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EFFECT OF IMAGERY INTERVENTION TO INCREASE MOTIVATION FOR PARTICIPATION IN PHYSICAL ACTIVITY AMONG UNDERGRADUATE FEMALE UNIVERSITY STUDENTS

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Abstract

Introduction: Imagery is an extensively studied topic in sports and exercise psychology and is considered an intervention strategy to modify behaviour related to exercise performance. Methods: In this study, we examined the effect of a Motivation Imagery (MI) intervention and a General Physical Activity Imagery (GPAI) intervention on motivation for Physical Activity in 20 undergraduate female students at The Islamia University, Bahawalpur. Ten participants, assigned at random, practiced the MI intervention, with motivation-related content, while the other 10 participants practiced a GPAI intervention with no motivation-related content. The intervention's impact was evaluated using the International Physical Activity Questionnaire (IPAQ) to measure the physical activity levels of participants, while the Physical Activity and Leisure Motivation Scale (PALMS) was utilized to evaluate both intrinsic and extrinsic motivation. Results: the independent t-test analysis revealed a significant difference ($p < .05$) between the MI and GPAI conditions in both intrinsic motivation and PA. Specifically, there was a greater increase in intrinsic motivation for Weeks 0 to 12 in the MI condition compared to the GPAI condition. Additionally, a greater increase in PA for Weeks 0 to 12 was observed in the MI condition compared to the GPAI. There was no significant difference in extrinsic motivation in the MI condition as compared to the GPAI conditions. Conclusion: These results supported the proposition that an imagery intervention focused on motivation was an effective cognitive-behavioural technique that led to an increase in intrinsic motivation, as well as promoting active participation in physical activities.

Keywords: Imagery intervention, intrinsic motivation, extrinsic motivation, physical activity

Introduction

Maintaining a healthy lifestyle and general well-being requires regular physical activity (Makhmudovich, 2023). Overcoming mental obstacles that prevent people from engaging in regular exercise is just as difficult as overcoming physical ones. Investigating novel strategies to increase motivation for physical activity thus becomes essential (Cole et al., 2023). Recently, a strategy that has gained a lot of attention is the use of mental imagery (Palmiero et al., 2019). The study of imagery in exercise and sports psychology is broad. Using imagery intervention is a well-established psychological technique for improving performance, psychological capabilities, and injury recovery (Simonsmeier et al., 2021). Numerous factors, including personal preferences, the nature of the sport, and the motives of the individual, influence engagement in physical activity. For effective initiatives to increase people's engagement and dedication, it is essential to increase the motivations that drive them to participate in physical activity (Moradi et al., 2020).

Since the earliest days of differential psychology, researchers have been studying how people differ in their capacity for imagery. Throughout history, people have naturally engaged in discussions about their minds and experiences, making self-report techniques the oldest method of studying imagery (Kosslyn & Jolicoeur, 2021). Without the aid of outside stimuli, people may construct multisensory, immersive mental images thanks to the cognitive process known as mental imagery. Prior studies have demonstrated that the use of imagery can enhance motor skills (Di Corrado et al., 2020). Imagery has the potential for use in exercise and is a common intervention technique in sports. It is most likely the most effective cognitive-behavioural method for changing behaviour to improve sports and exercise performance (Barker et al., 2020). Imagery is a phenomenon that occurs when a person interprets a movement or experiences it as an image without really seeing it. It can arise from either intentional or unintentional recall processes (Di Corrado et al., 2019).

The self-determination theory (SDT) and the goal-setting theory are two cognitive and motivational theories that are used in imagery therapies. The importance of autonomy, competence, and relatedness in fostering intrinsic motivation is emphasized by SDT (Robert et al., 2018). Sports performance depends heavily on motivation, which affects athletes' commitment, effort, and perseverance (Mencarini et al., 2019). Physical and psychological elements affect an athlete's performance in sports, but motivational aspects are crucial in determining the long-term effects of sports practice on a player's psychological growth. (Gómez-López et al., 2020). Motivation is the key element in increasing Physical activity levels (Abdullah et al., 2019). Motivations for PA participation have been shown in research to play a factor in PA promotion. (Morris & Roychowdhury, 2020). People who are more motivated to engage in exercise and PA lead generally healthier lives than those who lack such motivation. The motivation and desire a person has inside to engage in a particular activity for its inherent happiness and fulfillment are referred to as intrinsic motivation. Extrinsic motivation refers to the drive to participate in an activity driven by external incentives or rewards rather than genuine personal interest or enjoyment (Ntoumanis et al., 2021).

