



Rethinking the relationship between momentum and sport performance: Toward an integrative perspective



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ABSTRACT

The relationship between momentum and performance has elicited the curiosity of athletes, coaches, and sport psychologists since the late 1970s. Psychological momentum and behavioral momentum reflect both an impetus expected to entail changes in performance. This article aims to provide an integrative perspective of momentum that is guided by three core principles. Firstly, psychological momentum and behavioral momentum represent two distinct facets of a same phenomenon, called *psycho-behavioral momentum* (PBM), which mediates the relationship between early and subsequent success. Secondly, PBM reflects a composite phenomenon associating psychological, physiological, and behavioral constructs. Thirdly, PBM reflects a complex and dynamical phenomenon that may take place within different and interconnected time-scales. Additionally, the present perspective proposes to rethink the way of examining the relationship between PBM and sport performance, and encourages considering the distinction between behavioral performance (i.e., internal to the PBM process) and competitive outcomes (i.e., external to the PBM process).

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Athletes, coaches, spectators and media are used to employing the notion of “momentum” to comment sport events, describe and explain behaviors and situations, and make game predictions on the basis of the past and/or ongoing performance of an individual

or team. However, the notion of momentum still remains unclear for the actors and spectators themselves as well as for sport psychologists and scientists. In the field of sport psychology, momentum has been conceptualized and investigated through either a psychological or behavioral approach. The psychological approach developed the concept of *psychological momentum* (PM), which refers to an *altered state of mind* enabling to perform at an

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extraordinary level (Iso-Ahola & Dotson, 2016). The behavioral approach gave rise to the concept of *behavioral momentum* (BM), which represents the tendency of reinforced behaviors – that can take the form of tactical actions in sports – to persist in the face of disruptors. Specifically, BM may represent the level of resistance of reinforced behaviors to all opponent's efforts devoted to annihilate the successful spiral.

As a result, PM and BM both correspond to an impetus expected to entail changes in performance. The present perspective is guided by three core principles: (a) PM and BM represent the psychological and behavioral facets of a *same* phenomenon, called *psycho-behavioral momentum* (PBM), which mediates the relationship between initial success and subsequent success; (b) PBM reflects a composite phenomenon associating psychological, physiological, and behavioral components; and (c) PBM is complex because it takes place within multiple time-scales. I begin by reviewing several notable conceptualizations and empirical studies conducted on PM and BM that have appeared in the literature. Then, I will present an integrative perspective of momentum, and I will end by discussing different concepts and proposing new research directions.

1. Momentum and performance

In his seminal theory of PM, the social action model, Adler (1981) proposed a model involving five essential and interrelated factors: (a) goal-initiating motivation (referred to as *primitive force*), (b) motivation that initiates efforts toward goal attainment, (c) the elicitation of emotions related to goal pursuit, (d) increased physiological arousal associated with goal pursuit, and (e) enhanced performance (i.e., facilitated by the first four factors). Based on this sequenced conception of PM, authors proposed the view that a success at the first game may precipitate the success at the outcome (e.g., Iso-Ahola & Blanchard, 1986; Iso-Ahola & Mobily, 1980; Silva, Hardy, & Crace, 1988; Weinberg & Jackson, 1989). Additionally, they suggested that the subjective experience of PM (e.g., self-confidence) might mediate the relationship between initial and subsequent success (Silva et al., 1988). Such a conception of PM opened the door to different theorizations of PM, such as the models of PM based on control processes (Cornelius, Silva, Conroy, & Peterson, 1997; Gernigon, Briki, & Eykens, 2010; Taylor & Demick, 1994; Vallerand, Colavecchio, & Pelletier, 1988) and the mediational model of PM (Iso-Ahola & Dotson, 2014, 2016).

