

The relationship between motivation and body composition in women's group fitness programs

DANIJELA KUNA¹, MIRELA SUNDA², BARBARA GILIC^{3*}

^{1,2}Faculty of Kinesiology Osijek, Josip Juraj Strossmayer University of Osijek, CROATIA

^{1,2}Faculty of Kinesiology Osijek, Josip Juraj Strossmayer University of Osijek, CROATIA

³Faculty of Kinesiology, University of Split, CROATIA

Published online: August 31, 2025

Accepted for publication: August 15, 2025

DOI:10.7752/jpes.2025.08191

Abstract:

Introduction and Purpose: Physical exercise is crucial for developing a healthy body, and it is crucial to emphasize that motivation plays an important role in exercise commitment and achieving long-term physical changes. Regular exercise can help keep people from getting chronic diseases, but how well they stick to it depends on what motivates them. There are more women joining group fitness programs these days, but there isn't much proof that motivation changes how body measurements change after different types of exercise. This study aimed to examine the changes in anthropometric indices following two different group exercise interventions and to determine whether there is a relationship between motivational parameters and changes in anthropometric indices. **Methodology:** Forty females (27–57 years) were divided into two groups: 22 participants attending three combined exercise programs and 18 attending one program for three months, with anthropometric indices and motivation profiles assessed. Two-way analysis of variance (Group × Time) was used to assess the effects of the applied interventions on the anthropometric indices, and Pearson's correlation coefficients for the correlations between the motivational parameters and changes in the anthropometric indices.

Results: There were substantial changes in body mass, body mass index, and body fat percentage (all with high effect sizes) from before the intervention to after it. Revitalisation was identified as a principal element influencing alterations in body mass and body fat percentage (Person's R from -0.36 to -0.49). Women in the combination program group reduced more body fat and had a higher waist-to-hip ratio than women in the solo program group. It indicates that having a lot of programs made training more effective. Both of the groups reduced weight, but females who performed a variety of diverse activities experienced the biggest changes.

Conclusion: The motivation profile results reveal how significant intrinsic and health-related goals are for making changes to your body. Both types of intervention were helpful, but the combination program that included different types of exercise worked best. These results indicate that group fitness programs ought to be structured not simply to facilitate physiological adaptations but also to cultivate intrinsic motivation and health-oriented objectives. By using a mix of different types of programs.

Key Words: fitness intervention; self-determination theory; anthropometric indices; well-being; women's health

Introduction

Continuous physical activity is important for maintaining and improving health, improving physical fitness and achieving optimal body composition (Guthold et al., 2020). Consistent participation in physical activity contributes substantially to the preservation of health and well-being and constitutes a critical factor in the prevention of chronic disease (Durstine et al., 2013). Specifically, by using different forms of exercise, such as aerobic physical activities, strength training, and flexibility exercises, people can achieve better cardiorespiratory endurance, increase muscle mass, reduce body fat, and generally improve metabolism (Eckstrom et al., 2020). Body mass, body fat percentage, body circumference, and skinfold measures are examples of anthropometric indicators that are essential for evaluating physical fitness and health (Kolb et al., 2021; Guryanov et al., 2024)).

Moreover, reducing body fat percentage or increasing muscle mass through regular physical exercise can significantly improve metabolic health, reduce the risk of chronic diseases, and increase overall physical endurance (Cao & Thyfault, 2023). Disruptions in the harmony of regulatory systems may impair adaptation mechanisms, ultimately leading to declines in health, reduced physical activity, and lower quality of life if left unaddressed (Lojdová et al., 2021). These parameters not only allow tracking progress in training but also help better assess long-term health, which is the reason for their frequent use in the fitness industry. In addition to providing benefits for physical health, regular physical activity also has a positive impact on mental health; reduces stress, anxiety and depression; and generally improves quality of life (Herbert, 2022; Balogh et al.,

2025). Long-term effectiveness of physical activity depends on sustained adherence to exercise programs, which many individuals find difficult to maintain beyond the initial months (Gaby et al., 2023).

Group fitness programs, such as aerobics, Pilates, CrossFit and similar activities, have become popular and effective physical exercise modalities. One of the reasons why group fitness programs are popular with exercisers is their cost, as they offer more favorable prices than individual training sessions. Group training thus becomes more accessible to the general public, especially those who want to exercise regularly, but cannot afford a personal trainer. Another reason for their popularity lies in socialization. It often happens that group programs create a sense of community, support, emotional connection and belonging to a group through which participants share their successes, challenges and motivation (Graupensperger et al., 2019). Furthermore, the popularity of this form of exercise is noted more often among women, as they often choose group programs that include dance elements, energetic music, and rhythmic movements (English, 2020). In addition to increasing motivation through group exercise, these programs enable constant supervision by an expert and adjustment of intensity, which can result in faster progress and better results for participants of different fitness levels (Thøgersen-Ntoumani et al., 2016). Although the health benefits of such programs are well documented, relatively few studies have examined how the structure of group fitness interventions (individual vs. combined programs) influences anthropometric changes in women. Elucidating these effects could provide valuable insights for optimizing training design. For maintaining regular physical activity and achieving success and progress in exercise, motivation is one of the key factors. We can divide motivation into two main types: intrinsic motivation and extrinsic motivation (Teixeira et al., 2012). When a person is motivated because of the personal satisfaction that physical exercise brings, when there is enjoyment in the activity itself and a sense of achievement or a desire for self-development, then one can speak of intrinsic motivation (Markland & Ingledew, 1997). Conversely, when a person exercises for a reward, social recognition or specific goals such as losing weight or achieving certain aesthetic standards, then one can talk about external motivation (Ntoumanis et al., 2021). According to Self-Determination Theory (Deci & Ryan, 2000; Teixeira et al., 2012), intrinsic motivation is more sustainable over time and associated with better exercise adherence, whereas extrinsic motivation often leads to less consistent engagement. This theoretical perspective provides a valuable framework for interpreting motivational profiles in exercise research. Both types of motivation can be powerful drivers of regular physical exercise, but intrinsic motivation tends to be more long-term and sustainable because it is more focused on personal satisfaction and internal goals. Therefore, it is important to determine the motivation profile of individuals involved in physical exercise because it will enable them to choose the optimal training modality.

