

The Psychology of Dynamic Balance and Peak Performance in Sport: Correction
Theory

Abstract

This paper presents an introduction to a new approach to our understanding of peak performance and dysfunctional performance in sport - *Correction theory*. Correction theory, based within a *control theory* (W. Powers, 1973) and *dynamical systems* perspective, assumes that *dynamic balance* (A state in which a robust complex system will self-correct in response to imbalance) underwrites individual functioning. The central thesis presented in this paper is that an interdependent relationship exists between peak performance and dysfunctional performance in sport. Peak performance is, in part, a (corrective) response to dysfunctional performance, and vice versa. An overview of correction theory is presented, based on two propositions relating to balance. Implications of correction theory for our understanding of sporting performance are briefly considered.

Keywords: dynamic balance, peak performance, correction theory

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A psychological theory, if it is to be more than a technical makeshift, must base itself on the principle of opposition; for without this it could only re-establish a neurotically unbalanced psyche. There is no balance, no system of regulation without opposition. The psyche is just such a self-regulating system (Jung, 1966a, p. 61)

Aphorisms such as *success out of failure* and *triumph over adversity* are commonplace within sport. One regularly hears coaches and players talk about expecting a reaction following defeat, and warning against complacency after victory; alluding to a possible interdependent relationship between success and failure rarely explored within the academic literature. The pursuit of achieving sustainable peak performances in competition is arguably one of the defining goals and challenges for elite athletes (Nesti, Littlewood, O'Halloran, Eubank, & Richardson, 2012), and for those who seek to support them. Yet variation in performance is a certainty for athletes, including at elite levels, making success *and* failure an inevitable part of elite athletes lived experience (Gilbourne and Richardson, 2006).

Privette (1981) defined peak performance as “behaviour in any activity that transcends what normally could be expected in that situation” (p. 51). Based on this definition, peak performance refers to a higher level of functioning within any given activity (Privette, 1983), which is by definition quantitatively and/or qualitatively different to a “normal” level of performance.

The qualitative nature of the subjective experiences associated with peak performance in sport has attracted significant attention in the literature (i.e., Csikszentmihalyi, 1975; Jackson, 1992, Privette, 1981; Ravizza, 1977, 1984). Many

of these findings suggest that peak performance is an *ego-transcending experience* (Maslow, 1968) consistent with the construct of *flow* (Young & Pain, 1999), which Jackson et al (2001) described as an *optimal mental state* theoretically associated with *optimal athletic performance*. Csikszentmihalyi (1990) identified 9 characteristics of flow, including total concentration, a sense of personal control, and the merging of action and awareness. Jackson & Csikszentmihalyi (1999) give the following account of a runner reportedly in a state of flow: “I felt very in control...I felt very strong. I was able to run as I had planned...I felt really focused. I just felt like, you know, like athletes say, ‘It clicked’; it felt great the whole way” (p. 4).

However research into the association between flow and performance in sport settings reveals an inconsistent picture (see Schuler & Brunner, 2009). Even if one is to assume that flow is positively associated to performance, research has suggested that it is not experienced frequently by athletes (Jackson, 1992) despite a relatively high proportion of athletes reporting to have perceived control of factors affecting flow occurrence (see Swann, Keegan, Piggott, & Crust, 2012, for a review). Ravizza (1977, 1984), however, found that most athletes’ interviewed reported that peak performance states were involuntary and temporary in nature.

Swann et al (2012) concluded that whilst we have a fairly comprehensive understanding of what it is like to experience flow, “research should move from such description to *explaining* flow” (p. 819). If one is not to confuse description with explanation, it is likely that any explanation of optimal mental states will require an approach which moves away from static taxonomy, or abstraction, towards acknowledging the dynamic, temporal nature of performance itself.

