



A Confirmatory Factor Analysis of the Performance Enhancement Attitude Scale for adult and adolescent athletes



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ABSTRACT

Objectives: The Performance Enhancement Attitude Scale (PEAS; Petróczy & Aidman, 2009) is an extensively used questionnaire to assess doping attitudes among adult and adolescent athletes. To date, however, there is limited evidence to support the structure of the PEAS with either adult or adolescent athletes. The aim of this paper was to assess the factor structure of the PEAS with adult and adolescent athletes.

Design: Cross-sectional.

Methods: One thousand, one-hundred and fifty-four athletes, who were aged between 12 and 68 years (M age = 21.76 years, SD = 7.68) completed the PEAS in the presence of a research assistant. We subjected the data to Confirmatory Factor Analysis.

Results: The original 17-item PEAS displayed a poor model among the overall sample, and with the sub-samples of adult and adolescent athletes. The 11-item, 8-item, and 6-item versions of the PEAS, which were used in previous studies, provided a better fit than the original 17-item PEAS. The 8-item version of the PEAS demonstrated the best fit for adults, but no model exhibited a good fit with adolescent athletes.

Conclusions: Scholars could consider using the 8-item version of the PEAS with adults. Our data, however, infers that researchers should use the PEAS with caution to assess doping attitudes among adolescent athletes, due to the poor model fit of all versions tested. The accurate assessment of attitudes towards doping among adolescent athletes requires questionnaires specifically designed for this population, and grounded in an appropriate theoretical framework.

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1. Introduction

Doping represents the occurrence on an anti-doping rule violation, and includes the presence of prohibited substances, its metabolites, or markers within a sample that an athlete provides (WADA, 2015). Scholars usually refer to banned substances that aid performance as performance enhancing drugs (PEDs; Nicholls et al., 2015). According to the White Paper on Sport (2007), the use of PEDs represents a serious threat to European sport. PEDs undermine fair play and open competition. Furthermore, PEDs pose a significant threat to an athlete's physical (e.g., Johnson, 2012) and mental health (e.g., Lindqvist et al., 2013), due to supraphysiological intakes of PEDs (Bird, Goebel, Burke, & Greaves, 2016). Although

doping may be viewed occurring exclusively within the realms of elite sport, a report containing students from 36 European countries revealed that some athletes within grassroots sport also take performance enhancing drugs (ESPAD, 2011). In order to generate a greater understanding of doping in sport, there has been a substantial increase in the number of studies reporting the psychosocial predictors of doping intentions and behaviours (Ntoumanis, Ng, Barkoukis, & Backhouse, 2014). Ntoumanis et al. (2014) identified the Theory of Planned Behaviour (TPB; Ajzen, 1991) as the theoretical framework that guided many studies within their meta-analysis. This model infers that doping behaviour is an outcome of intentions, attitudes, subjective norms, and perceived behavioural control. Ntoumanis et al. reported that attitudes and subjective norms were the strongest predictors of doping behaviours. Attitudes are of particular interest to the present article and refer to evaluative judgements or behavioural tendencies to a specific object (Eagly & Chaiken, 1993). Cunningham and Johnson (2007)

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suggested that whether an individual perceives something as good or bad, pleasant or unpleasant, or to be avoided or approached influences behaviour. In recent years, adolescent athletes are starting to feature more prominently within the doping literature. Backhouse, McKenna, Robinson, and Atkin (2007) reported that adolescents featured sparingly within the doping literature, in comparison to adult athletes. The meta-analysis by Ntoumanis et al. (2014), however, reported 18 journal articles for both adults and adolescents, with nine journal articles containing a mixture of adults and adolescents. Weiss and Bredemeier (1983) suggested a person is an adolescent when they are aged between 12 and 18 years of age. The growing number of studies featuring adolescents is not surprising, because adolescents are at risk of doping (Schirilin et al., 2009). Further, adolescence is widely accepted as a period when a person's attitudes are formed (Harton & Latane, 1997), and when people are susceptible to descriptive norms (Rivis & Sheeran, 2003).