Motivation and imagery both play important roles in numerous aspects of human existence, affecting our attitudes, behaviours, and general well-being. Over the past five years, extensive studies have been conducted in the fields of psychology, neurology, and cognitive science on the power of imagery and how it affects motivation (Junnarkar et al., 2021). Other than improving performance, imagery can also improve motivational or affective results. Imagery therapy significantly improved motor performance, motivation, and emotional outcomes. When compared, physical practice alone yielded inferior results in contrast to the combined approach of physical practice and

imagery, highlighting the distinct impact of each method (Simonsmeier et al., 2021). Visualizing successful performances, achieving goals, and overcoming obstacles by possessing a profound sense of self-assurance and belief in one's own efficacy in one's talents can be developed through imagery, which fuels motivation (Pietluch, 2019). It has been frequently demonstrated that imagery enhances sports performance and short-term motivation. The best methods for improving performance and raising emotional elements like confidence involve using motivational imagery in addition to practice (Di Corrado et al., 2020). Professional athletes utilize mental imagery during their training and practice sessions to enhance their physical performance and skills (Stokes et al., 2020). It has been discovered that imagery increases self-assurance, concentration, and focus. When an athlete uses imagery, they frequently feel more enthused, determined, and passionate, which increases their motivation to succeed in their sport (Roy, 2018).

Pakistan is among the nations that are gravely concerned about the rates of inactivity; 81% of Pakistanis do not engage in enough PA (Qureshi et al., 2016). Two significant psychological factors that may improve PA involvement in Pakistani adults are motivation and passion (Habib et al., 2022). Despite the pivotal role that psychological interventions play in encouraging physical exercise and reshaping individuals' psychological perspectives on physical activity, there has been a conspicuous lack of studies in this context. This study seeks to address this gap by exploring the influence of an imagery intervention on levels of intrinsic and extrinsic motivation for physical activity, thereby contributing valuable insights to the field and fostering healthier lifestyles in diverse cultural contexts. This study's goal is to examine how imagery intervention affects people's motivation and physical activity. The current study investigates how an imagery intervention impacts the level of extrinsic and intrinsic motivation, as well as how different levels of motivation can influence a selected group's level of physical activity, in light of the possibility of employing imagery training to improve motivation and physical activity. We created an imagery script to increase motivation. The script was utilized in an intervention trial to improve PA participation and PA motivation.

Method and Procedure

In this study, we examined the effect of an (MI) intervention and a general physical activity imagery (GPAI) intervention on motivation for Physical Activity. An intervention research design was employed to explore the relationship between MI imagery intervention and GPAI imagery intervention to increase physical activity, intrinsic motivation, and extrinsic motivation. Participants in both conditions practiced imagery for three face-to-face, individual sessions per week for twelve weeks. Participation in the study was entirely voluntary, and all participants willingly provided written informed consent.

Sample of Respondents

We enlisted undergraduate female participants from the Islamia University, Bahawalpur, who had regularly exercised at a moderate level for the previous six months. We completed all aspects of this study in English, and participants were expected to be able to speak, read, and write the language well. We chose 20 volunteers in all to take part in this intervention trial. Both the General PA Imagery (GPAI) and Motives Imagery Script (MIS) intervention conditions were given to them at random. Ten people made up the MIS condition, and ten people made up the GPAI condition. The age range of both groups during the period of collecting data was 18 to 25.

Measure: Demographic Information

We acquired demographic data from the participants, including their names (optional), ages, educational backgrounds, and several factors of people's involvement in physical exercise, including the specific kind of physical activities they engaged in, how frequently they participated (measured in days per week), and how long they participated (measured in hours per week).

The Sports Imagery Ability Measure (SIAM)

The Sports Imagery Ability Measure (SIAM), the Sport Imagery Ability Measure for Exercise (SIAM-E) was created by Gaskin et al (2005). This 48-item survey was carefully created to evaluate participants' capacity to visualize while exercising. The questionnaire uses 12 different subscales within these scenarios to assess different aspects of imagery experience. Respondents rate each dimension, sense modality, or mood using a 100mm visual analog scale, which ranges from 0 to 100. The ratings for each of the four scenarios in a given subscale are added up to create subscale scores, which range from 0 to 400. The SIAM-E was essential in this study's early screening procedure, but its use was purposefully kept to only two scenarios of SIAM to increase participant interest. Only the exercise venue and the successful session were used out of the four given scenes. The SIAM was found to have good to very strong internal consistency, with Cronbach alpha scores ranging from 0.66 to 0.87. Scores for test-retest reliability during four weeks ranged from 0.41 to 0.76, indicating moderate to very good correlations (Morris et al., 2005). All subscale variables have strong internal consistency findings, with alpha values above for all of the variables.70 (Budnik-Przybylska et al., 2014).