1.1. Psychological momentum and performance

Several models have examined the role that PM may play in the development of behavioral performance and outcomes. The antecedents-consequences model of PM (Vallerand et al., 1988) defined PM as a set of *success perceptions* (e.g., perception of control, perception of progression toward the goal). The multidimensional model of PM (Taylor & Demick, 1994) and the dynamical model of PM (Gernigon et al., 2010) conceived PM as a *shift* in affects (e.g., anxiety), cognitions (e.g., perceptions of control and self-efficacy), physiology (e.g., heart rate), and behaviors (e.g., efficiency). Both models supposed that such changes may result from a series of personal (e.g., need for control, skill level or expertise) and/or situational events (e.g., importance of outcome), and that the experience of PM may entail dramatic changes in the ultimate performance. The dynamical model considered PM as a set of psychophysiological changes occurring in response "... to the perception of movement toward or away from either an appetitive or aversive outcome" (Gernigon et al., 2010, p. 397), and conceived performance as a *signature* of the intrinsic dynamics of PM (i.e., a looking-glass reflection of the phenomenon of PM). Cornelius

et al.'s (1997) projected performance model focused on control processes as well as the PM-performance link: It conceptualized performance both as a cause *and* as a consequence of PM. More specifically, the model argued that individuals would generate a range of expectations about their capacities to reach desired goals based on their prior performances, and this range of expectations refer to *mean zone performance*. This reference zone allows for the detection of discrepancies between mean zone performance and current performance. When perceptions of current performance exceed mean zone performance, PM appears.

Empirical tests of the theorizations have revealed results regarding different types of performance, such as effort-based performance and competitive outcomes. Studies revealed that positive momentum sequences led to higher levels of performance, in terms of energy expenditure (e.g., Perreault, Vallerand, Montgomery, & Provencher, 1998) and behavioral efficiency (e.g., Den Hartigh, Gernigon, Van Yperen, Marin, & Van Geert, 2014). Other studies also revealed relationships between positive momentum and outcomes (e.g., Burke, Aoyagi, Joyner, & Burke, 2003; Iso-Ahola & Blanchard, 1986; Iso-Ahola & Mobily, 1980; Miller & Weinberg, 1991; Silva et al., 1988; Smisson, Burke, Joyner, Munkasy, & Blom, 2007; Weinberg & Jackson, 1989). However, if the studies considering performance through behavioral constructs reveal that the results are somewhat consistent, those operationalizing performance through outcomes show that the results are lowly consistent. For example, Silva et al. (1988) revealed that early success did not predict the outcome when athletes' skill was controlled. In the same vain, Kerick, Iso-Ahola, and Hatfield (2000) observed no link between the experience of PM and outcomes in shooting tasks. Such results contributed to raise serious doubts about the existence of PM (e.g., Gilovich, Vallone, & Tversky, 1985). In sum, while PM seems to facilitate task completion, the literature seems to show that PM does not necessarily influence competitive outcomes.

1.2. Behavioral momentum and performance

The doubts about the existence of PM led some authors to shift their attention from a psychological conception to a behavioral conception of momentum, thereby leading to employ the approach of BM in the field of sport psychology. This approach falls under the view that momentum – this "... state of dynamic intensity marked by an elevated or depressed rate of motion, grace, and success" (Adler, 1981, p. 29) – can be operationalized through observed behavior (e.g., Roane, 2011; Wanzek, Houlihan, & Homan, 2012). Specifically, BM is defined as "... the relationship between response rate and resistance to behavior change when certain 'disrupter' events occur" in the sense that "... the velocity of a response is analogous to the rate of reinforcement" (Roane, Kelley, Troclair, & Hauer, 2004, p. 146). The literature reports that BM has been analyzed through serial dependency or non-stationarity at different levels of analysis of the games, such as the macro-level of outcomes (e.g., Hughes, Fenwick, & Murray, 2006; Iso-Ahola & Mobily, 1980; Jackson & Mosurski, 1997; Klaassen & Magnus, 2001; O'Donoghue & Brown, 2009) and micro-level of behaviors (e.g., Dumangane, Rosati, & Volossovitch, 2009; Moesch, Bäckström, Granér, & Apitzsch, 2013). Serial dependency refers to the view that an event is dependent on the adjacent event, while non-stationarity refers to the idea that the changes in success rate over the ongoing game exceed the possibility to be explained by chance (e.g., Moesch et al., 2013). Moreover, studies conducted in sports (e.g., basketball, handball, tennis, squash) revealed that the greater the reinforcement rate, the greater the beneficial response to adversity (e.g., Hughes et al., 2006; Jackson & Mosurski, 1997; Klaassen & Magnus, 2001; Mace, Lalli, Shea, & Nevin, 1992;

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