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Developing an Evidence-Based Smartphone Application for Monitoring and Promoting Athletes' Awareness to Unintentional Doping

Background

Despite WADA's effort in reinforcing doping control, the use of banned performance enhancing substances remains. Although majority of the doping cases can be attributed to intentional doping, there has been increasing incidences of claims or declarations that doping occurred unintentionally or inadvertently. Such anecdotal reports have received considerable attention in public and the media. In fact, unintentional doping could happen to "clean" athletes who accidentally intake food, supplements, or medications that contain banned performance-enhancing substances (Chan, Ntoumanis, et al., 2015). This is particularly true because athletes nowadays can easily access supplements or energy products worldwide through online shopping; for example, a recent study showed that a proportion (16.5%) of the dietary supplements available online contain substances prohibited by WADA (Baume, Mahler, Kamber, Mangin, & Saugy, 2006). If athletes have inadequate knowledge to identify or be aware of the presence of performance-enhance substances in these products, there is a higher risk of unintentional doping in their daily life (Chan, Ntoumanis, et al., 2015). The majority of research investigating psychological and personal factors that associated with athletes' intentions and actual behaviours of doping is growing (Ntoumanis, Ng, Barkoukis, & Backhouse, 2014); however, existing perspectives do not account for psychological processes of unintentional doping because they assume that doping is only an intentional behavior that depends solely on athletes' conscious decision-making and moral values (Chan, Ntoumanis, et al., 2015). A recent WADA funded meta-analysis of psychological factors of doping (Ntoumanis et al., 2014; Ntoumanis, Ng, Barkoukis, & Backhouse, 2013) has therefore been criticised because some doping violations are unintentional (Chan, Ntoumanis, et al., 2015). As such, future research should consider the psychological factors to avoid unintentional doping.

Existing Research

In the light of resolving this research gap, a line of research steered by Chan, Hagger, and colleagues has applied multiple theoretical frameworks and research methods to examine psychological factors of the avoidance of unintentional doping. In focus group interviews about young athletes' attitudes and beliefs of doping in sport, Chan, Hardcastle, Lentillon-Kaestner, and colleagues (2014) provided preliminary evidence regarding the challenges young athletes encounter in understanding the ingredients lists printed on the packing of food, drinks, supplements, or medications, and in order to avoid unintentional doping they had to be extremely vigilant. It was concluded that the avoidance of unintentional doping requires conscious effort and persistence, and its effectiveness might be dependent on the self-regulatory capabilities of athletes (Chan, Hardcastle, et al., 2014).

Following this initial qualitative study, Chan and colleagues conducted a series of quantitative studies to examine psychological and self-regulatory processes of unintentional doping. First, they applied self-

determination theory (Deci & Ryan, 1985) to examine if motivation of the avoidance of unintentional doping was related to young athletes' behavioural response when suspicious food product was offered, and if they were linked to self-reported behavioural adherence of the avoidance of unintentional doping, and doping intention. It was found that athletes who held high autonomous motivation in the avoidance of unintentional doping (i.e. avoid doping because it is consistent with their life goals, personal values and responsibilities) were more likely to check whether or not the ingredients list of food product specified banned performance-enhancing substances, and they were also more likely to report lower doping intention (Chan, Donovan, et al., 2014). In contrast, athletes who held high controlled motivation in the avoidance of unintentional doping (i.e., avoid doping because of the negative consequences, or to reduce the feeling of guilt of social disapproval for not doing so) were more likely to avoid doping by refusing to take or eat the lollipop, and they were also more likely to report higher behavioural adherence to the avoidance of unintentional doping. Overall, the results showed that both autonomous motivation and controlled motivation of the avoidance of unintentional doping were positively related to certain anti-doping behavioural outcomes. From a theoretical point of view, autonomous motivation was deemed more favourable because athletes who hold this type of motivation truly seek to familiarise, understand, or learn about the specific banned ingredient content in relation to the WADA prohibited list (Chan, Donovan, et al., 2014).

Subsequent research by Chan and colleagues incorporated other theoretical frameworks, including the theory of planned behaviour (Ajzen, 1985), trans-contextual model (Hagger, Chatzisarantis, Culverhouse, & Biddle, 2003), and strength-energy model of self-control (Baumeister, Bratslavsky, Muraven, & Tice, 1998). These studies identified possible psychological mechanisms associated with the avoidance of unintentional doping. It was found that motivation, intention, and self-reported behavioural adherence of the avoidance of unintentional doping could be directly and indirectly linked to social cognitive variables from the theory of planned behaviour (e.g., behavioural beliefs, subjective norm, perceived behavioural control, and their associated modal salient beliefs), trait self-control from the strength energy model of self-control, and sport motivation from the trans-contextual model (Chan, Dimmock, et al., 2015; Chan, Hardcastle, et al., 2015; Chan, Lentillon-Kaestner, et al., 2015).

This preliminary evidence has led us to speculate that the promotion of athletes' awareness to the avoidance of unintentional doping might be most effective when manipulating the psychological variables that are most salient with behavioural patterns of the avoidance of unintentional doping (Chan & Hagger, 2012; Hagger, 2009). As addressed in the research of Chan, Ntoumanis and colleagues (2015), these behaviours might include learning and updating correct knowledge of banned substances and paying extra attention to the food, drinks, supplements, and medication that are suspicious to contain banned performance enhancing substances. Representing the culmination of Chan, Hagger and colleagues' research on the avoidance of unintentional doping, we built the first evidence-based educational website www.playingclean.com.au that synthesised research knowledge into practical information comprehensive to young athletes, coaches, and other sport professionals. The website has

been highly regarded in Australia for anti-doping education purposes, but it is important that scientific evaluation is made on its effectiveness in changing athletes' awareness, behaviours, intentions, and associated psychological factors of the avoidance of unintentional doping.

The Present Study

The proposed research project aims to develop an evidence-based smartphone application that monitors and enhances athletes' awareness to the avoidance of unintentional doping. The smartphone application will be built upon the research evidence on the psychological factors of the avoidance of unintentional doping, and its reach is expected to be more significant to athletes than traditional websites because of the increasing popularity, accessibility, and usage of smartphones among athletes in this generation. Along with the examination of the effectiveness of the smartphone application, the research project will provide evidence about the causal relationship between psychological variables and behaviours of the avoidance of unintentional doping. This latter point is important, as the majority of research to date has employed cross-sectional designs with correlational analysis. Therefore, past work is unable to reveal whether changing the psychological factors (e.g., motivation) will lead to the change of behavioural pattern of unintentional doping.

The present study will therefore address this research gap because it will employ a randomised control trial with longitudinal follow-ups to scrutinise the causal effects of the psychology of unintentional doping, leading to a higher level of evidence to support the use of this evidence-based smartphone application for large scale educational interventions for WADA's global anti-doping promotion campaign in future. The smartphone application will be developed based on the research findings, educational materials, and assessment tools of recent empirical studies by Chan and colleagues about psychological factors (e.g., self-control, motivation, beliefs, attitudes, and intention) of the avoidance of unintentional doping (Chan, Dimmock, et al., 2015; Chan, Donovan, et al., 2014; Chan, Hardcastle, et al., 2015; Chan, Lentillon-Kaestner, et al., 2015; Chan, Ntoumanis, et al., 2015). In the proposed project, we will develop the smartphone application in Phase 1 (Year 1), and test the effectiveness of the smartphone application via a randomised controlled trial among athletes in two countries (Australia and Hong Kong – China), with 6 months follow-up period in Phase 2 (Years 2 and 3).