

Judgments about illegal performance-enhancing substances: Reasoned, reactive, or both?

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Abstract

This study applied aspects of the Theory of Reasoned Action and the Prototype/Willingness model to understand cognitions associated with the use of illegal performance-enhancing substances. There were two study objectives. One was to investigate whether the illegal-is-effective heuristic (i.e. belief that illegal performance-enhancing substances are more effective than legal performance-enhancing substances) affects willingness to use illegal performance-enhancing substances. The second was to examine whether attitudes, norms, and prototypes influence the willingness and intentions to use illegal performance-enhancing substances. The illegal-is-effective heuristic was a significant predictor of willingness but was not a significant predictor of intentions. Implications for future research and prevention efforts are discussed.

Keywords

dual-processing, intentions, performance-enhancing substances, prototypes, willingness

Athletes often seek ways to improve their performance. One way to do so may be by using performance-enhancing substances (PESs). In the United States, PESs may be legal or illegal. Legal PESs are marketed as dietary supplements, are available over the counter, and include substances such as creatine. In samples of US adolescents, estimates of lifetime use of legal PESs range between 17 - 71 percent (Dodge and Jaccard, 2008; Hoffman et al., 2008). Estimates of current use among US male athletes ranges 16-17 percent (Dodge and Jaccard, 2007; 2008).

Illegal PESs are illegal to use without a prescription from a physician. One of the most

frequently studied illegal PESs is anabolic steroids. Those who abuse anabolic steroids are at an increased risk of developing acne, experiencing problems with reproductive organs, liver malfunction, cardiac problems, aggression, and suicide when one discontinues use (Brower, 2002; Daly et al., 2003; Friedl, 2000; Pope and Katz, 1990). Despite the risks, prevalence estimates in US samples

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range between 1 and 3 percent with estimates higher among athletes than nonathletes (Dodge and Jaccard, 2006).

Given the potential consequences of illegal PESs such as anabolic steroids, it is important to understand why athletes choose to use such substances. Most studies that have examined cognitions associated with the use of illegal PESs have relied almost exclusively on analytical decision-making models (Dodge and Jaccard, 2008; Lucidi et al., 2008), which assume that decisions to engage in health behaviors are the result of extensive deliberation regarding the benefits and risks associated with the behavior. Although such models are useful, they fail to incorporate other aspects of decision making, such as the use of heuristics.

An abundance of literature has shown that heuristics, which provide relatively simple rules that one may follow, influence judgments and decisions in ambiguous situations (Kruger et al., 2004; Tversky and Kahneman, 1973). For example, when an individual is deciding how much food to take in a new setting, if there are no other cues in the environment, he or she will often take a single serving (Geier et al., 2006) where the rule is to take one serving regardless of how large or small it may be. Heuristics have been shown to affect judgments regarding how much to eat (Geier et al., 2006), risk perceptions (Slovic et al., 2005), and a referee's decisions about how to respond to player aggression (Souchon et al., 2009). Thus, it seems reasonable to assume that athletes' decisions to use illegal PESs are influenced by heuristics, yet no studies have tested this possibility.

One heuristic that is likely to affect PES use cognitions is the *illegal-is-effective heuristic*. The purpose of this study is to test whether the illegal-is-effective heuristic influences one's willingness to use illegal PESs. This possibility is tested by applying the Prototype/Willingness (P/W) framework to judgments about PESs.

Illegal-is-effective heuristic

The athletes who consider using a PES have the choice of using a legal PES or an illegal PES. Because the athletes are choosing between two options, they are likely to consider them relative to one another. While the use of legal and illegal PESs are positively related (Dodge and Hoagland, 2011), studies have also shown they are viewed as distinct behaviors. For example, when Australian athletes were asked to estimate the prevalence of legal and illegal PES use among competitors, their estimates of legal supplement use were greater than their estimates of illegal PES use (Petróczi et al., 2011). Another study showed that youth athletes who believed dietary supplements were critical for success in their sport were more likely to endorse other, potentially dangerous forms of performance enhancement than those who did not believe that dietary supplement use was critical for success (Bloodworth et al., in press). Finally, there is evidence that illegal PES use and dependence are associated with polydrug use (Dunn, 2010; Kanayama et al., 2009) but that is not necessarily the case for legal PESs. These studies highlight the importance of investigating how the distinction between legal and illegal PESs might affect willingness to use PESs.