In group fitness programs, motivation can be key to exercising consistency and achieving the desired results. Exercising in a group can further increase motivation, as training together often creates a sense of community and support (Davis et al., 2021). Additionally, motivation plays an important role in improving body-built indices, such as reducing body fat percentage, increasing muscle mass, and improving overall health. Increased motivation for exercise can lead to more consistent training, which can result in faster and more visible changes in body composition (Marcos-Pardo et al., 2018). Conversely, a lack of motivation can lead to interrupted training, quitting, and the absence of these changes. Although numerous studies have focused on the effectiveness of group fitness programs in improving physical fitness, more emphasis has not yet been placed on how different motivational factors, such as intrinsic or extrinsic motivation, affect specific outcomes, such as changes in body mass, body fat percentage, muscle mass, or other health-related anthropometric indicators. However, the majority of available research has focused on the physiological benefits of group exercise, with few studies looking systematically at how motivational variables interact with anthropometric changes in women (Prokopets et al., 2021). Specifically, whether mixing several forms of exercise offers more advantages than just one program is yet unclear. Additionally, the majority of individuals involved in group fitness training like to combine exercising types and to have a more diverse movement pattern (Graupensperger et al., 2019). Thus, individuals who have the choice to participate in several diverse fitness programs are expected to exhibit better exercise adherence and changes in anthropometric indices. Such studies could help better personalize the approach and increase the effectiveness of group fitness programs in achieving goals that are focused not only on physical fitness but also on permanent changes in body composition and overall health status. Although group fitness programs are becoming more popular among women, there is inadequate research on how program variety effects changes in anthropometric indices and how motivational characteristics moderate these outcomes.

The aim of this study was to examine the changes in anthropometric indices following two different group exercise interventions, with one group exercising on only one fitness program and the second group exercising in the three combined fitness programs. Additionally, the aim was to examine the relationships between motivational profiles and changes in anthropometric indices in participants in different fitness classes. The hypothesis of this research was that participants with stronger intrinsic motivations (e.g., enjoyment, revitalization) would show greater adherence and improvement in anthropometric indices. Additionally, the hypothesis was that different groups would exhibit distinct motivational profiles and corresponding body composition changes. Specifically, we hypothesized that individuals who combined three fitness programs would display greater improvements in anthropometric indices and a better motivation profile. The results of this study will identify motivational differences between groups and lead to practical implications for fitness program design.

Material and methods

Participants

A total of 40 females aged 27--57 years who had been attending group exercise pro-grams for at least 3 months were included in the study. The first experimental group (G1) consisted of 22 respondents who attended three combined exercise programs lasting 60 minutes, three times a week for a period of three months. The second experimental group (G2) consisted of 18 respondents who attended one model of the group exercise program for the same duration. All the respondents provided signed consent to participate in this study and were informed about the protocol and the aim of the study. The study was conducted in accordance with the current Declaration of Helsinki and was approved by the Ethics Committee of the Faculty of Kinesiology University of Osijek (classification code 029-01/22-01/05, registration number 2158-110-01-22-33).

Training program description

Exercisers in G1 attended only one group fitness program, the Feel the Burn program. Feel the Burn is a medium-intensity programme that combines cardio- and strength exercises with the goal of improving aerobic capacity, coordination, and repetitive and static strength. In training, smaller loads are used, such as dumbbells, elastic bands, and step-pers. On the other hand, the G2 participants combined the following three exercise programs: functional training, thighs abdomen back buttocks (TABB), and the Booty & Core program. The functional training was circular, with medium to high intensity, combining multiple joints, isolation and cardio-exercises. External loads such as barbells, dumbbells, and kettlebells were used in this training. TABB is a moderate-intensity training in which exercises are applied to strengthen and shape the muscles of the thighs, abdomen, back and buttocks via smaller loads, such as 1–5 kg dumbbells, 2 kg ankle weights, and elastic bands. Booty & Core is a choreographed medium-intensity program with modern pop mu-sic that is performed entirely with the assistance of a trainer/instructor with the aim of strengthening the muscles of the lower extremities and core muscles. In this training pro-gram, smaller loads are used, such as sand for ankles of 2 kg, elastic bands, and weights of 2-10 kg. Both groups exercised three times a week for 60 minutes during a three-month period.

Variables and testing protocol

The research was conducted in several parts and consisted of pre-intervention and post-intervention testing of the anthropometric characteristics and body composition of the participants, as well as completing an online survey questionnaire that examined the motivational factors upon completion of the treatment. Pre-intervention and post-intervention testing of anthropometric indices and body composition were carried out at the same time and were carried out by the same group of measurers in the same or-der. The subjects completed an online questionnaire after the treatment.

