The *What, How, Where* and *When* of Resilience as a dynamic, episodic, self-regulating system: A response to Hill et al. (2018)

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Abstract

Resilience research is undergoing a shift away from trait approaches, acknowledging the inherent process and dynamism of stress interactions. Hill et al. (2018) suggest that in order to understand the iterative nature of the multi-factorial resilience process, a dynamical systems approach needs to be employed. We suggest that explaining resilience through Whetten's (1989) *What, How, Where* and *When* of theory building will elucidate our understanding of both the disruptive and reintegrative pathways of resilience. Adopting this approach to resilience, we clarify (a) self-regulatory and episodic pathways to positive adaptation in the face of a broader range of stressors and (b) we use conservation of resources theory to explain the fluctuation and developable capacity of resilience. Researchers and practitioners are encouraged to develop resilience interventions for specific predictable adversities in sport. Building strategies around the dual-pathway model will promote preventive and reintegrative resilience approaches optimizing performance episodes and well-being in ongoing sporting endeavors.

Keywords: resilience, dynamic process, self-regulation, performance, sport, conservation of resources.

Resilience as a dynamic, episodic, self-regulating system: A response to Hill et al. (2018)

Sporting environments can engender significant adversity and researchers are increasingly interested in how we respond to these experiences in both the short and long term. As a consequence, mental toughness (Gucciardi et al., 2015) and resilience (Sarkar & Fletcher, 2014) have become topics of interest among applied sport psychologists. However, as research has accumulated on these topics there has been much debate regarding their conceptualization. In this commentary on Hill, den Hartigh, Meijer, de Jonge and van Yperen (2018), we evaluate their proposed dynamical approach to resilience, explore other dimensions of resilience and provide directions for future research. In our analysis, we employ Whetten's (1989) model of what constitutes a theoretical contribution to examine and advance a dynamic approach to resilience. We posit that a dynamical perspective addresses the *how*, but we also need to elucidate the *what*, *why*, *when* and *where* of resilience processes. To support our contention, we draw on broader theories of psychological resources and conservation of resources to consider how concepts of resource trajectories can augment our understanding (the *how*). Furthermore, we discuss issues of temporality to demonstrate resilience at the momentary 'match play' level in comparison with other less pressurized or longer timeframes (the *when* and the *where*).

We commend Hill et al. (2018) on the use of the dynamical systems approach (Van Geert, 2009) which is gaining consensus among researchers (Bryan, MacIntyre, & O'Shea, 2017; Sarkar & Fletcher, 2014). Considering how resilience unfolds over time helps researchers capture the *critical slowing down* of resilience for both chronic long-term stressors and more acute episodes. As Hill et al. (2018) suggest knowledge about the temporal dimension of resilience can assist researchers and practitioners to develop strategies to regulate incidents that would negatively affect resilience, well-being and performance.

Whetten (1989) proposed that a comprehensive theory must contain essential elements, summarized as *what, how, why, who, where* and *when*. *What* comprises which factors (e.g.

variables, constructs, concepts) should logically be considered as part of the explanation of the phenomena of interest. The next question is *how* are these factors related, normally operationalized through the use of a visual representation of arrows connecting variables. The *what* and *how* constitute the domain of a theory. *Why* relates to the underlying psychological, economic or social dynamics that justify the selection of factors and the proposed causal relationships (Whetten, 1989). *Who, where* and *when* are conditions that place boundaries on the generalizability of the theoretical model. The dynamical systems approach to resilience examines primarily *how* resilience is a dynamic process, but, as we contend, the *what, where* and *when* could additionally be examined to expand our theoretical understanding of a dynamic approach to resilience.

The *what* of a dynamic approach to resilience

If we conclude that the development and maintenance of resilience is a dynamic process, we need firstly to explain *what* resilience is from a dynamic process perspective. Hill and colleagues' (2018) approach dynamic resilience from the perspective of disruption and depletion. However, this perspective overlooks the basic tenets of many resilience definitions. Bryan et al. (2017; p. 8) defined it as "encompassing the capacity to maintain regular functioning through diverse challenges or to rebound through the use of facilitative resources".

Drawing on theories of self-regulation may be beneficial for defining the *what*. From a self-regulation perspective, performers regulate their day-to-day actions based on their own perceptions about themselves, their environment, goal progress and current affect, which subsequently influences their effort (Foo, Uy, & Baron, 2009). This type of self-regulation relies on meta-cognitive monitoring processes (MacIntyre, Igou, Campbell, Moran, & Matthews, 2014), which can be depleted through use (Baron & Henry, 2010), and when depleted may render the individual less able or willing to work or perform optimally (Baumeister & Vohs, 2007), and potentially leave them at risk of reduced capacity for resilience.

