

# The self-other divergence effect for doping likelihood

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**The self-other divergence effect for doping likelihood  
is mediated by guilt and moderated by moral agency and values:**

**A study of club rugby players**

1 The instrumental use of prohibited substances and methods to enhance performance constitutes a  
2 form of cheating by breaking the rules of sport to gain an unfair advantage. Intentional doping by  
3 athletes violates important intrinsic values of sport and is therefore deemed to breach the *spirit of*  
4 *sport* by the World Anti-Doping Agency (WADA, 2015). Accordingly, doping is commonly  
5 considered a moral transgression by athletes, administrators and academics (e.g., Donovan, et al.,  
6 2002; Erickson, et al., 2015; Murray, 2018; Strelan & Boeckmann, 2006). The present study aimed  
7 to improve our understanding of this issue by comparing athletes' estimates of doping using two  
8 indirect methods and evaluating them in relation to personal morality constructs that are central to  
9 the moral self (Blasi, 1984; Conway, 2018). We also sought to identify moral constructs as potential  
10 risk factors for doping by examining the relation between core moral traits and measures of doping  
11 likelihood.

12 Evidence concerning doping obtained by direct questioning of athletes is susceptible to bias,  
13 whereas indirect methods of assessing doping are considered more resistant to such threat (Petroczi,  
14 2016). Accordingly, scenarios have been used to assess decisions about doping in hypothetical  
15 situations. Using the self-referenced method, athletes are asked to imagine themselves in  
16 hypothetical situations and decide how they might act (e.g., Kavussanu, et al., 2016; Moston, et al.,  
17 2015; Petroczi et al., 2008; Strelan & Boeckmann, 2006). Using the other-referenced method,  
18 athletes are asked to assume the perspective of another athlete and decide how that athlete might act  
19 (e.g., Huybers & Mazanov, 2012; Petroczi et al., 2008; Ring, et al., 2018). These methods assess  
20 *self* doping and *other* doping, respectively (for an overview see Ring, et al., 2019b).

21 The presumption that self-referenced measures are equivalent to other-referenced measures relies  
22 on our tendency to overestimate the degree of similarity between ourselves and others. This  
23 phenomenon, termed the *false-consensus effect* (Ross, Greene, & House, 1977), has been noted for  
24 judgments about intentions, feelings, and attitudes (Marks & Miller, 1987), and such "self-other  
25 correspondence" (Cho & Knowles, 2013) has been explained by *social projection*, whereby we  
26 project our actions, feelings and thoughts onto others, and *self-stereotyping*, whereby we assume we

1 act, feel and think like others. However, the presumption of equivalence is often wrong (Cho &  
2 Knowles, 2013; Perloff & Fetzer, 1986). Indeed, preliminary evidence exists of differences between  
3 self and other estimates of doping prevalence (Petroczi et al., 2008; Uvascek et al., 2011) and  
4 doping likelihood (Ring, et al., 2019b). For instance, Ring and colleagues (2019b) found that  
5 individual and team sport athletes rated their own doping likelihood to be lower than the doping  
6 likelihood of another athlete competing in their sport. In the present study, we refer to this lack of  
7 self-other correspondence (Cho & Knowles, 2013) as the *self-other divergence effect* for doping,  
8 operationally defined as the measure of self doping minus the measure of other doping (i.e., the  
9 difference between the two perspectives).

10 The mechanisms underlying self-other divergence in moral thought and action have yet to be  
11 established. One possible mechanism is emotion (Coleman, 2018). It has been reported that  
12 individuals underestimate others' experience of negative emotions, such as anxiety, embarrassment,  
13 and guilt (e.g., Jordan et al., 2011; Sabini et al., 2010). Guilt, a self-conscious moral emotion, is a  
14 strong negative predictor of doping (e.g., Erickson, et al., 2015; Kirby, Moran, & Guerin, 2011).  
15 Accordingly, self-other divergence in guilt may mediate self-other divergence in doping likelihood.  
16 Ring et al. (2019b) provided preliminary evidence to support this mechanism: athletes believed that  
17 other athletes would experience less guilt about using a banned substance than themselves, and,  
18 importantly, differences between self and other doping likelihood were mediated by differences  
19 between self and other anticipated guilt about doping. In a replication and extension of this finding,  
20 the current study sought to evaluate whether self-other divergence in doping likelihood is mediated  
21 by self-other divergence in anticipated guilt about doping.