A caliper and a centimeter tape were used to measure the anthropometric indices of the subjects, and a TANITA BC-545 N digital medical scale was used to assess body composition. The following parameters were measured in this study: body mass, body height, body mass index, fat mass percentage, muscle mass percentage, visceral fat level, body water percentage, upper arm circumference, waist circumference, hip circumference, upper leg circumference, lower leg circumference, upper arm skinfold, subscapular skin-fold, abdominal skinfold, iliac crest skinfold, and upper leg skinfold. Skinfolds were measured three times with a caliper, and the mean value was taken for each result.

To assess motivation, the Croatian version of the Exercise Motivation Inventory (EMI-2) was used, and participants completed it via the online survey tool Google Forms (Anić et al., 2022). The EMI-2 consists of 51 items grouped into 14 different subscales covering both intrinsic and extrinsic motivators. These subscales include categories such as stress management, health pressures, enjoyment, social recognition, and appearance, allowing for a comprehensive understanding of why people choose to exercise (Kim & Cho, 2022). These subscales are related to five overarching themes based on self-determination theory (SDT): psychological motives (enjoyment, challenge, revitalization, stress management), interpersonal motives (affiliation, social recognition, competition), health motives (health pressures, ill-health avoidance, positive health), body-related motives (appearance, weight management), and fitness motives (strength and endurance, nimbleness) (Markland & Ingledew, 1997).

Statistical analysis

For all the examined variables, the Kolmogorov–Smirnov test was used to verify the normality of the distributions, and Levene's test was employed to determine whether the variables had appropriate homoscedasticity. The means and standard deviations are displayed as descriptive statistics. Two-way analysis of variance for repeated measures (ANOVA) was used to assess the effects of the applied interventions. The primary ANOVA effects were "Time" (pre- to postintervention) and "Group" (G1 vs. G2), with "Time×Group" serving as the interaction effect. Additionally, effect sizes were calculated and presented as partial eta squared, with threshold values for eta squared evaluated as small (0.01), medium (0.06), and large effects (0.14) (Adams & Conway, 2014). Differences between intervention groups in the motivation profile were calculated via independent samples t tests. For the purpose of this research, we calculated changes in anthropometric indices from pre- to post-intervention using the following formula: change (Δ) = Post-Intervention Value – Pre-Intervention Value. The new variable was used to calculate correlations, via Pearson's correlation coefficients, between changes in anthropometric indices and motivation variables. A significance level of $p < 0.05$ was applied to all computations, and we used Statistica v13.5 (TIBCO Software Inc., Palo Alto, CA, USA).

Results

Descriptive statistics of the body-built indices at the pre- and postintervention testing points for the total sample and the intervention groups are presented in Table 1. There was a visible reduction in body mass and body mass index from pre- to posttest points in the total sample. Other measures, such as visceral fat and waist circumference, also showed slight reductions. There was generally no significant difference between the two intervention groups, but slightly greater improvements in BF% and ULC (upper leg circumference) were noted in the second group.

Table 1. Descriptive statistics at pre- and post-intervention testing points for the total sample and stratified by intervention group.

	Total sample (n=40)		G1 (n=18)		G2 (n=22)	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD
BM (kg)	62.42 $\pm$ 9.32	61.56 $\pm$ 8.53	60.63 $\pm$ 7.8	60.18 $\pm$ 7.13	63.89 $\pm$ 10.35	62.69 $\pm$ 9.54
BMI (index)	22.82 $\pm$ 3.3	22.46 $\pm$ 3.03	22.33 $\pm$ 3.06	22.11 $\pm$ 2.82	23.21 $\pm$ 3.51	22.75 $\pm$ 3.23
BH (m)	165.45 $\pm$ 5.90	165.63 $\pm$ 5.77	164.95 $\pm$ 5.47	165.19 $\pm$ 5.28	165.86 $\pm$ 6.32	166.00 $\pm$ 6.25
BF%	28.30 $\pm$ 6.36	27.62 $\pm$ 6.08	28.28 $\pm$ 5.73	27.90 $\pm$ 5.63	28.31 $\pm$ 6.97	27.39 $\pm$ 6.55
BW%	52.61 $\pm$ 4.52	52.95 $\pm$ 4.65	52.63 $\pm$ 4.15	52.88 $\pm$ 4.05	52.6 $\pm$ 4.90	53.00 $\pm$ 5.19
MM%	42.03 $\pm$ 3.50	41.73 $\pm$ 3.27	40.93 $\pm$ 2.86	40.47 $\pm$ 2.17	42.93 $\pm$ 3.77	42.76 $\pm$ 3.68
VF (level)	4.05 $\pm$ 2.32	3.84 $\pm$ 2.21	3.72 $\pm$ 2.42	3.53 $\pm$ 2.37	4.32 $\pm$ 2.26	4.09 $\pm$ 2.08
UAC (cm)	27.43 $\pm$ 2.70	27.20 $\pm$ 2.53	27.09 $\pm$ 2.91	26.89 $\pm$ 2.8	27.70 $\pm$ 2.54	27.45 $\pm$ 2.32
WC (cm)	74.57 $\pm$ 7.41	74.04 $\pm$ 7.24	72.82 $\pm$ 7.62	72.68 $\pm$ 7.54	76.00 $\pm$ 7.09	75.15 $\pm$ 6.96
HC (cm)	97.39 $\pm$ 7.65	96.68 $\pm$ 6.77	96.69 $\pm$ 6.90	96.27 $\pm$ 6.12	97.95 $\pm$ 8.32	97.01 $\pm$ 7.39
ULC (cm)	57.00 $\pm$ 4.62	55.26 $\pm$ 4.15	56.26 $\pm$ 4.01	54.35 $\pm$ 3.4	57.6 $\pm$ 5.08	56.00 $\pm$ 4.61
LLC (cm)	35.91 $\pm$ 3.19	35.83 $\pm$ 2.67	34.84 $\pm$ 2.92	34.97 $\pm$ 1.98	36.79 $\pm$ 3.19	36.54 $\pm$ 2.98
UAS (mm)	21.32 $\pm$ 5.87	20.23 $\pm$ 5.65	20.15 $\pm$ 5.48	19.62 $\pm$ 5.38	22.29 $\pm$ 6.12	20.73 $\pm$ 5.94
SSS (mm)	15.52 $\pm$ 4.83	15.34 $\pm$ 5.30	15.83 $\pm$ 5.76	14.68 $\pm$ 5.10	15.27 $\pm$ 4.04	15.88 $\pm$ 5.52
ABS (mm)	19.24 $\pm$ 6.27	20.27 $\pm$ 6.84	18.68 $\pm$ 4.09	19.87 $\pm$ 5.53	19.70 $\pm$ 7.67	20.60 $\pm$ 7.87
ILCS (mm)	13.67 $\pm$ 6.64	12.67 $\pm$ 6.68	13.09 $\pm$ 4.52	13.68 $\pm$ 7	14.15 $\pm$ 8.05	11.85 $\pm$ 6.46
ULS (mm)	27.37 $\pm$ 10.54	23.88 $\pm$ 6.60	25.50 $\pm$ 9.72	23.42 $\pm$ 7.26	28.90 $\pm$ 11.16	24.26 $\pm$ 6.16
LLS (mm)	25.05 $\pm$ 8.09	23.15 $\pm$ 6.08	23.68 $\pm$ 7.48	21.83 $\pm$ 5.92	26.17 $\pm$ 8.55	24.23 $\pm$ 6.12