Furthermore, it may be beneficial to understand how resilience changes across key time points or performance episodes. A performance episode can be defined as a "within person temporal unit of performance", which is a naturally segmented, relatively short episode, thematically organized around relevant immediate goals or desired end states (Beal et al., 2005; p. 1055). O'Shea, Buckley and Halbesleben (2017) examined how the reciprocal regulation of action, cognition, emotion and motivation occurs in an episodic model of self-regulation (the A-CEM-A model). This model can be used to provide more explanatory value with regard to the dynamics of resilience development. For example, when a tennis player consistently loses points returning serve with their backhand in a match, this may cause the performer to cognitively reflect and perceive their ability when performing this type of shot as poor. This belief will then precipitate some emotional response (e.g. frustration), which may in turn motivate them to either reduce their reliance on this skill or to refine the skill before their next match. This cyclical model demonstrates the mechanisms through which self-regulation may promote and deplete resilience during adversities, but *how* they are related and then developed needs to be understood.

The *how* of a dynamic approach to resilience

In addition to explaining the *what* of the dynamics of resilience, we need a more detailed understanding of the role of resources and resource trajectories to fully understand the *how* of a dynamical approach to resilience. Hill et al. (2018) suggested resilience is a complex multi-factorial process. However, the authors did not explain in great detail *what* these underlying variables are (which we discussed above) nor *how* they fit into the dynamic perspective on resilience. We apply the conservation of resource theory to explain this issue (COR; Halbesleben, Neveu, Paustian-Underdahl, & Westman, 2014).

Life changing stressors may result in maladaptation, which can be explained as a loss of facilitative resources leading to a dysfunctional resilience reintegration (Richardson, 2002). Hill et al. (2018) have pointed to the value of detecting early warning signals of critical transitions (e.g.

critical slowing down, (Scheffer et al., 2012) and taking preventive actions before breakdowns in performances occur however they have not explained *how* this might happen. The concept of resources has been associated with notions of adaptation, coping and resilience since the inception of research in this area (Hobfoll, 2002). As noted by Hill et al. (2018) a dynamical system represents elements which dynamically interact over time. However, we need to define these elements and the nature of their dynamic interactions. Hill et al. discussed past research on protective factors which include resources. Similarly, COR defines resources as "anything perceived by the individual to help attain his or her goals" (Halbesleben et al., 2014; p. 1338). Resilience can be seen as one type of psychological resource amongst many others (e.g. self-efficacy, optimism, hope, energetic resources; Hobfoll, 2002). In addition, elements, like resources, may not solely be a function of an individual, but may also comprise contextual resources, such as social support, resources required to perform one's sport, access to appropriate facilities, expertise and training (Hobfoll, 2002). Our understanding would be enhanced by a more detailed exploration of how resources interact and change over time in a dynamic process to build resilience, which COR can provide.

Integrating COR with a dynamical perspective goes beyond identifying the relevant resources, but explains how they can be enhanced or depleted. The *primacy of resource loss* (COR principle 1) is the idea that it is psychologically more harmful for individuals to lose resources than it is helpful for them to gain the resources they lost (Halbesleben et al., 2014) and may explain the dynamics of resilience loss versus gain. For example, resilience may be consumed at a higher rate during adversity than can be developed or gained back. This is not dissimilar to what Hill et al. (2018) suggested whereby the history of past adverse events led to attractor states subject to tipping towards between relatively low and high resilience capacities. Resource theories offer an accumulative capacity of resilience which explains *how* this capacity depletes, *how* it can be

developed and *how* associated factors may work together in this dynamic process. COR is also a dynamic theory and the fluctuation of resources is a natural part of this (Halbesleben et al., 2014).

It is likely that resilience is gained or lost in a similar fashion to resource trajectories posited in conservation of resources theory (Halbesleben et al., 2014). To explain resource trajectories, Halbesleben et al. (2014) take an episodic perspective (Beal et al., 2005). A resource trajectory may take the form of an upward spiral when individuals use current resources to acquire new resources (Halbesleben et al., 2014). Thus, players may invest their resilience to gain other resources (e.g. optimism etc.), or conversely may invest other resources (e.g. hope, social support) in order to gain resilience, especially in the face of adversity. Similar to resilience research (Smith, Smoll, & Ptacek, 1990), Halbesleben et al. (2014) suggest that there is a fundamental allostatic load which means that while resources are being acquired, the investment required to achieve resource acquisition means that there is some downward pressure on the general upward trend in resources.