We suggest that theoretical attempts to understand peak performance in sport have been impaired by focusing primarily on its qualitative nature, based on a

between-person level of analysis. A between-person level of analysis allows researchers to assess cross-sectional (single time point) variation on a particular measure; and has typically been used to capture the subjective experience of peak performance states such as flow (i.e., Jackson, 1992; Ravizza, 1977). However Vancouver, Thompson, & Williams (2001) proposed that within-person level of analysis is better able to conceptualize change in performance levels over time, and thus allow for the possibility of temporal precedence to be established (Curran & Bauer, 2011). For example, Mizruchi (1991) studied National Basketball Association playoff data between 1947 and 1982, and found that “winning the previous game increased the probability of losing the present game by about 12%” (p.186). Mizruchi (1991) hypothesized that in team competition, success breed’s failure because it can lead to overconfidence which reduces the urgency for future success. Furthermore, Mizruchi (1991) also suggested that prior failure could increase the likelihood of success because it increases the motivation for achievement in the future.

We introduce a new theoretical framework with the aim of capturing the dynamic, temporal nature of performance variation in sport – correction theory. Correction theory is based within a dynamic systems perspective, in an attempt to capture the variable, complex nature of athletic performance. When judged from this perspective, the individual is viewed as a non-linear open system of which one of the defining characteristics is the spontaneous emergence of self-organization (Kauffman, 1995; Strogatz, 2003). Furthermore, notions of isolation and prediction become largely redundant, given the idea of indeterminacy is a key feature of many open system analyses of cognition and behavior (Schall, 2004).

In relation to the development of research and theory within the sport sciences over the last 3 decades, Balague, Torrents, Hristovski, Davids & Araújo (2013)

observed that a mechanistic view of human organisms has dominated the development of research and theory within the sport sciences over the last 3 decades. Given the tendency within sport science to overlook the dynamic organism-environment relationship in favor of reductive internal (mental) mechanisms (Davids & Araújo, 2010), Balague et al (2013) suggested that complex systems approaches provide a more ecological basis on which to conceptualize sport related phenomena. Furthermore, we believe that a dynamic systems approach is a promising way to develop theory with regard to the psychological basis for sporting performance.

Correction theory also utilizes control theory (W. Powers, 1973), which is based within a class of theories referred to as the *cybernetic-systems paradigm* (Vancouver, 2000, 2005). Control theory, emerging out of a non-linear dynamic view of human nature, theorizes that control is exerted on the system based on the concept of negative feedback, which W. Powers (1973) viewed as the “central and determining factor in *all* observed behavior” (p. 44). A negative feedback loop is described by Vancouver (2005) as “one that through its operation reduces the difference between the level of a variable and the reference (i.e., goal) level for the variable” (p. 49). Critically, according to control theory, feedback occurs on a perceptual rather than behavioral level wherein the purpose of the system is to reduce error between a desired state (i.e., performance goal) and the current perceived level (W. Powers, 1973).

Based on these perspectives we introduce two constructs which form the basis of correction theory:

- *Dynamic balance* - A state in which a robust complex system will self-correct in response to imbalance (resulting from perceived variation/challenge) in

order to maintain functional organisation; or, the individual *and* coordinated expression of balance and imbalance¹

- *Correction* - The response of the system to a source of imbalance or challenge

Correction theory views the individual as a system, and assumes that dynamic balance underwrites individual functioning. It will be argued that such a view of balance allows a new perspective on our understanding of peak performance and performance variation in sport. The central thesis is that we can no longer view peak performance² and dysfunctional performance³ as unrelated occurrences. Thus, instead of viewing dysfunctional performance as an anathema, it paradoxically forms a necessary part of our understanding of peak performance in sport. Peak performance and dysfunctional performance are viewed as two sides of the same naturally occurring phenomenon; a dynamic self-correcting system. The focus in this paper is to provide an introductory sketch; some of the details will warrant further discussion and clarification.

Balance – Conceptual meaning

¹ The later is based on Kelso's (2008) notion of *meta-stability*, which is described as "the simultaneous realization of two competing tendencies: the tendency of the components to couple together and the tendency for the components to express their intrinsic independent behavior" (p. 186).

² For consistency, the term *peak performance* will be used in this paper to describe any performance which is significantly above what can normally be expected (Privette, 1981).

³ Conceptualized as a below average performance.

