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Exploring the progressive use of performance enhancing substances by high-performance athletes

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Exploring the Progressive Use of Performance Enhancing Substances by High-Performance Athletes

Abstract

Background

Given the implications associated with the use of performance-enhancing substances (PESs), a variety of stakeholders from clinicians to managers must remain informed about usage precipitants and be able to anticipate conditions signaling athlete vulnerability to increasingly hazardous exposures.

Objectives

To gain deeper qualitative insight into athlete PES usage and explore the variables leading high-level athletes to escalate their PES use regimens. To reveal PES experiences of athletes during their careers and, unlike other studies, not to focus exclusively on ‘doping’ as measured by the use of WADA-banned substances.

Methods

A macro life course–based framework from which the data could emerge through a thematic coding analysis was utilized. Sixteen narrative life course histories of retired high-performance athletes report on the factors impelling their escalation in PES use, including for some, the first use of banned PES.

Results

Informant reports, thematically coded, reveal performance maximization urgency to be a central factor in escalating PES use, driven by four variables: Requirements, Opportunities, Influencers and Outcomes. These variables each comprise two key components that stimulate an urgency ecosystem affecting an athlete’s proximity to an escalation threshold.

Conclusions/Importance

Such a comprehensive investigation of PES use precipitants has not previously been undertaken. Advances in PES use were instantiated by a substantive, sometimes radical and often sudden increase in urgency to improve performance related to output requirements, specific demands, knowledge and access, timing windows, the competitive landscape, loyalty to coaches, efficiency expectations and likelihood of detection. This study informs incremental models of doping, the use of which is encouraged in order to analyze life course narratives to better understand athlete behaviors.

Introduction

Despite the regulation of athlete drug behavior via the Anti-Doping Code of the World Anti-Doping Agency (WADA), performance-enhancing substance (PES) use in sport remains problematic (Bricknell, 2015). Former WADA Director-General, David Howman, has lamented that possibly more than 10% of elite athletes are doping (Scarr, 2015). He highlighted the concern that athletes are often actively seeking a ‘breakthrough’ and can see PES as the catalyst to this performance intensification. Given the dangers of many PESs and associated behaviors, clinical, policy and management practitioners must take an active interest in the precipitants of their use. To date, revelations on PES usage have remained circumspect, particularly in terms of how such usage escalates for athletes. As Woolf and Mazanov (2017) have highlighted, a constructive and balanced dialogue on doping in sport requires a nuanced and inductive understanding regarding athletes’ specific perspectives, and which avoids ill-informed or preconceived assumptions.

This study explored the variables leading high-level athletes to escalate their PES usage regimens at different times in their life course. In doing so, it aimed to reveal the actual PES experiences of athletes during their careers and, unlike other studies, it did not focus exclusively on ‘doping’ as measured by the use of WADA-banned substances. Rather,

this study reviewed the entire substance use life course of athletes, with the aim of providing a more comprehensive personal and contextual understanding of changes in use level.

This research thus aimed to provide deeper qualitative insight into athlete PES usage and is further distinguished by its utilization of a macro life course–based conceptual framework from which the data could emerge through a thematic coding analysis. Two contributions are most salient. First, this study focused on the factors impelling high-level athletes to escalate their PES use in terms of volume, number of substances or substances perceived to be more potent. It began with an awareness that escalations in PES use might reflect sensitive and vulnerable times in an athlete’s career that represent opportunities for intervention and harm minimization. Second, this study revealed PES usage as reported by athletes in their own words, rather than through proxy attitudes or intentions towards doping captured via scales – thus providing a superior contextual perspective.

Such a comprehensive analysis of PES use precipitants has not previously been undertaken. Recent important signposts, however, offer some important clues, at least with regard to the use of banned substances. For example, Engleberg, Moston and Skinner (2014) found that although no single precipitating event stimulates doping, it most likely begins early in the career life course; while Ohl et al. (2015, p.867), focusing on the sport of professional cycling, refer to the ‘cultural heritage’ inherent in the sport and its influence on participants’ working conditions. Data obtained in other studies have confirmed the multi-factorial nature of the initiating factors for doping commencement, including practical variables like injury and career transitions (Hauw & Bilard, 2012) potentially connected to a tipping-point that increases temptation (Mazanov & Huybers, 2010), and where PES use represents a coping solution (Overbye, Knudsen & Pfister, 2013). In addition, Backhouse, Whitaker, Patterson, Erickson and McKenna (2016) recommended further qualitative studies of influences on PES use to expose the personal, situational and contextual factors in athlete

behavior because extant research has tended to be more top-down than bottom-up, thus lacking these critical perspectives. In particular, the present study responds to Backhouse et al.'s (2016) recommendation.

Given the exploratory nature of this study, an inclusive view of PES was taken. It considered a PES to constitute any material an athlete enters into their body with the intention of enhancing performance, directly or indirectly. Included are pharmaceutical drugs (prescription such as amphetamines; over-the-counter such as alcohol, analgesics and caffeine; and illicit such as cocaine), and dietary or nutritional supplements (such as amino acids). Also included are substances elite athletes use for recreational, recovery or stress-management purposes, and which may be performance reducing, neutral or enhancing, depending partly on the timing of consumption. Escalations in PES use were considered from several perspectives, including increases in the number of PESs, the volume of dosages, the strength of effect (and potential for harm) and, ultimately, the transition from permitted to banned PES.

PES use is complex, involving multiple interconnected factors and sometimes acausal relations. The data analyzed in this study help to narrow the specific precipitants of PES transitions and offer some personal and contextual insights concerning an athlete's substance use over the life course. The article begins by offering a selection of background literature to locate the issue of athlete PES usage behaviors, then provides an account of the research design, the study's results, and the theoretical and managerial implications, before presenting the conclusions.

Background and Literature

Despite the understandable reluctance of athletes to discuss banned PES consumption (Petróczi, 2007), the use of such substances is assumed to be widespread and an ingrained

feature of sport (Smith & Stewart, 2008). Mosten, Skinner and Engelberg (2014) indicated that almost one-quarter of Australian coaches surveyed believed that the use of banned substances was common, while Kissalita and Robinson (2014), in a study of American sportspeople, found that 8% of competitive cyclists used banned substances, with a clear majority using PESs that were not banned.

Although lacking the currency of the contemporary environment, Anshel (1991) undertook an early and detailed qualitative study of illegal substance use by athletes and their motives for such use. Since that study, a smorgasbord of personal and psychosocial predictors anticipating athletes' use of (mostly banned) PESs have been sharpened, or, as in the current study, connected to specific contexts, conditions or behaviors. For example, reported predictors of both permitted and banned PES consumption include current usage levels (Backhouse, Whitaker & Petróczy, 2013), substance type (Goulet, Valois, Buist & Côté, 2010), personal susceptibility (Barkoukis, Lazuras, Tsorbatzoudis & Rodafinos, 2013), critical events or timing (Stewart & Smith, 2014), social context (Wiefferink, Detmar, Coumans, Vogels & Paulussen, 2007), attitudes towards use (Smith et al., 2010) and doping intentions (Chan, et al., 2015).

