Functions of mental imagery in expert golfers

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ABSTRACT

Objectives: This two-study article examines the functional aspects of the use of imagery and describes the relationship among function, content and characteristics of mental images used by expert golfers in different situations.
Method: In Study 1, three methods of interviews (field interviews self-confrontation interviews and focus group) were used with 21 expert golfers to collect data about their use of imagery. In Study 2, 31 expert golfers were exposed to different situations (task-involving vs. ego-involving situations, easy vs. difficult tasks conditions) in order to examine the links between: (a) the function and the content, and the function and the characteristics of their mental images, and (b) the situation and the function of their mental images.
Results: Results indicated that one category of content (images of the outcome with an internal perspective) was principally used by all participants. Moreover, the expert golfers adapted the content and the characteristics of their images according to the function that was required by the situation. The influence of the situation on imagery use highlighted in Study 1 was not confirmed in Study 2.
Conclusions: Results confirm the links among function, content and characteristics of imagery postulated recently (Fournier, Deremaux, & Bernier, 2008; Murphy, Nordin, & Cumming, 2008; Nordin & Cumming, 2005). Taking into consideration these functional links should enhance the relevance of future research and help the sport psychology practitioner to better understand athletes' use of imagery. The influence of the situation on imagery use still requires further exploration.

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Hardy and Jones (1994, p. 67) define mental imagery as "a symbolic sensory experience that may occur in any sensory mode." Imagery may influence physical performance (Driskell, Copper, & Moran, 1994; Murphy, Nordin, & Cumming, 2008), and is thus a major research theme. The understanding of the relationship between mental imagery and sport performance has progressed along two different lines of research that seek to optimise the use of imagery by athletes. The first line studies the functional equivalence between real and imagined movement. Functional equivalence is related to the simulation theory (Jeannerod, 2001) that postulates that covert or imagined actions are considered as actions not actually executed. The second line of research, with which this article deals, regards the applied use of imagery by athletes. Several models have been presented to explain how athletes use mental imagery. The model proposed by Martin, Moritz, and Hall (1999) has been used in various studies to explore and improve understanding of the use of imagery by athletes. Martin et al.'s model supplements Hall, Mack, Paivio, and Hausenblas' (1998) original model, itself based on Paivio's (1985) functions model. Martin et al.'s model is made up of three main components: situation, type and outcome. This model postulates that athletes' mental imagery sessions take place in three different situations: training, competition and rehabilitation. Second, five imagery types include: (a) Cognitive Specific, (b) Cognitive General, (c) Motivational General-Mastery, (d) Motivational General-Arousal and (e) Motivational Specific. These types are also called the function or the purpose that the imagery is serving. The third component encompasses three outcomes that athletes hope to achieve: (a) to learn skills and strategies for performance, (b) to modify cognitions, (c) to regulate arousal and competitive anxiety. Hall et al. (1998) developed a questionnaire based on Paivio's (1985) functions model: the Sport Imagery Questionnaire (SIQ). The SIQ appraises the extent to which the five imagery types are used.

Martin et al.'s (1999) applied model and the SIQ have been used in numerous studies (e.g., Cumming, Clark, Ste-Marie, McCullagh, & Hall, 2005; Gregg, Hall, & Nederhof, 2005; Short et al., 2002). Recently, some limitations of the assessment tool and of the model have been highlighted due to the confusion between imagery type, function and outcome. Researchers have noted that a participant may use the same image for different reasons (Calmels, D'Arripe-Longueville, Fournier, & Soulard, 2003; Fournier, Deremaux, & Bernier, 2008; Hare, Evans, & Callow, 2008; Murphy et al., 2008; Nordin & Cumming, 2005; Short, Monsma, & Short, 2004) rather than equating content with

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function. The confusion between content and function of imagery is also present in the SIQ. Short et al. (2004) pointed out that previous studies have made the mistake of selecting one function for each image.

