ACTA GYMNICA, 2024, Volume 54, Article e2024.009
https://doi.org/10.5507/ag.2024.009

OPEN ACCESS

ORIGINAL RESEARCH

New findings on imagery use: What do exercisers imagine during gym workouts and why

Katerina Daskalaki[1]✉, Manos Stefanakis[2], Stelios Hadjisavvas[2], Katerina Papadimitriou[1], and Vivian Paraskevi Malliou[1]

[1]Department of Physical Education and Sport Science, School of Physical Education and Sport Science, Democritus University of Thrace, Komotini, Greece; and [2]Department of Health Sciences, School of Life and Health Sciences, University of Nicosia, Nicosia, Cyprus

Abstract

Background: Mental imagery (MI) is a psychological technique that is traditionally used in the absence of movement by athletes, exercisers, and dancers. In the few instances that MI (i.e., the formation of mental images) was investigated during exercise, it was found that it may produce positive emotional responses. Therefore, its use during movement deserves further investigation. **Objective:** The aim of the present research was to investigate the types and functions of MI used by gym members during their workouts (i.e., what do they imagine and why), both when the images are dictated by the instructors (i.e., guided MI) and when generated by the exercisers (i.e., personalized MI). Additionally, to examine if MI use is influenced by individual characteristics. **Methods:** A total of 130 exercisers completed the Exercise Imagery Pilot Questionnaire-Gym Version, which investigates through open and close-ended questions the characteristics of MI used during work-outs. Data were analysed with SPSS (descriptive statistics, analysis of frequencies, and chi-square test of independence). Regarding the types and functions of MI, the answers of the exercisers in the open-ended questions were grouped into common categories. **Results:** More than half of the exercisers responded that they use MI while exercising. Younger adults were more prone to use MI than older ones. The most frequent type of guided MI was "metaphorical images" and of personalized MI "images of other places". MI was mainly used for motivational reasons, for example, to distract attention from tiredness and pain and to make the exercisers feel peaceful and relaxed. **Conclusions:** These findings indicate that MI is used creatively by exercisers, mainly to reduce exercise-induced unpleasant sensations and enhance pleasant feelings during exercise.

Keywords: mental imagery, exercise imagery, imagery types, imagery functions, guided imagery, metaphorical imagery

Introduction

Although the problem of physical inactivity is a major concern for health, an equally concerning problem is often the insufficiency of the fitness industries to retain their already existing members (Hurley, 2005). A significant proportion of gym members quit early, negatively affecting their physical activity levels and well-being as well as the growth of fitness clubs (Gonçalves & Diniz, 2015). A lack of pleasant experiences and positive feelings during exercise has been reported as a possible reason for the adherence problem (Jones & Zenko, 2021; Welch et al., 2007). For this reason, it is important that exercise professionals implement strategies to promote and facilitate positive experiences during exercise. One of these strategies is the use of mental imagery (MI; Daskalaki et al., 2022, 2024; Jones & Zenko, 2021), which has been found to produce positive emotional and enjoyment responses during exercise, thus having a protective role against negative feeling states (Stanley & Cumming, 2010).

MI or "imagery" is a concept that has been subject to many different definitions, but it generally refers to the intentional formation of mental images. Contrary to motor imagery, which is a subcategory of MI and focuses on rehearsing mentally a motor act or movement "without any overt motor output" (MacIntyre & Moran, 2013, p. 2), MI can refer to movements, events, processes, and experiences and this mental activity may occur "in the absence of, or in combination with, overt physical movement" (Overby & Dunn, 2011, p. 9). MI is traditionally used in the form of mental practice in the absence of physical movement by athletes, exercisers, and dancers (Cumming & Williams, 2013; Hall et al., 1990; Martin et al., 1999). Its use by athletes during sports movements (i.e., while practicing their sports) is mentioned only anecdotally (Hanrahan & Vergeer, 2001) and sporadically (Munroe et al., 2000).

On the other hand, research from the dance field indicates that MI is extensively used during movement (Overby & Dunn, 2011). Studies that focus on the qualitative investigation of its use during exercise are lacking, with the exception of recent pilot research by Daskalaki et al. (2022). In all aforementioned fields, two parameters that are often investigated are what the persons imagine/visualize (content/types of MI) and why they imagine it (functions of MI; Cumming & Ramsey, 2009). In the traditional

✉ **Corresponding author:** Katerina Daskalaki, e-mail adaskala@phyed.duth.gr, ORCID® record https://orcid.org/0000-0002-1258-7713

Article history: Received February 16 2024, Accepted September 8 2024, Published October 4 2024

models established first by Paivio (1985), then by Hall et al. (1998), and later by Munroe-Chandler and Gammage (2005) who included in their model the exercise field, the content/types and functions may be cognitive or motivational. Combining the proposals of the previous models, MI may be cognitive-specific (CS; images/functions about technique and correct execution of the exercise), cognitive-general (CG; related to strategies; Fournier et al., 2008), motivational-specific (MS; related to goals and the behaviours needed to fulfil these goals), motivational general arousal (MG-A; related to the control of arousal levels and emotions, e.g., to become more energized, psyched-up or to relieve stress; Fournier et al., 2008; Munroe-Chandler & Gammage, 2005), and motivational general-mastery (MG-M; related to effective coping of challenging situations, e.g., during the workout to remain mentally tough and/or focused, to distract attention from tiredness/boredom; Daskalaki et al., 2022; Martin et al., 1999) etc.

In the research of Daskalaki et al. (2022), it was recorded that exercisers use additional types of MI that are also used by dancers, like anatomical images, context images (i.e., real or imaginary places and people), and metaphorical images. Metaphorical images may refer to real metaphors (i.e., situations that could apply in real life, including images of objects that are not present; Daskalaki et al., 2022; Nordin & Cumming, 2006), abstract metaphors (i.e., to imagine situations that are impossible in real life), and images of "characters/roles" (i.e., that the exerciser is visualizing that he/she transforms to a different person; Daskalaki et al., 2022, 2024). Taking into account that such images were rarely (if not never) mentioned in previous sport or exercise imagery studies, it becomes apparent that MI during exercise may hold unique characteristics that should be further investigated.

