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# Exploring Imagery as a Technique for Promoting Physical Activity in Older Adults

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Abstract

Exercise imagery can be beneficial for insufficiently active people as a means to promote physical activity (PA) engagement and positive psychological states. The present study explored imagery use in physically active and insufficiently active older adults. The revised applied model of deliberate imagery use (RAMDIU) was used as a framework to explain when, where, why, what, and how older adults image and explored whether the "who" component of the model (older adults/ PA status) interacts with these different components. 37 (*M*age = 64, *SD* = 5.2; 17 females) participants representing a range of PA levels took part in one of seven focus groups. Thematic analysis provided support for RAMDIU, with motivation, memory, and planning identified as the most common imagery functions, and scenery and reward images as the most commonly reported imagery content. Although some similarities exist, older adults tend to use imagery for unique functions compared to younger counterparts (e.g., to improve memory). Understanding the use of imagery in older adults will help to tailor PA interventions for promoting healthy ageing in this population.

**Key words:** exercise imagery; content; function; motivation; revised applied model

# Exploring Imagery as a Technique for Promoting Physical Activity in Older Adults

Physical activity (PA) improves the quality of life of older adults by reducing the risk of certain diseases associated with morbidity and mortality, such as cardiovascular diseases, diabetes, and cancer, as well as promoting psychological well-being (Reiner, Niermann, Jekauc, & Woll, 2013). Despite the significant health benefits of PA, more than 60% of the worldwide adult population are not sufficiently active (World Health Organization [WHO], 2003). According to the UK's Department of Health (2013), a large proportion of older adults are not reaching the minimum recommended amount of PA (i.e., 150 minutes of moderate-intensity PA per week or 75 minutes of vigorous-intensity PA per week), with PA rates generally lowering with increased age (Pate et al., 1995).

In light of the percentage of insufficiently active older adults, there is a need for suitable interventions to target this age group. A potential technique for promoting PA behaviour is mental imagery, which involves the representation of an experience in one's mind without the presence of an actual stimulus and includes one or more senses (Moran, 2004). Within PA and exercise settings, imagery refers to engaging in images such as being physically active, enjoying the workout, and achieving certain fitness outcomes from the exercise behaviour (Hall, 1995). Hall (1995) was one of the first advocates of exercise imagery suggesting that it may have a positive impact on motivation to exercise. This assertion has been supported by more recent evidence that images of a lean and healthy body as well as feelings of energy and relief can boost motivation to be physically active (Cumming, 2008).

Before an exercise imagery intervention can be effective for promoting PA in older adults, it is important to first understand how it is used within this targeted population. A model for guiding research and practical application of exercise imagery is the revised

applied model of deliberate imagery use (RAMDIU; Cumming & Williams, 2013), which is a recent extension of the applied model of imagery use originally developed by Martin, Moritz, and Hall (1999). The RAMDIU focuses on deliberate imagery (i.e., with a specific purpose in mind) as opposed to spontaneous or unintentional images that individuals can experience (e.g., day dreams). The model applies to a variety of individuals (e.g., athletes, exercisers, dancers, rehabilitation patients) and is composed of the interacting components of "why", "what", "how", "who", "when", and "where," that are thought to explain whether imagery will facilitate the desired outcome(s).

A major component of the model is the function of imagery use, which corresponds to "why" exercisers use imagery. Consistent with Paivio's (1985) 2 (cognitive/motivational) x 2 (general/specific) conceptual framework, mental imagery serves similar functions for exercisers as it does for the athletes (Hall, 1995; Munroe-Chandler, & Gammage, 2005). Cognitive reasons refer to improving skills (specific), or strategies and routines (general), while motivational reasons refer to functions such as, but not limited to, achieving certain goals (specific), increasing confidence (general), or arousal-stress reduction (general). However, depending on the context of imagery use, the functions of imagery extend beyond those proposed by Paivio (1985). Thus, regular exercisers may use imagery to achieve a variety of outcomes such as to improve their skills, to improve how they look, to increase self-confidence, and achieve positive psychological outcomes (Gammage, Hall, & Rodgers, 2000 ; Hausenblas, Hall, Rodgers, & Munroe, 1999).

Another component of RAMDIU refers to the types of images exercisers use (i.e., "what"). According to Hausenblas et al., (1999) exercise imagery is classified in three distinct types: 1) appearance imagery, which involves images of an improved physical appearance such as having a lean, fit, and healthy body; 2) energy imagery, which includes images of feeling energized and relieved from stress; and 3) technique imagery, which

includes images of learning and completing exercise tasks correctly. This simple classification expanded to include other types of exercise imagery such as self-efficacy images and health-related images (Giacobbi, Hausenblas, & Penfield, 2005), relaxation images (Cumming & Stanley, 2009), exercise routine images (Giacobbi, Tuccitto, Buman, & Munroe-Chandler, 2010), enjoyment images (Stanley & Cumming, 2010), and goal images (Chan & Cameron, 2012). Consequently, exercisers use a variety of imagery content.

