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Original Research

A Comparative Study on the Effect of Self-Determined Motivation of Generation Z on Their Exercise Adherence Intention According to Their Satisfaction with Body Image and Gender

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Abstract

Background: Generation Z is accustomed to using social media to expose themselves to others. Due to the characteristics of this generation, the intention to continue exercise differs depending on the satisfaction with one's body image. **Methods**: This study analyzed (a) the effect of Generation Z's self-determined motivation to exercise on their exercise adherence intention and (b) the moderating effect of satisfaction with body image and gender between self-determined motivation and exercise adherence intention. Data from 451 Generation Z (born during 1995–2010) university students in Republic of Korea were analyzed on self-determined motivation and exercise adherence intention by structural equation modeling (SEM). **Results**: The effect of self-determined motivation on exercise adherence intention showed that external regulation had a significant negative effect on exercise adherence intention. In contrast, identified regulation and intrinsic motivation had a significant positive effect on exercise adherence intention. Moreover, this study compared the differences between the four classified groups according to the gap between perceived and ideal body images, level of satisfaction or dissatisfaction with the body image, and gender. The comparison results indicated that external regulation had a significant negative effect on exercise adherence intention in all groups. In the group of men who were satisfied with their body image, intrinsic motivation had a positive effect on their exercise adherence intention. **Conclusions**: Based on the analysis results, Generation Z's exercise adherence intention was more affected by internal satisfaction rather than external motivations. It is significance lies in the fact that it focused on Generation Z, who will be the future leading consumers.

Keywords: Generation Z; self-determined motivation; exercise adherence intention; satisfaction with body image

1. Introduction

The supply of the most cutting-edge digital devices, such as smartphones, has increased due to technological development, providing people with opportunities to easily access social media platforms. Through these platforms, people can not only view others' lifestyles, but also project how they live to other users. However, owing to the characteristics of social media platforms, people tend to portray their lives in a positive light rather than a true reflection of reality [1,2]. In other words, they are likely to show virtual situations of their lives that are more positive than their actual situations, such as delicious food, excellent products, and muscular bodies [3]. The long-term influence of traditional media, including television programs and fashion magazines, has contributed to establishing a social atmosphere where people admire body images of slim women and muscular men [4]. The term "body image" refers to individuals' sentiments and attitudes about their own bodies. This concept reflects not only individuals' self-perceptions of their own bodies but also others' perceptions of them [5]. The results of the analysis regarding the effect of body image on individuals indicate that a positive body image is highly associated with high self-esteem, positive sentiments, and social behaviors [6]. In contrast, it has been reported that a negative body image might threaten mental health by causing low self-esteem and negative emotions or sentiments [7–9]. As such, body image serves as a variable that affects individuals' psychological and social behaviors. This variable can be adjusted through physical activity [10].

Physical activity has positive effects on enhancing individuals' body image, self-esteem, and overall confidence throughout their lives [11]. Those who exercise regularly show higher satisfaction with their body images than those who do not [12,13]. Additionally, those who recognize their body image positively tend to participate in exercise more actively than those who recognize their body image negatively [14,15]. Markland [16] analyzed the relationship between people's discrepancies concerning their perceived body sizes and physical activity and found that their level of emotional dissatisfaction and sense of shame about their bodies increased as their weight increased or self-discrepancies in their body images increased [17]. As for the phenomenon in which numerous people actively engage in physical activity to shape their ideal body image [18,19], self-discrepancy theory states that people take such action

as part of their efforts to reduce the gap between their actual and ideal body images [20].