Scholars assessed doping among adolescent athletes via a variety of different questionnaires. Barkoukis, Lazuras, and Tsorbatzoudis (2014) and Barkoukis, Kartali, Lazuras, and Tsorbatzoudis (2016) used a stem proposition in which athletes reported whether performance enhancing drugs were bad/good, useless/useful, harmful/beneficial, or unethical/ethical. Alternatively, Bloodworth, Petróczi, Bailey, Pearce, and McNamee (2012) stated that athletes completed a “modified version of a questionnaire used by UK Sport in its 2005 Drug-Free Sport survey” (p. 295), but provided no information on the scale, the modifications made, nor the theoretical framework that underpinned the questionnaire. Other scholars such as Gucciardi, Jalleh, and Donovan (2010) used a shortened 11-item version Performance Enhancement Attitude Scale (PEAS; Petróczi & Aidman, 2009) among their sample of adolescent and adult athletes. Accurately assessing an adolescent's attitude towards doping is important, because it could be the developmental period in which favourable or unfavourable attitudes towards doping are formed (Harton & Latane, 1997). Research is required to assess the validity of questionnaires to assess doping attitudes. It is unknown whether existing doping questionnaires are suitable for athletes of different ages, if questionnaires need to be modified so they are suitable for athletes of all ages, or indeed whether age specific questionnaires are required. Recent research by Nicholls et al. (2015) found that there might be subtle differences between adults and adolescents, in regards to the factors that predict attitudes towards doping and doping intentions. Nicholls et al. qualitatively explored the relevance of the Sport Drug Control Model (SDCM; Donovan, Eggar, Kapernick, & Mendoza, 2002) for adolescent athletes, because although two studies had provided evidence to support the SDCM (e.g., Gucciardi, Jalleh, & Donovan, 2011; Jalleh, Donovan, & Jobling, 2014), neither sample contained an adolescent only sample. This resulted in Nicholls et al. developing the Sport Drug Control Model for Adolescent Athletes (SDCM-AA). The key difference between the SDCM-AA and the original SDCM is that age/maturation, sport level, pressure, country of residence, and ethnicity were also factors that might influence an adolescent's attitude towards doping, in addition to perceptions of threat and benefit appraisals, morality, self-esteem, legitimacy, and reference group opinion. The implication from Nicholls et al.'s study is that there might be differences in attitudes towards doping among adult and adolescent athletes. This finding is somewhat echoed from the developmental psychology literature, as Compas, Connor-Smith, Saltzman, Harding Thomsen, and Wadsworth (2001) suggested adolescents should not be treated as *mini* adults and that adolescents require specific theoretical models and questionnaires. A questionnaire that is widely used in the doping literature to assess the doping attitudes of both adult (e.g., Backhouse, Whitaker, & Petróczi, 2013) and adolescent athletes

(e.g., Madigan, Stoeber, & Passfield, 2016) is the PEAS (Petróczi & Aidman, 2009).

1.1. Performance Enhancement Attitude Scale (PEAS)

The PEAS (Petróczi & Aidman, 2009) is a 17-item unidimensional measure of attitudes towards doping. The authors of this scale did not provide a theoretical or conceptual framework that underpins the PEAS. Furthermore, there is no published information on how the PEAS was developed other than that the original scale consisted of 97 items, of which 80 items were deleted due to poor fit. Nevertheless, it is widely used in the doping literature to explore the relationship between attitudes to doping and supplement use (Backhouse et al., 2013), perfectionism (Madigan et al., 2016), achievement goals and the motivational climate (Allen, Taylor, Dimeo, Dixon, & Robinson, 2015), willingness to dope (Whitaker, Long, Petróczi, & Backhouse, 2014), and social desirability (Gucciardi et al., 2010). Some of these samples have included adults (e.g., Backhouse et al., 2013), adolescents (Madigan et al., 2016), or a mixture of adults and adolescents (e.g., Allen et al., 2015). There is some conflicting evidence regarding the reliability and the validity of the PEAS (Petróczi & Aidman, 2009) and scholars have made several modifications to this scale. For example, Petróczi and Aidman assessed the reliability of the PEAS among nine independent studies over a period of seven years and included a broad range of participants (e.g., elite athletes, student athletes, coaches, and the general public). The internal consistency of the PEAS ranged from 0.71 to 0.91 in these samples, which led Petróczi and Aidman to declare that the PEAS is a useful tool to measure attitudes towards doping. Similarly, Zucchetti, Candela, and Villosio (2015) reported a Cronbach's alpha of 0.80 for the PEAS among a sample of 109 athletes.

In regards to modifications, Gucciardi et al. (2010), however, found less support for the PEAS. It should be noted that Gucciardi and colleagues used the 11-item short version of the PEAS, which contains 11-items from the original version. In particular, Gucciardi et al. found a poor model fit for the 11-item short versions of the PEAS, which resulted in the deletion of five of the 11-items, culminating in a 6-item scale that displayed an excellent fit. Further, Vargo et al. (2015) used an 8-item version of the PEAS whereas Elbe and Brand (2016) used a 6-item version of the PEAS because the 17-item and 11-item scale did not provide a good fit. Although Petróczi and Aidman (2009) and Zucchetti et al. (2015) found evidence to support the PEAS, the results from Gucciardi et al. and Elbe and Brand (2016) imply that further validation of the full 17-item PEAS is required. Given that there also may be subtle differences in factors that contribute towards attitudes towards doping among adults and adolescents athletes (Donovan et al., 2002; Nicholls et al., 2015), it could be argued that the scale should be analysed for both adult and adolescent samples.

In light of these findings, the aim of this study was to examine the factor structure of the PEAS (Petróczi & Aidman, 2009), using Confirmatory Factor Analysis (CFA). Given the potential differences between adults and adolescents in relation to doping (see Donovan et al., 2002; Nicholls et al., 2015) and calls for researchers to not treat adolescents as mini adults (Compas et al., 2001), we wanted to test the appropriateness of the PEAS among both adult and adolescent athletic samples.

2. Method

2.1. Participants

One thousand, one-hundred and fifty-four athletes (male $n = 747$, female $n = 406$, unreported gender $n = 1$), who were aged

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