BM, body mass; BMI, body mass index; BH, body height; BF%, body fat percentage; BW%, body water percentage; MM%, muscle mass percentage; VF, visceral fat; UAC, upper arm circumference; WC, waist circumference; HC, hip circumference; ULC, upper leg circumference; LLC, lower leg circumference; UAS, upper arm skinfold; SSS, subscapular skinfold; ABS, abdominal skinfold; ILCS, iliac crest skinfold; ULS, upper leg skinfold; LLS, lower leg skinfold

To further calculate the differences in body-built indices between the intervention groups, between the two time points and between the groups and time points, Table 2 is displayed. There was a significant difference in body mass, body mass index, body fat percentage, visceral fat, upper leg circumference, and upper leg and lower leg skinfolds (all large effect sizes) between pre- and postintervention testing points. The groups differed only in muscle mass percentage (medium effect size), whereas the only significant interaction (group $\times$ time) effect was found for the iliac crest skinfold (large effect size).

Table 2. Differences in body-built indices expressed by two-factorial analysis of variance for group, time, and group $\times$ time interaction

	Main effects						Interaction		
	Group (G1, G2)			Time			(Group $\times$ Time)		
	F test	p	μ^2	F test	p	μ^2	F test	p	μ^2
BM	1.04	0.31	0.03	7.27	0.01	0.16	1.53	0.22	0.04
BMI	0.57	0.45	0.01	9.49	0.01	0.2	1.13	0.29	0.03
BH	0.21	0.65	0.01	2.67	0.11	0.07	0.21	0.65	0.01
BF%	0.02	0.90	0.01	7.65	0.001	0.17	1.32	0.26	0.03
BW%	0.01	0.98	0.001	3.56	0.06	0.09	0.17	0.68	0.01
MM%	4.46	0.04	0.11	2.88	0.09	0.07	0.64	0.43	0.02
VF	0.65	0.42	0.01	9.91	0.01	0.21	0.08	0.78	0.01
UAC	0.53	0.47	0.01	1.25	0.27	0.03	0.02	0.90	0.01
WC	1.56	0.22	0.04	1.08	0.31	0.03	0.56	0.50	0.01
HC	0.19	0.66	0.01	1.46	0.23	0.04	0.21	0.65	0.01
ULC	1.27	0.27	0.03	17.65	0.001	0.32	0.14	0.71	0.01
LLC	4.07	0.05	0.09	0.06	0.80	0.01	0.59	0.44	0.02
UAS	0.89	0.35	0.02	2.66	0.11	0.07	0.65	0.43	0.02
SSS	0.05	0.82	0.001	0.09	0.76	0.01	0.99	0.32	0.03
ABS	0.19	0.66	0.01	2.01	0.16	0.05	0.04	0.85	0.001
ILCS	0.04	0.85	0.01	2.38	0.13	0.05	6.78	0.01	0.15
ULS	0.71	0.40	0.02	7.25	0.01	0.16	1.06	0.31	0.02
LLS	1.31	0.26	0.03	6.05	0.02	0.14	0.01	0.95	0.01

BM, body mass; BMI, body mass index; BH, body height; BF%, body fat percentage; BW%, body water percentage; MM%, muscle mass percentage; VF, visceral fat; UAC, upper arm circumference; WC, waist circumference; HC, hip circumference; ULC, upper leg circumference; LLC, lower leg circumference; UAS, upper arm skinfold; SSS, subscapular skinfold; ABS, abdominal skinfold; ILCS, iliac crest skinfold; ULS, upper leg skinfold; LLS, lower leg skinfold

In Figure 1, the motivational profile of individuals involved in group fitness programs is displayed. The top motivational factor across groups is positive health, as both groups have high mean scores (G1: 4.76; G2: 4.55), revitalization (G1: 4.35; G2: 4.45), and ill-health avoidance (G1: 4.28; G2: 4.05), suggesting a significant focus on preventing health issues. There were no differences in motivational profile between the two groups.