The ubiquitous nature of the term *balance* opposes a universal definition. The *Concise Oxford English Dictionary* (Soanes & Stevenson [Eds.], 2008) lists seven definitions for balance (noun), not including related terms such as *balanced* and *on balance*. Definitions include “a counteracting weight or force” and “mental or emotional stability” (p. 100). The metaphor of the weighing scales has endured, and is reflected in Aristotle’s *golden mean*, and Camus’ philosophy of limits.

Metaphysically, balance can also be considered in terms of recognition and/or acceptance of both sides of a particular dichotomy, and their inter-relation. In the last century, Jung developed a model of the psyche governed by the principle of dynamic opposition (Stevens, 1990) between opposing, yet complimentary systems. When reflecting on the lessons from history with respect to the boundaries of human existence, van Deurzen (2002) suggested that the “struggle between opposites” (p.52) is one the defining characteristics, in which the existential goal is too avoid one-sidedness.

Considered dynamically, balance cannot be seen as a stable ideal, but a constant shifting of sand, taking on new forms. In relation to a dynamic self-organising (open) system, absolute balance is a misnomer which doesn’t allow and account for imbalance, and therefore variation and change. Thus for a dynamically balanced system, and in light of Kelso’s (2008) notion of meta-stability, *balance necessitates imbalance*, and *imbalance necessitates balance*.

Although the idea of the *complementarity of opposites* is a new departure for sport psychology, it has lineage within the parent discipline of psychology (e.g., Jung’s depth psychology), as well as in the natural sciences (see Kelso & Engstrøm, 2006) and philosophy (e.g., Heraclitus’s notion of the *unity of opposites*). In reviewing such developments, Kelso & Engstrøm (2006) suggested that Neils Bohr’s

notion of complementarity could be a starting point to consider broader human concerns. Kelso & Engstrøm (2006) introduced the term *complementary nature*, which they defined as “a set of mutually dependent principles responsible for the genesis, existence, and evolution of the universe relating to or suggestive of complimenting, completing, or perfecting relationships and being complimented in return” (Kelso & Engstrøm, 2006, p. 39). This definition implies that the existence of the universe, and that which inhabits it, is dependent, and defined by its ability to organise itself based on the complementarity of opposites. Thus implying that the study of any phenomenon is incomplete without a consideration of its relationship with its complimentary opposite.

Balance and sport performance

Within elite sport, temporal variation in performance is a reality for all athletes. This paper will argue that these different performance levels are inter-related, and that peak performances are dependent on psychological and systemic sources of imbalance within elite sport.

For example, Balague (1999) has observed that elite athletes have to make major sacrifices in other aspects of their lives in order to fulfill the demands of their sport, as well as being required to give an extreme level of commitment to the activity itself. Similarly, Miller and Kerr (2002) have suggested that there is a cost of pursuing *performance excellence* at the expense of the overall development of the person, which they suggest could be due to over-identification with their athletic role.

From a more philosophical perspective, the work of Loland (2000) considered the effect of the *logic of quantifiable progress*, whereby progress is characterized by quantification of performance, and the breaking of records. The flaw that Loland identifies within this logic is that the goal of being *citius, altius, fortius* (faster, higher,

stronger) doesn't take into account our limitations as biological beings. Our "phylogenetic potential is stable" (Loland, 2000, p. 43), but this is ultimately incompatible with our insatiable appetite for improvement. Whilst peak performance is a defining goal of elite sport, the possibility of continuous peak performances appears an elusive dream. Ravizza (1977) found that peak performances are viewed by athletes as the exception rather than the norm, suggesting that athletes rarely perform to their full potential. Furthermore, Loland (2000) suggested that there could be a human cost for the pursuit of continual improvement, including the use of doping and genetic engineering within sport.

Culbertson (2005) suggested that such logic also has psychological implications for the athlete that can be encountered on an almost daily basis. Culbertson argued that to take part in record sports where quantifiable progress is the goal, promotes the need for self-deception on the part of the athlete. Drawing upon Sartre's notion of bad faith, Culbertson (2005) suggested that there is a fundamental contradiction between the endless pursuit of records (striving for transcendence), and human facticity. The latter he describes as "their past, their current situation, and their body – in short, that which is a given fact of their existence" (Culbertson, 2005, p. 67).