According to the original model of applied imagery use by Martin et al. (1999), the type of imagery ("what") depends on the motivation of exercisers and what they want to achieve. Consequently, the content of the images (e.g., appearance imagery) should match the purposes for using exercise imagery (e.g., to become leaner). In contrast, RAMDIU proposes that imagery content does not always reflect why individuals image. Indeed, a wide range of images can be used to achieve the same outcome and vice-versa, and this will be partly determined by personal characteristics such as age. Thus, it is important to account for the interaction between "what" and "why" by identifying what types of images serve which functions for older adults.

Another important but overlooked component of RAMDIU focuses on "how" individuals experience images. This refers to characteristics of the imagery such as whether it is in real time, duration, viewing angle, agency, and the colours and sensory modalities involved. Middle-aged exercisers seem to use multisensory images, which are either positive or negative in nature and range from deliberate to spontaneous images. In regards to visual perspective, exercisers tend to use both an internal and external perspective with a preference to internal (Kim & Giacobbi, 2009). What is not yet known is "how" older adults image and whether this differs from younger counterparts. Information of this nature will again be useful when creating personalised imagery interventions addressing the needs of older adults.

The "who" component of the RAMDIU describes characteristics of the individual

such as gender, age, and level of PA that can impact upon the content, function, and characteristics of imagery use (Cumming & Williams, 2013). Given the individual differences, the content and function of imagery is likely to vary not only among individuals of different ages but also amongst older adults themselves. When compared to younger adults, older adults tend to engage in energy imagery the most while they report less appearance imagery but similar amounts of technique imagery (Thøgersen-Ntoumani, Cumming, & Ntoumanis, 2012). Age also interacts with PA levels to explain exercise imagery use; that is, younger and more physically active individuals report the greatest use of exercise imagery (Giacobbi, 2007). Indeed, a robust finding in this area has been that regular exercisers use imagery more often than non-exercisers (Gammage et al., 2000).

Despite the popularity of exercise imagery and its apparent effectiveness at increasing or maintaining PA levels (Giacobbi, Hausenblas, Fallon, & Hall, 2003), there has been limited qualitative research that has investigated exercise imagery use in older adults (Kim & Giacobbi, 2009). Understanding more about the use of exercise imagery in this particular population would give an in-depth description of their imagery use and would provide researchers and applied practitioners with information on how to tailor an intervention and effectively address the needs of this group. An original contribution of the present research was the inclusion, for the first time, of participants above 65 years old to examine their functions of exercise imagery use, which might help clarify why PA widely varies in this population.

Kim and Giacobbi (2009) were the first to qualitatively examine the imagery use of middle-aged adults. This population used images, such as health outcome images, plan/strategy images, stress level images, and energy images to increase their confidence in achieving their goals, to reduce stress, and to motivate themselves exercise. However, it cannot be assumed that this will generalise to older adults, as they might use different types

of imagery relevant to their needs and reflecting their motivation to engage in PA.

Another assertion of the RAMDIU is that the timing and location of imagery can define imagery's effectiveness. Previous research has indicated that regular exercisers employ imagery in a variety of settings (e.g., within or away from the exercise setting, in bed, in the car) and at different time points (e.g., prior, during, or after exercise, during the day or at night) (Giacobbi et al., 2003; Kim & Giacobbi, 2009). The reason why imagery is employed and the content of images may differ depending on the situation. For instance, one image might be used before competition for preparation, while the same image might be used during competition for stress-reduction. In regards to "where", the more similar the imagined setting is to the actual setting, the more effective the imagery (Holmes & Collins, 2001). When for instance imagery is employed to learn how to use exercise equipment at the gym, the imagined setting should include the gym and the specific equipment. To date, there is no research on where and when older adult exercisers image and whether this is similar to younger aged exercisers.

Due to the scant amount of research surrounding imagery use with older adults, this study was the first to provide a comprehensive understanding of imagery use in this population. Using a qualitative approach, underpinned by the conceptual framework of RAMDIU, the primary aim was to explore the main components of imagery use and give an insight on how the "who" component (older adults) interacts with the "where", "what", and "why" older adults image. Factoring in the characteristics of the exerciser will help applied practitioners develop personalised imagery interventions appropriate for older adults to promote PA. A further purpose of this study was to examine if there are any differences in the patterns of imagery use in individuals who are physically active and insufficiently active.

