International Symposium on Performance Science
ISBN 978-90-9022484-8

Theoretical and practical applications of mental imagery

Melanie J. Gregg[1] and Terry Clark[2]

[1] Department of Kinesiology and Applied Health, University of Winnipeg, Canada
[2] Centre for Performance Science, Royal College of Music, London, UK

Mental imagery is used extensively by musicians as well as by athletes in sport. As performers, musicians and athletes strive to achieve excellence. Preparation is an essential precursor to performance and the use of mental imagery is a common method of achieving this state. In the sport psychology literature an applied model of imagery use has been proposed, the model suggests that the sport situation (i.e. training, competing, rehabilitation) will dictate the function of imagery used (e.g. arousal regulation, skill rehearsal), and this in turn will impact the outcome (e.g. feelings of efficacy, technique). Relevant mental imagery research in sport and music is reviewed, making links across the disciplines in an attempt to inform research and practice. The applied model of imagery use in sport guides the development of a similar applied model of imagery use in music.

Keywords: mental imagery; sport; music performance; applied model; interdisciplinary

The purpose of the present paper is to review the relevant mental imagery research in sport and music, making links across the disciplines in an attempt to inform research and practice. A secondary purpose is to employ the applied model of imagery use in sport as a guide for developing a similar applied model of imagery use in music.

Mental imagery is any experience that mimics sensory or perceptual experiences, whereby the individual is consciously aware of his/her imagery experience; thus, it differs from daydreams (Richardson 1969). Imagery can incorporate all five physical sensations (i.e. vision, audition, olfaction, gustation, and kinesthetic; Vines 1988). Previous experience is not necessary to create an image; as a result, it is possible to imagine future events or a

specific, desired outcome. Paivio (1985) identified the functional roles through which imagery influences sport performance, and his framework has been the predominant guide for imagery research in the sport psychology literature. The framework indicates that imagery affects performance through both cognitive and motivational functions. The cognitive function includes strategy and specific skill rehearsal whereas the motivational function consists of being successful, controlling emotions, and overcoming adversity.

Imagery has been demonstrated to be an effective means of enhancing performance in the performing arts and sport (e.g. dance, Fish *et al.* 2004; sport, Hall 2001; and music, Holmes 2005). However, simply using imagery is not sufficient to produce the desired effect on performance (Lee 1990, Smith *et al.* 2007). Martin *et al.* (1999) developed an applied model of imagery use in sport in an attempt to guide imagery practice and enhance the effectiveness of that practice. For the purposes of this paper, the model has been adapted for musicians as illustrated in Figure 1. The model indicates that the situation will dictate the function of imagery used, and this in turn will affect the outcome. For example, in a rehearsal setting where learning is the focus, the musician would likely use imagery for cognitive purposes and the outcome may be a technically correct performance of a scale. The model goes on to suggest that this relationship between imagery use and desired outcome is not perfect. With athletes several variables have been found to influence this relationship. Imagery ability, the quality of one's imagery, is one variable that influences this relationship. In the sport literature, athletes who have higher imagery ability use imagery more frequently than those with lower ability and derive greater benefits from that imagery use (Isaac 1992). Skill level is another variable that moderates the relationship between imagery use and desired outcome; athletes of higher skill levels use more imagery than those of lower skill levels (Gregg and Hall 2006). Type of sport has also been identified as a moderator of imagery use (Munroe *et al.* 1998). There is some evidence that the imagery use of musicians may also be explained by Martin *et al.*'s (1999) model and may be moderated by similar variables. University classical musicians who were performance majors reported using imagery more often to maintain focus, feel confident, and overcome difficulties than non-performance majors (Gregg *et al.* in press). The same study provided evidence that imagery use may also be moderated by type of instrument; the study found that of the participants the singers reported greater use of images of successful goal achievement as compared to the instrumental musicians.

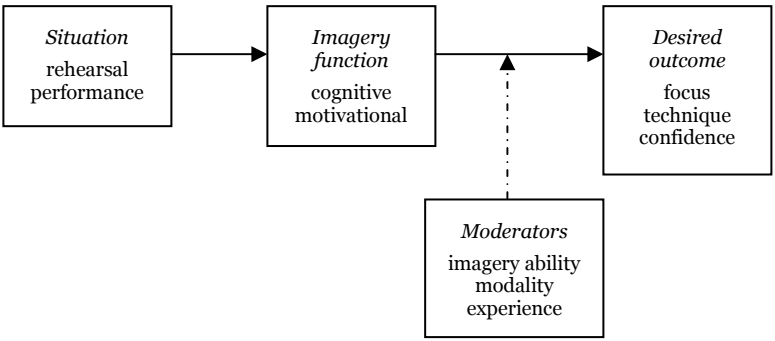

Figure 1. Applied model of imagery use. Adapted from Martin *et al.* (1999).

In sport, there is considerable support for the proposal that the function of imagery used should match the desired outcome. With respect to the cognitive function of imagery, numerous studies conducted in a wide variety of contexts have shown that the use of cognitive imagery is conducive to enhancing the learning and performance of motor skills (see Driskell *et al.* 1994 for a review). As well, the performance benefits of using cognitive imagery have been reported for strategy rehearsal in several sports (e.g. entire canoe slalom races; MacIntyre and Moran 1996). Similar evidence exists in the music literature, as Holmes (2005) identified auditory imagery as essential for learning and memorizing, suggesting a cognitive content to the imagery.

With respect to motivational imagery, when preparing for a performance, imagery of a desired performance goal aids musicians' preparation (Lehmann 1997). Using motivational imagery prior to an actual performance enhances confidence, critical to successful execution in both sport and music (Callow *et al.* 2001, McCormick and McPherson 2003, Schneiderman 1991).

