitive characteristics	Health concerns	.07	1.24 (.217)	.07	1.27 (.204)
	Self-efficacy	.40	5.80 (< .001)	.40	5.29 (< .001)
	Innovative propensity	.20	2.93 (.004)	.18	2.61 (.010)
	Outcome expectations	.21	3.49 (.001)	.18	3.06 (.003)
	Social influence	.02	.33 (.744)	− .01	− .08 (.939)
Quality-related app characteristics	Engagement			.16	2.14 (.034)
	Functionality			.09	1.19 (.234)
	Aesthetics			− .16	− 1.90 (.058)
	Information quality			.02	.27 (.790)
	Subjective quality			.04	.61 (.544)
Adj R^2		.393		.409	
F (*p*)		26.87 (< .001)		14.82 (< .001)	

Watson statistic was 1.98, which was close to the benchmark of 2; and at .06, the maximum Cook's distance did not exceed 1.0. Therefore, basic assumptions of regression models were satisfied.

4 Discussion

4.1 Social-cognitive characteristics and intention to continue using fitness apps

The highest mean score was health concerns. In this study, participants were young adults, and most were women. Therefore, this observation is consistent with the results of previous research indicating that a large proportion of young, particularly female, college students used online resources for healthcare [9].

The lowest mean score was for social influence, indicating that influence of family members, friends, and colleagues on participants' use of fitness apps was weak. In addition, correlation analysis showed intention to continue using fitness apps was not correlated with social influence. As this is inconsistent with a previous study indicating social effects influence weight loss significantly, more research is needed [10].

The results indicated that intention to continue using fitness apps was significantly positively correlated with health concerns, self-efficacy, innovative propensity, and outcome expectations. As these correlations were significant, and the coefficients were $\geq .40$, we focused our discussion on medium and strong positive correlations [11]. The correlation between the intention to continue using fitness apps and self-efficacy was stronger relative to the other variables. These findings indicate that medical experts' and researchers' efforts to encourage healthy behavior via fitness apps could be facilitated by the identification of the features of fitness apps that boost self-efficacy, or external factors that assist consumers in using fitness apps. In addition, innovative propensity was moderately strongly correlated with intention to continue using fitness apps; this finding is consistent with results of previous research [12].

4.2 Effects of social-cognitive characteristics and quality-related app characteristics on intention to continue using apps

The results suggest that social-cognitive characteristics explained 39.3% of the variance in intention to continue using fitness apps. In Model 2, which included quality-related app characteristics, 40.9% of this variance was explained, indicating that quality-related app characteristics explained an additional 1.6% of the variance in intention to continue using the apps. These findings suggest that users' tendency to continue using apps was more strongly affected by their own social-cognitive factors, rather than apps' quality-related factors. In Model 2, in particular, self-efficacy, innovative propensity, outcome expectations, and engagement affected participants' intention to continue to use fitness apps. Considering that results of some studies indicated that use of mobile apps did not affect weight control in

individuals receiving weight loss treatments [13], it appears that the effects of mobile apps are limited when individuals already depend on other factors for self-efficacy or outcome expectations.

4.3 Limitations of this study and suggestions for future research

While young adults were the target generation, the sample contained a high proportion of women. Therefore, future research can include samples containing similar numbers of men and women.

5 Conclusions

This study examined which social-cognitive and quality-related factors encourage young people to use fitness apps. The results showed that social-cognitive characteristics had a strong influence. These days, there are numerous adequate free fitness apps available, and newer and better apps will be introduced to the market. Consequently, it would be time-consuming for a single researcher to design and develop apps. Thus, researchers and/or healthcare providers who want to utilize fitness apps for young adults could invest time and effort in the selection of existing high-quality apps and design intervention programs to stimulate users' social-cognitive factors.

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