# Methods

## Participants

Participants were 37 older adult males ($n$ = 20) and females ($n$ = 17) from the local community in Birmingham, UK. The participants ranged in age from 55 to 80 years ($M$ = 64, $SD$ = 5.2) and represented a range of PA levels. Participants were classified in groups depending on the self-reported number of minutes they were active in a week. Specifically, binary categories were created based on the Department of Health's (2013) recommendation for engaging in more than 150 minutes of moderate intensity PA a week, to identify participants who either met this recommended activity level or fell below it. Participants reported engaging in either moderate levels of PA ($n$ = 26) or being insufficiently active ($n$ = 11). All but one participant (belonging to a mixed ethnic group) were Caucasian.

## Procedure

The Ethical Review Committee at a major University in West Midlands, UK approved this study. Using a purposive sampling strategy, participants were recruited from the local community through flyers and by word of mouth. Seven focus groups were held, which allowed for a range of opinions to unfold through the interactive discussion among participants (Smithson, 2000). Each focus group lasted between 48 and 89 minutes and consisted of 3-6 participants grouped mainly by their PA level. All participants provided written informed consent and demographic information on their age, gender, ethnicity, and PA level. White and Hardy's (1998) definition of imagery was provided to the participants, followed by a clarifying example and a simple imagery exercise, which involved imaging holding a lemon. The participants were then debriefed to get a sense of their imagery ability (e.g., How easy/difficult is it for you to generate these images) and ensure they understood the concept of imagery (e.g., Can you explain in your own words the concept of imagery).

## Interview Guide

The semi-structured interview guide was based on the RAMDIU with an emphasis on what, why, where and when the participants image. The questions directed participants to think about their use of imagery in general, and in relation to PA. To further explore the experiences of participants who were familiar with imagery use, follow-up questions and probes were used (e.g., "Help me to understand what you mean"), whereas those less familiar with imagery were asked to think of ways that imagery could be used to help them be more physically active in retirement.

## Data Analysis

Each focus group was audiotape recorded and transcribed verbatim. To protect participants' confidentiality, each participant was identified with a pseudonym. Following transcription and organising the data in NVIVO version 10, a thematic analysis of the data was undertaken (Braun & Clarke, 2006). The aim was to make sense of the responses of the participants in relation to the overall research question; in this case, to explore whether they use imagery for exercise related purposes. Initially, to identify themes that were matching with the RAMDIU, a deductive approach was followed. However, themes that did not readily fit the model were allowed to emerge inductively by encouraging the participants to speak freely about their imagery experiences. Thus, the inductive analysis revealed imagery types unique for older adults.

A critical realist perspective was adopted, which espouses the belief that it is possible to gain insight into people's experiences through their accounts, but also that researchers have a role in constructing knowledge (Madill, Jordan, & Shirley, 2000). A post-positivism approach was also adopted recognising the possible effect of biases on research (Clark, 1998). In this instance, the researchers' familiarity with previous exercise imagery research might have influenced the interpretations of our results. Thus, even though the goal is to

grasp the reality as objectively as possible, it is recognised that the researchers' perceptions about reality can have an impact in the findings (Ponterotto, 2005).

### Issues of Trustworthiness

Aligned to the critical realist and post-positivist standards of rigour, a number of steps were taken to establish trustworthiness (Creswell, 2007). First, triangulation was performed by involving three researchers in the analysis process (Creswell & Miller, 2000). Regular research group meetings took place while creating the interview guide, throughout the analysis stage by having multiple coders, as well as by getting support and exchanging ideas when interpreting the findings. These meetings provided consistency throughout the analysis process and helped to eliminate researchers' biases and ensure credibility (Onwuegbuzie & Leech, 2007). A pilot focus group composed by researchers experienced in qualitative and/or older adult research established credibility by helping to develop the content of interview guide further. Finally, direct quotes from the participants gave context in the findings and credibility to the researcher's interpretations, allowing the readers to make their own judgments (Tracy, 2010).

## Results and Discussion

The analysis led to five higher-order themes associated with older adults' deliberate imagery use: (1) who; (2) where and when; (3) why; (4) what; and (5) how. When appropriate, the interaction between the different components of the model is highlighted. Demographic information (e.g., PA level and gender) is provided to give context to each quote. Figure 1 is a representation of RAMDIU as it applies to the findings of this study.

—Insert Figure 1 here—.