Studies have also shown that the more effective male athletes perceive a PES to be, the more willing they are to use the substance (Dodge et al., 2008), suggesting that a heuristic about effectiveness may be particularly relevant to judgments about illegal PESs. Thus, the athletes likely hold a heuristic about the effectiveness of illegal PESs, which is associated with willingness to use an illegal PES. The psychological rationale for this is described below.

Over the past several years, a number of high-profile, successful professional athletes such as Mark McGwire and Floyd Landis have admitted using illegal PESs. These admissions have cost the athletes a great deal. For example, Mark McGwire jeopardized his chances of being voted into the Major League Baseball

Hall of Fame and Floyd Landis' 2006 Tour de France victory was rescinded. Male athletes are likely to conclude that if legal PESs were as effective as illegal PESs, then professional athletes would avoid the risks associated with illegal PESs by choosing to use legal PESs. Therefore, it seems reasonable to assume that male athletes have developed a heuristic about the effectiveness of legal and illegal PESs. Specifically, the athletes are likely to think that illegal PESs are more effective than legal PESs. We call this the illegal-is-effective heuristic. An athlete who endorses the illegal-is-effective heuristic should be more willing to use illegal PESs than an athlete who does not endorse the heuristic.

The assumption that willingness to use PESs is affected by the illegal-is-effective heuristic requires working within a framework that can accommodate heuristics. Existing research indicates that the framework must also accommodate analytical processing (Dodge and Jaccard, 2007; Lucidi et al., 2008). One such framework is the P/W model. This model maintains that there are two pathways that are related but independently predict decisions to engage in a risk behavior, the analytical–deliberative pathway and heuristic–reactive pathway.

P/W model

The P/W model is a model of risk behavior that has been shown to improve our understanding of a wide range of health behaviors (Gerrard et al., 2008; Gibbons et al., 2010). A central tenet of the model is a belief that not all health behaviors are planned or intentional, especially when those behaviors involve health risks (cf. Reyna and Farley, 2006). Consistent with other dual-pathway models, the P/W model maintains that people engage in both analytical and heuristically based processing (e.g. Boyer, 2006).

Intentions and willingness

Like other theories that rely on analytical processing (e.g. Theory of Planned Behavior; Ajzen,

1991), the P/W model recognizes that there is an analytical–deliberative aspect to decision making. This pathway in the P/W model is reflected in the formation of behavioral intentions.

An aspect of the P/W model that is unique from theoretical frameworks applied to the use of PESs thus far (Dodge and Jaccard, 2007; Lucidi et al., 2008) is the inclusion of the heuristic–reactive pathway, which results in behavioral willingness. Behavioral willingness recognizes that many risk behaviors are unplanned and evolve out of reactions to risk-conducive situations. The heuristic–reactive pathway assumes that opportunities to engage in risk behaviors can arise without preplanning, and decisions are reactions to the opportunity that are made without forethought (Gerrard et al., 2008). Therefore, while intentions reflect whether an individual plans to engage in a risk behavior, willingness reflects how an individual is likely to react if the social situation provided the opportunity to engage in the risk behavior. Both are proximal antecedents to actual engagement in the behavior (Gerrard et al., 2008).

Antecedents of intentions and willingness

In the P/W model, attitudes and norms are positively related to willingness and intentions. Willingness is also influenced by prototypes, which are images one has of the typical person (their age and gender) who engages in the risk behavior and can be favorable or unfavorable (Gerrard et al., 2008; Ravis et al., 2006). Adolescents and young adults often engage in risk behaviors together and, as a result, develop prototypes of the typical person who engages in the risk behavior (Gerrard et al., 2008). Prototypes are also influenced by exposure to the images conveyed by the media (Cin et al., 2009). These prototypes reflect a form of heuristic processing because an individual relies on social images to make a decision. With respect to PESs, male athletes may be exposed to sports stars on television who have considerable muscle mass and athletic prowess and assume that these stars use PESs.