A second type of resource trajectory is where there is an initial gain in resources but over time this changes to a loss of resources. This may be where an initial investment in resources does not yield the expected returns (Halbesleben et al., 2014). For example, it may be where an investment in resources does not reduce or remove the adversity being experienced and so, over time, and with continued resource investment, resilience loss occurs.

Finally, resource passageways are a relatively unexplored aspects of resource trajectories, which emphasize environmental conditions that may accelerate the change in resource for either better or worse (Halbesleben et al., 2014). They may add to the allostatic load of preservation, leading to a "bad-to-worse scenario" (Halbesleben et al., 2014; p. 1352) or conversely may fuel broaden-and-build dynamics (Frederickson, 2003) which benefits goal achievement and additional resources. For example, a reminder from a coach of a player's long-term goals when they are struggling (e.g. you have to win this competition to qualify for the Olympic team) may encourage that player to dig deep and invest more resources for an upcoming event. On the other hand, if it is

perceived as just additional pressure from the coach and beyond their current resources, it may have the opposite effect and just remind them of a perceived threat and the consequences of losing the competition. Thus, resource trajectories have much to offer in terms of explaining the *how* of a dynamic approach to resilience.

The *when* of a dynamic approach to resilience

Given the complexity of resilience where processes may depend on the situational needs, exposure to, and severity of an adverse experience, a comprehensive dynamic model of resilience needs to clearly address the issue of *when*. Hill et al. (2018) have offered a strong conceptual rationale to explain how the ongoing daily process of resilience occurs both in the short to long term. However, we also need to consider the magnitude of the effect that various types of adversity have on resilience and the motivational and situational needs occurring during the adverse timespan. Hill et al.'s (2018) dynamical perspective of resilience in sport can be understood using the *dual-pathway model* (Bryan et al., 2017), which allows us to consider constant dynamic reactions to varying environmental demands, as well as acute pressurized situations. The timespan of an adversity results in two distinct dynamic pathways to resilience, and thus any dynamic approach to resilience must consider this duality. The temporal aspects of resilience highlighted by the pathway model illustrate the distinct effects of adversity on resilience as a result of *when* the adversity occurs in combination with the magnitude. The maintenance of optimal functioning pathway, which is associated with minimal impact resilience, is characterized by a short to medium term adversity where the magnitude does not to exceed the individual's available resources. In contrast, the pathway involving a facilitated rebound with stronger learned qualities is characterized by significant adversities which do exceed the individuals' available resources. For example, take a tennis player who loses the opening match of a tournament; (a) a player with situational experience and broadened resources will have the resilience capacity to buffer any significance adverse effects on well-being or performance before their next match (minimal impact resilience) or (b) a player