**Who**

The dimension "who" refers to characteristics of the individual that differentiated participants in imagery use. Two subthemes emerged under "who", participation and familiarity with imagery. Participation refers to the doer of the action and contains two dimensions, imager and observer. While the majority of the participants talked about their experiences using imagery, a few participants had not experienced imagery themselves but had observed other people image. For example, one participant, who was aware that top athletes use imagery, described: "You normally see the top athletes before they get to the blocks, they're standing there and they are quite focused, their eyes aren't closed, but you can almost see them imagining themselves and getting to the finishing line" (Active female). Similarly another participant vicariously experienced imagery through watching a friend's son utilising imagery. He said: "We've got a friend whose son plays golf. He'll be in the garden swinging clubs and he's visualising his movements" (Active male).

A pattern of responses indicated a tendency for physically active individuals to report being more familiar with exercise imagery. They were able to describe their imagery use in more detail and seemed more open to the idea of using imagery for PA purposes compared to insufficiently active participants. For example, a physically active participant, described:

> I know where I want the ball to be put and so I have an image of what's going to happen and what I want is my body to make this come true. So imagery is a way of marrying your body's movements to the result you wish to achieve.

This finding supports previous research demonstrating that regular exercisers use more imagery than less frequent exercisers (Gammage et al., 2000; Giacobbi, 2007). Further, insufficiently active individuals seemed to be less familiar with imagery as indicated by a female, "Imagery is not something I use, hardly at all or I should say I don't really understand it very well. It doesn't come natural to me". Our results agree with the RAMDIU by

suggesting that older adults' motivation to use exercise imagery reflects their motivation to be physically active. Specifically, individuals who were insufficiently active tended to use less exercise imagery than physically active participants. This finding is not that surprising because insufficiently active individuals usually struggle with motivation, and the barriers they face tend to be more internal in nature (Kosteli, Williams, & Cumming, 2016).

Many of the insufficiently active participants initially reported not using imagery, but nevertheless described spontaneous use of imagery in their daily lives or talked about possible applications of imagery as the focus group discussions progressed. For instance, a participant described,

> I've never given it a name and I've never really thought about it that consciously, but I have used imagery for quite a few things like when I was skiing, there's a great deal of it there trying to get skiing movements correct. When I was learning to fly I used it, its very… very valuable, trying to land a plane, you know if you try to get it in your… the whole sequence in your head. But I've never actually thought about it consciously, it's just something I did.

It is possible that the focus groups provided a relaxed environment that allowed participants to reflect on their imagery use through interacting with others (Walden, 2012). The dynamic nature of the focus groups can bring to light viewpoints that would otherwise remain hidden (Farnsworth & Boon, 2010). For instance, a participant reported being unfamiliar with imagery but after listening to others talking about it, seemed to recognise its potential application to exercise and expressed a desire to try it in the future,

> It would be worth a try. I just thought about the possibility of seeing myself going there and changing and enjoying the water and swimming and feeling the water supporting your body, perhaps if I did think that for a whole week every day, then the next week I might try it (Inactive male).

These results suggest that imagery interventions are feasible with the older adult population, regardless of their level of PA. Furthermore, the findings suggest that it is important to account for "who is the messenger" of imagery interventions as peer supporters may be more effective at conveying information about the intervention (Ginis, Nigg & Smith, 2013). For instance, older adult exercisers who have previously used imagery might be more suitable in convincing others on the adoption of imagery for PA purposes.

**Where and When Older Adults Use Imagery**

Older adults reported using imagery more frequently right before engaging in PA rather than during or after the activity. One participant described, "I am visualising before the event if there's maybe something coming up with folk dancing that I'm nervous about getting right, when I'm thinking about doing it I'll try to visualise how it goes leading up to doing the actual thing"(Active male). In support of RAMDIU, older adults seem to match the timeframe of their imagery use to its intended function. Highlighting the interaction between "when" and "why", the same participant referred to using imagery after engaging in folk dancing to review and correct any mistakes. He stated, "I could visualise if there'd been an incident, maybe when I'm dancing and then I try, afterwards when I've calmed down a bit, I'll think how did that happen, how can I stop that…being frightened about that happening again, what could I have done different". Thus, the same image can be used for different purposes at different times. Participants referred to using imagery during the activity less frequently. One participant reported imaging while doing yoga. She stated "I use that in yoga. I sometimes use it when I'm doing it actually" (Active female).

While the majority of the participants stated that they used exercise imagery away from the exercise environment (e.g., at home, at work, in the car), there were still a few participants who used imagery while in the exercise location. For example, one participant stated, "When you're in the gym it can help" (Active female).