Numerous models and theories have also offered explanations for banned doping decision-making, including the use of gateway substances and windows of opportunity in an athlete's career (Karazsia, Crowther & Galioto, 2013). The 'gateway' hypothesis—although controversial in mainstream substance use—holds that certain substances act as a facilitating gateway for the use of other substances, typically from those of lower risk to those of higher risk (Hildebrandt, 2012; Yager & O'Dea, 2014). Accordingly, the use of lower-impact, lower-risk substances provides a facilitating gateway to the use of more impactful, higher-risk substances. For example, research has revealed that adolescent smokers are more likely to move onto illicit drugs than adolescent non-smokers (Lindsay & Rainey, 1997). Although

helpful, these assumptions about gateway substances do not provide a comprehensive picture of PES use pathways, especially as the gateway hypothesis tends to be misinterpreted as a theory explaining causality rather than vulnerability, while ignoring other potentially decisive life course variables such as the user's stage in their sporting life course, the level of PES use within the context of the physical requirements of different sports or the level of sporting performance against which the athlete competes.

Other theories that have been employed to explain PES usage include incremental models based on habit, goals and usage accommodation (Petróczi, 2013); systems models synthesizing usage, social perceptions and attitudes (Ntoumanis, Ng, Barkoukis & Backhouse, 2014); interaction theories combining cognitive development with environmental experiences (Johnson, 2012); themes highlighting the range of influences collectively determining doping decisions (Mazanov & Huybers, 2010); planned behavior models theorizing that attitudes and intentions predict usage indirectly (Armitage & Conner, 2001); and a suite of hybrid approaches fusing the social, psychological, motivational and ethical aspects of behavior (e.g. Lazuras, Barkoukis & Tsorbatzoudis, 2015). While these theories provide some important generalities about doping, they tend towards causal linearity, and potentially omit personal variables affecting decisions to use PESs. They also say less about the context surrounding broader kinds of PES use, including how, why and when transitions are made towards more potent substances. Marking some notable exceptions, Karazsia et al. (2013) identified the need to connect social and cultural influences with gateway theory to explain decision-making around the use of riskier forms of PESs, while Brissonneau and Montez de Oca (2018) charted a pharmacological career for doping athletes through a transition from a common or ordinary world to one that is extraordinary, and back again.

Other studies have highlighted that favorable views about the benefits of PESs can normalize their use (e.g. Petróczi, 2007; Petróczi, Mazanov, & Naughton, 2011), while peer pressure in the form of social networks and external facilitators influences PES use throughout an athlete's sporting life course (Petroczi & Aidman 2008).

Athletes are influenced by the beliefs, values and practices of their sporting compatriots, whose attitudes about PES consumption remain particularly powerful as a situational and contextual force (Petroczi & Aidman, 2008), shaping the socialization that occurs within a group (Ohl et al., 2015). These attitudes are contingent upon accessibility, performance impact and social acceptance (Smith et al., 2010), with the many permutations of substance type and their legal and moral standing adding to the contextual complexity, including perceptions of risk (Henning, 2014). While these factors can be examined through a lens of personality and identity—and in this vein management studies have identified a link between such traits and societal actions (e.g. Burke & Stets, 2009; Mittal, 2006)—prior research has revealed little beyond the generalization that adolescent athletes with lower self-esteem are more likely to abuse PESs (Lucidi, Grano, Leone, Lombardo & Pesce 2004; Zelli, Mallia & Lucidi, 2010), and that the personality traits of morality, self-control, identity beyond sport, and resilience to social pressure can be protective factors against illegal and banned PES use (Erickson, McKenna, & Backhouse, 2015).

Peers and authority figures within early sporting experiences are often influential, with some evidence suggesting that family and coaches play instrumental roles in shaping early athlete behaviors (Lenskyi, 2003; Streat & Holt, 2001). The network surrounding elite athletes might even establish an environment of trust and confidence in a group of insular stakeholders who are likely to be the people who first source and provide PESs to the athlete (Laure & Binsinger, 2005). These nascent experiences have been related to the way that higher levels of competition shape permissive attitudes toward banned PESs (Morris,

Sallybanks, Willis & Makkai, 2003). Commercial pressures and sporting culture can also become interconnected, with the expectations around rising professionalism and associated rewards and fame effectively exerting pressure on athletes to use substances that elevate performance and thereby produce a commercial benefit (Gems, 1999; Van Bottenburg, 2003), both personally and for the broader network.

We note that gaps remain in our understanding of elite athletes' use of all forms of PES, both permitted and banned, over their career life course. It is also unclear why and when athletes transition their PES regimens, especially towards greater quantities and more or stronger substances, and in so doing potentially risk harm or the transgression of WADA protocols. Despite public opinion being hostile to drug use in sport (Moston et al., 2012), and the moral and health dangers being well-understood and ever-prominent (Ingram, 2004, Parisotto, 2006), policymakers, clinicians and managers still only have limited knowledge of the attitudes, values and motivations of athletes who use a range of substances to elevate their performance, mold their physiques and dissipate stress, particularly at the elite level. Yet such an understanding could inform a framework upon which to scaffold effective policy and interventions that are beneficial to a range of stakeholders (British Medical Association, 2002).

Research Design

Utilizing a life course framework and adopting a narrative-based, case-history data collection process, this research sought to secure a better understanding of the ways in which high-level athletes transition through PES use. This approach offered several advantages (Wengraf, 2001). First, it revealed a granular and nuanced picture of each athlete's career sport experiences. Second, it ensured that contextual influences were central in considering the formation of athlete PES use decisions, thus locating the use of all kinds of substances

relative to the life course and not only when usage breaks the rules. Third, it illuminated the network of influences and relationships that shaped the processes through which athlete decisions and behaviors are formed, and the relative strength of each contextual factor.

This study adopted an interpretive analytical approach, informed by previous research, but remained inductive in that a naturalistic inquiry method was used consistent with the method advocated by Lincoln and Guba (1985), to allow for the presentation of the primary data emerging from conceptual coding. It was also consistent with the work of Denis, Lamothe and Langley (2001), who outlined how nascent theory can be explored and developed by starting with a theory-inspired problem and pursuing it via a detailed inductive procedure. While this method allowed for the emergence of new theoretical premises, it began with an acknowledgment of existing concepts and variables (Hsieh & Shannon, 2005). It therefore recognized the knowledge previous work has offered about the research inquiry but did not employ a priori hypotheses for testing against data.

Theoretical Framework: Life Course Theory

Consistent with de Silva, Samarasinghe, Senanayake and Lanerolle (2010) and Tscholl Alonso, Dollé, Junge and Dvorak (2010), this study invited retired high-level athletes to discuss their use of all forms of PES within the unique context of their own career sporting life course. This approach enabled the identification of the content and practicalities of informants' decisions about PES use, thereby offering an insight into how choices were correlated to precipitating incidents, events or occurrences. As a result, not only was it possible to identify significant contextual links and relationships that thread their way through each of the narratives, but also to see whether any common themes emerged across the informants' narratives and life courses (Riessman, 2008).