According to the "revised applied model of deliberate imagery use", another parameter that should be taken into account when examining MI use is the "who" element, that is, the characteristics of the individuals (i.e., age, gender, experience, etc.; Cumming & Williams, 2013). Indeed, previous research indicated that individuals who exercise more hours (Hausenblas et al., 1999) or more times per week (Gammage et al., 2000) used all types and functions of MI significantly more than low-frequency exercisers (Gammage et al., 2000; Giacobbi et al., 2003; Hausenblas et al., 1999). Apart from that, age and gender seem to influence MI use (Giacobbi, 2007), while it is also mentioned that future research could investigate MI use with regard to occupation (Hausenblas et al., 1999) and educational level (Giacobbi, 2007). The value of this kind of information lies in the assumption that exercise-related MI may influence exercise adherence (Giacobbi, 2007; Hausenblas et al., 1999), and that the knowledge of individual differences could make it possible to create more targeted MI interventions (Giacobbi, 2007). However, since these observations derive from studies that investigated exercise-related MI outside of practice, it remains unknown if MI use during exercise is influenced by individual characteristics.

The aim of the present research was to investigate if MI is used by gym members during their workouts and in which programs, to identify its types and functions both when dictated by the instructors (i.e., guided MI) and when generated by themselves (i.e., personalized MI) and to explore their preferences regarding it. Additionally, to examine if parameters such as age, gender, exercise experience, exercise frequency, occupation and educational level are related to MI use.

Methods

Inclusion criteria

In order to participate in the study, one should be an adult and have an active subscription to a gym. The Research Ethics Committee of Democritus University of Thrace approved this study. All participants were informed of the purpose of the study and signed informed consent.

Participants

A convenience sample was used. The study was announced in seven gyms in Athens (Greece) immediately after group exercise lessons and also in other areas of the gyms. In the research, 130 gym exercisers participated (108 women, 22 men), between 18 and 67 years old (mean ± *SD*: 40.12 ± 13.56 years), who were exercising for 9.92 ± 9.8 years and at that time 4.61 ± 2.62 hours per week.

Ninety of them were university graduates: Technological educational institution (n = 18), higher education institution (n = 45), Master's (n = 24), doctorate (n = 3). Of the remaining 40, one had graduated from lower secondary school, 19 from upper secondary school, 18 from vocational training institutes, while 2 of them just responded "other".

The respondents were working in the private sector (n = 42), public sector (n = 25), or were self-employed (n = 21), students (n = 14) or retired (n = 14). Few of them were unemployed (n = 7), homemakers (n = 2) or had other occupations (n = 5).

They were participating in a variety of gym activities, such as Pilates (n = 63), strength and conditioning programs (e.g., Body Sculpt, Total Body; n = 62), weight training (n = 46), yoga (n = 44), aerobic/step (n = 24), Zumba (n = 21), running (n = 8), CrossFit/cross training (n = 6), Fight Bo/boxing (n = 5) and cycling (n = 4).

Instruments

Given that the research aimed to generate mainly qualitative data, the Exercise Imagery Pilot Questionnaire-Gym Version (EIPQ-GV) was used (in the Greek language, see Supplement), which was pilot-tested in a previous study (Daskalaki et al., 2022) with the participation of 15 gym members. The exercisers confirmed its comprehensibility and comprehensiveness (Daskalaki et al., 2022), which are considered fundamental aspects of content validity (Terwee et al., 2018). Using newly developed questionnaires and/or questions when existing weighted questionnaires do not serve to collect the specific information that a study focuses on is an acceptable approach found often in the literature (Liddle et al., 2009; Marshall, 2005). Since the use of MI during practice is an unexplored theme, the use

of the EIPQ-GV, which, according to our knowledge, is the only questionnaire that contains questions relative to the theme, would permit the generation of new data regarding this topic.

The EIPQ-GV contains 27 questions (open and close-ended). In the first part, the questions refer to demographic characteristics (age, gender, studies, professional status), and habits related to exercise (experience pertaining to exercise, hours of training per week, type of exercise). Then, the definition of MI is provided:

> Using 'imagery' while exercising is the process during which the person who is exercising creates mental images that are related to the performed exercise. The images can be described/dictated by the trainer, or they can be created by the exerciser. They can be realistic, that is, actions/sensations that could actually apply to real life (e.g., imagine you are walking on sand), or they can be metaphorical and abstract, as images that could not possibly be real (e.g., imagine you are walking on water). Such images can involve one or more senses (vision, hearing, touch, taste, smell; e.g., imagine you are on the beach performing abs and hearing the sound of the waves). In other words, 'imagery' is employing your imagination to create images that are related to the exercise, while performing the actual exercise (it is not thoughts irrelevant to the exercise, e.g., what to do next or what to cook for lunch).

After that, there is a question about whether the respondent uses MI during exercise, and only if the answer is positive will they proceed to the second part. The second part focuses on questions about the use of MI: It includes close-ended questions about where and how the respondent learnt the MI technique as well as the delivery of MI instructions by fitness instructors (i.e., how many trainers provide MI instructions, how frequently, etc.). Then, four open-ended questions are posed about the types and functions of MI when it is guided (i.e., dictated by the trainers), and when it is personalized (i.e., defined by the exercisers; the exact questions are disposed in the Results and in the Appendix). As for the preferences of exercisers regarding MI, there is a close-ended question asking if the respondent prefers using guided or personalised MI and an open-ended question asking to explain the reasons. Finally, there are also close-ended questions about during which session at the gym the exerciser uses MI, how often, if they have ever used MI during an exercise in order to reduce pain caused by a specific musculoskeletal disorder, and whether this was helpful.