An athlete in pursuit of progress denies this contradiction yet is fully aware of it. The athlete believes that continual progress is possible (and conducts his or her life entirely in accordance with this belief) yet knows that it is not. This self-deception is bad faith. (Culbertson, 2005, p. 73)

In short, for those who strive for perfection, bad faith or imbalance is the price that most elite athletes will pay. Miller & Kerr (2002) alluded to this imbalance when they suggested that performance excellence is often at the expense of *personal*

excellence, compromising the development of the whole person, and arguably increasing the likelihood of athlete burnout and/or psychopathology. This imbalance has also been considered within research investigating the deleterious effects of perfectionism in sport (e.g., Gould, Udry, Tuffey, & Loehr, 1996; Lemyre, Hall, & Roberts, 2008). What hasn't been considered is the possibility that notions of balance and imbalance, in relation to a dynamically balanced system, might provide a new theoretical framework to help develop our understanding of performance variation and peak performance in sport.

Correction theory

The psyche is a self-regulating system that maintains its equilibrium just as the body does. Every process that goes too far calls forth compensations, and without these there would be neither a normal metabolism nor a normal psyche. In this sense we can take the theory of compensation as a basic law of psychic behavior (Jung, 1966b, p. 153).

The genesis of correction theory is in part indebted to Jung's dynamic view of the psyche, which assumes that the regulatory function of opposites underpins psychic functioning (Stevens, 1990). Jung based his *theory of compensation* on the *principle of equivalence* which states that "for any given quantity of energy expended or consumed in bringing a certain condition, an equal quantity of the same or another form of energy will appear elsewhere" (Jung, 1960, p. 18).⁴

It is worth noting that the principle of compensation has been discussed in relation to sport psychology by Ravizza (2002). Drawing on humanistic and

⁴ See Jung (1960) for a more detailed outline of his ideas concerning the *energetic standpoint*.

existential psychology to explain his role with professional athletes over many years, Ravizza claims that teaching skills that allow performers to compensate and adjust mentally has been a cornerstone of his applied work. The notion of compensation, or correction, is also an implicit element in W. Powers (1973) control theory.

Correction theory is based on the central assumption that *dynamic balance is a naturally occurring phenomenon which occurs due to the necessity of robust, stable complex systems to self-organize through correction*. Two associated propositions will be considered in relation to sport, as well as with respect to the implications for performance variation and peak performance in sport.

Proposition one

Challenges will require corrections in order to maintain the robustness of a dynamically balanced system.

We view a correction as the response (accommodation) of the system to a source of imbalance or challenge; the mechanism of which is to retain function, and allow for the required oscillations driven by the tension between balance and imbalance.

With few exceptions, corrections are evident in athletes who continually strive for peak performance within their sport, and can present on different levels (i.e., physical, psychological, interpersonal etc), but will typically manifest in the form of a cost to another aspect of the athletes' lived world (Balague, 1999). These costs can include constraints placed on social life, added pressures in relationships with coaches, family and friends, and physical fatigue. In psychological terms, costs may involve emotions such as anxiety and anger, and cognitions about failed expectations, confidence issues and doubt (Nesti, 2011). Whether a correction can manifest in the

form of a *performance correction* is yet to be explored in the literature, but some potential evidence will be considered later in the paper.

Whilst an athlete might not show any outward consequences of their endeavour, the necessity for redress means they, and/or others, will almost always pay a personal price. This interrelation between the person and athlete makes it unsurprising that an increasing number of applied sport psychologists report using a holistic approach to consultancy (e.g., Anderson, 2009; Bond, 2002; Friesen & Orlick, 2010; Henschen, 2001; Lindsay, Breckon, Thomas, & Maynard, 2007; Nesti, 2004; Ravizza, 2002; Simons & Anderson, 1995; Tod & Bond, 2010).

Proposition two

Imbalance is a requisite aspect of dynamic balance.