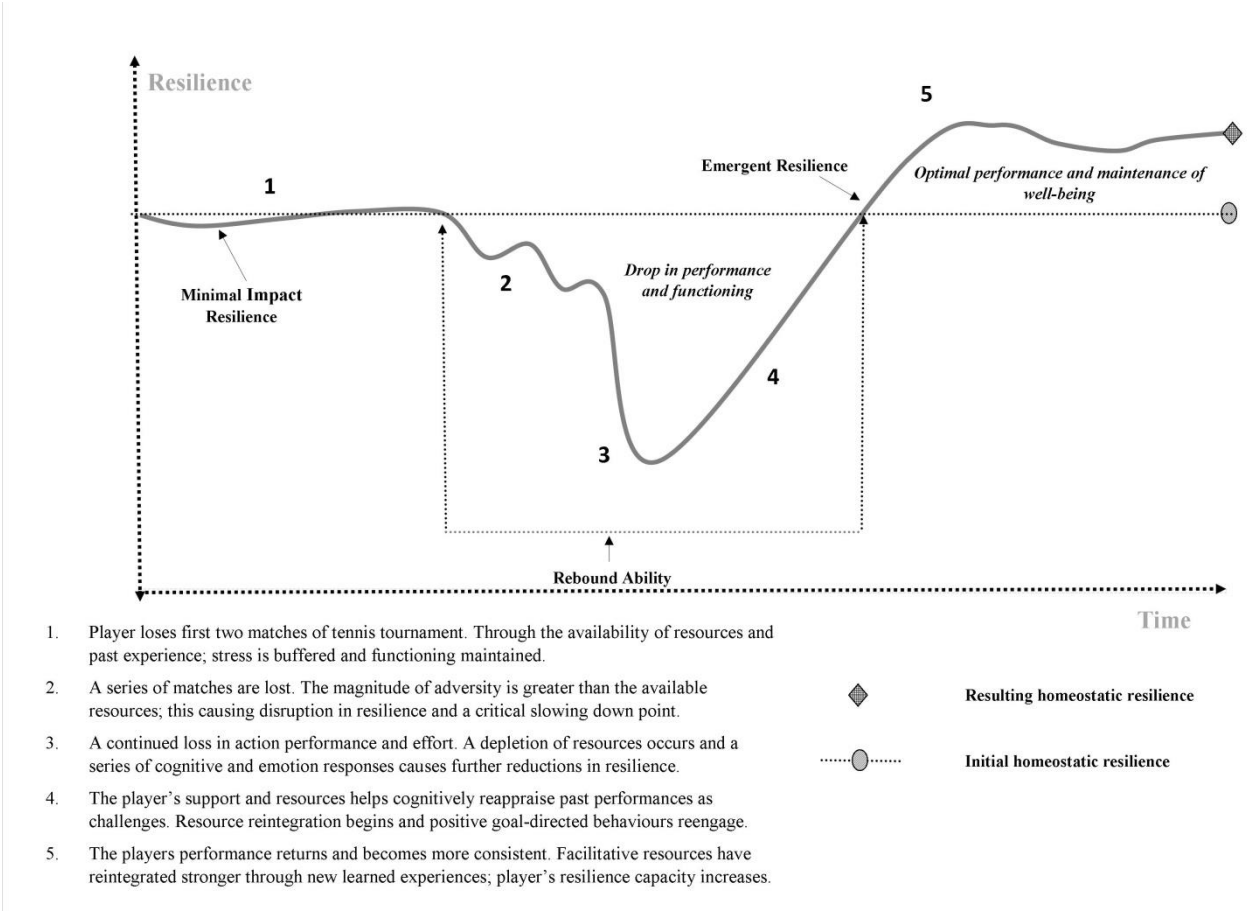
with lower situational experience and available resources will suffer a temporary disruption in performance and well-being leading into the next matches and with further loses may experience a depletion of personal resources and resilience capacity. However, over time and through learning, reintegration can occur (emergent resilience). Stress appraisal styles have been shown to be important in determining adaptive responses and reintegration to adversity (Armeli, Gunthert, & Cohen, 2001), in particular challenge appraisals (Galli & Gonzalez, 2015).

Although minimal impact resilience and emergent resilience represent different timeframes and thus, engender somewhat different processes, they can still be viewed under the same framework from a self-regulation perspective. Hill et al. (2018) outline how differing situational demands may require different facilitative resources and responses from athletes depending on the stressors, be they competition or personal. For the minimal impact resilience pathway, resources such as coping strategies (Secades et al., 2016) and optimism (Owens, Kirwan, Lounsbury, Levy, & Gibson, 2013) may be more relevant to maintain homeostatic resilience during competitive tasks. Practitioners should focus on developing this pathway by creating pre-performance routines (Cotterill, 2010) and instilling effective mental imagery practices (Moran, Guillot, MacIntyre, & Collet, 2012) with their athletes. The emergent resilience pathway contains levels of both disruption and reintegration. Hill et al. (2018) have already suggested focusing on periods of critical slowing down that may precede a disruption in resilience, where practitioners can detect early warning signals and develop preventative strategies. Reintegration refers to the rebound ability (i.e. a return to previous functioning and resilience capacities) and resilience development (i.e. a facilitated learning response to adverse experience). Fletcher and Sarkar (2016) highlight that resilience training can therefore be both proactive (i.e. reintegrating before critical slowing down) and reactive (i.e. to increasing the speed of rebound ability). Sport research points to the development of support (Lu et al., 2016), and self-efficacy (Cardoso, 2014) as a basis for developing this emergent resilience pathway. The magnitude and situational needs of each adversity is relevant in

determining which resilience pathway is utilized. Available resources and resilience capacity will contribute to the potential for an adaptive response. Flexibility is key for minimal impact resilience while self-managing learning may be key to emergent resilience. Thus, the ability to engage in self-regulation or self-management processes is key for resilience adaptation and reintegration of resources.

