Towards a Choice Model of Athletes' Decision to Use Performance Enhancing Substances or Methods: Factors and Covariates

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Abstract

This paper reports on the development of a list of factors and covariates from the psychological literature in preparation for developing an empirical choice model of athletes' decisions to use performance enhancing substances or methods. The factors were developed based on a review of the literature across basic (eg cognitive, developmental, social and abnormal) and applied psychology (eg health, sport and organisational). Factors were chosen on the basis of their relevance to drug use in the sports context and viability for a choice experiment. The factors are grouped into the emergent themes (performance, penalty, health, social and substance). The covariates were chosen as variables that could arguably influence the choice to use but largely unamenable to a choice experiment (eg it is impossible to systematically vary a person's emotional intelligence). Social scientists are called to respond to the paper as the first step towards reality testing the factors and covariates before testing with athletes commences.

Research into the psychology of athlete performance enhancing substance or method use is notably scant (Mazanov, O'Donnell & Battley, 2006). The research that does exist tends to be theoretical in nature. For example, Donovan, Egger, Kapernick and Mendoza (2002) report a sophisticated approach based on models of health prevention, and Strelan and Boeckmann (2003) present a model rooted in criminal deterrence theory. Both theories assume athletes think about their drug use behaviour in very specific ways; in terms of health or criminality, respectively. Both sets of implicit assumptions are valid, and provide useful insights into "doping" phenomena. However, without empirical validation it is uncertain as to which model best reflects how athletes think about doping. This suggests is may be prudent to develop a model of how athletes represent their doping behaviour by observing the pattern of how athletes make choices in doping situations using a methodology that makes minimal assumptions about how athletes think about doping. The method chosen to operationalise this suggestion is choice modelling.

The current paper presents an initial report on the progress of a project designed to develop an empirical choice model of athletes' decisions to use performance enhancing substances or methods. The aim of the paper is to draw additional input from independent researchers on possible factors that may be useful to this project.

The project has been supported financially by the Australian Government through the Anti-Doping Research Program, and UNSW@ADFA through the Research Training Scheme. The first section of the paper gives an overview of choice modelling, followed by an outline of the stages that go towards developing an empirical choice model. The second section articulates a range of factors and covariates drawn from the psychological literature that may influence athletes' decisions. The final section gives an indication on the next phase of the project.

Choice Modelling

Choice modelling is based on the family of probabilistic discrete choice models derived from random utility theory (RUT; Louviere, Hensher and Swait 2000). A RUT model is based on the idea that "utility" (economically defined; Hensher, Rose and Greene 2005)

can be broken down into a systematic/observable component and a random/unobservable component. The systematic component is a reflection of the decision strategy used by the individual and the random component represents the unobserved influences on decisions. The theoretical basis for the discrete choice modelling method was initiated by Dan McFadden for which he received the Nobel Prize for economics in 2000 (McFadden 2001). Importantly, RUT models can be used to model individuals' choices.

Choice experiments were introduced into theory and practice by Louviere and Woodworth (1983), typically using survey research methods. The experiments are predicated around the central notion that every choice made involves trade-offs between various influencing factors. The choice modelling approach uses the notion of factor trade-offs to provide insights into the relative weights of the various choice determinants.

Choice modelling has been applied in many different contexts, and publications have appeared in the academic literature across disciplines such as marketing, transport economics, environmental economics, tourism economics and health economics (see, for instance, Louviere and Woodworth 1983, Louviere and Hensher 1982, Adamowicz et al 1997, Huybers 2003, and Gerard et al 2003, respectively). The application of the choice modelling approach to athletes' substance use is novel.

The core of the proposed choice modelling project is a choice experiment carried out through a survey of athletes; the choice determinants are varied across appropriate levels to provide a series of different combinations of choice situations (called 'choice sets'). To illustrate, consider the following example in the case of a simple three-factor model. Choice set 1 presents the athlete with the following context to the decision about drug use: the probability of being caught is "low" (with the exact definition of levels to be determined during the course of the research project), the level of peer pressure is "high", and the probability of adverse health consequences is "medium". The survey respondent is asked to indicate their choice in that situation (for instance, a simple "yes" or "no" response regarding their choice of using a performance enhancing substance). In choice set 2, the probability of detection is "low", the level of peer pressure is "low", and the

probability of adverse health consequences is "high". Once again, the respondent is asked for their choice response. By systematically varying the levels of the factors across the series of choice sets – as determined by a statistical experimental design – the relative importance of each of the factors can be estimated. It should be noted that the appropriate response format is to be decided as part of the course of the research. Athletes could be asked to provide multiple responses to each choice set, for instance their choice about *considering* the use of the substance as well as their choice about actually *using* the substance.