**Why**

The dimension "why" refers to the functions of older adults' imagery, which constituted two categories, motivational reasons and cognitive reasons. Several participants used imagery as a motivator to exercise. Three subthemes were identified, including initiation or completion of PA**,** preparing for challenging situations, and self-efficacy. The majority of participants talked about using imagery before exercise to motivate themselves to initiate PA. For instance, one participant said, "I can think through that walk and think yes I will go, I'll pack my bag and I'll go. It motivates me to pack my sandwiches, get my flask and go" (Active female). However, imagery could also bring back memories from the past and could give older adults an incentive to do something that they have not done for years. For instance, a participant talked about motivating himself to exercise by recalling a past activity, "Imagery could make me go back and do something I've done in the past, like I haven't been skiing for many years" (Active male).

In addition to using imagery as a motivator to exercise, a few participants talked about using imagery to overcome different types of barriers that prevented them from exercising. For instance, one participant reported using imagery to overcome bad weather, as reflected in the statement of an active male,

> I have used it as a precursor to exercise, particularly again, coming back to dog walking, if its absolutely chucking it down with rain and you think I really don't want to do this, but you think well I'm going to put… I'm going to fleece up, I'm going to put my waterproofs on top, this is it, I can feel the rain coming on my face but I know at the end of it, when I come back into the warm, my face will be tingling and I'll be… I'll be fine with it. And it gives a little bit of motivation towards going out into the pouring rain. Another participant described using imagery to overcome fear, and concern for the unknown when she joins a new exercise class. She stated, "When I

> know I'm going to be doing something or going somewhere that I'm a bit concerned about, I try to see myself in the situation" (Active female). Similarly, one of the older physically active females stated, "I have used it during dance exams because it's always a difficult time. You're apprehensive and you're trying to imagine how it's going to be. It can be a form of preparation for what's to come".

Other participants stated that imagery gave them confidence to achieve a goal, including attending an exercise class. For example, the participant who used imagery to prepare for challenging situations regarding her dance class, reported having a secondary aim of gaining confidence, "You can think I'm quite comfortable now and I'll be like this and I'll be standing at the back of the class and it'll be alright. It's a form of comfort, it gives you a bit of confidence" (Active female). This example reinforces a main proposition of the RAMDIU that the same image may serve different purposes for the same individual. Other participants reported using imagery to become confident in sport related skills along the lines of,

> There's some theory says that if you imagine and play it through, you know there's things like muscle men, you can play it through and then you're going to be better. And if I do that I do feel more comfortable in my back hand. (Active male)

Participants also acknowledged the importance of employing imagery for cognitive reasons. Three subthemes were identified, including memory, planning, and skill execution/improvement. The majority of participants used imagery in regards to memorising steps in exercise classes or remembering. This was particularly true for the most physically active participants who engaged in activities such as folk dancing. A participant described using imagery in Tai Chi to "memorise the sequence of the movements" (Active female). Similarly, another physically active participant described,

> With folk dancing, there may be a tricky sequence of steps in some sort of dancing and you try and work it out. But usually when the music starts the muscle memory is there, but it could be a sequence of a pattern that you try and do figures with your set and you try and visualise where everybody else is supposed to be and that's mental exercise as well.

Less physically active participants also recognised the importance of imagery to help them remember and retrace lost objects. One participant shared the following, "If you lose things, you've got to retrace your steps in your mind where you've been and go backwards in time and you might be able to work it back. I have actually used that to find things" (Inactive male). Several other participants reported using imagery in an exercise setting to plan their moves ahead of time, which is reflected in the following statement,

> In sport I used it when I was doing competitive 1500 metre runs. I'd have the race in my head, every 200 metres would be a different stage of the race for me. So you'd know how you were going to run and you changed the way you were going to run depending on what the others were going to do. So you imagined the race before you actually ran it. (Inactive male)

The more physically active individuals and/or those who were involved in a sport referred to be using imagery to master sport-related skills. For instance, one participant reported, "I use it in some activities to achieve something which I wouldn't without it. It's yoga or not being able to jump back and to the front elegantly, with control" (Active female).

**What**

The dimension "what" includes the type of images older adults use; that is, the content of their images. This category consisted of four subthemes (i.e., imagery types), execution images, goal images, affect images and scenery images. Although some of the imagery types that emerged in the current study are similar to those referred by Kim and

Giacobbi (2009) (e.g., physical appearance images, health images, plan/strategy images, relaxation images), older adults engaged in unique types of imagery to motivate themselves exercise (e.g., reward images, avoidance images, scenery images). Some participants reported imagining themselves executing certain sport-related skills with the aim of mastering them or for other reasons. These images are similar in nature to technique images that athletes use but rather than focusing on exercise movements they focus on specific skills (e.g., how to hold the racket). For instance, one participant used the same image for two different purposes. He stated, "Before I go to badminton I try and imagine my back hand which is my weakest area. If I don't get it right I don't win the game" (Active male).