The *where* of a dynamic approach to resilience

Zautra, Arewasikporn and Davis (2010) characterized resilient adaptation by the speed and thoroughness of stress recovery (rebound), the capacity to sustain purpose (minimal impact resilience; maintain regular functioning), and the capacity to attain a form of psychological growth that reveals a greater maturity of the mind (emergent resilience). Before any stress-resilience interactions, a stable homeostatic state of resilience is thought to precede a perturbation and the capacity of resilience fluctuates as the magnitude of adversity exceeds resilience capacities which depletes available resources (Richardson, 2002). Figure 1 represents a practical example of both *when* and *where* resilience may fluctuate in sporting practice and highlights examples of the dual-pathway model (Bryan et al., 2017).



Whetten (1989) highlights the importance of visual representation during new theory explanation. Figure 1 reflects examples offered throughout this commentary and offers the reader a practical view of dynamic resilience processes. In the fluctuation of resilience, we can see a minimal impact perturbation (causing no lasting effect on performance and a return to stable homeostatic state), a rebound ability (time taken from initial disruption until a reintegration and return to initial homeostatic capacity) and emergent resilience (a reintegration of resilience surpassing that of initial homeostatic capacity). This new resilience capacity is the result of effective reintegration of facilitative resources together with broader perspectives of past historic adverse events. There is a need for researchers and practitioners to understand each pathway and fluctuations of resilience disruption and reintegration in order to understand *where* and *when* in the resilience process is most relevant to each specific adverse situation.

Moving forward: The next steps for resilience research as a dynamic, episodic, self-regulating process

We propose and discuss four avenues that are required to realize the potential of a dynamic approach to resilience. Firstly, we contend that there is still further work required on the definition and conceptualization of resilience (the *what*). We need a definition and conceptualization of resilience that moves away from trait approaches and acknowledges the inherent process and dynamism of resilience. Although definitions of resilience have tended to acknowledge the underlying trait-like protective factors and mental processes (Fletcher & Sarker, 2012, Hill et al., 2018), the first step in advancing a dynamic approach to resilience is to define it as such. The aforementioned definition in this article by Bryan et al. (2017) specifies resilience as a dynamic process, but also adopts a broad consideration of reactions to adversity which can include both chronic adaptation to adversity as well as an acute ability to persist in the face of adversity.

Second, we suggest that the process of resilience is more than just dynamic, but also benefits from inclusion of the concepts of episodic performance and self-regulation. The A-CEM-A model highlights the need to consider how self-regulation episodes unfold over time (O'Shea et al., 2017). Performance episodes would identify timeframes or time periods that either consumes, conserve or develop resilience. These episodes can be momentary, such as the example used by Hill et al. (2018) or can be longer term, depending on the magnitude of and exposure to adversity (Bryan et al., 2017).

Third, a broader perspective on resources and resource trajectories is required to understand the *how* of the dynamic process. Hill et al. (2018) offered an interesting basis for *how* this complex dynamical process works. This commentary offers an understanding of the *what* (cf. self-regulation and A-CEM-A model), expanded on the *how* (cf. resource theory) and detailed the *when* and *where* (cf. dual-pathway model and Figure 1) of dynamic resilience. Researchers and practitioners can now develop interventions to promote dynamic resilience along a spectrum of maintenance, disruption and reintegration in order to effectively maximize specific individual resilience processes.

Finally, the magnitude and performance situation of the stress-resilience process needs to be considered particularly with regard to what the optimal resilience pathway process looks like and whether associated resources and skills are the same or different for each pathway. As we have discussed in detail above, it is unlikely that the *when* of resilience is a unitary construct, but rather the temporal nature of resilience dynamics (e.g. in the moment versus longer-term) interacts with the magnitude of the stressor and the individuals current resource levels to result in two distinct pathways (minimal impact resilience or emergent resilience).

Conclusion

In this commentary, we have expanded upon the model of Hill et al. (2018) using Whetten's (1989) criteria for a theoretical contribution. We have shown how recent research investigating dynamic approaches to self-regulation (Vancouver, 2008), episodic model of performance and self-regulation (Beal et al., 2005; O'Shea et al., 2017), and conservation of resources theory (Halbesleben et al., 2014) can deepen our understanding of the *what*, *how* and *where* of dynamical resilience. Furthermore, we drew on the work of Bryan et al., (2017) to show how the timeframe of this dynamic system may result in somewhat different processes with distinct effects on resilience, and thus, demonstrated that the *when* of dynamic resilience may not be a unitary construct. This commentary has highlighted the importance of developing specific situational resources and self-regulatory processes in preparation for upcoming pressurized episodes as well as for unforeseen significant sporting adversities.

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