Crucially, the empirically derived choice model makes no judgement about what information is used, only how it is processed. That is, the only assumption made is that athletes process the information underlying their decision in a logical and rational manner. This is an assumption already made by most theories or models of decision making, especially in relation to health decision making (Ruiter, Abraham and Kok, 2001). This is unlike Donovan *et al* (2002) and Strelan and Boeckmann (2003), who have clear preconceptions about how athletes think about their doping behaviour.

Stages of the Choice Modelling Project
The current project is being conducted with four main stages.

Stage 1
An extensive review of the literature combined with qualitative research which results in the identification of a set of key factors that drive athletes' decisions about drug use. This involves in-depth one-on-one interviews and focus group discussion sessions with samples of relevant groups, including athletes, sports organisation representatives and support staff.

Stage 2
In order to generate reliable data, it is crucial that the manner in which the choice experiment is presented to respondents reflects, as closely as possible, realistic situations faced by athletes. This is achieved by thorough pilot testing of the survey instrument. In

particular, the various choice factors and their levels need to be defined and described such that their interpretation is unambiguous to respondents, and the required background information need to be established. It is also vital that the choice experiment does not go beyond respondents' cognitive limits. In that respect, determining the appropriate number of choice factors in each choice set and the number of choice sets in the experiment are two issues to be tested. Once again, a series of focus groups is to be used for that purpose.

The choice experiment is augmented with questions about athletes' socio-economic background, personal characteristics and other questions including the type of sport in which they are involved. Responses to these questions can be used as co-variates in the choice models to provide insights into the potential existence of certain segments in the population. To firmly anchor the choices expressed in the choice experiment into actual behaviour, questions about actual drug taking experience may be included. Careful pilot testing is required to determine which types of questions can be appropriately included.

Stage 3

The finalised survey is used for the major data collection. A sample of athletes is recruited and surveyed using the method most likely to generate a large enough sample of acceptable quality. Possible methods include a mail survey, an on-line survey (which are compared in Deutskens et al, 2006) or personal interviews.

Stage 4

The data collected in Stage 3 are used to develop the choice model by way of statistical estimation techniques. The complexity of the model is determined by the data and the different distributions of the random components assigned by the researcher. The choice model estimates reveal the relative importance of the choice factors and the significance of potential co-variates to decision making. Importantly, the model allows the investigation of heterogeneity within the population of athletes; that is, potentially identifying athlete profiles that may be more sensitive to some policy initiatives.

This paper is concerned with reporting on the factors identified as part of the literature review undertaken towards completing Stage 1.

The factors identified

As noted above, the first step towards identifying factors that may play an important role in the decision making process relevant to the choice model has been to review literature. The review has focused on literature from psychology due to the background of the researchers and because psychology was considered to offer the most valuable insight into individual differences in decision-making processes. In-line with recommendations from Mazanov *et al* (2006) about the paucity of psychological research on this topic, the literature review was undertaken by examining standard texts from across basic (eg cognitive, developmental, social and abnormal) and applied psychology (eg health, sport and organisational). The factors have been organised by emergent theme to aid communication.

Importantly, the factors and covariates are indicative only. They are yet to pass through the filter of interviews or focus to arrive at the set of factors and covariates that will be presented for the choice experiments. As such, they should be viewed as a "work in progress" that might provoke research questions rather than an established set of valid and reliable factors upon which to base policy.

Factors involved in the decision

Performance Factors: The performance factors are those that could be considered more central to sports rather than other behaviour (eg organisational).

Competitiveness – Again, drawn from sport and organisational psychology is the need for athletes to meet certain performance or qualifying standards. For fringe athletes this could be the difference between being on a national team. For established athletes it could be about staying on the team. For senior athletes it might be about extending their career for as long as possible. This factor could be thought of as getting the athlete

meeting the minimum requirements to get into the competition; that is, to be competitive at the level they seek to compete.