In summary, the P/W model applies a dual-pathway approach to studying risk behaviors. The formation of intentions is the result of deliberate and analytical processing, whereas willingness is the result of less deliberate, more heuristically based processing. According to the model, intentions and willingness serve as related, but independent, proximal predictors of risk behaviors (Gerrard et al., 2008; Gibbons et al., 1998).

P/W, heuristic processing, and PESs

Although studies identify the utility of reasoned decision making in understanding the use of illegal PESs (Dodge and Jaccard, 2008; Lucidi et al., 2008), some researchers have recently argued for the inclusion of pathways that are less analytical and more heuristically or affectively based when studying illegal PESs (Mazanov and Huybers, 2010; Stewart and Smith, 2008). Indeed, a number of studies have demonstrated that affectively or heuristically driven pathways may provide additional insight into understanding risk cognitions and behaviors (Gerrard et al., 2008; Gibbons et al., 2003; Ravis et al., 2006).

In the context of doping, consider the following example of an athlete who has no intentions to use illegal PESs, yet finds himself in a situation where a teammate offers to share with him a supply of an illegal PES. Although the athlete had no plans to use an illegal PES, when confronted with such an opportunity he might be willing to try the substance. Indeed, studies suggest that one barrier to using anabolic steroids is finding a source who can supply the substances and that having access to a source facilitates anabolic steroid abuse (Maycock and Howat, 2005, 2007). When the athletes are formulating future plans they may assume, based on familiarity with their environments, they will not have access to a supply, and the behavioral intent is based on this circumstance. Yet when a new, unexpected circumstance is encountered the previously planned course of action may be overridden by the immediate context. In this

circumstance, willingness may be a better predictor of behavior than intention. As a result, judgments about illegal PES use may be predicted best when considering both behavioral intentions and willingness.

Despite the potential of applying a dual-pathway framework to the study of illegal PES cognitions, no studies to date have done so. Furthermore, no research has examined how the use of heuristics might influence willingness to use illegal PESs.

The present study

The present study aimed to address gaps in the literature by applying the P/W framework and the illegal-is-effective heuristic to risk cognitions associated with illegal PES use. Based on the P/W framework, attitudes and subjective norms are expected to be positively related to intentions and willingness to use illegal PESs. It is also expected that prototypes will be positively related to willingness to use illegal PESs. A final prediction is that the illegal-is-effective heuristic will be positively related to willingness but unrelated to intentions to use illegal PESs.

Method

Participants

The participants ($n = 132$) were male athletes recruited from two sites. Fifty-six percent of participants were athletes from men's National Collegiate Athletic Association (NCAA) Division III teams, and 44 percent were college baseball players in a competitive summer league.

Procedure

Collegiate male athletes were recruited during the spring semester by sending an e-mail to each male athlete listed on team roster. Teams included soccer, tennis, swimming and diving, baseball, basketball, lacrosse, and golf. The e-mail explained that the study was about nutrition in sports and stated

that those interested in participating could contact a research assistant to arrange a time to participate. Approximately 40 percent of the athletes responded to the invitation, and 100 percent of those who read the consent form agreed to participate.

Upon arrival to the lab, the participants provided consent and completed the questionnaire. To increase feelings of anonymity, completed questionnaires were placed in an envelope, and the envelope was dropped into a drawer containing other questionnaires.

Players in the summer league were recruited during the summer by asking the coaches of the four teams in the area whether they would allow their athletes to complete a survey on nutritional supplements and sports. Three coaches granted permission. Upon arrival to the field, the athletes were given an informed consent form. Those who provided consent were given the questionnaire and a blank envelope for the completed questionnaire. Approximately 75 percent of the athletes from the three teams agreed to participate.