Analysis

For the analysis of the data, descriptive statistics and analysis of frequencies were applied using SPSS Statistics (Version 23; IBM, Armonk, NY, USA) with the level of statistical significance set at $p \leq .05$. Regarding the types and functions of MI, the answers of the exercisers in the open-ended questions were grouped into common categories. For the development of categories, a combination of previously established categories found often in the literature (e.g., technique) and of "data-driven" categories, based on the answers of the respondents (e.g., sensorial images) was used (Popping, 2015). In order to avoid the bias of misrepresenting respondents' answers, which would negatively impact semantic validity (Glazier et al., 2021), and since this study was mainly descriptive rather than conceptual (Holton, 2009), one of the researchers did the "coding" trying to remain as close as possible to the words and phrases used by the respondents and to avoid a subjective interpretation of the answers. A second researcher of the present team reviewed the proposed categorization and confirmed that it was consistent and logical (Pitney & Parker, 2009). After that, the number of persons who reported images falling in each one of the selected categories was calculated (Hausenblas et al., 1999). Then, the cumulative percentages per broader (higher-level) category (e.g., CS, CG, MS, MG-A, MG-M) were also calculated, summing up all percentages of categories that belonged to the same type or function (e.g., the percentages of "appearance" and "goals/result" were combined as MS MI). As for the preferences regarding MI, answers were synthesized to form a comprehensive text.

To investigate if the use of MI (i.e., being an "imager" or not) was associated with gender and other demographic and exercise-related variables, the chi square (χ^2) test of independence was used. This non-parametric test determines if there are associations between categorical variables. Therefore, exercisers who responded that they use MI were categorized as Group 1 (n = 73), while those who did not use MI as Group 2 (n = 57). Additionally:

- Age was converted into a categorical variable. The data were split into four equal parts in ascending order (from the lowest to the highest age) through the command quartiles (analysis of frequencies). The categories used for the χ^2 test were those that corresponded to the lowest (25^{th}) and the highest (75^{th}) percentiles and were younger adults (18 to 28 years old, n = 32) and older adults (52 to 67 years old, n = 35).
- For exercise experience, the same procedure was followed. The categories used were less experienced exercisers (exercising two years or less, n = 35) and more experienced exercisers (exercising 15 years or more, n = 44).
- For exercise frequency, the distinction was better when using the lower and higher 16.9% of the distribution. The categories used were less frequent exercisers (exercising 2.5 hours or less per week, n = 21) and more frequent exercisers (exercising 7 hours or more, n = 21).
- For occupation, the categories that were taken into account were public sector, private sector, self-employed, student, retired, and for education level: upper secondary school, vocational training institute, technological educational institution, higher education institution, Master's.

Results

More than half of the exercisers (56.2%, n = 73, 62 women, 11 men, age range 18–64, mean age 38.09 ± 12.89) who were exercising from 4 months to 40 years (mean 9.61 ± 9.68 years), for 4.87 ± 2.88 hours per week, and were participating in a variety of exercise classes responded

that they use MI at the gym while exercising. The types of programs that they were practicing and the percentage of them using MI by program are presented in Table 1. In comparison with other programs, MI was used more often during yoga and Pilates sessions.

Half of the respondents learned the MI technique at the gym. The majority of them (n = 47) stated that their ability to use MI is something that they learned from someone else and more often from a trainer either at the gym (n = 25) or elsewhere (n = 7). Twenty-three exercisers responded that this ability came naturally.

Regarding the number of trainers that encouraged the use of MI during training sessions, 11.1% of the exercisers indicated that "none" did so, 13.9% "one", 47.2% "few", 15.3% "several", 8.3% "many", and 4.2% "all".

In the question "How frequently do the trainers that are encouraging to the use of imagery during training sessions give you imagery instructions?", 8.3% responded "rarely", 26.7% "occasionally", 45% "average", 13.3% "often", and 6.7% "always".

Of the participants, 96.9% responded that they followed the MI instructions given by the trainers, and all of them reported that the images described were helpful and useful while exercising. Of the exercisers, 69.4% declared that regardless of the images suggested by the trainers, they also create their own images while working out.

Table 1 Exercise programs attended by the participants (N = 72) and use of mental imagery by program as percentages and absolute numbers

Program	Participants	Using mental imagery
Pilates	58.3% (42)	90.5% (38)
Yoga	47.2% (34)	100.0% (34)
Strength and conditioning programs	41.7% (30)	40.0% (12)
Weight training	34.7% (25)	48.0% (12)
Aerobic/Step	16.7% (12)	58.3% (7)
Zumba	16.7% (12)	41.6% (5)
CrossFit/Cross training	5.5% (4)	25.0% (1)

Types of guided and personalized MI

Fifty-eight exercisers responded to the open-ended question "What do the trainers encourage you to imagine while exercising?" (i.e., types of guided MI), and forty-four to the question "What kind of images do you create on your own/what do you imagine?" (i.e., types of personalized MI). In both cases, the exercisers reported a variety of images (Table 2). The most frequent type of guided MI was "metaphorical images" and of personalized MI "images of other places".

Examples of real metaphors included parallelizing the movement executed at the gym with a similar or different movement that could be executed elsewhere with or without the use of imaginary objects, for example, imagine that: "you lift a rock", "a string pulls you from the head" etc. (that was said to be used for correct body alignment and technique), or using imaginary situations in order to increase effort during exercise (e.g., "imagine that someone chases you, run faster"). Other examples of real metaphors included: imagine that: "you want to reach something with your hand", "something is pulling your leg", "you kick a wall", "while pressing your legs, someone exerts resistance against your movement", "you walk on sand", "you move into the water", "there is a rope, try to jump over it" etc. Abstract metaphors included parallelizing the whole body or a body part with an object or an animal. For example, imagine that: "your spine is made of pearls", "your spine touches the ground vertebra after vertebra like a pearl necklace", "your torso twists like a straw", and "you are a bird". Such images were sometimes used to enhance the technique. For example, an exerciser indicated that in Zumba lessons, they were encouraged to imagine that they were birds, in order to help their hands move with the appropriate quality. Images of roles were personalized, with the exercisers describing what they imagined to be: "a ballerina",

Table 2 Types of guided and personalized mental imagery as percentages and absolute numbers