Success – This factor represents the importance of "winning" to the athlete. While it is acknowledged that athletes may be motivated by factors other than winning or personal success, it would be remiss to exclude this from the current list. It represents the first obvious answer to the question why do athletes dope; usually answered with "to win". Psychologically speaking, the premise of this idea can be drawn from the applied psychologies (sport and organisational). This factor may be operationalised several ways, potentially including percent improvement in performance (eg take this drug for a 5% improvement), chance of winning, monetary gains, or increased social status. As distinct from competitiveness, this factor could be though of as athletes who meet the minimum requirement seeking to accelerate their performance.

Fear of Failure – This factor derives more from abnormal psychology, with its applications in the sport and organisational contexts. This relates to the anxiety athletes may feel about maintaining their performance, such as a perceived performance inequity (cf equity theory; Landy and Conte, 2004). Athletes may psychologise the drugs as a permission to increase their performance (eg Maganaris, Collins, et al, 2000). That is, athletes use the drugs as a psychological crutch to train more or push harder than before with the belief that the drug will provide the necessary extra boost.

Penalty Factors: These represent structural factors that the athlete must consider in relation to their decision to use performance enhancing substances or methods.

Deterrent – Great emphasis has been placed on the effect of sanctioning athletes caught doping (Wilson and Derse, 2001). This comes from the basic psychology behind rewards and punishment underpinning behaviourism (Landy and Conte, 2004). This factor is included as a consideration to what effect such deterrents have on athletes' decisions to use drugs. Operationalising this factor may need to take into issues such as the length of any ban imposed (eg the difference between a 2 year or a life ban) and the likelihood of

being caught, perceived or real. The latter point is currently a difficult one to assess, as there is no concrete evidence of prevalence rates to determine the actual probability of catching an athlete who has used a substance or method on the prohibited list.

Stage of Career – Making use of the stage models favoured by developmental psychology, the stage of career may influence their decision to dope (cf Brissonneau, 2006). For example, an athlete at the start of their career might take a very different view in terms of how the ban might influence the length of their career. An athlete at the end of their career may have nothing to lose, or be very concerned about their "legacy".

Health Factors: These factors relate to the physical integrity of the athlete.

Side Effects – Grounded in abnormal psychology, drug use may have side effects that are either psychological (eg extended use of cannabis and psychosis) or physiological with resultant psychological effects. The latter is exemplified by females who have used excessive amounts of testosterone for performance enhancement purposes ending up with permanent changes in morphology or gender identity disorders (eg Monoghan, 2002). One operationalisation of this idea is to capture how athletes trade off a premature death against success.

Pain / injury – Athletes may compete despite carrying particular injuries, through cortisone or pain management medication. This notion was derived from the work in health psychology examining health promoting behaviour like wearing seatbelts (Greening and Stoppelbein, 2000) or turning up for screening (eg breast cancer; Orbell and Sheeran, 1998). Extrapolating this idea a little, athletes willingness to defer management of pain or injury until after the competition (eg after the final event of the competition) may be an important factor.

Weight control – Many sports require the athlete to maintain certain a weight as a control of the "level playing field" (eg boxing or tae kwon do) or that certain weights are perceived to be associated with superior performance (eg gymnastics or rugby). An

athlete may use drugs to assist with this weight control by managing weight loss (eg diuretics) or weight gain (eg steroids). The legitimacy of weight control as a normal part of competing may be generalised to legitimate prohibited substance or method use. Health and abnormal psychology indicate that weight control can be a key indicator of psychological dysfunction in relation to drug use and other behaviours that result in abnormal decision making (eg anorexia).

Social Factors: These factors were included to tap the influence of others on decisions to use or abstain.

In / Out Group – Social Identity Theory (Turner, 1991) would posit that athletes are more likely to trust and conform to the information delivered by an in group member. The usual source of information originates from a number of sources such as ADOs, NSOs, other athletes, friends, etc. Comparing the amount of credence athletes place in the information they receive from these various sources may help to determine appropriate delivery mechanisms in the future.

Social Influence – athletes are expected to be influenced by there surroundings, similar to other people (Turner, 1991). Perceptions about what the athlete believes are the normative behaviours are likely to influence the athlete's subsequent behaviour (Turner), just as the athlete may be more likely to fulfil the beliefs or expectations that others may have of them (Vaughan and Hogg, 2002). Possible operationalisation of this factor is to compare the choices made when the athlete is given options about the beliefs and norms from the significant others surrounding them.