Human systems are continuously being exposed to external influences, resulting in a dynamic form of self-organisation (Bertalanffy, 1950). At any given point in time, a dynamically balanced system will be in a state of imbalance, but is considered robust as long as it maintains the ability to correct itself. On this basis, negation rather than imbalance is diametrically opposed to balance. Imbalance represents a challenge to the balanced system but not a total negation of the existing state. Therefore imbalance represents an open system in a state of flux, but the system is (paradoxically) considered balanced because of its inherent tendency to correct itself, and its capability to adjust. Rose (1997) recognised this paradox in observing that the stability and self-organisation of an open system is dependent on the individual components being in a state of constant flux: “Change is virtually the only constancy. Stasis is death” (Rose, 1997, p. 140). If the stability of an open system is dependent on continual change, or variation, this has important implications for our understanding of the nature of performance variation and peak performance in sport.

Implication one

It provides a theoretical basis for observation that peak performances are intermittent and temporary in nature (Ravizza, 1977, 1984). A central tenet of this approach is that there is a dynamic tension between the tendency of the system to self-organize in order to remain robust (balance), and the desire to achieve continual peak performances (imbalance). On this basis, peak performance states by their very nature are considered inherently unstable and therefore unsustainable.

Implication two

It supports the observation that athletes have limited conscious control over the psychological states associated with peak performance (Jackson, 1992). Jackson (1992) gives the following account of a figure skater commenting on the perceived controllability of flow:

Yeah, I think you can increase it...It's not a conscious effort. If you try to do it, it's not going to work. I think maybe through trying you turn off the switch so it can't happen...I think there are things, factors you can lessen, to make it happen more often. I don't think it is something you can turn on and off like a light switch. (p. 174)

The idea that we misattribute conscious thought as the primary cause of behavior, has received considerable support in the psychology literature (see Wegner & Wheatley, 1999, for a review). Wegner and Wheatley (1999) conclude that "the real causal mechanisms underlying behavior are never present in consciousness. Rather, the engines of causation are unconscious mechanisms of mind." (p. 490). If peak performance states are subject to unconscious as well as conscious processes, it is likely that deterministic predictability is an impossible dream. When viewed as a feature of a complex system, we suggest that peak performance states are an emergent

phenomenon; order at the edge of chaos (Kauffman, 1995; Waldrop, 1992), and therefore not subject to mechanistic laws.

Implication three

It suggests an interdependent relationship between peak performance and dysfunctional performance states. As previously stated, corrections are viewed as the response of a system to a challenge (proposition 1). Given that the tendency of any dynamic system is to maintain its robustness and integrity through self-organization (Kelso, 1995), the response to any form of imbalance is to compensate (correct) to avoid negation. It is therefore theoretically possible that, in some instances, a dysfunctional performance could be, in part, a self-regulatory (involuntary) response to peak performance(s); and a peak performance could be, in part, a self-regulatory (involuntary) response to dysfunctional performance(s). One would therefore expect to find the foundation for a peak performance in the psychological response to dysfunctional performance(s); and the seeds of a dysfunction performance in the psychological response to peak performance(s).

Dysfunctional performance and peak performance: An interdependent, circular relationship?

Although correction theory is a new departure for sport psychology, there is a growing body of literature which suggests that a circular relationship exists between dysfunctional and peak performance states. Silva, Hardy, & Crace (1988) introduced two constructs to describe how momentum can be lost or gained. The first is *positive inhibition*, which Silva et al (1998) describe as “the process whereby success may actually result in the loss of momentum and thus increase the probability of subsequent failure” (p. 346). The second is *negative facilitation*, “whereby failure increases the probability of subsequent success” (p. 347). Cornelius, Silva, Conroy,

Petersen (1997) developed the *Projected Performance Model*, based around these two constructs, to explain how shifts in momentum could be related to the perception of increased or decreased performance levels. Specifically, the Projected Performance Model suggests that performance fluctuations around the mean are in part due to inhibitory forces (e.g., over-confidence and complacency) when the athlete has a positive perception of the performance, and facilitative forces (e.g., increased motivation) when the athlete's perception of the performance is negative (Cornelius et al, 1997).