Gulbin (2011) designed a life course model of elite sport development, which was later adapted by Stewart and Smith (2014) to explicate the journey of athletes likely to use PESs across a series of stages. Each of the stages is located within one of three pre-transition periods. Period 1 is characterized by fun and enjoyment (Discover); period 2 focuses on training, skill absorption, tactical know-how and game science (Explore); and period 3 involves progression to a more elite level, where athletic maturity, accommodation to high-intensity training and high-level performance are the goals (Commit / Immerse). Post-transition represents a final period where the athlete discontinues sport (Leave). This research employed Gulbin's (2011) model as adapted by Stewart and Smith (2014) as a theoretical guide to life course structure for athletes and charted the informants' experiences through each of these periods, while allowing them to traverse and describe the life course in their own terms.

Data and Analysis

An interpretive approach was taken, reflecting the ontological assumption that athlete narratives are socially constructed and therefore subject to different interpretations, and operate at the symbolic margin of reality where the social and personal worlds collide (Cunliffe & Coupland, 2011). Accordingly, an athlete's self-conceptualizations—their embodied engagement with others and with substances—are derived in part from understandings not reached until behaviors are repeated over and over (Smith, 2010). Athletes, like all of us, do not necessarily make sense of their experiences until they have been reworked into a readily digestible cognitive structure.

To that end, the approach used here is based on a biographic-narrative interpretive method that emphasizes personal experience, lived situations and life-histories, and wields a strong inclination for open questions (Wengraf, 2001). The motivation for the present study

reflects an appetite for more diverse methodological and theoretical perspectives on PES use in sport settings, and for a transition away from deductive approaches towards strategies that allow for polyphonic and individually contextualized data (McGarry, 2010).

Data Collection

Informants for this study consisted of retired athletes who had participated in at least one of three categories: 1) clubs from Australian national sporting leagues, 2) non-league based semi-professional and professional sports operating in interstate competitions and tournaments, and 3) Olympic and Commonwealth Games sports with national-level competitions. A heterogeneous, or maximum variation sample, was employed in selecting from the three population categories noted, with the intention of identifying patterns shared across individual cases drawn from diverse sporting contexts (Patton, 2002). In order to achieve maximum variation, informants were selected from sports with different levels of commercialization, physical performance requirements and individual or team dynamics. In total, 16 cases were selected, and a balanced gender representation was sought, although ultimately 10 of the participants were male and 6 were female. All informants were retired at the time of data collection. This provided a longitudinal account of each athlete's complete career PES usage and improved informant candor given their anonymity and distance from anti-doping test regimens.

In terms of recruitment, previous researchers' recommendations reinforced the importance of sensitivity during interactions with informants and sport organizations aimed at exploring PES use (e.g. Stewart & Smith, 2010). Consequently, a dual strategy was conceived. First, clear reference was made to the confidential and anonymous nature of the study's protocols and it was noted that the study did not demand that informants identify whether they had used banned or illicit PESs during their careers. The stipulation that

informants would not be pressured or expected to voluntarily reveal banned or illicit PES use was a condition of cooperation from the endorsing governing sport organizations, whose involvement was essential to managing the ethical and privacy requirements for the informants. In addition, it was confirmed with informants and facilitating sport organizations that the researchers—and the conversations and consequent data collected during the interviews—were independent of WADA guidelines and reporting. Conforming to university ethics guidelines, it was also agreed that the researchers would not be permitted to reveal the identities of any informants to WADA or any other anti-doping agency. Second, the researchers worked with organizations and informants over a lengthy period prior to the formal interviews to acquire their confidence and establish a strong rapport. Access to informants was gained via word-of-mouth introductions by sport organization officials and snowball recommendations through informants. The final sampling frame is reproduced in Table 1. As it highlights, all athletes were considered high-performance; that is, they had sought to establish an elite career and had participated at a state representative or high competitive level at the very least. Many had competed internationally.

[Insert Table 1]

Life Course Narrative Interviews

Following a broad structure consistent with Stewart and Smith's (2014) adaptation of Gublin's (2011) life-course model, informants were guided through an in-depth interview designed to capture their life course narrative histories of PES use, with an emphasis on the context surrounding escalations in use. The approach allowed informants to construct a life course narrative in recounting their personal sporting stories (Clarke, 2005). Interviews were conducted as free-flowing conversations (Riessman, 2008), where allowance was made for

relevant digressions and follow-up questions. Informants were asked to identify key incidents that led to their PES usage along with the decisions, information sources, evaluations, choices and pathways connected to this usage. In doing so, care was taken to allow informants to develop a narrative that explained their journey through the various stages of their careers and their changes in PES use along the way.

Data analysis

Interviews were compiled into an aggregated data set for thematic coding based on the research aim to explore escalations in PES use. The results of the thematic coding are summarized under the four major categories and the two key components for each, detailed in the following section. Interviews were audio-recorded, while detailed memos and theoretical notes were taken by hand. All audio data were transcribed and organized within NVivo, constituting approximately 200,000 words. To ensure a rich and textured familiarity with the data, a further set of narrative life courses for each informant was also produced to provide a strong foundation that reflected each informant's understanding of their journey through PES use.

Notwithstanding the complex debates surrounding variations in grounded analysis, this study favored Strauss and Corbin's (1998) general theory of action to build an axis for an emerging theory. Components emerged from a detailed, line-by-line investigation of the data, coded in hierarchical layers. The subsequent theme building escalated these codes into concepts, categories and ultimately categorical themes (which became eight components). In sum, the conceptual implications of the analysis were formulated based on a comparative method that interrogated these themes as they were developed until the point of saturation. In the first instance, the procedure treated the 16 individual life course narratives as the units of analysis in order to develop discrete personal narrative accounts. The data were subsequently

aggregated in order to form a composite for the thematic coding (Riessman, 2008). That is, the results presented in this article reflect a synthesized data set of all informant narratives rather than a comparison of irreducible and different personal narratives. While the latter would no doubt have provided compelling insights, the choice of the former reflected a better fit with the research aim of advancing an overarching theory to understand common PES usage escalations.

Codes were employed to structure and organize the data and analytical process, including the revision of notes and audio tapes (Miles, Huberman & Saldana, 2013). The codes acted as tags or labels for assigning units of meaning to the descriptive or inferential information compiled during the research. Subsequently, these codes were attached to chunks of varying size—words, phrases, sentences or paragraphs (Miles et al., 2013). During the coding process, keywords were applied to sections of the text, providing specific meanings as well as a label for the section. Labels were selected that best described the conceptual contents of each code. The outcome of this iterative and inductive process was four ‘open’ codes. These initial codes correspond generally to Strauss and Corbin’s (1998) four factors of chief interest: conditions, strategies and tactics, interaction among the actors, and consequences.