Label	Guided (n = 58)	Personalized (n = 44)	Type
Metaphorical images	60.3% (35)	25.0% (11)	
Real metaphors	41.4% (24)	20.5% (9)	
Abstract metaphors	31.0% (18)	11.4% (5)	
Roles/Characters	0.0% (0)	4.5% (2)	
Images of other places	48.3% (28)	52.3% (23)	
Images of nature	37.9% (22)	36.4% (16)	
Beloved persons	0.0% (0)	6.8% (3)	
Peace/Relaxation/Fun/Entertainment	24.1% (14)	29.5% (13)	MG-A
Sensorial images	17.2% (10)	4.5% (2)	
Concentration/Focus	5.2% (3)	0.0% (0)	MG-M
Appearance	0.0% (0)	4.5% (2)	MS
Energy	3.4% (2)	4.5% (2)	MG-A
Goals/Result	3.4% (2)	15.9% (7)	MS
Strategy	3.4% (2)	0.0% (0)	CG
Anatomical images	3.4% (2)	2.3% (1)	CS
Technique	1.7% (1)	0.0% (0)	CS

Note. CG = cognitive general; CS = cognitive specific; MG-A = motivational general-arousal; MG-M = motivational general-mastery; MS = motivational specific. Some images are not here categorized in the Type column because they are not belonging in only one type.

"a champion in gymnastics", "a weightlifter", "an athlete competing for a prize".

Images of other places in both contexts included the beach/sea, mountains, fields, forests, and peaceful landscapes. When guided, such images could be used in order to produce cognitive outcomes (e.g., to imagine walking on sand in order to increase the resistance during movement) or during cooling down (e.g., in Pilates classes), while in both guided and personalized situations, images were sometimes correlated with the goal to feel internal peace and relaxation (e.g., in yoga lessons). When personalized, they could be also known and favourite places to the exerciser said to create peace and relaxation in reality.

Functions of guided and personalized MI

Sixty-one exercisers responded to the open-ended question "What are the reasons why use the imagery suggested by your trainers while exercising?" (i.e., functions of guided MI) and forty-five to the open-ended question "What are the reasons why you create your own images while exercising?" (i.e., functions of personalized MI). In both cases, the exercisers reported a variety of functions (Table 3). The most frequent function of guided MI was "enhancement of understanding/correct technique" (CS MI), and of personalized MI "peace/relaxation" (MG-A) and "to be distracted from tiredness/pain" (MG-M).

Comparison of guided and personalized MI by "higher-level category"

In summarising the percentages of the distinct categories, it was shown that although all known broader categories of content/functions of MI were mentioned (i.e., CS, CG, MS, MG-A and MG-M), in some cases, there were great differences regarding their frequency between guided and personalized MI. For example, the cumulative percentage of guided MI of a MS function was 18%, while personalized only 2.2%. MG-M was the most frequently reported function when personalized. The cumulative percentages by imagery type and function are presented in Table 4.

Preference of MI

Of the exercises, 50.7% (n = 37) responded that they prefer to use both guided and personalized MI, 38.4% (n = 28) to use only guided MI, and 11% (n = 8) only personalized MI. Reasons for the preference of guided MI included the fact that the instructor, being a professional and having the expertise and the experience, has greater knowledge (n = 9) on what functions better during the work-outs, and the images given by him/her are more concrete and precise. They enhance understanding and help with the correct execution of the exercise (n = 10) and maintaining the rhythm while exercising (n = 1). Also, they function as motivation for the exercisers (n = 3), especially during difficult workouts, and they help them maintain their focus

Table 3 Functions of guided and personalized mental imagery as percentages and absolute numbers

Label	Guided (n = 61)	Personalized (n = 45)	Function
Enhancement of understanding/Correct technique	47.5% (29)	15.6% (7)	CS
Peace/Relaxation	24.6% (15)	26.7% (12)	MG-A
In order to focus	16.4% (10)	17.8% (8)	MG-M
More interesting the lesson/pleasant the exercise	13.1% (8)	17.8% (8)	MG-A
Enhancement of performance/endurance	9.8% (6)	2.2% (1)	MS
For experiencing holistically the exercise	9.8% (6)	13.3% (6)	MG-A
Positive feelings/Mental wellbeing	8.2% (5)	2.2% (1)	MG-A
To reach my goals/Result	8.2% (5)	0.0% (0]	MS
To be distracted from tiredness/pain	8.2% (5)	26.7% (12)	MG-M
Energy	6.6% (4)	4.4% (2)	MG-A
To escape from reality	6.6% (4)	4.4% (2)	MG-A and MG-M
Motivation to continue/persevere/stick to the exercise	4.9% (3)	6.7% (3)	MG-M
As a "strategy"	4.9% (3)	2.2% (1)	CG
As a motivation/To be encouraged	3.3% (2)	11.1% (5)	MG-M
For boredom relief	3.3% (2)	6.7% (3)	MG-M

Note. CG = cognitive general; CS = cognitive specific; MG-A = motivational general-arousal; MG-M = motivational general-mastery; MS = motivational specific.

Table 4 Accumulative percentages of the content and functions of guided and personalized mental imagery

Type	Content		Function	
	Guided (n = 61)	Personalized (n = 45)	Guided (n = 61)	Personalized (n = 45)
CS	5.1	2.3	47.5	15.6
CG	3.4	0.0	4.9	2.2
MS	3.4	20.4	18.0	2.2
MG-A	27.5	34.0	68.9	68.8
MG-M	5.2	0.0	42.7	73.4

Note. CG = cognitive general; CS = cognitive specific; MG-A = motivational general-arousal; MG-M = motivational general-mastery; MS = motivational specific.

and concentration (n = 3; e.g., not to be distracted from thoughts irrelative to the exercise and daily problems). Further, guided MI is easier/more relaxing (n = 5), since it demands less alertness, and the exercisers are not constrained to think, which is also convenient when they are too tired, out of breath, bored, or in a bad mood. Finally, it's helpful for those exercisers who lack the imagination to form their own images (n = 5).

On the other hand, reasons referred for the preference of personalized MI included the fact that the exercisers have better knowledge of their own selves (body, personal desires, and/or needs; n = 10), and sometimes it was linked with greater relaxation and satisfaction. Also, some exercisers referred to their desire to have freedom in visualizing their own images without limitations (n = 3).

MI and musculoskeletal disorders

Of the exercisers, 64.4% (n = 47) responded that they have used MI during an exercise while in pain to reduce pain caused by a specific musculoskeletal disorder, and 97.9% (n = 46) of them declared that this was helpful.