Markland [16] explained the relationship between self-discrepancy and physical activity in terms of behavioral regulation or Self-Determination Theory (SDT). SDT is a representative concept of motivation used to explain the reasons for people's constant exercise or participation in physical activity [21]. Motivation provides information that can be used to understand individuals' decisions and determine the direction, strength, and continuity of their behavior. Thus, participation in any form of physical activity, including sports, is closely related to motivation [22]. Deci and Ryan [23] classified the motivation to engage in activities into three types: individually controlled behaviors, that is, planned activities (intrinsic motivation), behaviors controlled by external forces (extrinsic motivation), and behaviors performed without motivation (amotivation). The aforementioned types of motivation are not oppositional to each other but appear in diverse forms on a continuous line according to the degree of self-determination [23]. Extrinsic motivation comprises external regulation, introjected regulation, and identified regulation, according to the level of self-determination in ascending order [24]. Intrinsic motivation occurs when people exercise to obtain essential pleasure and satisfaction from their exercise behaviors, whereas extrinsic motivation arises when people exercise to achieve other specific purposes (e.g., a desire to lose weight or to get in better shape) [25]. Previous studies examining the relationship between self-determined motivation and exercise behaviors reported that those who possess a strong sense of self-determined motivation are likely to actively participate in consistent exercise [26,27].

As described in the aforementioned theories, self-determination plays a crucial role in motivating individuals to consistently engage in physical activity. However, participation intention might differ according to each individual's situation. As the younger generation (i.e., Generation Z) is accustomed to exhibiting themselves on social media platforms, pleasure or satisfaction obtained through body shaping can be a more significant motivating factor than participation in exercise for health. In various industries, it has been already considered that the MZ generation has a different tendency from the previous generation [28]. In particular, Generation Z, born from 1995 to 2010, shows a distinct difference from the Baby Boomers (1946–1964) and Generation X (1965–1978) [29]. Thus, the degree to which self-determined motivation affects exercise adherence varies according to the self-discrepancy in body image, which indicates a difference between the ideal and perceived body images of individuals. Rodin [30] argued that people prefer a slim and thin figure, which is commonly admired in modern society, and that more than 40% and 50% of men and women, respectively, were not satisfied with their body images.

Thus, this study analyzed the effect of self-determined motivation on exercise adherence intention by focusing on members of Generation Z, who are skilled at using social media platforms and tend to actively expose themselves to others using these platforms. In addition, this study investigated the moderating effect of satisfaction with body image and gender between self-determined motivation and exercise adherence intention. Consequently, this study established the following research problems and a research model (Fig. 1):

Research Problem 1. Self-determined motivation (i.e., intrinsic, external regulation, introjected regulation, and identified regulation) of Generation Z will significantly affect their exercise adherence intention.

Research Problem 2. Self-determined motivation of Generation Z will have different effects on their exercise adherence intention according to gender and perceived satisfaction with their body image.

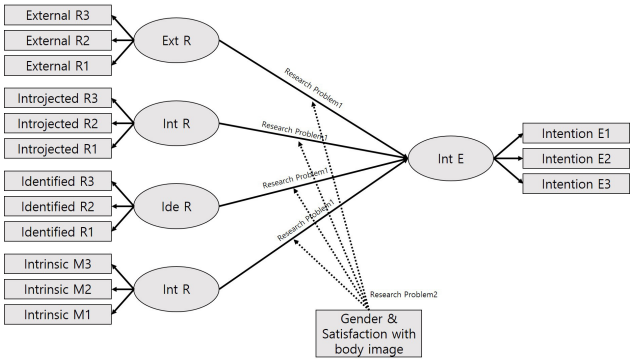

Fig. 1. Research structural model.

2. Methods

2.1 Participants

This study selected Generation Z members as the research participants. This study limited the range of Generation Z research participants to those born during 1995–2010. Table 1 presents the general characteristics of the participants.

Table 1. General characteristics of respondents.