Modelling – according to Bandura (1977) we model behaviour that we see especially if that behaviour is performed by someone we respect or look up to. If an athlete has direct contact with a successful athlete who uses drugs and believes (or knows) that drugs are being used then the option of drug use becomes more attractive. Operationalising this factor would involve comparing the importance the athlete places on the actions of others.

Substance Factors: The characteristics of the substances themselves may have an impact on athlete's choices to use.

Type of drug – each classification of drugs according to the World Anti-Doping Code (2003) may be considered differently by athletes, and as such the choices they make may vary according to the drug being considered. Comparison between the use of banned and non-banned drugs and also between the banned substances such as recreational, performance enhancers, and masking agents may provide a more holistic picture.

Availability – Emphasis is beginning to be placed on the 'non analytical positive' which provided ADOs with the ability to charge an athlete with drug use if it can be shown that the athlete was in possession or had purchased a banned substance (ASADA, 2006). Drugs that require minimal identification (eg internet purchases) are likely to be considered more favourable than drugs that require authorisation and identification. Development of this factor needs to consider how the availability impacts upon the choice.

Covariates

Covariates are used to help determine the influence the factors have after accounting for other variables that are unobservable in the choice experiment. The aim of the covariates is to tap into psychological phenomena that may influence the decision to use.

Emotional Intelligence – this measure encompasses areas such as maturity and sophistication, emotional stability, and contentiousness. With differing levels, such as higher emotional stability or lower conscientiousness, changes are seen in the drug use behaviour (Sarafino, 2006). These elements seek to take into account the various personality differences to allow a more robust understanding of the decision process regardless of these personality factors.

<u>Risk Seeking</u> – people who are more likely to seek out risk or are impulsive have more chance of not following the standards set out by society (Zuckerman, 1994). If athletes play certain sports, such as kayaking, for the risk associated with that sport, while others may take up sports that have little risk associated with it (eg lawn bowls). The decision to use drugs in either of these sports should be considered without the interference from impulsivity or risk seeking.

<u>Reasoning</u> – moral reasoning measures what stage of development the athlete is according to Kohlberg in their thinking on issues of right and wrong. Reasoning can also relate to the cognitive development of the athlete in terms of there ability to think through a problem. People with more developed may be able to make judgements about the value of drug taking.

<u>Attitude</u> – this measure will take into account the different attitudes towards drug use in sport. Those people who are more sympathetic towards drug use or perceive the problem to be less severe may be more likely to use (Sarafino, 2006).

<u>Overconfidence</u> – this measure takes into account how invulnerable the athlete believes they are to being tested and/or being caught. If the athlete believes they are unlikely to be caught then they are more chance of taking drugs (Donovan *et al.*, 2002).

<u>Social Vulnerability</u> – an athlete who is more vulnerable to social influences may weight the modelling and social factors higher (Turner, 1991). Related to this is the level of commitment an athlete feels towards their group. If they are not committed then they are less likely to be influenced by the beliefs of other group members. These social factors need to be addressed to avoid contamination of the decision process.

<u>Representativeness</u> – the aim of this covariate is to give an indication of the influence that how the athlete links cause and effect in relation to drug use and performance. This may also be linked back to the placebo effect as seen in the Maganaris and Collins study (2000).

<u>Coping</u> – this measure determines how well an athlete deals with stressors. It is assumed that people with poorer coping strategies may be more susceptible to drug use as a coping mechanism (Sarafino, 2006).

<u>Self esteem</u> – people with more self esteem or self confidence may be considered to be less likely to take drugs as they have more personal belief and therefore do not feel they have to rely on artificial enhancers to compete at the highest level (Anshel, 2005).

The Next Step

With the identification of a list of factors, the next step in the process is reality testing. At its core, the factors and covariates identified are theoretical in nature and largely without empirical support from outside the drugs in sport context. This paper represents the first step in reality testing by stimulating debate within the social science community about athlete decision making in relation to drugs in sport, and debate on athlete drug use behaviour more broadly. With feedback from other social scientist, the next step will see those involved in sports providing their advice on which factors or covariates are realistic, which can be safely omitted, and which have been left out. These factors then lead to the pilot and finally the choice model experiment, which will hopefully provide an answer to the question of how athletes think about doping.

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