Coaches remained unaware of who chose to participate. The participants were paid US\$20 for participating. An institutional review board approved the study.

Measures

PES use. The participants were asked, "Have you ever used a substance to help improve your athletic/physical performance?" (0 = *no*, 1 = *yes*). The participants who had used a PES were asked to check from a list those they had tried.

Willingness. Willingness to use PESs was measured by asking participants how willing they would be to take PESs in various scenarios. One scenario involved a new substance that claimed to enhance a person's physical capacities and eventually would be classified as illegal. Willingness to use was measured with two follow-up questions: how willing the participant would be to try the substance, (1) once and (2) for 4 weeks. Another scenario asked how willing the participants

would be to accept an offer of a 4-week supply of an illegal PES from a friend who claims that the steroid had significantly increased his physical capacities. Willingness in this scenario was measured by asking how willing the participant would be to use the 4-week supply if the supply was (1) a powder to be mixed with milk or juice, (2) in pill form, or (3) in injection form. These items were selected because they provide an increasing level of commitment to PES use (Maycock and Howat, 2005), which is a hallmark of willingness measures (e.g. Gibbons et al., 2010). Items were scored from 1 to 7 (1 = *not at all willing*, 7 = *very willing*). The five items were averaged ($\alpha = .87$).

Intentions. The mean of the following two items assessed intentions: "I intend to use an illegal PES at some point within the next 6 weeks to help improve my athletic performance" and "In the next 6 weeks I plan to use an illegal PES to help improve my athletic performance" (1 = *strongly disagree*, 7 = *strongly agree*; $r = .89$).

Subjective norm. Norms were assessed by asking participants how much six different reference groups would approve of their using an illegal PES. The participants were asked, "If I were to use an illegal PES to help improve my athletic performance, my mother/father/closest friend(s)/teammates/coach/sibling(s) would approve." The items were averaged ($\alpha = .82$).

Attitudes. A five-item set of semantic differentials measured attitudes toward illegal PESs. The stem for the items read, "When you think about illegal PES, what comes to mind?" The five items were as follows: "good to bad," "safe to unsafe," "healthy to unhealthy," "right to wrong," and "acceptable to unacceptable." Items were scored on a 7-point scale where higher scores reflected more positive attitudes ($\alpha = .87$).

Illegal-is-effective heuristic. The following item assessed heuristic thinking, "In general, the PES that are illegal will have a greater effect on one's physical performance than those that are legal" (1 = *strongly disagree*, 7 = *strongly agree*).

Prototypes. Images of male athletes who use illegal PESs were assessed by asking the participants to

... think about the type of male your age in your sport who has used illegal PES. We are not suggesting these people are always alike, but we are interested in what traits you think this type of person is likely to have.

The participants rated this image on four adjectives: smart, popular, attractive, and motivated (1 = *not at all*, 7 = *extremely*). The participants also rated how similar they were to the typical person (their age and gender) who uses illegal PESs (1 = *not at all*, 7 = *very similar*). Descriptor items were averaged and multiplied by similarity ($\alpha = .67$; Gerrard et al., 2006).

Analytic plan

The two primary outcome measures were willingness to use an illegal PES and intentions to use an illegal PES within the next 6 weeks. The primary predictor variables for willingness were attitudes, norms, prototypes, and heuristic thinking. The primary predictor variables for intentions were attitudes and norms. Past PES use and site were entered as covariates. The tests of the primary study objectives were conducted with path analyses using Mplus 5.1 (Muthén and Múthen, 1998–2008). The sample size recommendations for path analyses are 10–20

cases for each pathway that is to be estimated (Kline, 2005). The present sample size is adequate in this respect.

Results

Descriptive statistics

Seventy-five percent of the sample reported lifetime PES use. The use of PESs was similar for baseball players and college athletes ($t(131) = -.70, p = .48$). Protein supplements and creatine were the most commonly used PESs. Of those who reported having used a PES, 93 percent reported having tried protein supplements and 54 percent reported having tried creatine. None of the participants reported having ever used an illegal PES.