Items	Frequency (persons)	Percentage (%)
Gender		
Male	226	50.1
Female	225	49.9
Main social media platform used		
Instagram	377	83.6
Facebook	14	3.1
Twitter	12	2.7
TikTok	8	1.8
None	40	8.9
Total	451	100.0

2.2 Instruments

The survey consisted of 19 items, each measured on a five-point Likert scale. The specific items included in this survey tool are as follows. First, a figure rating scale (FRS) proposed by Steiger, Fraenkel, and Leichner [31] was used to measure respondents' perceived body images. This scale, indicated in Fig. 2 (Ref. [26]), consists of nine male and nine female body figures that increase in size, with accompanying numerical ratings from 1 to 9. Respondents were asked to select (1) the ideal body type they desired and (2) the body type that they perceived as their current body type. After subtracting the values of their actual body images from the values of their ideal body images, if the calculated value is positive, it means that the participant expects his or her perceived body image to increase. If the calculated value is negative, it means that the participant expects his or her perceived body image to decrease. If the calculated value is 0, it means that the participant considers his or her current body image equivalent to his or her ideal body image.

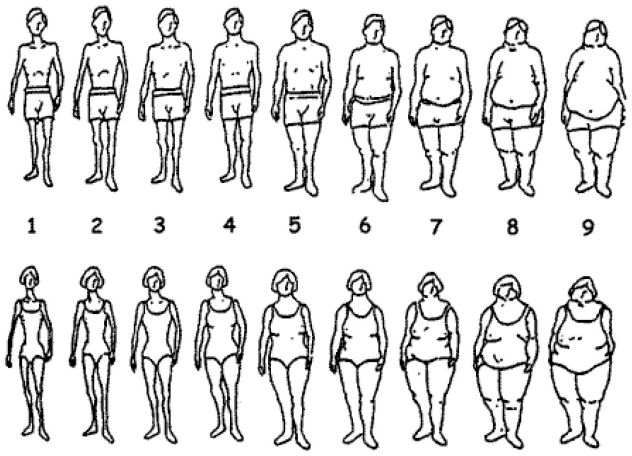

Fig. 2. Figure rating scale (FRS) by Steiger, Fraenkel, and Leichner [26].

Second, this study revised and supplemented the Behavioral Regulation on Exercise Questionnaire-2 (BREQ-2) proposed by Markland and Tobin [32]. The revised questionnaire was then used to measure participants' self-determined motivation. This questionnaire comprises 12 items based on four factors. Specifically, it includes three items each on external regulation (used to measure the effect of external influences on participants' participation in exercise), introjected regulation (used to measure the effect of perceived guilt on their participation in exercise), identified regulation (used to measure the effect of benefits obtained through exercise on their participation in exercise), and intrinsic motivation (used to measure the pleasure gained by participation in exercise).

Finally, this study adjusted and supplemented items used in a previous study conducted by Bhattacherjee [33] and applied three revised items to measure participants' exercise adherence intention. In addition, this study included an additional 19 questionnaires to investigate participants' demographic characteristics (e.g., gender, age, and status of using social media).

2.3 Data Analyses

This study used the statistical programs SPSS 23.0 (IBM Corp., Chicago, IL, USA) and AMOS 23.0 (IBM Corp., Chicago, IL, USA) for analysis. Confirmatory factor and reliability analyses of the research tool were also conducted (Table 2). In addition, a normality test and correlation analysis between variables were conducted to examine the relationship between variables and multicollinearity (Table 3). The research problems were investigated using a structural equation model, and moderating effect analysis was performed to verify the differences between groups. This study conducted all empirical analyses at a significance level of $\alpha = 0.05$.

2.4 Procedure

Ethical approval was obtained from the Institutional Review Board (IRB) of Gachon University through a preliminary review, in accordance with the Bioethics and Safety Act, in February 2022. Subsequently, an online survey was conducted by applying a convenience sampling (non-probability) method for approximately three months. This study used the Google platform to create online questionnaires and inform research participants about the purpose of this study and the instructions on the information to be collected. After voluntarily agreeing to participate in this study, research participants completed self-administered questionnaires. The data of 451 questionnaires were obtained through the survey process.