Poczwardowski and Conroy (2002) interviewed eight elite athletes and eight performing artists about their coping responses to success and failure. Interestingly, it was found that coping responses to failure included facilitative steps to improve future performances. For example, 69% of participants reported enhanced motivation after failure; and 69% of participants reported to having learnt from previous failures, and had subsequently improved (Poczwardowski and Conroy, 2002). Similarly, in a study of academy football players, Sagar, Busch, and Jowett (2010) found that all players interviewed, adopted at least one problem-focused coping strategy in response to failure, including increased effort and determination to prove their ability.

Carver (2003) suggested that the feelings associated with things going well on a specific task (i.e. winning) can result in a shift of resources to other perceived needs; a process Carver (2003) referred to as *coasting*. In three studies involving multiple goal pursuit, Louro, Pieters, & Zeelenberg (2007) found that positive emotions associated with being close to achieving a goal did result in a reallocation of effort towards other goals. Similarly, W. Powers (1991) suggested that when an individual has optimistic beliefs about their current performance level (i.e., overconfidence), the perceived discrepancy between the observed level and desired level diminishes,

resulting in less resources being allocated. On the other hand, optimism in relation to higher goals being set, results in an increase in effort due to the perceived discrepancy between current performance level and goal level (W. Powers, 1991). Thus, according to control theory (W. Powers, 1973), it is not psychological variables (e.g., self-efficacy) themselves which determine the level of effort, but discrepancies between perceived current and ideal states. This proposition has been supported in a recent study by Woodman, Akehurst, Hardy, & Beattie (2010) who found that inducing self-doubt in participants perceived ability, resulted in higher performances on a skipping task. Woodman et al (2010) concluded that “a decrease in self-confidence (i.e., an element of self-doubt) may increase participants’ perceived discrepancy between their current performance standard and their goal (potential) standard, which leads them to increase on-task effort” (p. 469).

Even if high levels of motivation are maintained, an athlete’s internal world cannot always match the external reality (the desire to win alone is not enough). Positive thinking, generally believed to be essential for peak performance, cannot control variations in external factors, such as weather, playing surface, and opponents (“He played better than me. There’s not a whole lot more to it.” - British tennis player Andy Murray, on his third-round exit to Stanislas Wawrinka in the 2010 US tennis open). Such factors will inevitably vary, and so therefore will the performance and the outcome. Positive emotions in sport are therefore in themselves unstable because they do not entirely reflect all aspects of an athlete’s lived reality (Nesti, 2004). Inevitable challenges to this state potentially result in the experience of emotions such as anxiety and possibly depression. In turn, subsequent feelings of joy and adulation are duly heightened. Similarly, a football coach, who compromises the balance of the team in favor of attack, increases the likelihood of scoring a goal; but also increases the

likelihood of conceding a goal. As long as an athlete lives in bad faith, and aspires to produce a peak performance in every competitive event (here facticity is affirmed as being transcendence), performance corrections in the form of *choking* (Baumeister, 1984), *catastrophe* effects (Fazey & Hardy, 1988), and *yips* etc. are inevitable.

Whilst negative performance corrections might appear to have little value, Vealey and Chase (2008) suggest otherwise:

Successful people often reduce their attention because they have no reason to change strategies or standards. Thus self-correcting spirals are more beneficial than upwards spirals because a person who analyses performance can make adjustments in future efforts and reverse the previous decrease (or increase) in performance (p. 95).

Concluding remarks

In this paper we have considered some of the implications of W. Powers (1973, 1991) control theory and dynamic systems approaches for our understanding of peak performance and performance variation in sport. Cybernetic models of self-regulation and dynamic system approaches offer the complimentary principles of feedback and self-organization (Carver & Scheier, 2002); both of which form the theoretical basis of correction theory. More importantly, we believe that the holistic notion of dynamic balance, as outlined in this paper, offers researchers a basis on which to explore performance variation in sport with regard to its interrelation to the person. When judged from this perspective, peak performance is not viewed as an end in itself, but part of an ongoing dynamic process. Rather than viewing the inevitability of performance variation as a defeatist position, we believe that embracing its reality will paradoxically free athletes and those who support them, to work towards a higher frequency of peak performances in their sport. As M. A. Powers (1994) observed:

“variability...(is) the essence of behavior: the phenomenon to be explained, not explained away” (p. 1).

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