The mean rating for the illegal-is-effective heuristic was above the midpoint of the scale ($M = 5.62$, standard deviation (SD) = 1.24). Other scale means and correlations among study variables are shown in Table 1.

Independent samples *t*-tests compared willingness, intentions, attitudes, norms, prototypes, and heuristic thinking across the sites. There were statistically significant differences between the summer league players and the collegiate athletes on willingness ($t(130) = 3.79, p < .001$, unequal variances assumed), intentions ($t(130) = -2.46, p = .02$, unequal variances assumed), and prototypes ($t(129) = -2.31, p < .03$) with summer league

Table 1. Correlations among study variables.

	1	2	3	4	5	6	7
1. Ever use	—						
2. Willingness	.23*						
3. Intention	.08	.40**					
4. Attitude	.01	.51**	.54**				
5. Norm	.12	.50**	.40**	.46**			
6. Prototype	.05	.36**	.28**	.36**	.20*		
7. Heuristic	.01	.17*	.16	.08	.07	.04	—
M (SD)	.76 (.43)	1.78 (1.05)	1.20 (.64)	6.42 (.73)	1.44 (.67)	9.2 (7.24)	5.62 (1.24)

SD: standard deviation.

* $p < .05$, ** $p < .01$; ever use coded (0 = no; 1 = yes).

players reporting greater willingness, intentions, and more favorable prototypes than collegiate athletes.

Heuristic thinking and the P/W model

A path analysis was conducted to test the hypotheses. The two outcome variables were entered in the model: willingness and intentions to use an illegal PES. The direct effects of attitudes, norms, prototypes, and heuristic thinking on willingness were estimated. The direct effects of attitudes and norms on intentions to use a PES were estimated. Inspection of fit indices suggested acceptable model fit, comparative fit index (CFI) = .99, root mean square error of approximation (RMSEA) = .04, probability of close fit (PCLOSE) = .42, and standardized root mean square residual (SRMR) = .02. The results showed that willingness was predicted by more favorable prototypes ($b = .02, p < .05$), greater perceptions of normative approval ($b = .44, p < .01$), more positive attitudes ($b = .46, p < .01$), and greater agreement with the illegal-is-effective heuristic ($b = .20, p < .01$). Site ($b = .48, p < .01$) and history of use ($b = .39, p < .05$) were also statistically significant predictors of willingness, such that the players from the summer league and those with a history of past PES use reported higher levels of willingness. Intentions were predicted by norms ($b = .16, p < .01$) and attitudes ($b = .38, p < .01$). Site was a marginally significant predictor of intentions ($b = .17, p < .06$), but past use was not ($b = .08, p > .05$). Overall $R^2 = .50, p < .01$ for willingness, and for intentions, the $R^2 = .34, p < .01$.

A second model tested whether allowing a path from the illegal-is-effective heuristic to intentions improved model fit. Addition of the path did not improve model fit when tested using the chi-square difference (chi-square difference = 2.03, $df = 1$). Furthermore, the path coefficient for the illegal-is-effective heuristic to intentions to use an illegal PES was statistically nonsignificant ($b = -.05, p < .20$).

Discussion

This is the first study to test the utility of applying a dual-pathway framework to judgments about illegal PESs. The results suggest that when examining cognitions associated with illegal PES use, both analytical and reactive pathways should be considered. Furthermore, this study indicates that the more athletes endorse the illegal-is-effective heuristic, the more willing they were to try a new illegal PES.

This study adds to the literature on the P/W model by demonstrating that heuristics affect the reactive pathway but not the analytical pathway. This is consistent with the idea that there are two distinct pathways involved in judgments about future illegal PES use. Furthermore, this is one of the first studies to demonstrate that heuristics affect willingness in the P/W model. The present study also provides further support for the P/W model by showing that favorable images of and perceived similarity to male athletes who use illegal PESs predict willingness to use an illegal PES. The prototype to willingness link is well established in the literature examining alcohol and other drug use (Gerrard et al., 2005, 2008), but this is the first study to show that prototypes play a similar role in judgments about illegal PESs.