3. Results

3.1 Descriptive Statistics Analysis, Correlation Analysis, and a Normality Test

This study conducted a normality test on the valid survey data. To this end, it also conducted descriptive statistics and correlation analyses. Table 3 presents the results of the analyses. First, this study calculated the self-discrepancies of participants in their body images by subtracting the values of their actual body images from the values of their ideal body images. The mean (M) and standard deviation (SD) of participants' self-discrepancies in their body images were calculated as –0.75 and 1.5, respectively. Based on these results and the purpose of this study, participants were divided into a group of those generally satisfied with their body image (self-discrepancy $<\pm 1$) and a group of those dissatisfied with their body image (self-discrepancy $>\pm 1$). To reflect the research purpose, this study analyzed the satisfaction of male and female groups according to self-discrepancies in their body images. The mean and standard deviation of self-discrepancies of the male group in

Table 2. Confirmatory factor analysis and reliability analysis of self-determined motivation.

Items		β	SE	t	AVE	CR	α
External regulation	I decided to exercise after listening to what others said.	0.764					
	I exercise to hang out with my friends.	0.848	0.072	15.876	0.930	0.975	0.837
	I exercise because I am afraid that people might not like me if I do not exercise.	0.771	0.071	15.335			
Introjected regulation	I get nervous when I do not exercise regularly.	0.595					
	I feel guilty when I do not exercise.	0.928	0.155	11.186	0.861	0.947	0.837
	I feel ashamed when I skip exercise.	0.695	0.119	11.586			
Identified regulation	I find it important to exercise regularly.	0.697					
	It is important for me to exercise regularly.	0.810	0.089	12.970	0.902	0.965	0.769
	I gain pleasure and satisfaction through exercise.	0.732	0.093	12.659			
Intrinsic motivation	I think that exercise is a pleasant activity.	0.856					
	I enjoy my exercise time.	0.952	0.044	27.117	0.962	0.987	0.788
	I exercise because it is fun.	0.864	0.049	24.119			
Model fit	X^2 df p	IFI	TLI	CFI	RMSEA		
	129.115 48 0.000	0.969	0.957	0.968	0.061		

IFI, Incremental fit index; TLI, Tucker-Lewis index; CFI, Comparative fit index; RMSEA, root mean square error of approximation.

Table 3. Descriptive statistics analysis and correlation analysis.

	1. Self-discrepancy in the body image	2. Self-discrepancy of the male group	3. Self-discrepancy of the female group	4. External regulation	5. Introjected regulation	6. Identified regulation	7. Intrinsic motivation	8. Exercise adherence intention
M	–0.75	–0.17	–1.3	2.4	2.7	4.5	4.2	4.3
SD	1.5	1.7	0.8	1.1	1.1	0.6	0.9	0.7
Skewness	0.65	0.01	0.3	0.57	0.30	–1.7	–1.06	–0.75
Kurtosis	0.97	0.22	0.36	–0.45	–0.81	5.33	0.37	–0.22
4. External regulation				1				
5. Introjected regulation				–0.002	1			
6. Identified regulation				–0.134**	0.342**	1		
7. Intrinsic motivation				–0.303**	0.168**	0.286**	1	
8. Exercise adherence intention				–0.456**	0.261**	0.354**	0.435**	1

**$p < 0.01$.

their body images were –0.17 and 1.7, respectively. The mean and standard deviation of self-discrepancies of the female group in their body images were –1.32 and .84, respectively. As both male and female groups showed negative self-discrepancy values, it can be concluded that both groups expected their body figures to decrease and that the female group exhibited higher expectations for a decrease in their body size.

In addition, this study examined the analytical values of descriptive statistics to verify whether there was a multivariate normal distribution (Table 3). It was found that skewness was between –1.26 and 1.44 and that kurtosis was between –1.16 and 2.45. Thus, the analysis results satisfied standards for skewness of ±2 and kurtosis of ±7, as proposed by West, Finch, and Curran [34]. Furthermore, a correlation analysis was performed to examine the fundamental relationship between the variables used in this study. Table 3 shows the analysis results. It was found that all the values of the correlation coefficients were lower than 0.80, the reference value proposed by Kline [35]. The calculation results verified the appropriateness of multicollinearity among the variables.