Results

Our findings suggest that, at certain times in an athlete’s career, they will be exposed to pressures emanating from a combination of four key variables: Requirements, Opportunities, Influencers and Outcomes, with each comprising two key components or sub-codes. These elements together constitute an urgency ecosystem, both internally and externally, affecting an athlete’s proximity to an escalation threshold. With greater urgency comes a greater likelihood of PES use escalation. Each category, and its constituents, is detailed below.

Requirements

The category ‘Requirements’ describes the escalation impetus imposed on athletes by their performance and sporting needs. It reflects an athlete’s perception of how much they need the ‘boost’ that comes from a new PES or an increased dosage of a current PES. Two descriptive components emerged within this category: first, performance level, where urgency increases with lower levels of performance and performance drop-offs; and second, specific sport demands, where urgency increases with the need to match usage against upcoming events or sport requirements in order to maximize impact.

The first component of Requirements represents the importance at a point in time of an athlete’s current level of performance and associated success. Times connected with lower levels of performance and success stimulate a heightened sense of urgency, and a higher likelihood of escalating PES consumption. For example, referencing a disposition to PES usage, one informant noted,

... if there’s something I wanted and I wanted it bad enough I just do what I had to do to do it.

Like most elite athletes, this informant’s career life course was punctuated by periods of performance slumps, which motivated them to explore new training methods, recovery modalities, coaching inputs and PESs. In order to secure a critical position on a national-level squad, the informant first tried a banned stimulant, having “*exhausted the easy options.*”

Another informant viewed their own PES use as analogous to a life-threatening physical response, where the choice of defensive weapon is commensurate to the danger:

So you can use a knife or a machine gun, so why can’t you pick ... and say yeah well, well you use Nandrolone [androgenic and anabolic steroid – AAS].

Thus, this need for performance enhancement and a significant lack of success in the twilight years of their career demanded the metaphorical equivalent of a machine gun, which was an initial use of an AAS. Lower performance was also commonly observed as coinciding with periods of injury, where the requirement to return to competition increased urgency:

I smashed my heel bone to pieces and then I took some cortisone [permitted corticosteroid anti-inflammatory] and that was my first time.

While this informant did not report escalating their use of banned PES, they did add that, ultimately, “*the cortisone injections were what stuffed up my knees.*”

The second constituent of Requirements reflects the specific performance demands inherent to each sport. In this regard, one informant reported usage of permitted analgesic and anti-inflammatory drugs:

Dependent on whether we had a competition or not. So if I was just training every day, I'd just have one ... one anti-inflammatory in the morning, if we had competition and I was in a lot of pain I would have my anti-inflammatories plus maybe a couple of Nurofen [brand of ibuprofen analgesic] before competition or a couple of Panadol [brand of paracetamol analgesic] to give that little bit of an edge.

This informant described how their use of permitted pharmaceuticals to control pain and inflammation escalated steadily throughout their career, and has only diminished slightly during retirement.

Performance requirements tended to deliver greater needs, as one informant noted more broadly in regard to athletes:

... the shift of boundary for themselves, what can be done, what can't, and they constantly shift that boundary further and further and further.

With boundary expansion came more and greater PES usage:

I kept trying new supplements whenever they came out and used more of the same in general just trying to keep up with the training.

For the above informant it eventually spilled over into some tentative AAS use alongside a comprehensive supplements regimen.

From a life course perspective, several commonalities emerged surrounding Requirements. First, the urgency level increased sharply when there was a need to make the first ‘break’ into elite-level performance (early in career) or maintain competitive-level performance (late in career). This finding reinforces former WADA Director-General David Howman’s fear that athletes use banned PES to accelerate breakthroughs to new levels of performance and competition. Second, urgency also increased when performance needs coincided with a requirement for a new or underdeveloped physical attribute in order to improve or maintain competitiveness, or to facilitate some special preparation for a major event. For example, an athlete might determine that a new performance level demands a higher endurance capacity or strength. Also, the athletes appeared to be more vulnerable to banned PES usage escalations during preparations for what one informant specifically described as “*life changing events... [which] could make or break my career*”, highlighting the significance of these transitional moments. Previous research has revealed that elite athletes assumed that reaching the highest levels of performance required extending their abilities beyond natural talent (Cooper, 2013) through a combination of advanced training, coaching, supplements and substances. Some similarities might be observed between Requirements and ‘athlete’s achievement goals’ (Barkoukis et al., 2013), ‘controlled motivation’ (Hodge, Hargreaves, Gerrard, & Lonsdale, 2013), or ‘self-determined motivation’ (Chan et al, 2015), which have also proven relevant in predicting doping intentions.

Opportunities

A second category, ‘Opportunities’, describes the temporal circumstances that raise urgency, resulting in a catalytic escalation. It comprises two elements: first, availability opportunities, where urgency increases with improved insight into PES availability and most effective utilization; and second, a timing window, where urgency increases with periods of opportunity to progress in one’s career or rise in competitive levels and playing contracts.

The first element of Opportunities is substance knowledge and access, which reflects an athlete’s awareness of new or accessible PESs they were not employing. Improved access or sudden availability, along with greater knowledge about a substance’s perceived benefits, amplifies urgency, leading to a realization of what may be possible or what other peers may be taking advantage of. Informants were frequently condescending about competitors and peers who they felt were failing to maximize their performance due to an ignorance about the available PESs. In relation to one informant’s use of Clenbuterol, a banned steroid bronchodilator they used to maintain muscle mass while decreasing weight, they observed that,

... to be honest, most of them wouldn’t understand what that drug would do for them anyway.

Yet, ironically, most informants believed they were highly knowledgeable about PES options, while conceding that some substances remained difficult to obtain or that it could be difficult to guarantee the authenticity of such substances, precluding or limiting their usage. Another informant, who had made guarded and ambiguous reference through third-person language to their use of a myriad of AASs, commented that “*sometimes [you] took what you could get.*”

Informants also commonly reflected on the effects of substances, particularly the likelihood of maintaining or increasing dosages of those considered optimal or effective:

But the thing is being on Ventolin [permitted bronchodilator inhalation aerosol] makes you want Ventolin. It's almost an addictive-type thing.

This informant described how they had been exposed to salbutamol (active ingredient in brand name Ventolin) when one of her teammates had passed around an inhaler during a break in a game. By the end of their career, the informant was using salbutamol at every training session and game.

Not all informants were accurate in their PES effect appraisals. A combat sport informant for example expressed concern with regard bleeding and the use of the endurance hormone erythropoietin, when in fact the substance increases blood viscosity:

So, yeah, they just tap them and they start bleeding. So whatever it did to help you fitness-wise in terms of probably getting the oxygen through your system better seemed to make you more susceptible to bleeding ... they stop the fight.