The International Physical Activity Questionnaire (IPAQ)

The International Physical Activity Questionnaire (IPAQ), developed by Craig et al (2003), is a dependable instrument for assessing an individual's physical activity levels. It finds applications in practical work settings as well as research environments. This questionnaire evaluates three distinct categories of physical activity: walking, moderate-intensity exercise, and vigorous-intensity exercise. The Metabolic Equivalent of Task (MET) values, a metric generated from the data acquired from the IPAQ, is used to depict the data in MET minutes/week The following equation can be used to calculate MET minutes by multiplying the MET level (Metabolic Equivalent of Task) by the number of minutes of activity per day and the number of days per week. The total MET-minutes/week is obtained by summing the IPAQ scores for these activities. The IPAQ, with defined MET values for walking (3.3 METs), moderate physical activity (4.0 METs), and vigorous physical activity (8.0 METs), is widely utilized for analyzing physical activity data. Extensive validation tests in 12 countries using IPAQ-set criteria confirmed the validity and reliability of the IPAQ. Spearman's rho test-retest reliability ratings, which indicate strong repeatability, varied from 66 to 88 (average: 76). When compared to the IPAQ long form, the concurrent validity of the short form was demonstrated by Spearman's rho correlations ranging from 64 to 70 (average: 67) (Craig et al., 2003).

Physical Exercise and Leisure Motivation Scale (PALMS)

Zach et al (2012) created the Physical Exercise and Leisure Motivation Scale (PALMS) as a thorough instrument for studying the reasons why people choose to exercise during their free time. This measure consists of 40 items, each of the nine elements, namely Mastery, Physical Condition, Affiliation, Psychological Condition, Appearance, Family and Friends' Expectations, Enjoyment, Health Professionals' and Employers' Expectations, and Competition/Ego, is evaluated on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). These items were derived through comprehensive in-depth interviews. With Cronbach's alpha coefficients ranging from 0.70 to 0.92, the PALMS, a well-known measure of participation motives, exhibits great reliability and has received significant validation through wide study applications. (Kueh et al., 2019).

Imagery Intervention Scripts

In the intervention, we created a standardized imagery script based on the seven components of the PETTLEP model of imagery. Both the Motivation Imagery Script (MIS) and General Physical Activity Imagery (GPAI) scripts emphasized utilizing senses, mental imagery of the specific task environment, and active

participation in the action. Cognitive imagery in both scripts involved visualizing oneself performing the task in a specific environment. Additionally, motivational imagery in the scripts was associated with fostering a desire to engage in the activity, experiencing a sense of accomplishment during the activity, and feeling a sense of achievement afterward. According to earlier research, including all of the PETTLEP components in a given intervention may maximize performance outcomes. However, people may struggle to focus if too much information is provided during visual interventions on the appropriate stimuli and responses. (Quinton et al., 2014). According to Williams et al. (2013), a delivery method they named "layering" to manage the complexity of PETTLEP imagery, where simple aspects (such as the physical environment) are first presented in the picture. Then, other components are gradually included, such as task, time, and learning. Finally, the picture screenplay is expanded with more sophisticated aspects like emotion and perspective. In this approach, we made sure that the imaging experience advanced from basic to complicated by methodically including all PETTLEP components over time. The emotional experience was There was a feature that was shared by both varieties of script, but it also set the two apart. Overall, the three subsections of the MIS and GPAI imagery scripts were descriptive and changed depending on the MIS and GPAI conditions. In order to explore how imagery affects motivation and physical activity for a study was conducted.

Procedure

We made contact with those who had agreed to volunteer for the research study. Out of the initial 50 people who expressed interest, a final selection of 20 volunteers was made to take part in the research. This selection process included a screening phase employing the SIAM-E (Self-Imagery Ability Measurement) to ascertain the participants' capacity for adequate mental imagery. Participants who scored below 120 on the SIAM-E scales were excluded from the study. We used the International Physical Activity Questionnaire (IPAQ) and Physical Activity Leisure Motive Scale (PALMS) Week 0 scores to determine the participants' baseline levels of physical activity (PA) and motivation at the start of data collection. Participants were randomly allocated to one of two conditions for the intervention: the Motive Imagery Script (MIS) or the General Physical Activity Imagery Script (GPAI). Participants in the GPAI condition adhered to the GPAI script with no motivation-related content, while those in the MI condition engaged in practices that matched the MI script with motivation-related content. Each participant underwent the entire imagery intervention for a total of 12 weeks. From Weeks 1 to 12, we conducted imagery sessions with each participant from both groups. We custom-tailored imagery sessions depending on their preferred kind of exercise three times a week. To evaluate any changes attributable to the in-person delivery of MI and GPAI therapies, we administered the Physical Activity and Leisure Motivation (PALM) questionnaire and the IPAQ at the end of the 12-week intervention period.