Prevention implications

Results of the present study imply that prevention programs targeting illegal PESs incorporate information about the illegal-is-effective heuristic. For example, prevention programs might consider correcting the illegal-is-effective heuristic by explaining that illegal substances are not necessarily more effective than legal substances. A specific instance of this might be the use of androstenedione, which is illegal but may be ineffective (King et al., 1999).

The prevention programs should educate individuals that legal methods such as nutrition in conjunction with a proper weight lifting program are an effective way to improve athletic performance. These suggestions are consistent with the Adolescents Training and Learning to Avoid Steroids (ATLAS) program, which teaches

adolescent athletes healthy alternatives to anabolic steroid use such as proper nutrition and weight lifting techniques (Goldberg et al., 1996). These results suggest that ATLAS might see additional benefits by correcting the illegal-is-effective heuristic in conjunction with emphasizing healthy alternatives.

Future directions and limitations

Although studies on risk behavior thus far show that intentions and willingness make unique contributions to behavior, future research should nonetheless test whether intentions and willingness independently predict actual use of illegal PESs. Another avenue for future research is to identify factors that affect prototypes of illegal PES users because prototypes are malleable constructs that can be targeted in intervention and prevention programs (e.g. Gerrard et al., 2006). Prototypes are likely to be based, at least in part, upon exposure to sports stars, and future research should test this possibility. As such, programs might include an educational component that teaches male athletes how to critically evaluate images of sports stars in the media.

Seventy-five percent of the sample reported having ever used a legal PES, which is consistent with estimates reported by some researchers (71%; Hoffman et al., 2008), but considerably higher than estimates reported by others (16%–17%; Dodge and Jaccard, 2006, 2007). Such variability highlights the need for a more systematic way of assessing PES use. For example, Hoffman et al. (2008) provided the participants with a list of substances that included vitamins. Dodge and Jaccard (2006, 2007) did not provide a list but provided a definition of legal PESs and asked the participants to respond if they used a substance that matched the definition. There needs to be a concerted effort in the literature to coalesce around a limited number of measures that reflect the type of use that is of interest. To this end, future work should identify the types of measures that have the best predictive validity.

While the results provide new insight into decision making in the context of illegal PESs,

they must be viewed in light of several limitations. It is possible that the timing of questionnaire administration may have affected responses on some of the variables. For example, the athletes who will not be participating in a sport in the future may respond differently to intentions to use than the athletes who will be participating in the future. We created a dichotomous variable to reflect seniors (i.e. those who may not participate in their sport in the future) versus underclassmen (i.e. those who may participate in the future) and conducted a *t*-test on the intention items (which ask the participants about taking an illegal PES within the next 6 weeks). The results showed no statistically significant differences between these groups ($t(128) = -.34, p > .70$).

The primary outcome measures were intentions and willingness to use illegal PESs and did not include measures of PES use. However, given the relatively low base rates of illegal PESs, such as anabolic steroids (Dodge and Jaccard, 2006), it is desirable to first identify the social cognitive processes related to behavior. This was achieved in the present study and lays the groundwork for future longitudinal research to examine the cognitive processes identified here as predictors of PES use among a larger sample of athletes. Finally, the sample included only male NCAA Division III athletes and summer league baseball players, and although the prevalence estimates of use are consistent with some research, they are considerably higher than others, so generalizing to other sample must be done with caution.

Conclusion

Despite the limitations, this study makes both theoretical and practical contributions to research on cognitions associated with decisions to use illegal PESs. It is one of the first studies to apply a dual-pathway framework to PES risk cognitions and to provide empirical support for the use of heuristics as a component of the reactive pathway. Furthermore, within the context of illegal PESs, the present study suggests that the illegal-is-effective heuristic can influence behavior through its effect on behavioral willingness.

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