In two more recent model propositions (Fournier et al., 2008; Murphy et al., 2008), three key concepts emerged: content (or type), characteristics and function. These three concepts are defined and integrated in more complex models by the authors to explain how athletes use imagery. Their definitions of the three concepts are similar, which suggests that these terms are relevant. The content (or the type) of a mental image is what is imagined. The content may include various elements (e.g., the movement itself, the outcome, the environment). It is not limited to the types defined in Martin et al.'s model (i.e., CS, CG, MS, MG-A and MG-M) that, for the reasons previously outlined, does not distinguish between content and function. Fournier et al. (2008), Nordin and Cumming (2005) and Murphy et al. (2008) have suggested newly identified kinds of content according to the sport in which they studied imagery use (e.g., images depicting emotions, images of the context, images of strategy, body-related images). Fournier et al. (2008) suggested that the content of a mental image is defined both by a focus of attention (i.e., what is seen in the image) and by the perspective (internal vs. external). In a view different from Munroe, Giacobbi, Hall, and Weinberg's (2000) framework, which considered perspective as a characteristic of mental imagery, Fournier et al. (2008) argued that what is seen is determined by the perspective. Thus the perspective is an element of the content. Characteristics are how mental images are imagined. Murphy et al. (2008) integrated various characteristics in their neurocognitive model of imagery: imagery amount, duration, direction, deliberation and modality. Other characteristics emerged from imagery uses of elite skydivers in the Fournier et al. (2008) study; they were speed, vividness and colour. Finally, the function corresponds to the reason why mental images are imagined. For example, one may use mental images in order to learn or to get motivated. Functions are linked to the role attributed to mental images, or to the goal sought through the use of mental images. In both recent models the concept of function is central. "Thus the column labeled *imagery function* is in some ways the most important part of the model, because the choice of goals will highly influence the nature and process of the ensuing cognitive activities." (Murphy et al., 2008, p. 309).

Fournier et al. (2008) and Murphy et al. (2008) used the same three key concepts in distinct approaches. Murphy et al. (2008) considered these three components in a neurocognitive approach establishing links between cognitive processes. This model also draws attention to the imagery "outcome" or the behavioural, affective and cognitive effects of imagery. Fournier et al.'s (2008) model is based on a dynamic approach highlighted in two studies with skydivers that contends that the three elements (content, characteristics and function) vary with the demands of the situation. Thus the model points out that the situation influences imagery use. The content and the characteristics of mental images are generated because they correspond to specific needs, or functions, in specific situations (e.g., easy or difficult sequences, in different steps of the preparation for the jumps). Nordin and Cumming (2005) also observed differences in imagery content depending on the time (e.g., times of day, practice, performance, certain periods of the year). It is therefore necessary to consider and define the notion of "situation". Indeed, many elements (e.g., time, context, specificity of the task) that can be classified as situation seem to have an influence on imagery use. Hence, situation is understood in the present article as "a combination of all the things that are happening and all the conditions that exist at a particular time in a particular place" (Pearson Longman, 2009).

Since the concept clarifications are recent, the present study aimed to replicate and extend previous findings on the three key concepts. The first qualitative descriptive study was designed to explore imagery function, content and characteristics with a sample of elite athletes in the sport of golf. The second goal of Study 1 was to explore more thoroughly the functional links between the concepts suggested by recent studies. The influence of the situation mentioned by Fournier et al. (2008) and Nordin and Cumming (2005) was also examined in this exploratory study. In addition, a quantitative quasi-experimental research study (Study 2) was performed with elite golfers to confirm some specific links that seemed central in imagery use: (a) the link between function and content, and function and characteristics, (b) the link between situation and function. The goal was to deepen our knowledge about the relationships among the concepts.

Study 1

The goal of this first qualitative study was to describe mental imagery used by expert golfers regarding its content (what does an expert golfer imagine in preparing the shot?), its characteristics (how does the golfer imagine it?), its functions (why does the golfer use these images?) and the links between these three elements. The study also explored the influence of the situation on imagery use. The study was based on a design with three qualitative methods in order to optimise data collection. As this study was exploratory, researchers took into account the images used by golfers in ecologically valid conditions.

Method

Participants

Twenty-one expert golfers (6 female and 15 male; M age = 26.36, SD = 4.68) volunteered to take part in this research study. The participants had practised golf for 12–25 years (M = 16.31, SD = 3.38). According to criteria defined by Ericsson, Krampe, and Tesch-Römer (1993) they were thus considered expert athletes. Nine players were elite amateur golfers and had a handicap between −2 and 6. Three of them participated in international amateur tournaments (European and World Championships). The other twelve participants were professional golfers and had competed in various professional tours (Alps Tour, Challenge Tour, European Tour). Because they were professionals, they did not have official handicaps but their play level corresponded to a negative handicap. All players signed an informed consent form and were told that they could withdraw at any time from the study.

Design

To increase validity, the same phenomena were observed with three different qualitative methods (field interview, self-confrontation interview and focus group), the strengths of one offsetting the weaknesses of the others. Golfers were assigned to each method according to their availability when one method was used. Professional and amateur golfers ended up being distributed equally in each method.

Field interviews were held during play with 7 players (2 professional female, 3 amateur male and 2 professional male). A researcher accompanied each golfer as they played a 9-hole course. After each shot he/she asked the golfer a series of questions to describe the mental images used both before and after playing each shot. The interviews were audio recorded to allow for later transcription. This method allowed for stimulating immediate recall of the images used in the previous situation. However, the interview process between two shots might have an influence on the following imagery experiences on the course.