22 Since studies have established that doping intention and behavior are associated with individual  
23 differences in moral traits (Ntoumanis et al., 2014), it follows that one should be able to evaluate the  
24 validity of a method for measuring doping by examining its relation with moral traits that are  
25 central features of the moral self. These traits include *moral agency*, the capacity to act according to  
26 personal standards and take responsibility for one's actions (Bandura, 1986; Black, 2016), *moral*

1 *identity*, the degree to which people consider being moral is a central part of their self-concept  
2 (Aquino & Reed, 2002; Blasi, 1984), *moral perfectionism*, the personal moral standards and  
3 concerns over moral mistakes (Stoeber & Yang, 2016; Yang, Stoeber & Wang, 2015), and *moral*  
4 *values*, the importance of personal beliefs that motivate action (Chen, 2008; Yang et al., 2015).  
5 Evidence indicates that self-referenced doping likelihood is negatively associated with moral  
6 agency (Ring & Hurst, 2019; Ring et al., 2019b), moral identity (Kavussanu et al, 2020; Kavussanu  
7 & Ring, 2017; Ring & Hurst, 2019; Ring, et al., 2019a; 2019b), personal moral standards (Ring &  
8 Hurst, 2019; Ring et al., 2019b) and moral values (Ring & Hurst, 2019; Ring, Kavussanu &  
9 Gürpınar, 2020; Ring et al., 2019b). The evidence for self-referenced doping likelihood and concern  
10 over moral mistakes is mixed, with one study reporting a negative correlation (Ring & Hurst, 2019)  
11 and another reporting no relation (Ring et al., 2019b).

12 To date, only two studies have investigated the relation between other-referenced doping and the  
13 abovementioned moral traits. Ring et al. (2018) noted that other doping likelihood was negatively  
14 correlated with moral identity whereas Ring and colleagues (2019b) found that other doping  
15 likelihood was negatively correlated with moral agency, moral identity and concern over moral  
16 mistakes but not with personal moral standards and moral values. Moreover, the coefficients were  
17 smaller for other doping than self doping in relation to moral agency, moral identity, personal moral  
18 standards, and moral values. The coefficients did not differ between other and self doping in  
19 relation to concern over moral mistakes. Taken together, these findings suggest that other-  
20 referenced measures of doping are less connected to constructs concerning the moral self.

21 Building on past research we investigated self-other divergence for doping in rugby. Rugby  
22 players participate in a sport associated with a high risk for doping based on the global incidence of  
23 anti-doping rule violations in this sport (WADA, 2018). Doping may be a problem in contact sports  
24 such as rugby where the players' mass, strength and endurance confer performance benefits (e.g.,  
25 Till, et al., 2016). Although sanctions handed down to elite professional players make the news  
26 media, most anti-doping rule violations among rugby players in the UK have been detected in

1 amateur players, with those aged 18-25 years being most at risk for doping (Whitaker & Backhouse,  
2 2017). Accordingly, we chose to recruit young adult amateur club players.

3 We had four study purposes. First, we examined self-other divergence in doping likelihood and  
4 anticipated guilt about doping, hypothesizing that self doping likelihood would be lower than other  
5 doping likelihood and that self guilt would be higher than other guilt. Second, we investigated the  
6 role played by self-sanctioning emotion in any doping-related self-other divergence, hypothesizing  
7 that the difference between self and other guilt would mediate the difference between self and other  
8 doping likelihood. Third, we examined the role of moral traits in doping-related self-other  
9 divergence, hypothesizing that moral identity, moral agency, moral perfectionism and moral values  
10 would moderate any self-other divergence in doping likelihood (i.e., the higher the moral trait the  
11 greater the difference). Fourth, we assessed the degree to which moral traits were related to self and  
12 other doping likelihood, hypothesizing that doping likelihood would be negatively correlated with  
13 moral traits, and, moreover, that self doping likelihood would be more strongly correlated with  
14 moral traits (cf., Ring, et al., 2019b).