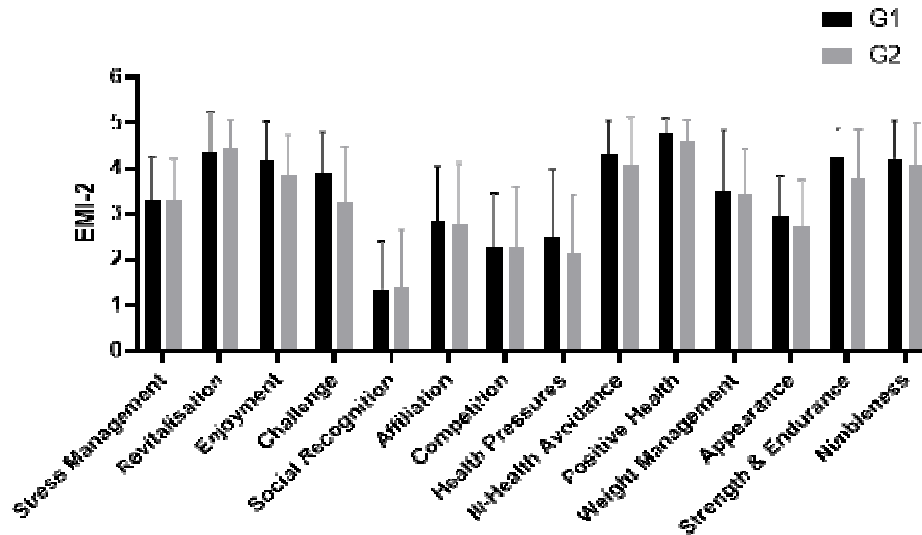


Figure 1. Motivational profile for individuals practicing group fitness classes, stratified by group

The correlations between motivation variables and the most significant changes in anthropometric indices after the intervention protocols are shown in Table 3. There was a significant negative correlation between changes in body mass, body mass index, body fat percentage and visceral fat and the revitalization parameter of motivation. Moreover, individuals motivated by weight management achieved reductions in body mass index and upper leg circumference.

Table 3. Correlation analysis between motivation variables and changes in anthropometric indices after intervention protocols.

Variable	BMA Δ	BMI Δ	BF% Δ	VFA	ULCA	SSSA	ILCSA
Stress Management	-0.14	-0.17	-0.19	-0.16	-0.06	0.30	0.02
Revitalization	-0.49**	-0.49**	-0.39**	-0.36*	-0.18	-0.05	-0.08
Enjoyment	-0.03	-0.06	-0.11	-0.14	0.12	0.17	0.15
Challenge	0.04	-0.01	-0.02	-0.10	-0.04	0.21	0.19
Social Recognition	-0.18	-0.24	-0.06	-0.12	-0.10	0.01	0.01
Affiliation	-0.04	-0.08	-0.11	-0.12	0.01	0.28	0.15
Competition	0.05	0.00	0.04	0.11	-0.01	0.12	0.07
Health Pressures	0.09	0.00	0.04	0.06	-0.17	0.07	0.16
Ill-Health Avoidance	-0.10	-0.13	-0.17	-0.22	-0.28	0.01	0.09
Positive Health	-0.09	-0.13	-0.04	-0.25	-0.07	0.30	0.22
Weight Management	-0.26	-0.33*	-0.17	-0.14	-0.45**	-0.16	0.18
Appearance	-0.16	-0.20	-0.16	-0.09	-0.24	0.10	0.10
Strength & Endurance	0.03	0.00	-0.10	-0.07	-0.08	0.13	0.12
Nimbleness	-0.14	-0.18	-0.11	-0.10	-0.23	0.30	-0.03

Δ - change, BM – body mass, BMI – body mass index, BF% - body fat percentage, VF – visceral fat, ULC – upper leg circumference, SSS - subscapular skinfold, ILCS - iliac crest skinfold * denotes $p < 0.05$, ** denotes $p < 0.01$

Dicussion

The main finding of this study is that both fitness group exercise intervention protocols were effective overall, with significant changes in key body composition measures. Time was a more critical factor than group differences were, suggesting that the interventions had similar effectiveness across groups. In regard to motivation, revitalization and weight management emerged as key drivers of body composition improvements, emphasizing the role of intrinsic and health-related goals in achieving physical changes.