A second constituent of Opportunities is the timing window associated with the prospect of using an additional PES, which is shaped by factors such as perceptions of career-making success, economic returns, fame or simply holding one's place in a team, and the relationship to increased urgency. Accordingly, one informant noted that placing themselves in front of recruiters at the right point in time was critical. Speaking generally, they observed, *"If they [the athlete] don't increase their performance, people don't get interested."* To that end, the informant described a history of trying out new and more PESs to capitalize on sudden windows of opportunity. For example, they laughingly described a sudden interest in using (the permitted supplements) bovine colostrum powder and bee's royal jelly to improve recovery and testosterone production, respectively, despite any evidence of their veracity at the time. This informant also indicated that, prior to important events mid-career, they began to increase their consumption of caffeine (permitted stimulant)

to levels (300mg both before and during competition) that “*gave the shakes.*” Career progression was thus a sudden incentive to consider additional PES usage:

I wasn't just playing at my local association, I was representing at that stage ... our region ... taking steps up through the development pathway and needed something.

‘Something’ for this informant was a cocktail of stimulants, including several pre-performance energy drinks and caffeine pills, which later evolved into ‘purple drank’ (a colloquial term for a concoction of cough syrup and grape soft drink, usually mixed with prescription [banned] cough syrup).

Most informants considered “*anything to make sure ... maintain or achieve that level of being the best*” as a basic requirement of elite sport, although some reported that this view only related to the fullest range of permitted substances. There remained some ambiguity, however, around dosages of permitted PESs. Some informants only considered whether or not the PES was permitted; various amounts and combinations with other PESs were seen as acceptable, the most common examples being caffeine, energy drinks, therapeutic exemption asthma medications, analgesics, anti-inflammatories, and over-the-counter stimulants. Furthermore, they noted that increasing monetary rewards were commensurate with increased risk taking,

If there's a lot of money in it, the risk/reward and even the investment of the drugs reward tends to, you know, that incentive is increasing.

For example, aware that the next victory would lead to a significant ‘pay day’, one informant spoke of his decision to use a banned diuretic to help lose water weight for a weigh-in without having to sacrifice muscle. Opportunity timing appears to overlap with ‘situational temptation’, which has been shown to mediate intentions to dope (Lucidi et al., 2004).

From a life course viewpoint, PES knowledge appeared to accumulate with career maturity, as did the connections for secure access to PESs, especially through trusted sources

to deliver banned (and authentic) pharmaceuticals. It should be noted, however, that it is not possible to determine for this sample whether greater knowledge about PESs causally led to more use, or whether knowledge was a necessary (or likely) but insufficient condition preceding use. In addition, it appeared that opportunity tended to coincide with an athlete's first exposure to elite experience. Informants noted that opportunities to be considered for elite recognition and rewards often came early in their life course, when immaturity and uncertainty were at their peak. While in mid-career athletes experienced fewer opportunities, some reported another window coinciding with their final opportunity to remain at the elite level, which reinforces the nascent data suggesting that late-career elite athletes have a higher propensity for doping (Coupé & Gerguad, 2013). Overall, however, the results of the present study imply a 'bookend' timing window from first elite exposure to last.

Influencers

The third category contributing to urgency, Influencers, describes the effects of other people in encouraging or enabling PES use escalations, and is represented by two elements. The first is competitive landscape, where urgency increases when the competitive landscape is perceived as unequal due to the use of banned PES. The second is unquestioning loyalty, where urgency increases with higher levels of devotion to coaches and senior peers.

The first constituent of Influencers, competitive landscape, reflects the perceptions athletes' hold about the PES usage regimens of their competitors, where perceptions of more PES use, more efficacious PES choices and the use of banned PESs by competitors lead to higher levels of urgency. Athletes made a concerted study of their competitors, as in the following example, where an informant compared their personal regimens with those of their adversaries: "... when I was watching with a mate, it's like oh, you reckon he's using?" In this case, the informant's PES regimen included AASs and they competed in a non-drug-

tested competition. They further described how athletes would “*spot the natural*” in the competitive environment, in reference to the assumption that AAS use was commonplace and well-understood.

Informants were also concerned about comparative performance, often noting in extravagant terms the significant potential imbalance when adversaries were perceived as doping. One self-declared ‘natural’ observed that doping competitors were obvious “*because the advantage he has compared to his competitors was massive*”, adding, “*I knew that these guys were using because they were absolutely massive.*” Some elite athletes revealed their ambitions; and in a potent display of urgency, one declared,

*Everything’s a competition ... and I think it’s ridiculous ... I mean but ****, we’re doing drugs everywhere and anywhere.*

In this case, however, the informant described their own regimen in modest terms, as restricted to the occasional use of banned stimulants and illicit recreational drugs.

Urgency accompanied the informants’ expectation that, since some competitors were using every means available to win, so must they. This perspective was accompanied by strong rationalizations across the life course. For example, one informant felt that the playing field was ‘level’, and it was unreasonable to think that their success was due to their use of a PES, in this case Higenamine (permitted at time of use, banned in 2017), a beta-2 agonist used to enhance cardiac function.

... is it an unfair advantage to get a better coach? Oh, you train harder than everyone else. Is that an unfair advantage? No, because I choose to train harder, ‘cause I choose to take drugs, ‘cause I choose to pay more money to get a better coach or I choose to get you know a psychologist to work on me? I mean are they all unfair advantages?

The second constituent of Influencers, unquestioning loyalty, came in the form of a coach and peer effect. Athletes, understandably, often report an unquestioning compliance with their coach's instructions in explaining their use of PES. One informant described taking a daily handful of pills without knowing what any of them were: *"I was listening to him because he's my coach. So, he said oh, this is good for your recovery... and I did that."* Another informant reported the same experience with a daily regimen of pills and powders, noting that,

... looking back again now, I didn't question anything, like I just did what I was told basically. Like if our coaches told us this is how many things you have to do ... I didn't like it but you just did it.

Peer influence was also highlighted as a stimulus for trying new PESs as part of a 'no stone unturned' approach to performance. One informant felt that the eager approach to new PESs was a product of environment, although they did not suggest that it led to the use of banned substances: *"I think it's just a whole culture of the group that I've come through."* Another informant commented that all athletes sharing a common training culture also share a common PES usage regimen: *"If you're hanging around with people that will take drugs, it's the accepted norm."* In this case, the 'accepted norm' was the use of illicit recreational drugs like cannabis and stimulants as a way of escaping relentless performance pressure.

The unquestioning loyalty effect aligns with the notion of a controlling climate (Hodge et al., 2013), which has been linked to doping, as has 'social desirability' (Gucciardi, Jalleh, & Donovan, 2010). Similarly, the opinions of athletes' reference groups contributed to a positive attitude towards doping insofar as athletes believed that their immediate community was supportive of PES use (Jalleh, Donovan, & Jobling, 2014). Further, peer pressure and the social acceptability of doping among peers—or 'defensive doping' (Kirkwood, 2012)—were relevant to athletes' normative beliefs about PESs. As this study's

data suggest, some athletes concluded that they could not avoid taking banned PESs if they wanted to remain competitive.