Statistical Analysis

In this study, we employed the statistical program SPSS version 25 to thoroughly examine the impact of imagery interventions on motivation levels and physical activity (PA). Specifically, we focused on two conditions: Motivation Imagery (MI) and General Physical Activity Imagery (GPAI). To assess the effectiveness of these interventions, we utilized the independent t-test, a statistical method tailored for comparing means between pre-intervention and post-intervention measurements within each condition. Furthermore, we also employed ANOVA, a powerful analytical tool that enables the examination of interactions between different factors in a study. By combining the independent t-test with ANOVA, we aimed to gain comprehensive insights into how these imagery interventions influenced the critical variables of interest. This multifaceted statistical evaluation strategy allowed for a

nuanced understanding of the effectiveness of the imagery interventions and their impact on the intrinsic and extrinsic motivation levels and PA within each condition.

Result

The result of Table 1 shows that the average age of the respondents was approximately (M=20.55) years, with a standard deviation of 1.76. All participants in this intervention are female. Regarding the intervention groups, the study consisted of an equal split between two groups: 50% (N=10) of the respondents were in the GPAI intervention group, while the other 50% (N=10) were in the MI intervention group.

Table 1:

Frequency Distribution of Demographic Questionnaire (N=20)

Respondents Characteristics		*F (%)*	*M ± (SD)*
Age			20.55 ± (1.76)
Gender	Female	20 (100.0)	
Intervention Group	GPAI	10 (50.0)	
	MI	10 (50.0)	

Table 2 presents the results of an analysis of variance (ANOVA) comparing pre-intervention and post-intervention measures for different physical activity categories across two groups, GPAI and MI. The table includes means, standard deviations (SD), F-statistics, and associated p-values. For the "Walking" category, both GPAI and MI groups experienced a significant increase in mean scores from pre-intervention to post-intervention, with GPAI participants showing a change from 282.0000 to 424.0000 (p = .003) and MI participants from 260.00 to 398.0000 (p = .005). The F-statistics of 12.245 and 10.084, respectively, indicate that the differences in means are statistically significant. In the "Moderate" category, there is no significant difference within the GPAI group (p = .785), while the MI group showed a significant increase from 326.0000 to 428.0000 (p = .012), as reflected in the F-statistic of 7.842. For the "Vigorous" activity level, both GPAI and MI groups exhibited significant changes in mean scores. The GPAI group showed a non-significant increase from 274.1000 to 330.4000 (p = .242), while the MI group demonstrated a substantial increase from 284.2000 to 384.6000 (p = .000). The F-statistic of 25.237 indicates a highly significant difference in the MI group. In the "Total Physical Activity" category, both groups experienced significant increases in mean scores from pre-intervention to post-intervention. The GPAI group demonstrated a change from 860.1000 to 1047.4000 (p = .007), and the MI group showed a change from 870.2000 to 1210.6000 (p = .000). The F-statistics of 9.196 and 67.607, respectively, signify the statistical significance of these changes. The results suggest that there are significant differences in physical activity levels between pre-intervention and post-intervention assessments, with varying patterns across different activity categories and groups. These findings provide valuable insights into the impact of the intervention on physical activity outcomes for both GPAI and MI groups, and MI has a more significant impact as compared to GPAI on all three categories and overall Physical Activity.

Table 2

Comparison between intervention of MI and GPAI with pre and post: Physical Activity Categories (N=20)

Variable		Pre (n=10)		Post (n=10)			
		Mean	SD	Mean	SD	f	Sig
Walking	GPAI	282.0000	103.47302	424.0000	75.89466	12.245	.003
	MI	260.00	125.078	398.0000	56.92100	10.084	.005
Moderate	GPAI	304.0000	90.82339	293.0000	86.41631	.077	.785
	MI	326.0000	94.30447	428.0000	66.13118	7.842	.012
Vigorous	GPAI	274.1000	96.31251	330.4000	111.36546	1.462	.242
	MI	284.2000	37.42192	384.6000	50.92958	25.237	.000

Total Physical Activity	GPAI	860.1000	85.50042	1047.4000	175.60511	9.196	.007
	MI	870.2000	89.38034	1210.6000	95.65703	67.607	.000