Association of MI use with demographic variables and exercise experience

According to the chi-square test of independence, there was a statistically significant association between imagery use and age ($\chi^2(1) = 3.856$, $p = .05$). Within groups, the majority of the younger adults declared that they use MI (65.6%), while the majority of the older adults (57.9%) that they do not use it (Table 5).

There was no statistically significant association between imagery use and gender ($\chi^2(1) = 0.407$, $p = .52$), educational level ($\chi^2(4) = 1.951$, $p = .74$), occupation ($\chi^2(4) = 1.468$, $p = .83$), years of exercising ($\chi^2(1) = 0.351$, $p = .55$) and hours of exercise ($\chi^2(1) = 0.071$, $p = .79$).

Discussion

The findings that the majority of exercisers declared that trainers who use imagery techniques are few, that those who use it do so in an average frequency, and that exercisers in their totality find this technique helpful are in perfect accordance with the results of the pilot research conducted by Daskalaki et al. (2022). This result, combined with the fact that 11% of the exercisers had never received MI instructions, indicates that either many instructors ignore this technique or that they choose not to use it. Considering that exercisers appreciated the use of both guided and personalized MI and taking into account that in both situations, it was found that it serves multiple functions, it becomes apparent that fitness instructors should at least be informed on this technique and, if they decide to use it, to offer a variety of images during their exercise classes and teach their exercisers to employ their own images according to their own personalized needs (Daskalaki et al., 2024).

As shown in the present research, the most frequent type of guided MI was "metaphorical images". Metaphorical imagery has been documented in previous dance (Nordin & Cumming, 2007) and exercise (Daskalaki et al., 2022) but not in sports research (Nordin & Cumming, 2007). Some of the respondents, without being explicitly asked, spontaneously described that such images were used for enhancing correct technique, movement quality, and increase of effort, reasons that have been already mentioned also by dancers, together with enjoyment (Hanrahan & Vergeer, 2001; Torrents et al., 2013). An interesting finding was also that some exercisers formed "images of roles" when using personalized MI. As has been described by Hanrahan and Vergeer (2001), imagining to be another character who has the desired attributes of the sporting activity can lead to an increase in energy levels. In the present research, "images of roles" were correlated with images of perfection and success inspired by the sports and dance environments (e.g., imagining being a ballerina or an elite athlete). All these prove what has already been claimed about metaphorical images, that is, that they can serve both cognitive and motivational functions (Hanrahan & Vergeer, 2001).

On the other hand, "images of other places" constituted the preferred type of personalized MI, it was used both during the main part of the lesson and during cooling down, and it served both cognitive (when correlated with metaphorical imagery) and more often MG-A functions. In the sports context, in the rare instances that are mentioned, such images are said to reduce arousal (i.e., the athlete may picture himself in a relaxing, favorite place away from the athletic environment; Martin et al., 1999). One athlete had once described that picturing of nice places during sports training served him to get the mind off practice (Munroe et al., 2000). The wide use of this type of MI indicates the necessity of exercisers to employ psychological techniques during exercise for motivational reasons, as is also revealed from the big percentages of the motivational functions of personalized MI.

Reviewing the results of the present study, it becomes apparent that MI during exercise differs from what has been sometimes described for the use of MI outside of the exercise environments (i.e., not during exercise). Previous research that investigated the use of personalized MI outside of the exercise location found that aerobic exercisers and weightlifters employed appearance imagery (MS) the most, followed by technique (CS), and lastly, energy MI (MG-A; Gammage et al., 2000; Hausenblas et al., 1999; Munroe-Chandler et al., 2004). It should be clarified, though, that in those studies, only the previously mentioned types/functions of MI were investigated (i.e., CS, MS, MG-A) through the Exercise Imagery Questionnaire-Aerobic Version of Hausenblas et al. (1999), which does not measure CG and MG-M MI. An interesting finding of the present

Table 5 Mental imagery use in relation to age as percentages and absolute numbers

Group	Using mental imagery	
	Yes	No
Younger adults (n = 32)	65.6% (21)	34.4% (11)
Older adults (n = 38)	42.1% (16)	57.9% (22)
Total (N = 70)	52.9% (37)	47.1% (33)

qualitative research was that the most frequent function of personalized MI, in terms of accumulative percentages, was MG-M followed by MG-A, while MI about appearance (MS) was used to a very small extent. This finding confirms the untested -at that time- hypothesis of Munroe-Chandler and Gammage (2005) that MI may differ with the setting (i.e., in versus outside of exercise). As they suggested, it is more probable that specific outcomes of exercise, like weight loss and improved appearance, are mainly visualized outside of the exercise environment to motivate one to actually exercise. They also speculated that during exercise, it is more possible to use MG-A MI to maintain energy and arousal, and MG-M MI to stay motivated during exercise (e.g., when tired or bored). The extensive use of MG-A and MG-M MI indicates that this sample of exercisers aimed to impact their own psychological states, forming images with their imagination that would help them gain a more positive experience during exercise. So, instructors must pay even more attention to addressing psychological challenges during their exercise sessions, especially when considering that pleasant images may distract attention from unpleasant tasks (Hall et al., 2010).

On the other hand, as was demonstrated, fitness instructors provide plenty of images about the correct execution of the exercise, which may account for the less frequent use of personalized CS MI. The limited use of CG MI can be attributed to the fact that CG MI derives from the sports environments, and it is mainly related to the use of strategies and tactics in relation to competitive events (Cumming & Ramsey, 2009). In the exercise field, CG MI may not be as urgent since exercise programs and activities lack the dimension of competition against an opponent or an opposing team.

MI was used to a greater or lesser extent during all exercise classes and most often during Pilates and yoga classes. These types of exercise programs are frequently characterized as "mind-body disciples" or "holistic movement practices" (Vergeer et al., 2017) and incorporate a more "holistic" approach, encouraging the simultaneous use of the mind during bodily movements. Accordingly, some exercisers declared that they are using MI to experience the exercise holistically. Future research could be more focused on investigating MI use by program, although, as it seems, all types and functions of MI here presented could be applied in all types of gym classes, adjusted to the particularities of the different lessons.