Changes in body composition following exercise intervention

The finding that the group exercise intervention in both groups had effects on body-built indices is expected. Indeed, group exercise programs are known to elicit improvements in body composition metrics, such as body mass and body fat percentage, owing to their structured, consistent, and community-driven approach (Alves et al., 2022). A study that included an 8-week intervention of training in self-selected intensity reported notable improvements/reduction in body fat percentage when comparing women included in aerobic and resistance training and nonexercising controls (Alves et al., 2022). Additionally, one review study revealed that, compared with light and moderate training or nonexercising training, high-intensity training significantly reduced the total body fat percentage, visceral fat percentage and subcutaneous abdominal fat percentage (Poon et al., 2024). The background for reducing body mass and body fat percentage following exercise intervention might be an overall increase in energy expenditure, which leads to caloric deficit and a decrease in body fat (Most & Redman, 2020). Moreover, both groups combined aerobic and resistance exercises, which is the most effective strategy for increasing energy expenditure. Specifically, resistance training helps maintain lean muscle mass during weight loss, whereas aerobic exercise efficiently lowers the body fat percentage by encouraging the mobilization of fat as an energy source (Hunter et al., 2008, Eshiev et al., 2025).

We expected that changes in body composition would be more pronounced in the second group, which combined the three fitness programs for the following reasons. The participants in the second group experienced moderate to high-intensity exercise, a more diverse range of exercises, integrated high-intensity circuits, choreographed movements, and targeted muscle group training. On the other hand, G1 focused on general improvements in aerobic capacity, coordination, and overall strength and exercised only at medium intensities. Additionally, G1 uses smaller loads such as elastic bands and light dumbbells, whereas G2 incorporates both smaller loads and heavier weights, such as barbells and kettlebells, especially in the Functional training program, which should be connected with greater improvements in body-built indices. A possible explanation is that both groups might have used approximately the same amount of energy overall during the intervention. Specifically, caloric deficits might result in comparable changes in body mass and fat percentage because session length, frequency, and overall activity levels are comparable between groups (Redman et al., 2007). According to research, one of the main factors influencing changes in body composition is overall caloric expenditure rather than the type of activity (Fonseca et al., 2018, Bocharin et al., 2025). Thus, it seems that different types of group fitness programs produce similar effects on body-built indices as long as they have similar energy expenditure levels.

Motivational profile of individuals involved in group exercise programs

The motivational profile of individuals involved in group exercise programs revealed that intrinsic aspects of motivation are the leading drivers. Specifically, women in group fitness programs are driven mostly by health-related goals, emphasizing the desire to improve overall well-being, feel energized, and prevent health issues. Since health-related motives are closely linked to long-term advantages, they are frequently among the strongest indicators of adherence to physical activity, including improved emotional and physical well-being and chronic illness prevention. The lack of notable differences in the motivational profiles of the two groups might be attributable to the universal attraction of intrinsic motivators. Specifically, individuals are likely to put their health and renewal above outside considerations such as competition or good appearance, regardless of the kind or level of activity. According to self-determination theory, intrinsic motivators such as the desire for health and well-being encourage higher levels of engagement and adherence in physical activity environments (Deci & Ryan, 2012). Furthermore, by encouraging a sense of belonging and mutual support, the group exercise setting strengthened comparable motivational tendencies by directing participants' attention toward health-related goals rather than program-specific goals.

Notably, social recognition, as a form of extrinsic motivation, had the lowest scores in both groups, which additionally proves that women involved in group fitness programs are more focused on intrinsic motivators such as increasing health and feeling energized after the workout. Social recognition, which includes receiving praise, admiration, or acknowledgment from others, depends on outside approval rather than on the inner satisfaction or sense of fulfillment that comes from the activity itself. Importantly, when people exercise just for external rewards and recognition, they might not have enough drive, which would allow them to fully use the benefits of regular exercise and continue lifelong physical exercise. Indeed, in regard to exercise participation, intrinsic motivation is superior since it encourages long-term persistence by making exercise intrinsically pleasurable and rewarding rather than depending on outside incentives (Teixeira et al., 2012).

Revitalization and weight management emerged as key drivers of body composition improvements. One major reason for people looking to improve their body composition and health is revitalization, which is defined as the desire to feel reenergized and reduce stress through physical activity (Kim & Cho, 2022).

According to a 2022 study, body mass index, body fat percentage and motives for enjoyment and revitalization are directly correlated, meaning that those who exercise for these reasons are more likely to experience improvements in body composition (Galan-Lopez et al., 2022). In a similar vein, controlling weight is an essential incentive for people who want to change their body composition and become healthier. Weight loss and positive changes in body composition have been demonstrated to be facilitated by regular physical exercise in conjunction with adequate nutritional recommendations (Białkowski et al., 2024). Therefore, it is expected that weight loss is associated with changes in body composition.

Conclusions

The group fitness exercise intervention in both groups had effects on body-built indices, as group exercise programs are known to elicit improvements in body composition metrics, such as body mass and body fat percentage, owing to increased energy expenditure. Both groups are highly motivated by health-related goals, so fitness interventions should emphasize these aspects, such as the health benefits of regular exercise. Since enjoyment, revitalization, and health are stronger motivators than appearance or social recognition is, programs should prioritize intrinsic rewards over external incentives. Compared to the women in the single-program group, the women in the combined program experienced greater reductions in body fat and waist-to-hip ratio. This illustrates how program modification improves training effectiveness. These results demonstrate that intrinsic motivations, like enjoyment and revitalisation, not only increase adherence but also regulate the degree of physical changes, which is consistent with the principles of self-determination theory.

Instructors and program designers should use a variety of exercise techniques while focussing on internal health goals in order to maintain participation and optimise benefits for women. Future studies should investigate the relationship between psychological health, motivational factors, and long-term health outcomes; confirm these findings in larger and more diverse populations; and extend interventions over longer time periods.

Conflicts of interest The authors declare no conflict of interest.

Acknowledgements:

The authors would like to acknowledge the administrative and technical support provided by the Faculty of Kinesiology University of Osijek.