Considering life-course commonalities across the sample, informants who were later in their careers were more likely to assume that competitors were using banned PESs, which increased their own urgency. The term ‘level playing field’ was employed by numerous informants as they described their motivations for being attracted to PES usage. While the evidence is insufficient to conclude that the informants were ‘defensive doping’, they were, at the very least, afraid of being disadvantaged. For some, the possibility that competitors had discovered a new permitted PES or combination was an ever-present consideration, which meant, as one informant put it, that events and training sessions were infused with constant discussion about the ‘latest supplements.’ Only the two non-doping-tested informants in this study considered the use of banned PESs—or AASs in this case—to be essential to high-level performance. Yet their language reflected more of a prosaic acceptance of the need to use AASs than their use as a defensive strategy.

In addition, informants who were nearing the end of their careers were more reliant on their own decision-making, lessening the impact of influencers. However, by this point, at least some of the ‘damage’ had already been done, and returning to a degree of naivety about PES use was not possible. Conversely, authority figures loomed most prominent for early-career athletes, especially when on the cusp of an elite breakthrough.

As a final observation, informants reported an increasing cynicism about banned PESs as their career life courses had progressed—a consequence perhaps of a growing accommodation to the competitive environment and a ‘resignation’ effect that tends to accompany career maturity. Yet such speculation requires further research for clarification. For example, the data suggested that even emerging athletes are not immune from cynicism, as confirmed by the following quip from a relatively young informant made in reference to

painkillers: *“Not much point in fighting it if you want to stay in the game.”* They had, in fact, stayed ‘in the game’ as long as their body could endure, bolstered by a combination of permitted analgesics, anti-inflammatories and banned appetite suppressants, all of which this informant had continued to use, albeit in lower dosages, well into retirement.

Outcomes

A final category, Outcomes, describes athletes’ perceptions of whether a PES will deliver performance results, and the likelihood (or trade-off) of being caught using a banned PES. Urgency was higher with greater expectations of efficacy and lower with fears of being exposed, and was expressed through the following two elements: first, efficacy expectations, where urgency increases with higher expectations of PES efficacy; and second, likely detection, where urgency increases with perceptions of lower likely detection.

The first constituent of Outcomes, efficacy expectations, represents an athlete’s assessment of a substance’s likely performance impact. Perceived efficacy was found to be especially relevant to informants’ decisions to increase the amounts of PESs used where they felt such PESs were delivering performance outcomes. One informant described their use of permitted analgesics, which began infrequently and intermittently but escalated as they discovered that more worked even better:

... I was taking painkillers, eventually every day ... I wouldn’t have been able to get through it without those sort of things.

Additional quantities of PESs and new forms of PESs were often considered essential as athletes progressed through the latter part of their careers and struggled to maintain performance requirements: *“... I was able to hold my body better and take the bumps,”* one informant reported about their use of the banned stimulant ephedrine. Efficacy was strongly connected to outcomes when a PES became either known or available to an athlete at a time

of sudden performance need, further highlighting the impact of opportunity noted earlier. This combination may have facilitated athletes' transition from using permitted to banned PESs. One informant explained with regard to their decision to use a prohibited stimulant,

It was now or never but I couldn't compete without them and they just seemed to turn up when I needed them most.

Another remarked about their decision to try an AAS,

I knew they would work and that if I was going all the way I would sooner or later [use the banned substances] ... it was suddenly sooner ... 'cause I was offered a place ... that was it.

In addition to efficacy, urgency was linked to outcomes and was inversely related to the perceived risk of likely detection. Some informants sought to maximize their performance through the liberal use of permitted substances in order to avoid anti-doping testing complications, as demonstrated by the following comments about the perceived benefits of an advanced regimen of permitted PES:

"But I would suggest that yeah, there's quite a few people using painkillers"; "... I've had a lot of cortisone ... it's worked really well for me ... definitely something to try"; "Sudafed [brand of nasal/sinus decongestant containing the stimulant pseudoephedrine] ... that's sort of been on and off the list"; "asthma medication is really good ... just get a therapeutical exemption"; "the girls do take caffeine"; "energy drinks by the dozen."

Several informants who had utilized banned PESs avoided some substances, however effective, when they were not absolutely certain how to sidestep testing. For example, one preferred to use higher dosages of ephedrine rather than a more complex but more potent concoction of amphetamines because *"I knew how it worked"*, referring to the relationship between timing of use and detection.

At the same time, some informants explained that anti-doping testing was not a serious deterrent: “*Well, we can do that but it’s still going to grow. I mean the drugs are still going to grow.*” Although a few non-tested informants were unconcerned about anti-doping testing, they expressed a strong desire to keep their banned PES usage regimens covert: “... *wouldn’t go to my GP [General Practitioner] ... everything’s ordered online.*”

With respect to common experiences across the life course of athletes, it was noted that the perceived efficacy of PESs increased with an athlete’s career maturity. It is plausible that such a transition has relevance to the claim that older athletes are more likely to use banned PESs. Moreover, the perceived risk of detection might peak before an athlete reaches elite status and then fall with career maturity. Although a speculation, the data here suggest that the longer an athlete used banned PESs without detection, the less they feared detection in the future. As one self-declared veteran put it in reference to anti-doping tests, “*that’s why they call them ‘idiot-detection’ tests.*” As one final complication, the two informants from sports that did not conduct anti-doping tests accepted the use of banned PESs as essential “*tools of the trade,*” and did not consider their use to be a form of cheating.

Discussion and Implications

As this study has highlighted, the performance maximization pathway for competitive athletes involves learning about and using PESs, encouraging a gradual shift towards more complex performance enhancement. The final stage in this pathway, from which there appears to be little retreat, involves excursions into the use of banned PESs when the urgency to achieve greater performance rises dramatically. These dramatic rises change the urgency ecosystem dynamics, propelling the athlete towards the banned PES threshold. Many informants indicated that their first use of banned PESs occurred when they reached a

certain level of performance, and that achieving a corresponding new level of success led to the deliberate or unsolicited arrival of a banned PES opportunity.

One reading of these results could be that permitted PES use may be a precursor to banned PES use as the former helps informants become accustomed to utilizing substances for performance improvement. In this respect, among the informants PES use routinely accumulated. All the athletes in this sample began with permitted and relatively low-risk substances, excluding medical prescriptions for illness. At various times, urgency encouraged them to add to their volume and type of PES use, or to explore novel combinations. On the surface it appeared that the use of permitted PES, like nutritional supplements, caffeine, therapeutic exemption substances and anti-inflammatory injections, represented a ‘gateway-like’ predictor of banned PES use. However, this supposition is less helpful than it might appear for two reasons.