P>0.05

Table 3 presents the results of an analysis of variance (ANOVA) comparing pre-intervention and post-intervention measures for different motivational factors across two groups, GPAI and MI. The table includes means, standard deviations (SD), F-statistics, and associated p-values. In terms of the "Mastery" factor, there is no significant difference within the GPAI group (p = .175). However, in the MI group, a substantial increase is observed from 14.6000 to 19.2000 (p = .000), with an associated high F-statistic of 56.012. For "Physical Condition," a slight non-significant increase is noted in both GPAI and MI groups. The GPAI group shows a change from 15.8000 to 16.3000 (p = .540), while the MI group demonstrates a change from 15.6000 to 17.1000 (p = .044), with an associated F-statistic of 4.677. In the "Affiliation" factor, no significant differences are observed in the GPAI group (p = .526). In the MI group, there is a slight increase from 14.3000 to 15.6000, with a moderate F-statistic of 2.897 (p = .106). For "Other Expectations," a trend toward significance is seen in the MI group (p = .011), with an increase from 13.6000 to 14.8000 and an F-statistic of 8.018. However, the GPAI group does not exhibit a significant change (p = .078). In the "Enjoyment" factor, both GPAI and MI groups show significant increases from pre-intervention to post-intervention. GPAI participants experienced a change from 14.3000 to 15.9000 (p = .011), while MI participants had a change from 14.5000 to 17.8000 (p = .000). The associated F-statistics are 7.945 and 24.441, respectively. The table suggests that the intervention has differential effects on psychological and motivational factors across the GPAI and MI groups.

Table 3

Comparison between intervention of MI and GPAI with pre and post: Motivational Factors (N=20)

Variable		Pre (n=10)		Post (n=10)			
		Mean	SD	Mean	SD	F	Sig
Mastery	GPAI	14.9000	1.66333	15.8000	1.13529	1.997	.175
	MI	14.6000	1.57762	19.2000	1.13529	56.012	.000
Physical Condition	GPAI	15.8000	1.93218	16.3000	1.63639	.390	.540
	MI	15.6000	1.57762	17.1000	1.52388	4.677	.044
Affiliation	GPAI	14.6000	1.64655	15.0000	1.05409	.419	.526
	MI	14.3000	1.70294	15.6000	1712 70	2.897	.106
Psychological Condition	GPAI	14.8000	1.03280	15.1000	.875 60	.491	.492
	MI	14.2000	1.31656	14.3000	1.25167	.920	.350
Appearance	GPAI	14.6000	1.50555	15.3000	.948 68	1.547	.229
	MI	15.1000	1.19722	15.7000	1.33749	.171	.684
Other Expectations	GPAI	13.6000	1.26491	14.5000	.849 84	3.488	.078
	MI	13.6000	1.26491	14.8000	1.13529	8.018	.011
Enjoyment	GPAI	14.3000	1.41814	15.9000	1.10050	7.945	.011
	MI	14.5000	1.71594	17.8000	1.22927	24.441	.000
Competition	GPAI	15.0000	1.15470	15.2000	.918 94	.184	.673
	MI	14.4000	.96609	15.3000	.948 68	4.418	.050

P>0.05

Effect of Imagery Intervention on Physical Activity

Table 4 presents the results of an independent t-test comparing physical activity levels before (pre-test) and after (post-test) an intervention between two groups: GPAI and MI. Before the intervention, both GPAI and MI

groups had similar mean physical activity scores, with GPAI at 860.1000 (SD = 85.50042) and MI at 870.2000 (SD = 89.38034). The t-test comparing these pre-test scores yielded a non-significant result (t = -0.258, df = 18, p = 0.799), indicating no statistically significant difference in physical activity levels between the groups before the intervention. However, after the intervention, the groups showed noticeable differences in their mean physical activity scores. GPAI's post-test mean was 1047.400 (SD = 175.60511), whereas MI's post-test mean was 1210.600 (SD = 95.65703). The t-test comparing these post-test scores revealed a significant difference (t = -2.581, df = 18, p = 0.019) between the groups. This indicates that after the intervention, the MI group engaged in significantly higher levels of physical activity compared to the GPAI group. The analysis suggests that the intervention had a differential impact on the two groups. While there were no significant differences in physical activity levels before the intervention, the post-intervention results showed a significant increase in physical activity in the MI group compared to the GPAI group. These findings underscore the effectiveness of the intervention in promoting physical activity, particularly in the MI group.