3.2 Effect of Self-Determined Motivation on Exercise Adherence Intention

3.2.1 Verification of Goodness of Fit of the Structural Model

The analysis results of goodness of fit of the structural model established in this study are as follows. The result of calculating the goodness-of-fit values showed that X^2/df was 2.77 and that this value satisfied the reference value of 3.0 or lower [36]. Based on these results, the measured model was verified to be appropriate for the collected data. The result of examining all goodness-of-fit values also showed that IFI, TLI, CFI, and RMSEA were calculated as 0.958, 0.944, 0.958, and 0.063, respectively. Based on these results, it was verified that all goodness-of-fit values satisfied the standards (IFI >0.90, TLI >0.90, CFI >0.90, RMSEA <0.10) [36]. As the structural model established in this study was verified to be appropriate for the collected

Table 4. Verification of research problem 1 based on the structural model.

Paths	β	SE	t	p
External regulation- > exercise adherence intention	–0.366	0.027	–6.174	0.000
Introjected regulation- > exercise adherence intention	0.023	0.031	0.732	0.464
Identified regulation- > exercise adherence intention	0.182	0.049	3.093	0.002
Intrinsic motivation- > exercise adherence intention	0.207	0.028	3.890	0.000

β, Estimate of standardized regression weight; *SE*, Standard error of regression weight; *t*, Critical ratio for regression weight; *p*, Level of significance for regression weight.

Table 5. Comparison of goodness of fit between the model applying equivalence and constraint between groups and the baseline model.

Model	X^2	df	p	Q	IFI	TLI	CFI	RMSEA
1	793.698	350	0.000	2.268	0.883	0.856	0.890	0.053
2	922.336	395	0.000	2.335	0.859	0.849	0.858	0.055

1: The model applying a constraint on measurement invariance, 2: The model applying an equivalence invariance constraint between groups.

data, a follow-up analysis was performed.

3.2.2 Verification Based on the Structural Model

Table 4 and Fig. 3 present the results of verifying the relationships among the variables based on the structural model established in this study. First, among the types of self-determined motivation for exercise, external regulation had a significant negative effect on exercise adherence intention (β = –0.366, t = –6.174, $p < 0.000$). Second, among the types of self-determined motivation for exercise, introjected regulation did not have a significant effect on exercise adherence intention (β = 0.023, t = 0.732, $p > 0.05$). Third, identified regulation had a significant positive effect on exercise adherence intention (β = 0.182, t = 3.093, $p <$ 0.05). Finally, intrinsic motivation had a significant positive effect on exercise adherence intention (β = 0.207, t = 3.890, $p < 0.000$).

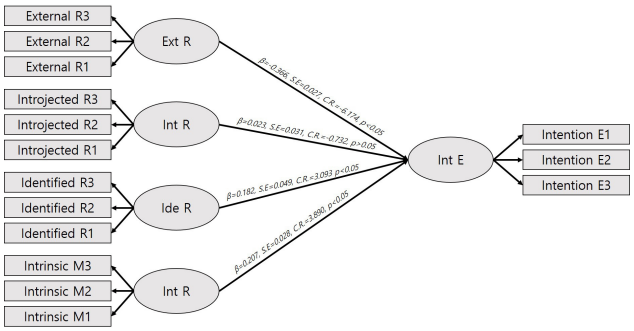

Fig. 3. Result of the structural model.

3.3 Effect of Self-Determined Motivation on Exercise Adherence Intention Varies according to Gender and the Difference between Perceived and Ideal Body Images

This study divided research participants into a group of those generally satisfied with their body image (self-discrepancy $<\pm1$) and a group of those generally dissatisfied with their body image (self-discrepancy $>\pm1$) to verify the research problem of this study. Subsequently, as both groups were divided according to gender, the following groups were finally formed: satisfied men (n = 117), dissatisfied men (n = 106), satisfied women (n = 110), and dissatisfied women (n = 115). This study conducted a multigroup structural equation modeling (SEM) analysis based on the four groups to analyze the differences in path coefficients.