## 15 **Method**

### 16 *Participants*

17 We recruited 100 (88 males) players from local rugby clubs in the West Midlands, UK, who  
18 ranged in age from 18 to 28 ( $M = 21$ ) years and had played competitively for 1 to 15 ( $M = 8$ ) years.  
19 Their highest ever competitive standard was club (62%), county / regional (35%), national (2%),  
20 and international (1%). Although most anti-doping rule violations have been for male players (e.g.,  
21 WADA, 2018), we also recruited females because rugby is played by both genders. With a sample  
22 size of 100, our study is powered at 90% to detect significant ( $p < .05$ ) within-participant  
23 differences corresponding to a small effect size ( $d = .328$ ) by dependent  $t$  test, and correlations  
24 corresponding to a medium effect size ( $r = .316$ ) by Pearson  $r$  test (Cohen, 1992)<sup>3</sup>.

### 25 *Measures*

1        *Doping likelihood and guilt.* Self- and other-referenced doping likelihood and guilt were  
2 measured using a hypothetical scenario and 18 situations that described financial, legal and social  
3 incentives for doping as well as deterrents against doping and the absence of explicit career,  
4 financial and performance benefits (cf., Ring, et al., 2019b). Players rated the likelihood that they or  
5 another player<sup>1</sup> would use the banned substance in each situation (e.g., “*encouraged by a coach*”,  
6 “*high chance of detection*”), on a scale, anchored by 1 (not at all likely) and 7 (very likely). The  
7 means of these ratings served as measures of self and other doping likelihood, respectively.  
8 Participants were also asked to imagine that they/another player used the banned substance, how  
9 they themselves/another player would feel, and to rate the five guilt items (e.g., “*feel bad*”) from the  
10 State Shame and Guilt Scale (Marschall, et al., 1994) on a scale, anchored by 1 (not at all) and 7  
11 (very strongly). The means of these ratings served as measures of self and other anticipated guilt,  
12 respectively. The order of completing the self-referenced and other-referenced ratings was  
13 counterbalanced across participants<sup>2</sup>. The scenarios and situations are provided in the online  
14 *Supplementary File*.

15        *Moral traits.* Moral agency was measured using the Moral Agency Scale (Black, 2016). Players  
16 rated their agreement with 15 statements (e.g., “*I am the one responsible for my own behavior, good*  
17 *and bad*”) using a scale anchored by 1 (strongly disagree) and 7 (strongly agree). Moral identity  
18 was measured using the Internalization Subscale of the Moral Identity Scale (Aquino & Reed,  
19 2002). Players were shown moral traits (e.g., *caring, compassionate*) and responded to linked  
20 statements (e.g., “*I strongly desire to have these characteristics*”) on a scale anchored by 1 (strongly  
21 disagree) and 7 (strongly agree). In line with most previous research, we measured moral identity  
22 using the Internalization Subscale (and not the Symbolization Subscale) because it is a better  
23 predictor of morally relevant outcomes (e.g., Aquino & Reed, 2002). Moral perfectionism was  
24 measured using the Personal Moral Standards Subscale and Concern Over Moral Mistakes Subscale  
25 of the Moral Perfectionism Scale (Yang et al., 2015). Players were shown statements, told they  
26 reflected moral standards and expectations, and rated agreement with seven items about personal

1 moral standards (e.g., “*I have extremely high moral standards*”) and nine items about concern over  
2 moral mistakes (e.g., “*The fewer moral mistakes I make, the more people will like me*”) on a scale  
3 anchored by 1 (strongly disagree) and 7 (strongly agree). Moral values were measured using the  
4 Moral Values Subscale of the Adolescents' Values Scale (Chen, 2008; Yang et al., 2015). Players  
5 viewed 15 values (e.g., *dedication, sympathy*) and rated how important each value was to them on a  
6 scale anchored by 1 (very unimportant) and 7 (very important).

