



## Interactive effects of video, priming, and music on emotions and the needs underlying intrinsic motivation



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### ABSTRACT

**Objectives:** Emotions can enhance motivation towards a particular goal (Brehm, 1999), while activation of human motivation does not necessarily involve conscious processes (Bargh, 1990). The main purpose of the present study was to explore the impact of video, priming, and music on a range of emotion- and motivation-related variables, while the secondary purpose was to conduct a cross-cultural comparison. **Design:** A randomized controlled design was employed to address the interactive effects of video, priming, and music on emotions and motivation with reference to the circumplex theory of emotion.

**Methods:** Participants comprised a convenience sample of 210 volunteers (English,  $n = 128$ ;  $M = 20.0$ ,  $SD = 4.7$  years; Male,  $n = 65$ ; Female,  $n = 63$ ; Greek,  $n = 82$ ,  $M = 23.3$ ,  $SD = 2.4$  years; Male,  $n = 59$ ; Female,  $n = 23$ ). A control condition and five experimental conditions were presented to participants in a counterbalanced order. The needs underlying intrinsic motivation were accessed using the Activity Feeling-state Scales (AFS; Reeve & Sickenius, 1994), while emotional states were assessed using adjectives from the Circumplex Model of Affect (Russell, 1980).

**Results:** Findings showed that music had positive effects on emotional states and the psychological needs underlying intrinsic motivation. They also highlighted the positive effects of priming as a psychological intervention – particularly when presented through video and coupled with music.

**Conclusions:** The study presents the state-of-the-art for the use of video, priming, and music in sport and includes recommendations for sport psychology practitioners and researchers.

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Emotions can enhance motivation towards a particular goal (Brehm, 1999) while there is also a strong link between emotions and performance (Hanin, 2000; Jones, Mace, & Williams, 2000). Human motivation can be activated automatically without the involvement of conscious guidance or choice (Bargh, 1990), and an intervention that can impact upon motivation at a subconscious level is known as *priming*. Priming techniques are concerned with temporary activation states and how environmental information together with internal readiness interact to influence perceptions and evaluations as well as motivations and behaviours (Bargh, 1997). For example, by seeing an image of a Coca Cola can in a millisecond during a movie, one might feel the urge to purchase a can during the interval (Vicary, 1957 cited in Radford, 2007, pp. 18–21). Priming can therefore act as a process by which to

unconsciously alter an individual's psychological state both prior to and during the execution of a task.

### Use of video in sport

Video has been used in psychosocial interventions as a feedback tool for behaviour modification strategies as well as to develop specific communication skills and behaviours (Barwood, Weston, Thelwell, & Page, 2009; Bishop & Forzoni, 2006; Halliwell, 1990; Ives, Straub, & Shelley, 2002; Williams & Grant, 1999). It can also be used to train decision-making skills and sport-specific anticipatory skills (Ives et al., 2002). Williams and Grant contended that video is one of the most efficacious perceptual motor training tools. Mental training videos can heighten motivation and be used for teaching purposes as well as to develop skills such as mental rehearsal (Ives et al., 2002). Halliwell noted that video coupled with visualization techniques led to “remarkable performance changes” (p. 371) and provided examples of how highlight videos might enhance both confidence and motivation. Ives et al. suggested that video can be used to enhance the communication and relationships

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between athletes and coaches, rather than eliminating the human element in sport psychology.

Baumgartner, Lutz, Schmidt, and Jänke (2006) designed a functional magnetic resonance imaging (fMRI) study to investigate how musical stimuli might enhance affective responses to pictures. They combined happy, sad, and fearful pictures from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 1995) either singularly or coupled with congruent classical music that was known to elicit the same emotional experience as the pictures (Peretz, Gagnon, & Bouchard, 1998). Ratings on the valence scale (pleasure/displeasure) showed that the emotional experiences (happy, sad, fear) during the interactive conditions (pictures with music) were significantly increased when compared to the pictures-only conditions. Further, despite the noisy scanner environment, it was reported that the participants were able to apprehend and recognize the emotional musical excerpts. It should be noted, however, that these researchers did not include a music-only condition. Accordingly, one cannot exclude the fact that the results observed in the interactive condition could also have been produced by a music-only condition; a potential confound that we sought to eliminate in the present study.