However, he also used the same skill execution image to boost his self-efficacy and feel more comfortable with his backhand, "If you imagine and play it through, then you're going to be better. If I do that, I do feel more comfortable in my back hand". This example supports the assertion of the RAMDIU and suggests that the same imagery content can serve multiple functions, as well as further highlighting the interaction between "what" and "why" (Nordin & Cumming, 2005). The idea that skill execution images could serve dual functions (e.g., motivation to initiate PA and skill improvement) was expressed by several participants. Other individuals reported using skill execution images to master non-exercise related tasks. For example, one participant used imagery while learning to play a musical instrument. He stated, "I'm learning to play the ukulele very badly, so I do visualise about the chord structures and how my hands should be" (Active male).

Several participants indicated imaging the steps required to complete a certain exercise task. For instance, a participant described, "With folk dancing there may be a tricky sequence of steps and you try and work it out. You visualise where everybody else is supposed to be" (Active male). Another participant described his experience of using sequence imagery to master a non-exercise related skill, relevant to his job as a pilot. He

said, “When I was learning to fly I used it, it’s very valuable, trying to land a plane, if you try to get the whole sequence in your head” (Active male). This quote also demonstrates the interaction between “what” and “why” as older adults were found to use imagery within a range of activities.

A commonly reported theme amongst participants were images concerned with exercise-related goals, which particularly focused on the results older adults desired achieving. Participants reported experiencing images related to their desired physical appearance such as becoming thinner. For example, a participant imagined how she would like to look following weight loss, “Sometimes I’ve visualised that I’ve lost all my weight and I’m doing all sorts of things” (Inactive female). Appearance images also included changes in musculature, “With my walking I think about the inner experience of the muscles toning up” (Inactive female). Although physical appearance imagery was mentioned by a few of the participants, it was not the most frequently reported type of imagery. This is not surprising as incentives for exercise vary with age, with older adults focusing on improving their physical and mental health (Gill & Overdorf, 1994). These findings further reinforce the suggestions from Wesch, Milne, Burke and Hall (2006) that older adults’ motivation to exercise is less likely to focus on improving physical appearance.

A few participants indicated that they imagined themselves receiving a reward at the end of the exercise session in recognition of their achievement. Reward images could involve anything that provided a sense of satisfaction to older adults. For instance, one participant described, “Having the reward at the end of it, perhaps a nice hot cup of tea when you come back” (Active male). Even insufficiently active participants recalled motivating themselves by using reward images when they were more physically active. A participant commented, “I was imagining this pastry at the end of the race because by then I was starving” (Inactive male).

Several other participants discussed wanting to prevent a negative health outcome as a result of getting older. For example, one participant reported, "You might see yourself either in a wheelchair or not being able to get upstairs, having to have a carer and the longer you keep that off the better" (Active male). A few other participants discussed how they would carry out a given task. These images focused on the process of the goal rather than on the actual outcome. For example, one participant reported, "I imagined my ball going exactly where I wanted it, over the tree and onto the green and it did" (Inactive male). Another participant experienced something similar in tennis, "About tennis you've got to visualise where you're going to serve it and where you're going to return it" (Inactive male).

Several participants indicated that they experienced images related to mental health and psychological affect such as images of being calm and relaxed. For instance, one participant said, "I imagined that my blood pressure would remain calm and I'd be at peace" (Inactive female). Another participant said, "You go to your happy place and you're just calm and you can just feel yourself relaxing" (Active male). Images of enjoyment were not as common as relaxation images but there were a couple of participants who referred to imagining their enjoyment of PA, "I thought about seeing myself going there, changing and enjoying the water" (Active male).

The final type of images, mentioned by most participants, related to the scenery. These images referred to the physical place or general location where exercise would take place. These images support the assertion of Lang's bio informational theory (1977) about the importance of including stimulus propositions (i.e., details about the environment) in imagery. For example, a participant described, "For me it would be like thinking oh yeah I'm going to swim in the Mediterranean and it's going to be lovely and warm and sunshine and everything around me" (Inactive male). This individual not only imagined the ideal exercise setting, but also used response propositions by imagining how it would feel to be there (e.g.,

it's going to be lovely). The combination of stimulus and response propositions can lead to more vivid imagery, which can be more effective (Lang, Kozak, Miller, Levin, & McLean, 1980). Similarly, another participant reported using scenery images during a spinning class guided by the instructor, highlighting the interaction between "where" and "what", along the lines of, "In the spinning classes you've got an instructor and he is telling you're picturing this, come on push, and he is telling about the greenery, all the scenery that you're seeing and that motivates you" (Inactive female). Another participant described of imagining the natural surroundings for motivational purposes, highlighting the interaction "what" and "why". She said, "If you want to go on a walk you could imagine the walk, the birds, the open spaces and that might actually make you want to go on the walk" (Active female). Overall, the findings suggested that certain imagery is better suited for individuals depending on their age, gender, or PA level.