Martin *et al.*'s (1999) applied model was developed to guide research and practice in sport imagery research. This version, adapted for musicians (Figure 1), may be suitable for guiding such inquiry as well. The applied model has led to the examination of questions such as where athletes use imagery, why they use it (i.e. cognitive or motivational), when they use it, and what they image (e.g. perspective, modality; Munroe *et al.* 2000). Using the model provides a structure for examining imagery use in music and allows for similar questions to be examined. In sport, there has been limited research into the modalities of imagery use; the focus has predominantly been on

visual images with some examination of kinesthetic imagery. Though athletes are generally encouraged to use all their senses when creating an image there has been limited interest expressed by sport imagery researchers into the effects of other modalities including auditory imagery, spatial imagery, and so on. Generally, music imagery research has taken a more inclusive approach to imagery modality, and this may have important implications for application in sport psychology. Imagery modality may be another moderator of the imagery use and desired outcome relationship. Specific modalities may align better with explicit imagery functions leading to desired outcomes. This certainly warrants further exploration.

The effectiveness of imagery interventions may be improved through a structured approach to imagery use. Smith and his colleagues (2007) demonstrated the effectiveness of enhancing athletes' performance through a structured imagery intervention. Simply asking athletes or musicians to engage in imagery is not enough. Imagery is a skill (Rodgers *et al.* 1991), it can be practiced, and improvements may be made over time, resulting in enhanced effectiveness of the imagery. Thus, by encouraging musicians to practice imagery and teaching them when and what to image at appropriate times, their imagery may become more effective, and ideally they will experience the corresponding benefits of the effective use of imagery.

MAIN CONTRIBUTION

This paper fosters the sharing of information across disciplines which may impact the use of imagery by both musicians and athletes. A model of imagery use in music could guide music imagery research and help practitioners employ imagery in an appropriate and effective manner in applied settings

IMPLICATIONS

The development of a suitable model for imagery use in music will help to guide research and practice, resulting in performers' using imagery more effectively.

Address for correspondence

Melanie J. Gregg, Department of Kinesiology and Applied Health, the University of Winnipeg, 515 Portage Avenue, Winnipeg, Manitoba, R3B 2E9, Canada; *Email:* m.gregg@uwinnipeg.ca

References

Callow N., Hardy L., and Hall C. (2001). The effect of a motivational general-mastery imagery intervention on the sport confidence of high-level badminton players. *Research Quarterly for Exercise and Sport, 72,* pp. 389-400.

Driskell J. E., Copper C., and Moran A. (1994). Does mental practice enhance performance? *Journal of Applied Psychology, 79,* pp. 481-492.

Fish L., Hall C., and Cumming J. (2004). Investigating the use of imagery by elite ballet dancers. *Avante, 10,* pp. 26-39.

Gregg M., Clark T., and Hall, C. (in press). Seeing the sound: An exploration of the use of mental imagery by classical musicians. *Musicae Scientiae*.

Gregg M. and Hall C. (2006). The relationship of skill level and age to the use of imagery by golfers. *Journal of Applied Sport Psychology, 18,* pp. 363-375.

Hall C. (2001). Imagery in sport and exercise. In R. N. Singer, H. A. Hausenblas, and C. M. Janelle (eds.), *Handbook of Sport Psychology* (2nd ed., pp. 529-549). New York: John Wiley & Sons.

Holmes P. (2005). Imagination in practice: A study of the integrated roles of interpretation, imagery and technique in the learning and memorization processes of two experienced solo performers. *British Journal of Music Education, 22,* pp. 217-235.

Isaac, A. R. (1992). Mental practice: Does it work in the field? *The Sport Psychologist, 6,* pp. 192-198.

Lee C. (1990). Psyching up for a muscular endurance task: Effects of image content on performance and mood state. *Journal of Sport and Exercise Psychology, 12,* pp. 66-73.

Lehmann, A. (1997). Acquired mental representation in music performance: Anecdotal and preliminary empirical evidence. In H. Jørgensen and A. Lehmann (eds.), *Does Practice Make Perfect?* (pp. 141-164). Oslo: Norwegian Academy of Music.

MacIntyre R. and Moran A. (1996). Imagery use among canoeists: A worldwide survey of novice, intermediate, and elite slalomists. *Journal of Applied Sport Psychology, 8,* p. S132.

Martin K., Moritz S., and Hall C. (1999). Imagery use in sport: A literature review and applied model. *The Sport Psychologist, 13*, pp. 245-268.

McCormick J. and McPherson G. (2003). The role of self-efficacy in a musical performance examination: An exploratory structural equation analysis. *Psychology of Music, 31,* pp. 37-51.

Munroe K. J., Giacobbi P. R., Hall C., and Weinberg R. (2000). The four Ws of imagery use: Where, when, why and what. *The S*port *Psychologist, 14,* pp. 119-137.

Munroe K., Hall C., Simms S., and Weinberg R. (1998). The influence of type of sport and time of season on athletes' use of imagery. *The Sport Psychologist, 12,* pp. 440-449.

Paivio A. (1985). Cognitive and motivational functions of imagery in human performance. *Canadian Journal of Applied Sport Science, 9*, pp. 241-253.

Richardson A. (1969). *Mental Imagery*. New York: Springer.

Schneiderman B. (1991). *Confident Musical Performance.* St. Louis, Missouri, USA: MMB Music.

Smith D., Wright C., Allsopp A., and Westhead H. (2007). It's all in the mind: PETTLEP-based imagery and sports performance. *Journal of Applied Sport Psychology, 19,* pp. 80-92.

Vines S. W. (1988). The therapeutics of guided imagery. *Holistic Nursing Practice, 2*, pp. 34-44.