References:

- Adams, M. A., & Conway, T. L. (2014). Eta Squared. In A. C. Michalos (Ed.), *Encyclopedia of Quality of Life and Well-Being Research* (pp. 1965-1966). Springer Netherlands. https://doi.org/10.1007/978-94-007-0753-5_918
- Alves, R. C., Enes, A., Follador, L., Prestes, J., & SG, D. A. S. (2022). Effect of Different Training Programs at Self-Selected Intensity on Body Composition, Perceptual Responses and Fitness Outcomes in Obese Women. *Int J Exerc Sci*, 15(4), 373-385.
- Anić, P., Pokrajac-Bulian, A., & Mohorić, T. (2022). Role of sociocultural pressures and internalization of appearance ideals in the motivation for exercise. *Psychological reports*, 125(3), 1628-1647.
- Balogh, L., Szklenár, E., Makra, G., Torma, E., Rátgéber, L., Bíró, E., ... & Papp, G. (2025). Comparative analysis of ten-week high-intensity interval training, moderate-intensity continuous training, and proprioceptive workouts: Impact on cognitive abilities, body composition, perceived stress and motor skills. *Journal of Physical Education and Sport*, 25(3), 460-468. 10.7752/jpes.2025.03050
- Białkowski, A., Soszyński, P., Pinkas, J., Ostrowski, J., & Religioni, U. (2024). Effects of a Six-Month Physical Activity Program on Health Risk Factors and Body Composition Among Overweight and Obese Middle-Aged Adults. *Healthcare*, 12(21), 2140. <https://www.mdpi.com/2227-9032/12/21/2140>
- Bocharin, I., Vorozheikin, A., Alieva, K., Omurzakova, G., Myrzabekova, N., Akmatova, A., Kraynik, V., Vyazovichenko, Y., Smirnov, V., Shirokova, M., Kovylyna, R., Sushchenko, V., Vasilyeva, V., & Tyupa, P. (2025). Variation in body composition under the impact of a short health-enhancing fitness training cycle in a university setting. *Journal of Physical Education and Sport*, 25(3), 506-512. <https://doi.org/10.7752/jpes.2025.03055>
- Cao, X., & Thyfault, J. P. (2023, 2023/06/01/). Exercise drives metabolic integration between muscle, adipose and liver metabolism and protects against aging-related diseases. *Experimental Gerontology*, 176, 112178. <https://doi.org/https://doi.org/10.1016/j.exger.2023.112178>
- Davis, A. J., MacCarron, P., & Cohen, E. (2021). Social reward and support effects on exercise experiences and performance: Evidence from parkrun. *PLoS One*, 16(9), e0256546. <https://doi.org/10.1371/journal.pone.0256546>
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227-268. https://doi.org/10.1207/S15327965PLI1104_01
- Deci, E. L., & Ryan, R. M. (2012). Self-determination theory. *Handbook of theories of social psychology*, 1(20), 416-436.
- Durstine, J. L., Gordon, B., Wang, Z., & Luo, X. (2013). Chronic disease and the link to physical activity. *Journal of Sport and Health Science*, 2(1), 3-11. <http://dx.doi.org/10.1016/j.jshs.2012.07.009>