**How**

The dimension "How" refers to imagery characteristics and consists of two categories, senses and direction. The majority of the participants tended to use mainly visual images. One participant described, "I'm visualising, you're going to get dressed and you're going to go out and you're going to start running" (Inactive male). Other participants referred to kinaesthetic images, along the lines of "Sitting here I've just been visualising it, going through the feeling of skiing and I think perhaps I should go again this winter" (Active male). However, a few participants described using negative health images to motivate themselves to exercise, reflecting an interaction between "what", and "why". For instance, a participant said "You might think of yourself either in a wheelchair or not being able to get upstairs, having to have a carer and the longer you keep that off the better" (Active male).

## General Discussion

Previous research on exercise imagery use in older adults has mainly been quantitative in nature (Wesch et al., 2006; Thøgersen-Ntoumani et al., 2012). To date, there is limited qualitative research on exercise imagery use and this has focused on young (Giacobbi et al., 2003) or middle-aged adults (Kim & Giacobbi, 2009). This is one of the few qualitative studies to explore the imagery use of older adults (Giacobbi et al., 2014). Underpinned by the RAMDIU, the study found interactions among the different components of the model, while also drawing comparisons between physically active and insufficiently active individuals. The inclusion of individuals from a variety of PA levels allowed us to get an insight on a wide range of experiences and understand more about the content and the function of imagery of both physically active and insufficiently active older adults. The findings suggest exercise imagery is a promising intervention strategy by demonstrating that that older adults already use it to at least some extent. Similar to athletes and younger exercisers, older adults reported using imagery for both cognitive and motivational reasons (Hausenblas et al., 1999). Thus, exercise imagery has the potential for motivating older adults to engage in PA, which in turn can facilitate healthy ageing and have tremendous public health implications.

A number of interactions emerged throughout the results. One of the most apparent interactions was between "what" and "why". The results confirmed the suggestion of the RAMDIU that the content of images is not always indicative of the function of images. Older adults often use the same image for multiple purposes or a variety of images for the same purpose. Accounting for the personal meaning of images, practitioners can help older exercisers to find the right type of images that can serve the right purpose. The interaction of the "when", "what", and "why" components was highlighted in the results, as the same image was used for different purposes in certain time points. This further highlights the importance

of accounting for the particular situation. The interaction of the "who" and "what" components is apparent due to different individuals using a variety of images to motivate themselves initiate PA. These results confirm a main assertion of the RAMDIU that it is important to account for who is using the imagery. Individual characteristics of the imager such as age, gender, and PA level appear to impact both the function and the content of images used. For instance, a motivational image for an older adult (e.g., imagining the walk, the birds, the open spaces) might not be motivational for younger exercisers. Similarly, regular exercisers seemed to differ in their imagery use compared to insufficiently active individuals. Thus, practitioners working with older adults should consider PA levels before designing imagery interventions. The interaction between "who" and the other model components indicates the importance of personalising the interventions to make them individually tailored to the PA level of the individual. In the present study imagery content seemed to vary according to activity level of the participants. Specifically, physically active individuals reported using more skill execution images and sequence execution for cognitive reasons (e.g., planning, mastering and improving skills).

Finally, the results indicated that older adults were not very descriptive when discussing how they imaged compared to what athletes would describe – i.e., there was no mention of timing, colour/vividness. This finding suggests that their meta-imagery skills, i.e., "people's knowledge about, and control over, their own mental imagery processes" (Moran, 2004, p. 285) may need further development in order to fully benefit from an imagery intervention (MacIntyre & Moran, 2009). An effective strategy that has been used with younger athletes for such purposes is layered stimulus response training (LSRT; Williams, Cooley, & Cumming, 2013). Although not yet applied with older adults, it is possible that LSRT could enhance imagery ability and meta-imagery skills for this population.

A limitation from this study is the use of self-reported PA as a way to classify participants as active vs. insufficiently active. Although participants were screened prior to the study and placed in homogeneous groups depending on their reported PA levels, it is possible that some of the participants over-reported their PA level. To overcome this issue, any comparisons made between physically active and insufficiently active participants were based on their responses during the focus groups and not based on the initial screening. Future researchers should perhaps consider using validated self-report measures to determine their actual PA levels.