To compare the path coefficients between groups, this study applied a constraint on measurement invariance and an equivalence constraint. A constraint on measurement invariance was applied to verify whether responses between groups were equivalent to each other under the same research model conditions [37]. An equivalence constraint between groups was applied to restrict each regression coefficient according to a research model and verify the existence of a difference between groups based on each path [38]. This study compared goodness of fit between a model applying a constraint on measurement invariance between groups and a model applying an equivalence constraint. Table 5 presents the results of the comparison results. The IFI, TLI, CFI, and RMSEA of the model applying the equivalence constraint between groups were similar to those of the model applying the constraint on measurement invariance. This comparison result confirmed the validity of the equivalence constraint between groups ($\triangle X^2$: 128.63, $\triangle$df: 45, $\triangle$IFI: –0.024, $\triangle$TLI: –0.007, $\triangle$CFI: –0.032, $\triangle$RMSEA: 0.002).

Based on the aforementioned verification results, this study compared the path coefficients between groups. Specifically, this study compared 12 path coefficients related to the effect of self-determined motivation for exercise on exercise adherence intention, path coefficients of the model applying a constraint on measurement invariance, and path coefficients of the baseline model. Table 6

Table 6. Goodness of fit of the (baseline) model applying a constraint on measurement invariance and parameter estimates according to groups.

Paths	Satisfied with the body image				Dissatisfied with the body image			
	Male		Female		Male		Female	
	B (β)	t	B (β)	t	B (β)	t	B (β)	t
External regulation → exercise adherence intention	–0.217 (–0.369)	–3.741***	–0.154 (–0.372)	–3.029**	–0.159 (–0.418)	–2.253*	–0.129 (–0.375)	–2.871**
Introjected regulation → exercise adherence intention	0.037 (0.048)	0.539	0.138 (0.289)	2.677**	–0.079 (–0.151)	–1.096	–0.129 (–0.204)	–1.667
Identified regulation → exercise adherence intention	0.069 (0.071)	0.664	0.102 (0.121)	0.694	0.105 (0.204)	1.534	0.280 (0.306)	2.084
Intrinsic motivation → exercise adherence intention	0.412 (0.368)	3.559***	0.097 (0.193)	1.069	0.064 (0.145)	1.070	0.072 (0.221)	2.037

***$p < 0.001$.

presents the comparison results. Regarding the effect of self-determined motivation for exercise on exercise adherence intention, external regulation had a significant negative effect on exercise adherence intention in all groups. In the group of women who were satisfied with their body image, introjected regulation had a significant positive effect on exercise adherence intention. In the group of men who were satisfied with their body image, intrinsic motivation had a significant positive effect on exercise adherence intention.

4. Discussion

This study analyzed the effect of Generation Z's self-determined motivation for exercise on their exercise adherence intention. The analysis results showed that external regulation had a significant negative effect on exercise adherence intention. However, identified regulation and intrinsic motivation had a significant positive effect on exercise adherence intention. Based on these results, it was verified that pressure from the surrounding people (external regulation) negatively affected Generation Z's exercise adherence intention. Moreover, guilt resulting from failure to exercise did not affect exercise adherence intention. In contrast, achievement of goal through exercise (identified regulation), as well as pleasure and fun obtained through exercise (intrinsic motivation), had positive effects on exercise adherence intention. Previous studies analyzing the relationship between self-determined motivation and exercise behaviors reported that those who had high self-determined motivation tended to actively participate in exercise and showed a high level of exercise adherence intention [23,24]. Deci and Ryan [39] stated that self-determined motivation is a functional ability of human beings, including the experience of internal causal materials and the capacity to autonomously select one's behaviors. In other words, self-determined motivation is not based on control but rather on pleasure and fun. For example, Schaefer, Vella, Allen, and Magee [40] investigated self-determined motivation and found that golf players' performance increased when they were driven by intrinsic regulation, which helped them obtain fun and pleasure through golf. However, their performance decreased when external regulation by parents or other people increased. That is, external motivating factors, such as external regulation, introjected regulation, and identified regulation, did not affect exercise adherence intention or had a negative effect. In line with these findings, this study concluded that among the various types of extrinsic motivation, external regulation and identified regulation had negative and positive effects, respectively, on Generation Z's exercise adherence intention. This study's findings indicate that Generation Z is deeply interested in the benefits that can be obtained through exercise, such as health enhancement, and that their motivation for exercise is more related to their own satisfaction than external factors.