Table 4

Independent T-test on Physical Activity pre- and post-intervention

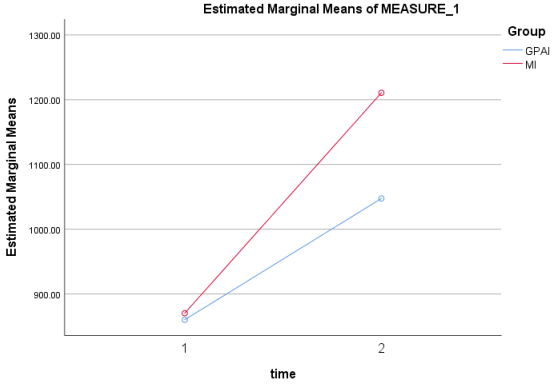
Tests	Groups	Mean	SD	T-test	df	Level of significance
Pre-test	GPAI	860.1000	85.50042	-.258	18	.799
	MI	870.2000	89.38034			
Post-test	GPAI	1047.400	175.60511	-2.581	18	.019
	MI	1210.600	95.65703			

P>0.05

In Figure 1, the estimated marginal means of physical activity represent the average levels of physical activity measured across various pre-intervention and post-intervention periods. These means provide valuable insights into the differences in physical activity levels among MI and GPAI groups. MI has a higher estimated marginal mean than GPAI, which suggests that, on average, participants in MI engaged in more physical activity compared to those in GPAI.

Figure 1

This figure shows the estimated marginal means of physical activity.



Effect of Imagery Intervention on Intrinsic Motivation

In Table 5, an independent t-test compares intrinsic motivation levels before (pre-test) and after (post-test) an intervention between two groups: GPAI and MI. Before the intervention, both groups had similar mean intrinsic motivation scores, with GPAI at 29.2000 (SD = 2.20101) and MI at 29.1000 (SD = 3.10734). The t-test comparing these pre-test scores yielded a non-significant result (t = 0.083, df = 18, p = 0.935), indicating no statistically significant difference in intrinsic motivation levels between the groups before the intervention. However, after the intervention, significant differences in intrinsic motivation emerged between the groups. The post-test mean for GPAI increased to 31.7000 (SD = 1.25167), while the MI group's mean jumped to 37.0000 (SD = 2.05480). The t-test comparing these post-test scores showed a highly significant difference (t = -6.966, df = 18, p < 0.0001) between the groups. This indicates that after the intervention, the MI group exhibited significantly higher intrinsic motivation levels compared to the GPAI group. The analysis suggests that the intervention had a substantial impact on intrinsic motivation levels, particularly in the MI group. While there were

no significant differences in intrinsic motivation before the intervention, the post-intervention results revealed a significant increase in intrinsic motivation in the MI group compared to the GPAI group.

Table 5

Independent T-test on Intrinsic Motivation pre- and post-intervention

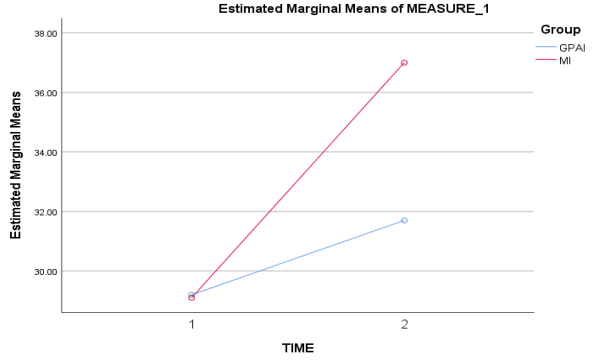
Tests	Groups	Mean	SD	T-test	df	Level of significance
Pre-test	GPAI	29.2000	2.20101	.083	18	.935
	MI	29.1000	3.10734			.000
Post-test	GPAI	31.7000	1.25167	-6.966	18	
	MI	37.0000	2.05480			

P>0.05

In Figure 2, the estimated marginal means of intrinsic motivation represent the average levels of intrinsic motivation measured at pre-intervention and post-intervention. These means provide valuable insights into the differences in intrinsic motivation levels among different MI and GPAI groups. MI has a higher estimated marginal mean than GPAI, which suggests that, on average, participants in MI show more improvement in their intrinsic motivation.

Figure 2

This figure shows the estimated marginal means of intrinsic motivation.



Effect of Imagery Intervention on Extrinsic Motivation

The data presented in Table 6 illustrates the results of an independent t-test examining extrinsic motivation levels before (pre-test) and after (post-test) an intervention, comparing two groups: GPAI and MI. Before the intervention, both groups displayed relatively similar mean extrinsic motivation scores, with GPAI at 88.4000 (SD = 4.16867) and MI at 87.0000 (SD = 3.59011). The t-test for these pre-test scores resulted in a non-significant p-value (t = 0.805, df = 18, p = 0.431), indicating no significant difference in extrinsic motivation levels between the groups before the intervention. After the intervention, the mean extrinsic motivation scores for GPAI and MI changed to 91.4000 (SD = 2.41293) and 92.6000 (SD = 3.33999), respectively. The t-test comparing these post-test scores produced a non-significant result (t = -0.921, df = 18, p = 0.369), indicating no statistically significant difference in extrinsic motivation levels between GPAI and MI after the intervention. The analysis suggests that the intervention did not significantly impact extrinsic motivation levels in either the GPAI or MI group. Both before and after the intervention, the groups demonstrated comparable extrinsic motivation scores.