First, all informants used permitted PESs in significant volumes, having escalated their use over time, but starting early from the onset of their sporting careers. Unsurprisingly, the heavy consumption of nutritional supplements has been correlated with age, the desire to enhance performance, more training, and knowledge about efficacy (Dietz et al., 2014). Yet, while informants continued to consume vast quantities of permitted PESs until retirement, some had chosen to add selected banned PESs while others had not. Therefore, the use of permitted PES was not found to predict doping. Rather, permitted PES use appeared to be a necessary but not sufficient precursor to banned PES.

Once a PES use regimen was started, it tended to escalate over time. Although gateway theories deserve the critical scrutiny they have recently received in relation to recreational and illicit drugs (Kleinig, 2015) and the associated implications about causality, the data from the current study suggest that substance ‘creep’—that is, more use over time—should be taken seriously, especially considering the previous evidence connecting

supplement users with more favorable perceptions, and biased associations with, of banned PESs (Petróczi et al., 2011). In fact, prior studies have found that young athletes who declare that supplementation is vital for sporting success are more likely to accept doping (Bloodworth, Petróczi, Bailey, Pearce, & McNamee, 2012). The findings of the current study indicate that this mentality is alive and well among athletes as they commence their career life courses. Numerous studies have established a relationship between the use of supplements and a later escalation towards banned and illicit PES use (e.g. Blackhouse, Whitaker & Petróczi, 2013; Calfee & Fadale, 2006; Dodge & Jaccard, 2006; Lucidi et al., 2008; Papadopoulos, Skalkidis, Parkkari & Petridou, 2006). At least one study has found that supplement usage increases the likelihood of later tobacco, alcohol or recreational drug use as well (Yussman, Wilson & Klein, 2006). However, it would be prudent not to infer that supplement use commands more than a correlation with the later use of pharmaceutical drugs. The results of this current study reflect a necessary but insufficient relationship, where all the informants used over-the-counter supplements, but only a small proportion moved on to consume pharmaceutical substances. The evidence here thus suggests that PES use is hierarchical from lower performance impact substances to higher performance impact substances, but not that the use of weaker substances instantiates the use of stronger substances.

Theoretical Implications

The results from this study bolster the theoretical utility of the ‘incremental model of doping’ (Petróczi, 2013), which posits that doping athletes are focused on their own performance maximization and not simply on ‘cheating’ or beating competitors. The informant insights into elevating their outcomes revealed in this study highlight the need to fulfill their potential, not simply to surpass that of others. The insights also highlight the application of a

life course perspective, which gives attention to timing, opportunity, circumstance, and career peaks and troughs. Further, the incremental model speculates that the use of nutritional supplements does not act as a gateway, but rather a gateway window arises when an athlete seeks advantages from supplements at the same time as other susceptibility risks occur, like injuries. The current data help to explain how such a process might work.

For the informants in this study, a rapid increase in urgency stimulated an escalation of PES use within the context of each athlete's unique career position, whether this urgency was imposed by a coach or shaped by the professional demands of their sport. Exemplars have been found in studies of elite road cyclists aware that a move into the professional ranks may necessitate banned PES use despite the pressure of policies seeking to redress the influence of illegal substances (Brissonneau & Ohl, 2010). Informants in the current study reported that, at the professional level, 'anything goes.' In a broad sense, 'urgency' here might relate to what has been termed 'obsessive passion' (Wilson & Potwarka, 2015).

Obsessive passion can be internalized or observed in others through the complex peer and collegial networks of the competitive sport environment. In one relevant previous study, athletes were most willing to take banned PESs in the event of injury or performance slump or when under the impression that competitors were using them (Whitaker, Long, Petróczi, & Backhouse, 2014). In the current study, athletes' attitudes towards banned substances were clearly shaped by the attitudes and practices of their peers, with favorable views about substance efficacy and appropriateness normalizing their use. Further, peer pressure in the form of social networks, external facilitators and inhibitors that influence PES use was identified. The data in the current study indicate that these networks grow exponentially over time as athletes progress in their sport and achieve higher levels of success. This expansion of the network suggests its growing influence on athletes throughout the life course and a

disengagement from broader social morals or ethics with regard to cheating or deceptive behavior.

However, little evidence suggests that an athlete's moral position acts as a strong constraining or facilitating variable. A weak moral (i.e., 'doping is not cheating') orientation was not found to be connected to banned PES use. Nor did the evidence in this current study support 'moral disengagement' as a predictor, which has previously been related to susceptibility to use banned PESs (Boardley, Grix, & Harkin, 2015). The results presented here do not resolve the question of the role of moral disengagement as a precursor to banned PES use, and do not point to any form of moral position as a predictor of PES use escalation into banned territory. Rather, informants referenced ethics and morality as retrospective justifications for their decisions, perhaps as a compensatory strategy to reconcile the cognitive dissonance arising from these decisions, or simply to confirm their certitude about a level playing field.

Practical Implications

While allowance must be made for the informant data coming from a wide array of sport types, a number of implications of the findings have salience for stakeholders interested in reducing harm to athletes: 1) informants added substances or combinations that they perceived to be more efficacious than those currently used; 2) all informants used permitted PESs; 3) over time, informants escalated their use of permitted substances, utilizing higher dosages corresponding to greater urgency (e.g. caffeine, analgesics and anti-inflammatories); 4) there was a progressive development in the choice of substances, moving from permitted to banned PESs, in line with perceived efficacy; 5) once using banned PESs, informants did not return to a regimen without them; and 6) the shift from permitted to banned PESs was instantiated by a substantive, sometimes radical, and sudden escalation in urgency.

The suggestion that illegal PESs appeared in the life course through external sources, rather than being actively sought out as levels of success occurred, is particularly concerning and implies that the imbedded nature of banned PESs is a significant problem at later stages of the athlete life course. In mid to late career—and for those athletes who have already transgressed—there appears to be little way back from banned PES use, and resources expended on encouraging a reversal pathway may be better prioritized towards ensuring that the demarcation between legal and illegal PES is both vast and well signposted. Critical to this juncture when PES use begins, as demonstrated in this study, are moments of extreme urgency that can occur from a young age as elite talent is filtered. Informants described banned PESs as a form of ‘trump card’—or as a “*joker*”, as one informant stated—that can be utilized at a critical point to provide the boost needed to propel one’s performance maximization. While younger athletes must remain a priority focus, our data suggest that older athletes are susceptible to escalations into illegal territory later in their life course, so must not be overlooked. This finding is contrary to studies that suggest an early (teenage years) transition to performance-enhancing drugs in some contexts. For example, North American high school and college sport has been linked with early exposure to and use of performance-enhancing drugs (PEDs) (Dodge & Jaccard, 2006; Yusko et al. (2008), although such usage might be situation-specific. In addition, the value of PEDs usage for image-enhancing purposes may be encouraging earlier adoption (Castillo & Comstock, 2007; Murray et al., 2016; Smith, Stewart, Westberg & Stavros, 2018).