An interesting finding was also that the overwhelming majority of exercisers with musculoskeletal disorders used MI during their gym sessions in order to reduce pain. Previous research has documented that injured athletes receiving physiotherapy formed images during rehabilitation exercises to manage, block, or be distracted from pain (Driediger et al., 2006). Based on the present findings, MI carries the potential to limit the sensation of pain to exercisers. Therefore, this technique may be beneficial for individuals with chronic musculoskeletal conditions who, on many occasions and as has been documented, hesitate to work out due to pain (Kolasinski et al., 2020). However, this hypothesis should be explored with further research.

Finally, the finding that MI use during exercise (i.e., imagers versus not imagers) is not associated with exercise experience or exercise frequency is in total opposition with other studies (Gammage, et al. 2000; Hausenblas et al., 1999). This could be due to the fact that the use of MI during gym workouts is often influenced by the presence of an instructor, who may dictate images to different exercisers. In contrast, when MI is used outside of practice, the individuals form exercise-related images without receiving specific instructions to do so. Maybe this is also the reason why it was found that gender, educational level and occupation were not related to MI use. It is also important to mention that the results of the present research cannot be directly comparable to other studies that used questionnaires with specific items and measured the frequency of MI use per type or function using Likert scales. Age, on the other hand, was found to be associated with the use of MI. Although the statistical significance of this association was borderline (i.e., $p = .05$), this is the first indication that differences may exist between younger and older adults, since it was observed that a greater percentage of the former use MI, while the latter do not. It has already been argued that there are alterations "in the ability to generate and manipulate mental images with age" (Malouin et al., 2010, p. 1125). Nevertheless, the goals and priorities of older adults regarding MI often differ from those of younger exercisers (Thøgersen-Ntoumani et al., 2012), so it is possible that the instructions given by the trainers did not meet these needs, leaving them without a motive to use MI. Considering that MI during movement is a relatively unexplored concept, it is self-evident that more research is needed before generalizing these findings to the population.

Although the findings here-produced come from a convenience sample, and more research is needed on the topic, the results of the present research are of great importance, since they provide new evidence on an under-investigated phenomenon, opening up the scientific dialogue for a new area with regards to MI. It is already suggested that fitness trainers are informed about the particularities of MI during movement in order to use it effectively during their exercise classes (Daskalaki et al., 2024). The qualitative nature of the present research produced new knowledge that could be used both theoretically and in the applied field of exercise.

Conclusions

As it was shown, exercisers use MI during a variety of exercise classes, not only to enhance their technique but also for motivational reasons. The most frequent type of guided MI was "metaphorical images" and of personalized MI "images of other places", indicating that the use of MI during exercise differs from what has been described for its use outside of practice. As it was also shown, exercisers mainly formed mental images in order to feel peace and relaxation, and to be distracted from tiredness and pain. Apart from that, individuals with musculoskeletal disorders stated that MI helped them to reduce pain. All these data show the potential of MI to alleviate negative feelings associated with

the exercise experience and underscore the importance of further investigating this technique in both the theoretical and the applied field of exercise.

Conflict of interest

The authors report no conflict of interest.

References

Cumming, J., & Ramsey, R. (2009). Imagery interventions in sport. In S. D. Mellalieu & S. Hanton (Eds.), *Advances in applied sport psychology: A review* (pp. 5–36). Routledge.

Cumming, J., & Williams, S. E. (2013). Introducing the revised applied model of deliberate imagery use for sport, dance, exercise, and rehabilitation. *Movement & Sport Sciences – Science & Motricité, 82,* 69–81. https://doi.org/10.1051/sm/2013098

Daskalaki, K., Beneka, A., Mamoukari, P., & Malliou, P. (2022). Construction of the questionnaire "Exercise Imagery Pilot Questionnaire-Gym Version" for the investigation of the imagery of gym members during exercise – A pilot research. *European Psychomotricity Journal, 14,* 15–25. https://psychomotor.gr/wp-content/uploads/2022/01/3_DASKALAKI_15_25.pdf

Daskalaki, K., Papadimitriou, K., & Malliou, P. (2024). Use of mental imagery techniques to transform your fitness classes into a fantastic experience. *ACSMs Health & Fitness Journal, 29*(2), 37–41. https://doi.org/10.1249/FIT.0000000000000947

Driediger, M., Hall, C., & Callow, N. (2006). Imagery use by injured athletes: A qualitative analysis. *Journal of Sports Sciences, 24*(3), 261–271. https://doi.org/10.1080/02640410500128221

Fournier, J. F., Deremaux, S., & Bernier, M. (2008). Content, characteristics and function of mental images. *Psychology of Sport and Exercise, 9*(6), 734–748. https://doi.org/10.1016/j.psychsport.2007.12.003

Gammage, K. L., Hall, C., & Rodgers, W. (2000). More about exercise imagery. *Sport Psychologist, 14*(4), 348–359. https://doi.org/10.1123/tsp.14.4.348

Giacobbi, P. R. (2007). Age and activity-level differences in the use of exercise imagery. *Journal of Applied Sport Psychology, 19*(4), 487–493. https://doi.org/10.1080/10413200701601508

Giacobbi, P. R., Hausenblas, H. A., Fallon, E. A., & Hall, C. A. (2003). Even more about exercise imagery: A grounded theory of exercise imagery. *Journal of Applied Sport Psychology, 15*(2), 160–175. https://doi.org/10.1080/10413200305391

Glazier, R. A., Boydstun, A. E., & Feezell, J. T. (2021). Self-coding: A method to assess semantic validity and bias when coding open-ended responses. *Research & Politics, 8*(3), Article 20531680211031752. https://doi.org/10.1177/20531680211031752

Gonçalves, C., & Diniz, A. (2015). Analysis of member retention in fitness through satisfaction, attributes perception, expectations and well-being. *Revista Portuguesa de Marketing, 38*(34), 65–76. http://hdl.handle.net/10198/13805

Hall, C. R., Mack, D., Paivio, A., & Hausenblas, H. (1998). Imagery use by athletes: Development of the Sport Imagery Questionnaire. *International Journal of Sport Psychology, 29*(1), 73–89. https://psycnet.apa.org/record/1998-04132-006