Table 6

Independent T-test on Extrinsic Motivation pre- and post-intervention

Tests	Groups	Mean	SD	T-test	df	Level of significance
Pre-test	GPAI	88.4000	4.16867	.805	18	.431
	MI	87.0000	3.59011			.369
Post-test	GPAI	91.4000	2.41293	-.921	18	
	MI	92.6000	3.33999			

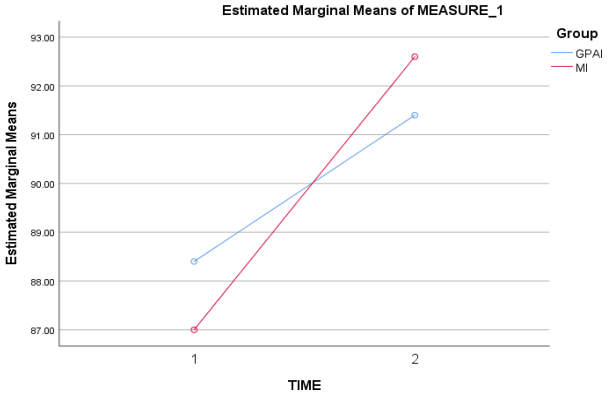
P>0.05

In Figure 3, the estimated marginal means of intrinsic motivation represent the average levels of extrinsic motivation measured at pre-intervention and post-intervention. These means provide valuable insights into the differences in extrinsic motivation levels among different MI and GPAI groups. Both groups have a similar estimated marginal mean, which suggests that, on average, participants in both groups show very little improvement in extrinsic motivation; however, MI has a very

slightly higher marginal mean.

Figure 3

This figure shows the estimated marginal means of intrinsic motivation.



Discussion

This study's primary goal was to evaluate the results of an imagery intervention program created to boost motivation for PA involvement. We wanted to know, specifically, if a motivation-boosting imagery intervention would have a bigger impact on motivation and PA than a general imagery intervention to boost PA. Despite the fact that both general imagery and motivation imagery have advantages, our results suggest that focusing on motivation imagery may lead to more significant and durable increases in people's intrinsic motivation and level of physical activity. The provided analysis underscores the differential impact of an intervention on intrinsic and extrinsic motivational factors within the GPAI and MI groups. Notably, while both groups experienced increases in certain aspects of intrinsic motivation—specifically, enjoyment and mastery—the MI group showcased more pronounced enhancements in these areas compared to the GPAI group. The significant rise in mastery observed exclusively in the MI group reflected in a substantial increase from 14.6000 to 19.2000 (p = .000), indicates a robust effect of MI on intrinsic motivation. This suggests that MI interventions have a potent ability to bolster individuals' sense of mastery or competence in engaging with physical activity. On the other hand, the analysis reveals a nuanced impact on extrinsic motivational factors. While both groups exhibited some changes, these alterations were less pronounced and, in some cases, non-significant. Moreover, the intervention's influence on physical activity levels was evident, with significant improvements observed across all categories for both groups. But MI had a more significant impact on all three Walking, Moderate, and Vigorous categories.

Improvement in Physical Activity Levels

Modern research has long recognized the value of physical activity in improving overall health and well-being (Mahindru et al., 2023). The use of motivational tools, like as mental imagery techniques, has become more common in behavioural interventions aimed at encouraging better lifestyles (Wyman et al., 2019). In order to determine the efficacy of this intervention, this study examines the specific impact of motivational imagery on physical activity levels by contrasting it with General Physical Activity Imagery. The results of the t-test comparing pre-test physical activity scores between the GPAI and MI groups provided crucial insights into the initial comparability of the two groups. The non-significant p-value (p = 0.799) indicated that there were no significant differences in physical activity levels between the groups before the intervention. After the intervention, the significant difference in post-test scores between the GPAI and MI groups (t = -2.581, p = 0.019) highlighted the differential impact of the interventions. The MI group demonstrated substantially higher levels of physical activity compared to the GPAI group, indicating the effectiveness of the MI intervention in promoting increased activity levels. This statistical significance underscores the meaningful impact of the MI approach on participants' behaviour, emphasizing its role in fostering positive changes in physical activity.

The observed variations in the effectiveness of the interventions underscore the importance of personalized approaches in promoting physical activity. The MI intervention, with its tailored and individualized strategies, proved to be significantly more impactful in increasing activity levels compared to the standardized

GPAI approach. The study's findings contribute valuable insights to the field of health promotion, emphasizing the importance of personalized strategies in encouraging individuals to adopt and maintain active lifestyles.