- Eckstrom, E., Neukam, S., Kalin, L., & Wright, J. (2020, Nov). Physical Activity and Healthy Aging. *Clin Geriatr Med*, 36(4), 671-683. <https://doi.org/10.1016/j.cger.2020.06.009>
- English, C. (2020). Feminism and finding meaning in group fitness. *FairPlay, Revista de Filosofía, Ética y Derecho del Deporte*(16), 1-17.
- Eshiev, A., Slivkina, N., Vorozheikin, A., Guryanov, M., Kireeva, O., Torchinsky, N., Dyussenova, L., Danyshbayeva, A., Aikhozhayeva, M., Dyussebayev, B., Temirtassova, Z., Ryzhkova, L., Apchel, V., & Usenok, S. (2025). Effectiveness of a three-month fitness training program for 40–54-year-old women. *Journal of Physical Education and Sport*, 25(3), 499–505. <https://doi.org/10.7752/jpes.2025.03054>
- Fonseca, D. C., Sala, P., de Azevedo Muner Ferreira, B., Reis, J., Torrinhas, R. S., Bendavid, I., & Linetzky Waitzberg, D. (2018, 2018/08/01/). Body weight control and energy expenditure. *Clinical Nutrition Experimental*, 20, 55-59. <https://doi.org/https://doi.org/10.1016/j.clnex.2018.04.001>
- Gabay, M., Levi, O., Petracovschi, S., Negrea, C., Matichescu, M., & Oravitan, M. (2023). Exploring exercise adherence and quality of life among veteran, novice, and dropout trainees. *Frontiers in Sports and Active Living*, 5, 1293535. <https://doi.org/10.3389/fspor.2023.1293535>
- Galan-Lopez, P., Lopez-Cobo, I., García-Lázaro, I., & Ries, F. (2022, Oct 29). Associations between Motives for Physical Exercise, Body Composition and Cardiorespiratory Fitness: A Cross-Sectional Study. *Int J Environ Res Public Health*, 19(21). <https://doi.org/10.3390/ijerph192114128>
- Graupensperger, S., Gottschall, J. S., Benson, A. J., Eys, M., Hastings, B., & Evans, M. B. (2019, Aug). Perceptions of groupness during fitness classes positively predict recalled perceptions of exertion, enjoyment, and affective valence: An intensive longitudinal investigation. *Sport Exerc Perform Psychol*, 8(3), 290-304. <https://doi.org/10.1037/spy0000157>
- Guryanov, M., Bocharin, I., Kalyuzhny, E., Kraynik, V., Limarenko, O., Lukashevich, E., Tereshkin, A., Faleeva, E., Vorozheikin, A., & Tyupa, P. (2024). Personalization of physical education based on the study of body composition and body vegetative support in female students. *Journal of Physical Education and Sport*, 2 (24), 353-359. <https://doi.org/10.7752/jpes.2024.02042>
- Guthold, R., Stevens, G. A., Riley, L. M., & Bull, F. C. (2020, 2020/01/01/). Global trends in insufficient physical activity among adolescents: a pooled analysis of 298 population-based surveys with 1·6 million participants. *The Lancet Child & Adolescent Health*, 4(1), 23-35. [https://doi.org/https://doi.org/10.1016/S2352-4642\(19\)30323-2](https://doi.org/https://doi.org/10.1016/S2352-4642(19)30323-2)
- Herbert, C. (2022). Enhancing Mental Health, Well-Being and Active Lifestyles of University Students by Means of Physical Activity and Exercise Research Programs. *Front Public Health*, 10, 849093. <https://doi.org/10.3389/fpubh.2022.849093>
- Hunter, G. R., Byrne, N. M., Sirikul, B., Fernández, J. R., Zuckerman, P. A., Darnell, B. E., & Gower, B. A. (2008, May). Resistance training conserves fat-free mass and resting energy expenditure following weight loss. *Obesity (Silver Spring)*, 16(5), 1045-1051. <https://doi.org/10.1038/oby.2008.38>
- Lojdová, M., Kvintová, J., Štěrbová, D., & Krol, P. (2021). Assessment of life satisfaction and its selected components in relation to the level of physical activity. *Journal of Physical Education and Sport*, 21(3), Art 171, 1346 – 1353. <https://doi.org/10.7752/jpes.2021.03171>
- Kim, S.-H., & Cho, D. (2022, 2022/02/14). Validation of exercise motivations inventory – 2 (EMI-2) scale for college students. *Journal of American College Health*, 70(1), 114-121. <https://doi.org/10.1080/07448481.2020.1726929>
- Kolb, S., Burchartz, A., Oriwol, D., Schmidt, S. C. E., Woll, A., & Niessner, C. (2021, Oct 13). Indicators to Assess Physical Health of Children and Adolescents in Activity Research-A Scoping Review. *Int J Environ Res Public Health*, 18(20). <https://doi.org/10.3390/ijerph182010711>
- Marcos-Pardo, P. J., Martínez-Rodríguez, A., & Gil-Arias, A. (2018, Jan 22). Impact of a motivational resistance-training programme on adherence and body composition in the elderly. *Sci Rep*, 8(1), 1370. <https://doi.org/10.1038/s41598-018-19764-6>
- Markland, D., & Ingledew, D. K. (1997). The measurement of exercise motives: Factorial validity and invariance across gender of a revised Exercise Motivations Inventory. *British Journal of Health Psychology*, 2(4), 361-376.
- Most, J., & Redman, L. M. (2020, May). Impact of calorie restriction on energy metabolism in humans. *Exp Gerontol*, 133, 110875. <https://doi.org/10.1016/j.exger.2020.110875>
- Ntoumanis, N., Ng, J. Y., Prestwich, A., Quested, E., Hancox, J. E., Thøgersen-Ntoumani, C., Deci, E. L., Ryan, R. M., Lonsdale, C., & Williams, G. C. (2021). A meta-analysis of self-determination theory-informed intervention studies in the health domain: Effects on motivation, health behavior, physical, and psychological health. *Health psychology review*, 15(2), 214-244.
- Poon, E. T., Li, H. Y., Little, J. P., Wong, S. H., & Ho, R. S. (2024, Nov). Efficacy of Interval Training in Improving Body Composition and Adiposity in Apparently Healthy Adults: An Umbrella Review with Meta-Analysis. *Sports Med*, 54(11), 2817-2840. <https://doi.org/10.1007/s40279-024-02070-9>
- Prokopets, T., Osipov, A., Lyakh, V., Ratmanskaya, T., Orlova, I., Vinnik, Y., ... & Kudryavtsev, M. (2021). Effect of healthful physical training on functional status in physically inactive middle-aged women with

- hypertension. *Journal of Physical Education and Sport*, 21, 2199-2208. <http://dx.doi.org/10.7752/jpes.2021.06475>
- Redman, L. M., Heilbronn, L. K., Martin, C. K., Alfonso, A., Smith, S. R., & Ravussin, E. (2007, Mar). Effect of calorie restriction with or without exercise on body composition and fat distribution. *J Clin Endocrinol Metab*, 92(3), 865-872. <https://doi.org/10.1210/jc.2006-2184>
- Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012, Jun 22). Exercise, physical activity, and self-determination theory: a systematic review. *Int J Behav Nutr Phys Act*, 9, 78. <https://doi.org/10.1186/1479-5868-9-78>
- Thøgersen-Ntoumani, C., Shepherd, S. O., Ntoumanis, N., Wagenmakers, A. J., & Shaw, C. S. (2016, Feb). Intrinsic motivation in two exercise interventions: Associations with fitness and body composition. *Health Psychol*, 35(2), 195-198. <https://doi.org/10.1037/hea0000260>