### Music interventions in sport

In their review of psycho-musicological research in sport and exercise in the period 1997–2010, Terry and Karageorghis (2011) concluded that motor performance could be facilitated by music in a number of ways. For example, music has the capacity to act as a legal stimulant or sedative and can enhance both pre-task and in-task affect (feelings of pleasure/displeasure). Further, music stimulates the right hemisphere of the brain, which facilitates cognitive tasks such as imagery and mental rehearsal (Levitin & Menon, 2005). According to Karageorghis, Terry, and Lane (1999), factors that contribute to the motivational qualities of music include *rhythm response*, *musicality*, *cultural impact*, and *association*. Rhythm response relates to one's physical reaction to the speed (tempo) and accentuation (rhythm) of music. Musicality has to do with the pitch-related elements of music such as harmony and melody, which, in combination with the speed of music, shape the listener's mood. Cultural impact refers to the pervasiveness of a piece of music within society; people tend to express a preference for familiar musical selections. Finally, association relates to extra-musical associations that are inspired by music (e.g., Vangelis's *Chariots of Fire* and Olympic glory).

### The Circumplex Model of Affect

The Circumplex Model of Affect developed by Russell (1980) forms the basis of the circumplex theory of emotion. It illustrates how most emotions (emotional experiences) can be arranged in a circular fashion around the perimeter of two independent bipolar dimensions that intersect each other, namely pleasant/unpleasant and arousing/sleepy. These divide the circumplex into four quadrants that are numbered 1 to 4 moving clockwise. Loizou and Karageorghis (2007) provided initial support for the use of the Circumplex Model of Affect and its dimensions in sport, with both English and Greek samples. North and Hargreaves (1997) used a modified version of the Circumplex Model to investigate the relationship between liking and arousal potential in order to demonstrate that the emotions expressed by musical pieces may be predicted and explained using liking and arousal ratings. Despite evidence that music strategies could be used to alter mood regulation (Saarikallio & Erkkilä, 2007), music has received limited attention as a pre-performance strategy in sports (e.g., Eliakim, Meckel, Nemet, & Eliakim, 2007; Pates, Karageorghis, Fryer, & Maynard, 2003).

### The needs underlying intrinsic motivation

Motivation is a powerful inner force that directs, sparks, or maintains human behaviour (Virgilio, 1997). Deci and Ryan (1985) asserted that behaviour is influenced by three primary motivational factors: intrinsic motivation, extrinsic motivation, and amotivation. Intrinsic motivation is characterized by participation in an activity for the pleasure and satisfaction that one derives from it, while participation for the purpose of gaining of external rewards characterizes extrinsically motivated behaviour. A lack of perceived competence coupled with low expectations of engaging in an activity, that is, the absence of either intrinsic or extrinsic motivation, is associated with the state of amotivation.

Motivation involves identification of personal and social factors that reflect some form of valued reward or encouragement. Therefore, the desire to successfully execute optimal skill challenges in sport settings determines intrinsic motives (Clews & Gross, 1995). The degree to which intrinsic motivation will be experienced, involves the extent to which, the needs for self-determination, competence, and relatedness are satisfied (Deci & Ryan, 1985, 1987; Ryan & Deci, 2000). Self-determination theory (SDT) was based on the assertion that human behaviour is affected by three psychological factors; namely competence, relatedness, and autonomy (Deci & Ryan, 1991; 1985; Georgiadis, Biddle, & Chatzisarantis, 2001; Ryan & Deci, 2000). Competence refers to how an individual perceives themselves as being efficacious in achieving a desired outcome. Relatedness involves the development of genuine interpersonal relationships, and autonomy refers to choiceful involvement in an activity without influence from external factors (Vallerand & Losier, 1994).

Considering the purported positive effects music can have in manipulating or regulating an athlete's pre-competitive emotions (Terry & Karageorghis, 2011), as well as those of priming and video techniques (Bargh, 1997; Ives et al., 2002; Williams & Grant, 1999) an additive effect is likely to transpire with reference to emotional manipulation and the satisfaction of the needs underlying intrinsic motivation. Investigation of the impact of such interventions on emotions and dimensions of motivation might shed considerable light upon how to integrate modern-day technologies such as the Blu-ray Disc (BD) and the android technology used in smartphones and tablet computers within applied practice.

The present study applies a revalidated version of the Circumplex Model of Affect (Loizou & Karageorghis, 2007) in a sporting context among two cultures – English and Greek – using experimental conditions with various combinations of video, music, and priming. The main purpose was to explore the impact of the experimental conditions on the dependent variables (DVs; emotion and intrinsic motivation) while the secondary purpose was to conduct a cross-cultural comparison. To this end, an interaction approach was adopted to examine Culture  $\times$  Condition differences in the DVs. Given that the study was primarily exploratory in nature, the sole a priori hypothesis was that the combination of video, music, and priming would be the most efficacious condition across cultures in facilitating positive change in the DVs. Specifically, more positive affect and less negative affect coupled with greater satisfaction of the psychological needs underlying intrinsic motivation was expected following exposure to this condition. A significant Culture  $\times$  Condition interaction was not expected to emerge.

### Method

#### Determination of sample size

In two meta-analyses of subliminal priming (Anatchkova & Rossi, 2002; DeCoster & Claypool, 2004) the mean effect size

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