The results indicated that older adults differ in their imagery use compared to younger exercisers. Older adults engaged in some unique types of images (e.g., reward images, scenery images) and these images served functions reflecting their needs (e.g., remembering). Furthermore, the results suggest that the RAMDIU can be a useful conceptual framework to better understand imagery use in older adults and further supports it's applicability for non-athlete populations. Accounting for the needs of this group can help in the creation of personalised imagery scripts, with imagery content tailored to the outcomes older adults want to achieve (Williams, Cooley, Newell, Weibull, & Cumming, 2013). Future researchers might want to consider personalising their approach by providing an appropriate definition of imagery and instructions, as well as relevant examples according to the PA level of the participants.

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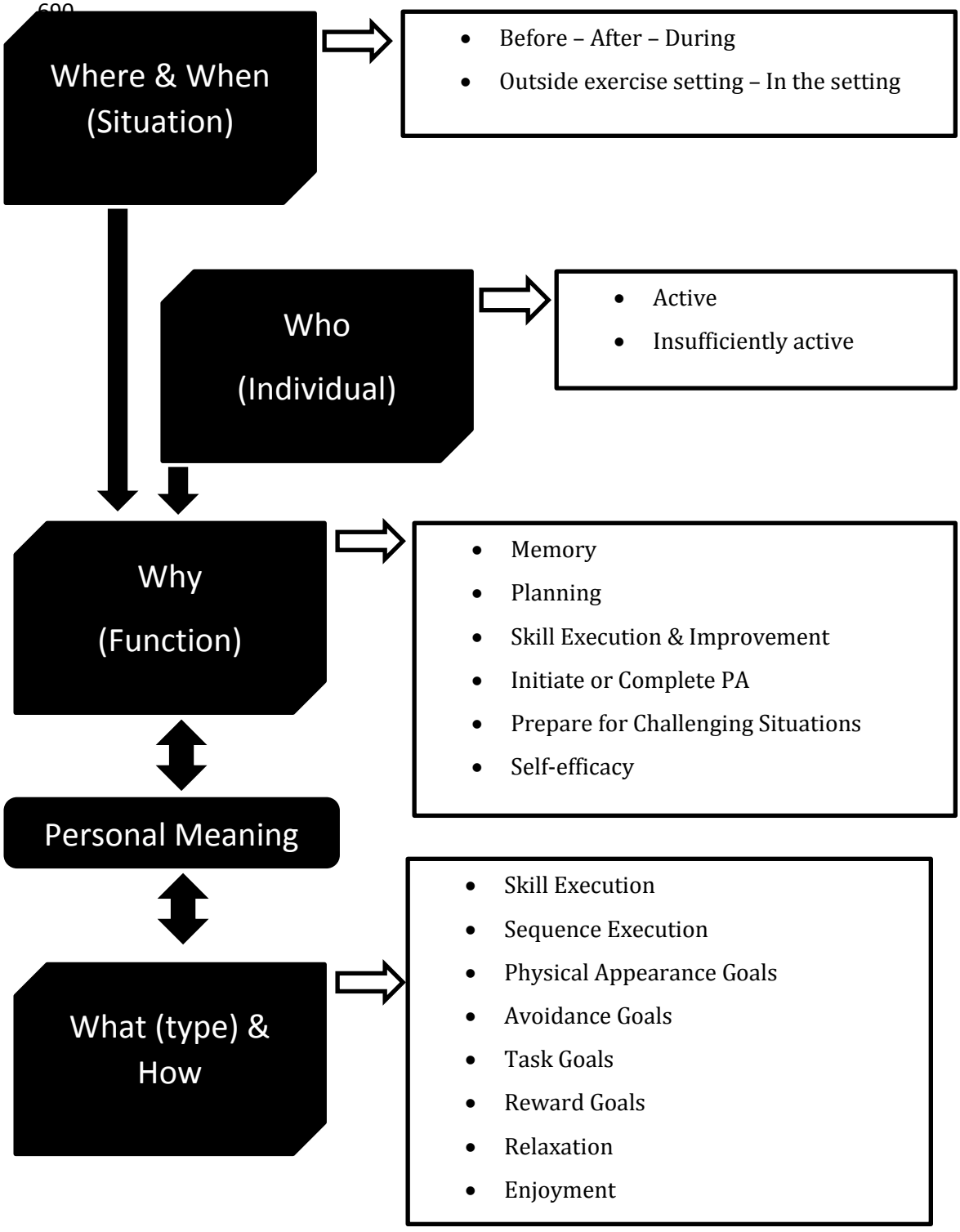


Figure 1. Revised applied model of deliberate imagery use