The performance pathway for professional athletes may well differ considerably from that of recreational athletes. For example, it may transpire in a more truncated timeline during which athletes reflect upon their careers and transition from the use of improved equipment technologies and more intensive training to supplement and related substance use. Similarly, learning about nutrition and energy production opens the gates to learning about

supplements and more efficient bodily performance. The use of supplements thus becomes part of the training, maintenance and performance improvement regimen required to meet the strenuous demands of serious training and competition (Jones, 2010). This mechanization of the body encourages a gradual shift from the benign use of PESs for the maintenance of health and sustaining energy towards a more complex use for recovery and performance enhancement, which tends to be experimental by nature. The final stage can often then involve excursions into the use of banned PESs. As athletes advance along the life course from recreational to elite performance—and from low body concern to high body concern—they also use more substances and newer substances, and in experimental combinations.

Practitioners can readily map levels of performance success to identify areas of urgency elevation where the appearance of banned PESs is most likely to occur. Given the range of such levels, highly targeted approaches will be required to minimize harm at each juncture, utilizing a ‘carrot and stick’ approach to empower those refraining from banned PES use to reap the rewards of recruitment and selection, while making the trade-off for athletes considering an escalation to banned PES usage one that is highly undesirable. As athletes are generally reluctant to embarrass their family and friends, it is paramount that this be emphasized in intervention programs. Through such programs the meaning of harm minimization can be extended beyond the athlete to include harms done to the support network upon which athletes are reliant.

The illusion of superiority displayed by some athletes in this study when comparing themselves to their peers suggests that the mentality of ‘I’m different’ is pervasive and powerful. Such a mentality not only breeds a sense that the reward is worth the risk, but also fosters the view that illegal PES usage is possible without broader harm if rationalized. Addressing such attitudes will require the skilled resources of clinicians and sport

psychologists to adroitly traverse the fine line between hyper-aggressiveness and individualism that is rewarded by modern sport and the temptation to maximize performance that appears to be driving PES usage. In this regard, maximum performance needs to be reframed as that which is achieved legally, not that which can be achieved under any circumstances.

Limitations and Further Research

Several methodological limitations constrained this study, each of which points to opportunities for further research. This research only considered athletes from one country who, through their high-level experiences, have progressed through similar cultural and social sporting processes. This can be rectified in future research by using broader geographic bases for sample recruitment. Similarly, further studies can delve more deeply into specific sport types as has been common in past studies involving sports such as cycling. While the current study purposefully sought diversity in sport types, deeper investigations of individual sports may yield greater detail on specific sport triggers and escalation points that may be contextually relevant. This may facilitate greater generalizability given the broad range of sports presented here, rather than a focus on informants from one sport. In addition, as always with small sample, in-depth qualitative studies, this work lacks generalizability to the wider population of athletes.

While the life course approach adopted here sought to explicitly draw out the reflections of athletes at a point post career, interviews with athletes throughout their life course (assuming there is candor) would be a fascinating entrée into the minds of competitively active athletes at specific points in time. It is probable that active athletes will have different perceptions from those in retirement, who have had time to reflect upon their experiences.

Conclusion

In this study the precipitants of PES use escalations were narrowed, and a relatively unique and important perspective has been presented. Athletes from a variety of sports reflected on their careers, and through a life course narrative highlighted the urgency associated with action regarding PES use, and detailed the platform conditions relevant to understanding the doping life course. Informants outlined their specific requirements, evolving opportunities, the role of influencers and outcome efficacy concerns, along with how these elements can coalesce and propel them along the PES usage path. Sometimes, irrevocably, the pathway can lead to a leap across the line between what is permitted and what is banned. For sport managers, understanding this demarcation, and the factors that drive athletes tantalizingly close to it, stands as a new but increasingly important imperative. Consequently, the content of substance abuse policy, and the timing of its release, will be most effective if targeted at athletes during times when they are most vulnerable to PES abuse, or most open to change.

Doping is the most insidious aspect of contemporary sport. Its impact goes well beyond the health and welfare of athletes who feel compelled to traverse the path from normalized PES usage to the consumption of banned and illegal substances that promise performance maximization. Doping shreds the integrity of sport, diluting fandom and alienating stakeholders such as governments, media and sponsors whose community and commercial considerations are tarnished by association. For all health stakeholders in sport, an understanding of athlete behaviors and the points in their journey from aspirants to transgressors is now a critical component of their operational skills.

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Table 1. Sampling Frame & Informant Characteristics

Sport	(Highest) Level	Gender	PES Usage Additions
Cycling (Individual)	State and Club	M	Basic DNS, Caffeine, Advanced DNS, Permitted Analgesics
Badminton	International	M	Basic DNS, Advanced DNS, Banned AAS
Downhill Skiing	International	M	Illicit Recreational Drug - Cannabis, Banned Stimulants, Basic DNS
Gymnastics	Olympic	F	Basic DNS, Permitted Anti-inflammatories. Permitted Analgesics, Banned Appetite Suppressants
Netball	National League	F	Basic DNS, Advanced DNS, Caffeine, Permitted (with therapeutic exemption) Bronchodilator
Powerlifting*	National Competition	M	Basic DNS, Advanced DNS, Banned AAS
Professional Bodybuilding*	National Competition	M	Basic DNS, Advanced DNS, Banned AAS, Banned Human Growth Hormones, Banned Insulin
Pro Boxing	International	M	Basic DNS, Permitted Analgesics, Banned Appetite Suppressants
Team Cycling	International	M	Basic DNS, Advanced DNS, Banned and Permitted Stimulants, Banned Hormones
Rugby	National	M	Basic DNS, Advanced DNS, Permitted Anti-Inflammatories
Swimming	State	F	Basic DNS, Advanced DNS, Permitted Analgesics
Track & Field	State	F	Basic DNS, Advanced DNS, Permitted Anti-Inflammatories
Mixed Martial Arts	National	M	Basic DNS, Advanced DNS, Caffeine, Banned Bronchodilator (Steroid), Banned Stimulants (Ephedrine), Banned Diuretics
Water-polo	International	F	Basic DNS, Advanced DNS, Permitted (banned 2017) Beta-2 Agonist
Women's Cricket	International	F	Basic DNS, Permitted Anti-Inflammatories
Wrestling	State	M	Basic, Advanced DNS, Caffeine, Banned Stimulants (Amphetamines, Ephedrine), Banned Bronchodilator (Steroid)

DNS - *Dietary and Nutritional Supplements*, **Basic DNS** – *Proteins, Amino Acids, Carbohydrate Supplements, Multi-vitamins and Minerals*, **Advanced DNS** – *Creatine Monohydrate, Glutamine, Fish Oils, Glucosamine, Curcumin, Specific Vitamins, Pre-workout Concoctions (Combinations of Caffeine, Creatine, Beta-Alanine, Guarana, Branch-Chain Amino Acids, Taurine, Carbohydrates, Arginine)*, **AAS** - *Anabolic Androgenic Substances*.

*No WADA Anti-Doping Tests