### 7 *Procedure*

8 Participants were recruited from local rugby clubs. Players were told the study aims, taking part  
9 was voluntary, honesty in responses was important, data were anonymous, and data would only be  
10 used for research purposes. After consenting, participants completed the measures using web-based  
11 software. **The order of completing the self- and other-based measures was randomized<sup>2</sup>.**

## 12 **Results**

### 13 *Self-other doping likelihood and guilt*

14 Our first study purpose was to examine self-other divergence in doping likelihood and guilt  
15 (**Table 1**). The vast majority of participants reported lower doping likelihood (95% of players) and  
16 greater guilt (92% of players) for self than other assessments. Self doping likelihood was lower than  
17 other doping likelihood,  $t(99) = 12.91, p < .001, M_{\text{difference}} = 0.84, d = 1.03$ , and, self doping  
18 likelihood was positively and highly correlated with other doping likelihood,  $r = .68, p < .001^3$ . Self  
19 guilt was higher than other guilt,  $t(99) = 9.85, p < .001, M_{\text{difference}} = 0.82, d = 0.98$ , and, positively  
20 and highly correlated with other guilt,  $r = .51, p < .001$ . Both self and other guilt were negatively  
21 and mediumly correlated with doping likelihood,  $r = -.35, p < .001$ , and  $r = -.36, p < .001$ ,  
22 respectively.

### 23 *Guilt as a mediator of self-other divergence in doping likelihood*

24 Our second study purpose was to determine whether the difference between self and other  
25 doping likelihood was mediated by the difference between self and other guilt. We used MEMORE  
26 2.1, model 1, to perform within-participant mediation (Montoya & Hayes, 2017). For each variable



1 pair we entered the self measure first and the other measure second. We used 10,000 bootstrap  
2 samples to compute percentile 95% confidence intervals (*CI*); an effect was significant when the  
3 intervals did not cross zero. Perspective (self minus other) exerted a total effect on doping  
4 likelihood,  $-0.837$ , 95% *CI* =  $-0.965$ ,  $-0.708$ ,  $t(99) = 12.91$ ,  $p < .001$ , comprising direct and indirect  
5 effects (**Figure 1**). Perspective had a direct effect on doping likelihood, whereby self doping  
6 likelihood was lower than other doping likelihood, after controlling for guilt. Perspective also  
7 exerted an indirect effect on doping likelihood via guilt, whereby the lower self doping likelihood  
8 was explained by higher anticipated guilt restraining doping likelihood. The partially standardized  
9 indirect effect (MacKinnon, 2008), measuring the effect in terms of the *SD* of the outcome variable  
10 (doping likelihood), was 0.155.

#### 11 *Moral traits as moderators of self-other divergence in doping likelihood*

12 Our third study purpose was to determine whether the difference between self and other doping  
13 likelihood was moderated by moral traits. We used MEMORE 2.1, model 2 (Montoya, 2019), to  
14 perform within-participant moderation: moral agency,  $b = -.208$ , 95% *CI* =  $-.392$ ,  $-.024$ , and moral  
15 values,  $b = -.204$ , 95% *CI* =  $-.409$ ,  $-.001$ , moderated the self-other divergence in doping likelihood.  
16 The predicted mean differences (self minus other) in doping likelihood for players with scale scores  
17 corresponding to the  $M - 1 SD$ ,  $M$ , and  $M + 1 SD$ , were  $-0.693$ ,  $-0.837$  and  $-0.980$  for moral agency,  
18 and  $-0.709$ ,  $-0.837$  and  $-0.964$  for moral values, respectively. In sum, higher moral agency and  
19 moral values were associated with larger differences between self and other doping likelihood.