Hall, C. R., Rodgers, W. M., & Barr, K. A. (1990). The use of imagery by athletes in selected sports. *Sport Psychologist, 4*(1), 1–10. https://doi.org/10.1123/tsp.4.1.1

Hall, C. R., Rodgers, W. M., Wilson, P. M., & Norman, P. (2010). Imagery use and self-determined motivations in a community sample of exercisers and non-exercisers. *Journal of Applied Social Psychology, 40*(1), 135–152. https://doi.org/10.1111/j.1559-1816.2009.00566.x

Hanrahan, C., & Vergeer, I. (2001). Multiple uses of mental imagery by professional modern dancers. *Imagination, Cognition and Personality, 20*(3), 231–255. https://doi.org/10.2190/RLBE-XQK9-C65F-X05B

Hausenblas, H. A., Hall, C. R., Munroe, K. J., & Rodgers, W. M. (1999). Exercise imagery: Its nature and measurement. *Journal of Applied Sport Psychology, 11*(2), 171–180. https://doi.org/10.1080/10413209908404198

Holton, J. A. (2009). Qualitative tussles in undertaking a grounded theory study. *Grounded Theory Review, 8*(3), 37–49. https://groundedtheoryreview.com/2009/11/30/808

Hurley, T. (2005). Managing customer retention in the health and fitness industry: A case of neglect. *Irish Marketing Review, 17*(1&2), 23–29. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=6c88af630bbffb4df594c7b00873cd0915bff0e1#page=25

Jones, L., & Zenko, Z. (2021). Strategies to facilitate more pleasant exercise experiences. In Z. Zenko & L. Jones (Eds.), *Essentials of exercise and sport psychology: An open access textbook* (pp. 242–270). Society for Transparency, Openness, and Replication in Kinesiology. https://doi.org/10.51224/B1011

Kolasinski, S. L., Neogi, T., Hochberg, M. C., Oatis, C., Guyatt, G., Block, J., Callahan, L., Copenhaver, C., Dodge, C., Felson, D., Gellar, K., Harvey, W. F., Hawker, G., Herzig, E., Kwoh, C. K., Nelson, A. E., Samuels, J., Scanzello, C., White, D., … Reston, J. (2020). 2019 American College of Rheumatology/Arthritis Foundation Guideline for the Management of Osteoarthritis of the Hand, Hip, and Knee. *Arhritis & Rheumatology, 72*(2), 200–233. https://doi.org/10.1002/art.41142

Liddle, S. D., Baxter, G. D., & Gracey, J. H. (2009). Physiotherapists' use of advice and exercise for the management of chronic low back pain: A national survey. *Manual Therapy, 14*(2), 189–196. https://doi.org/10.1016/j.math.2008.01.012

MacIntyre, T., & Moran, A. P. (2013). Definitions of mental imagery in the 21st century: Implications for theory, research and practice. In *15th Congress of Association de Chercheurs en Activites Physiques et Sportives (ACAPS)* (Vol. 1). https://www.researchgate.net/profile/Tadhg-Macintyre/publication/259189961_Definitions_of_mental_imagery_in_the_21st_Century_Implications_for_theory_research_and_practice_In_symposium_La_representation_mental_du_mouvement_de_sa_definition_theorique_a_son

Malouin, F., Richards, C. L., & Durand, A. (2010). Normal aging and motor imagery vividness: Implications for mental practice training in rehabilitation. *Archives of Physical Medicine and Rehabilitation, 91*(7), 1122–1127. https://doi.org/10.1016/j.apmr.2010.03.007

Marshall, G. (2005). The purpose, design and administration of a questionnaire for data collection. *Radiography, 11*(2), 131–136. https://doi.org/10.1016/j.radi.2004.09.002

Martin, K. A., Moritz, S. E., & Hall, C. R. (1999). Imagery use in sport: A literature review and applied model. *Sport Psychologist, 13*(3), 245–268. https://doi.org/10.1123/tsp.13.3.245

Munroe, K. J., Giacobbi, P. R., Jr., Hall, C., & Weinberg, R. (2000). The four Ws of imagery use: Where, when, why, and what. *Sport Psychologist, 14*(2), 119–137. https://doi.org/10.1123/tsp.14.2.119

Munroe-Chandler, K. J., & Gammage, K. L. (2005). Now see this: A new vision of exercise imagery. *Exercise and Sport Sciences Reviews, 33*(4), 201–205. https://doi.org/10.1097/00003677-200510000-00009

Munroe-Chandler, K. J., Kim, A. J., & Gammage, K. L. (2004). Using imagery to predict weightlifting dependency in men. *International Journal of Men's Health, 3*(2), 129–139.

Nordin, S. M., & Cumming, J. (2006). The development of imagery in dance. Part I: Qualitative findings from professional dancers. *Journal of Dance Medicine and Science,* 10(1&2), 21–27. https:/doi.org/10.1177/1089313X06010001-206

Nordin, S. M., & Cumming, J. (2007). Where, when, and how: A quantitative account of dance imagery. *Research Quarterly for Exercise and Sport, 78*(4), 390–395. https://doi.org/10.1080/02701367.2007.10599437

Overby, L. Y., & Dunn, J. (2011). The history and research of dance imagery: Implications for teachers. *IADMS Bulletin for Teachers, 3*(2), 9–11. https://iadms.org/media/2942/iadms-bulletin-vol3n2.pdf

Paivio, A. (1985). Cognitive and motivational functions of imagery in human performance. *Canadian Journal of Applied Sport Sciences, 10*(4), 22S–28S.

Pitney, W., & Parker, J. (2009). *Qualitative research in physical activity and the health professions.* Human Kinetics.