Next, this study compared the difference in the effect of self-determined motivation on exercise adherence intention based on the level of satisfaction or dissatisfaction with body image and gender. Based on the results, the significant differences have been found on gender. Previous studies also found that gender differences may exist on exercise participation [41,42]. In this study, specifically, in the group of women who were satisfied with their body image, introjected regulation positively affected their exercise adherence intention. In the group of men who were satisfied with their body image, intrinsic motivation positively affected their exercise adherence intention. That is, men regarded pleasure based on exercise as a motivation for exercise adherence. This result is in line with the result of previous research [43] investigating the differences between gender motives for exercise participation. That is, men tend to participated in exercises for psychological pleasure (e.g., happiness or enjoyment) unlike women. In contrast, women regarded fear or guilt that they might feel when they do not exercise as the most crucial reason for exercise adherence. According to Leng, Phua, & Yang [44], women tend to want smaller body sizes even though they are satisfied with their body image, and the tendency could

be manifested by the exercise adherence intention. In addition, Harman and Burrows [45] stated that women tend to feel guilty about their negligence in body shape management. Given this difference, attention should be paid to the fact that exercise adherence intention varies according to gender.

5. Conclusions and Implications

Based on the analysis results, this study derived the following conclusions. First, external regulation, a lower factor of Generation Z's self-determined motivation for exercise, negatively affected their exercise adherence intention. Only intrinsic motivation positively affected exercise adherence intention. Second, this study analyzed the effect of Generation Z's self-determined motivation for exercise on exercise adherence intention according to their satisfaction or dissatisfaction with their perceived body image and gender. The analysis results indicated that external regulation negatively affected exercise adherence intention in all groups. For women who were generally satisfied with their body image, introjected regulation positively affected their exercise adherence intention. Meanwhile, for men who were generally satisfied with their body image, intrinsic motivation positively affected their exercise adherence intention. Based on these results, it was verified that, overall, Generation Z's exercise adherence intention was more affected by internal satisfaction than external factors.

Therefore, this study analyzed the effect of self-determined motivation on exercise adherence intention according to satisfaction with the body image. Its significance lies in the fact that it focuses on Generation Z, who have recently gained considerable attention from various industries as they are the future leading consumers. Even so, this study has the following limitations. First, it calculated Generation Z's satisfaction with their body image using the FRS, which shows a series of consecutive body images that increase in size. As people can exercise not only to change their body image but also to enhance their health, further research should be conducted from various perspectives. In addition, this study identified participants' self-determined motivation for exercise based on a survey. In this regard, further experimental research should be conducted to verify the difference in exercise participation according to satisfaction with the body image and the degree of change in self-determined motivation according to exercise progress. Last, Generation Z, which was selected as the subject of this study, includes a period of 20 years. Given the fact that differences between generations Z could occur, research should be conducted on a wider range of ages in the future. In addition to age, it is also necessary to consider the need to conduct research by applying additional factors such as frequency of social media use.

Author Contributions

IL and CC set the research topic and design. All authors implemented the data collection and analysis. IL and CC completed the first draft of this study. CB reviewed the manuscript. All authors contributed to editorial changes for the revision process and approved the submitted manuscript.

Ethics Approval and Consent to Participate

This study is officially waived from Ethics Approval by IRB Committee at Gachon University (reference number: 1044396-202203-HR-047-01).

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Conflict of Interest

The authors declare no conflict of interest.

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