Increase in Intrinsic Motivation

Indicating that the interventions had a favourable effect on participants' internal drive to engage in physical activity, both the motivational imagery intervention group and the general physical activity group displayed improvements in their intrinsic motivation levels. Our study's analysis of the data showed that improvement within the motivating imagery intervention group is noticeably more pronounced. The results of the independent t-test comparing pre-test intrinsic motivation scores between the GPAI and MI groups established the initial equivalence in motivation levels ($t = 0.083$, $p = 0.935$). This finding indicated that both groups started the intervention with similar intrinsic motivation levels, ensuring a fair baseline for evaluating the impact of the interventions. However, post-intervention, a substantial difference emerged, with the MI group exhibiting significantly higher intrinsic motivation levels compared to the GPAI group ($t = -6.966$, $p < 0.0001$). This statistically significant difference emphasized the profound impact of the MI intervention on enhancing participants' intrinsic motivation.

This finding highlights the effectiveness of motivational imagery in fostering substantial behavioural changes within the domain of intrinsic motivation. Motivational imagery likely facilitated a deeper connection between the participants' personal interests, values, and the physical activities they engaged in.

Changes in Extrinsic Motivation

The analysis of extrinsic motivation levels post-intervention in both the Motivation Imagery (MI) and General Physical Activity Imagery (GPAI) groups did not reveal statistically significant changes. This indicates that the interventions had a limited impact on participants' extrinsic motivation for engaging in physical activity. Extrinsic motivation is the practice of doing something for external rewards or incentives, such as social acceptance, recognition, or health benefits, as opposed to for one's own pleasure or internal fulfillment (Lepper et al., 1997). The results of the independent t-test comparing pre-test extrinsic motivation scores between the GPAI and MI groups established the absence of a significant difference before the intervention ($t = 0.805$, $p = 0.431$). This initial equivalence in extrinsic motivation levels between the groups ensured a balanced starting point for the evaluation of the interventions. Following the intervention, the post-test scores for both GPAI and MI groups remained comparable, as indicated by the non-significant t-test result ($t = -0.921$, $p = 0.369$). This lack of significant change in extrinsic motivation levels suggested that the interventions did not have a substantial impact on participants' extrinsic motivation.

In the context of extrinsic motivation, these results imply that neither the GPAI nor the MI interventions brought about distinct changes. Despite the interventions, participants in both groups maintained similar levels of extrinsic motivation, indicating that intervention strategies did not significantly influence participants' motivation in this regard. It is important to note that while the interventions did not impact extrinsic motivation, they might have influenced other aspects of participants' behaviour or attitude. The absence of significant changes in extrinsic motivation suggests that external factors, such as rewards or recognition, remained relatively stable despite the interventions.

Role of Targeted Imagery Strategies

This finding suggests that the tailored MI intervention played a pivotal role in enhancing participants' intrinsic motivation and physical activities. The deliberate inclusion of particular motivational components within the imagery interventions may be responsible for the variations in intrinsic motivation and physical activity results between the two groups. This was confirmed by the research findings, which also provided empirical support for the

effectiveness of motivational imagery therapies in promoting physical activity and motivation. Participants' attitudes, beliefs, and motivations regarding physical exercise are likely to be greatly influenced by the intentional inclusion of motivating aspects in the imagery interventions. The motivational imagery intervention group received targeted psychological cues by carefully designing the imagery sessions to include components like goal-setting, positive reinforcement, and visualizing the benefits of physical activity. Their intrinsic drive was increased by positive reinforcement mechanisms, increasing their propensity to engage in physical activity out of real interest and delight. In conclusion, our research shows that the deliberate addition of particular motivational components to imagery interventions has a significant impact on outcomes related to intrinsic motivation and physical activity.

Conclusion

The findings of this study demonstrated the immense influence that imagery interventions have on motivation and activity. According to this research, both motivation imagery and general imagery techniques can result in positive transformations in these significant domains. However, a deeper examination of the results reveals the differences between these two approaches. Motivational imagery, which was developed specifically to promote motivation, proved to be the more successful intervention. It had a noticeably stronger effect on intrinsic motivation and levels of physical activity. This outcome highlights the importance of tailoring imagery therapy to specific motivational needs. These findings highlight the need for a more targeted approach when creating interventions aimed at enhancing motivation and physical activity. Despite the fact that both general imagery and motivation imagery have advantages, our results suggest that focusing on motivation imagery may lead to more significant and durable increases in people's motivation to engage in physical exercise.

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