Popping, R. (2015). Analyzing open-ended questions by means of text analysis procedures. *Bulletin of Sociological Methodology/Bulletin de Méthodologie Sociologique, 128*(1), 23–39. https://doi.org/10.1177/0759106315597389

Stanley, D. M., & Cumming, J. (2010). Are we having fun yet? Testing the effects of imagery use on the affective and enjoyment responses to acute moderate exercise. *Psychology of Sport and Exercise, 11*(6), 582–590. https://doi.org/10.1016/j.psychsport.2010.06.010

Terwee, C. B., Prinsen, C. A. C., Chiarotto, A., Westerman, M. J., Patrick, D. L., Alonso, J., Bouter, L. M., de Vet, H. C. W., & Mokkink, L. B. (2018). COSMIN methodology for evaluating the content validity of patient-reported outcome measures: A Delphi study. *Quality of Life Research, 27*(5), 1159–1170. https://doi.org/10.1007/s11136-018-1829-0

Thøgersen-Ntoumani, C., Cumming, J., Ntoumanis, N., & Nikitaras, N. (2012). Exercise imagery and its correlates in older adults. *Psychology of Sport and Exercise, 13*(1), 19–25. https://doi.org/10.1016/j.psychsport.2011.08.002

Torrents, C., Castañer, M., Dinušová, M., & Anguera, M. T. (2013). Dance divergently in physical education: Teaching using open-ended questions, metaphors, and models. *Research in Dance Education, 14*(2), 104–119. https://doi.org/10.1080/14647893.2012.712100

Vergeer, I., Bennie, J. A., Charity, M. J., Harvey, J. T., van Uffelen, J. G. Z, Biddle, S. J. H., & Eime, R. M. (2017). Participation trends in holistic movement practices: A 10-year comparison of yoga/Pilates and t'ai chi/qigong use among a national sample of 195,926 Australians. *BMC Complementary and Alternative Medicine, 17,* Article 296. https://doi.org/10.1186/s12906-017-1800-6

Welch, A. S., Hulley, A., Ferguson, C., & Beauchamp, M. R. (2007). Affective responses of inactive women to a maximal incremental exercise test: A test of the dual-mode model. *Psychology of Sport and Exercise, 8*(4), 401–423. https://doi.org/10.1016/j.psychsport.2006.09.002

Appendix

EXERCISE IMAGERY PILOT QUESTIONNAIRE-GYM VERSION	
1.Age:	**2. Gender:** Male ☐ Female☐
3. Studies/Education: Primary School☐ Lower Secondary School☐ Upper Secondary School☐ Vocational Training Institute (IEK)☐ Technological Educational Institution (TEI)☐ Higher Education Institution☐ Master's☐ Doctorate/PhD☐ Other☐ (specify)……..	
4. Professional status: Public sector☐ Private sector☐ Self-employed☐ Rentier☐ Student☐ Worker☐ Unemployed☐ Homemaker ☐ Retired ☐ Other☐ (specify)……	
5. How long have you been exercising? ……. **6. On average, how many hours per week do you exercise?**.....	
7. Which sessions do you attend at the gym? (tick all that apply): Weight training☐ Pilates☐ Yoga☐ Aerobic/Step☐ Zumba☐ Body Sculpt/Total Body/Hips & Abs☐ Other (specify): ……	
BEFORE YOU CONTINUE, CAREFULLY READ THE FOLLOWING INFORMATION:	
Using "imagery" while exercising is the process during which the person who is exercising creates mental images **that are related to the performed exercise.** The images can be described /dictated by the trainer or they can be created by the exerciser himself/herself. They can be realistic, that is, actions/sensations that could actually apply to real life (e.g. imagine you are walking on sand) or they can be metaphorical and abstract, as images that could not possibly be real (e.g. imagine you are walking on water). Such images can involve one or more senses (vision, hearing, touch, taste, smell) (e.g. imagine you are on the beach performing abs and hearing the sound of the wave). In other words, 'imagery' is employing your imagination to create images **that are related to the exercise**, while performing the actual exercise (it is not thoughts irrelevant to the exercise, e.g. what to do next or what to cook for lunch).	
8. Before you read this questionnaire, were you familiar with the term imagery? Yes☐ No☐ **9. Do you use imagery at the gym while exercising, even without being aware of the technique (that is do you create images while exercising)?** Yes☐ No☐	
PROCEED WITH THE QUESTIONNAIRE ONLY I F YOU USE IMAGERY WHILE EXERCISING	
10. Where did you learn the imagery technique? At the gym☐ Elsewhere☐ **11. Your ability to use imagery is something that:** came naturally☐ I learnt from someone else☐ **12. If you learnt it from someone else, who was it from?** (tick all that apply): Trainer at the gym☐ Trainer elsewhere☐ (specify)_____ Co-athlete at the gym☐ Co-athlete elsewhere☐ (specify which sport)_____ Parents☐ Books☐ Media ☐ (specify)_____	
13. How many trainers encourage you to use imagery during training sessions: None☐ One☐ Few☐ Several☐ Many☐ All☐ **14. How frequently do the trainers that are encouraging to the use of imagery during training sessions, give you imagery instructions?** Rarely☐ Occasionally☐ Average☐ Often☐ Always☐ **15. Do you follow the imagery instructions given by the trainers?** Yes☐ No☐ **16. Are the images described by your trainers helpful while exercising (are the descriptions useful)?** Yes☐ No☐	

17. What do the trainers encourage you to imagine while exercising? Specify in detail.
18. What are the reasons why use the imagery suggested by your trainers while exercising? Mention all reasons.
19. Regardless of the images suggested by your trainers, do you ever create your own images while performing an exercise that are related to the specific exercise? Yes☐ No ☐
20. What kind of images do you create on your own / what do you imagine? Give examples.
21. What are the reasons why you create your own images while exercising? Mention all the reasons.
22. What do you prefer: Being given images by the trainer☐ Create my own images☐ Both☐ **23. Explain the reasons why you chose the above answer:**
24. During which session at the gym do you use imagery? (tick all that apply): Weight training ☐ Pilates☐ Yoga☐ Aerobic/Step☐ Zumba☐ Body Sculpt/Total Body/Hips & Abs☐ Other (specify)☐:_____
25. How often do you use imagery? Rarely☐ Sometimes☐ Often☐ Very often☐ Always☐ **26. Have you ever used imagery during an exercise, while in pain**, in order to reduce pain caused by a specific musculoskeletal disorder? Yes☐ No☐ **27. Has this helped you?** Yes☐ No☐