#### 20 *Moral traits as correlates of self and other doping likelihood*

21 Our fourth study purpose was to determine the extent to which moral traits were related to self  
22 and other doping likelihood. We computed Pearson correlations between doping likelihood and  
23 moral traits (**Table 1**), interpreted the coefficients as effect sizes (Cohen, 1992), and compared the  
24 coefficients between the two perspectives using *Z* tests (Steiger, 1980). Self doping likelihood was  
25 correlated with all five moral traits: with small effects for personal moral standards and concern  
26 over moral mistakes; and medium effects for moral identity, moral agency, and moral values. In

1 contrast, other doping likelihood was correlated with only three moral traits: with small effects for  
2 moral agency and concern over moral mistakes; and a medium effect for moral identity. It was  
3 unrelated to personal moral standards and moral values. Doping likelihood was correlated positively  
4 with concern over moral mistakes. Importantly, *Z* tests confirmed that the correlations with moral  
5 agency and moral values were stronger for self doping likelihood than other doping likelihood.

## 6 **Discussion**

7 We investigated self-other divergence in judgments about doping by athletes competing in a  
8 sport at high-risk for doping. In line with rugby's history of relatively high incidence of anti-doping  
9 rule violations (Till et al., 2016; WADA, 2018; Whitaker & Backhouse, 2017), estimates of doping  
10 likelihood, both self- and other-referenced, were notably higher in our sample of rugby players  
11 compared to a mixed sample of individual and team sport athletes (cf., Ring, et al., 2019b). The  
12 current study compared self-referenced and other-referenced measures of doping likelihood and  
13 guilt, and then examined direct, indirect and conditional effects of perspective on doping likelihood.

### 14 *Self-other doping likelihood and guilt*

15 Our first study purpose was to examine self-other divergence in doping likelihood and guilt  
16 about doping. In support of our first hypothesis, and in agreement with earlier reports of self-other  
17 divergence in estimation of doping likelihood (Ring, et al., 2019b), we found that self doping  
18 likelihood was lower than other doping likelihood. Here, the difference in doping likelihood  
19 between the two perspectives corresponded to a large effect size. Similarly, a self-other divergence  
20 effect for doping prevalence has been noted in earlier studies (Petroczi et al., 2008; Uvascek et al.,  
21 2011). These findings resonate with reports that students perceive that other students are more  
22 likely to cheat than themselves (e.g., Allen, Fuller, & Lockett, 1998; Chapman, et al., 2004). We  
23 also found that self guilt was higher than other guilt, a replication of the findings reported by Ring  
24 et al. (2019b). Here, the difference in anticipated guilt between the two perspectives corresponded  
25 to a large effect size. Such underestimation of others' negative emotions, like guilt, has been  
26 reported in non-sport contexts (e.g., Jordan et al., 2011; Sabini et al., 2010). Accordingly, the

1 current findings replicate those from a previous study of self-other judgments about doping  
2 likelihood and anticipated guilt (Ring, et al., 2019b). This replication suggests that the findings are  
3 robust and independent of the degree of doping likelihood and intensity of guilt about doping.  
4 Together these differences in doping measures between the two perspectives provide evidence  
5 contrary to any false consensus effect (Ross et al., 1977) in the measurement of doping and instead  
6 argue for a self-other divergence effect for estimates of doping likelihood and guilt. However, the  
7 statistics showing that estimates of both doping likelihood and guilt were positively and highly  
8 correlated between the self and other assessments suggests consistency across the two perspectives.  
9 A similar phenomenon was reported in Katz and Allport's (1931) classic study in the context of  
10 academic cheating by university students: estimates of the frequency of cheating by other students  
11 were positively correlated with the students' own cheating behavior (cf., Jordan, 2001). Regardless  
12 of this form of inter-~~perspective~~~~contextual~~ consistency for doping in the current study, our mean  
13 difference findings argue against consensus in self and other assessments of doping. Thus, the rugby  
14 players exhibited limited *social projection* or *self-stereotyping* (Cho & Knowles, 2013) when  
15 making their estimates of doping by other players. In sum, our findings indicate that athletes  
16 perceive clear differences between themselves and other athletes when it comes to doping.

### 17 *Guilt as a mediator of self-other divergence in doping likelihood*

18 Our second study purpose was to determine whether the difference between self and other  
19 doping likelihood was mediated by the difference between self and other guilt. In support of our  
20 second hypothesis and in agreement with past research (Ring, et al., 2019b), we confirmed that the  
21 difference between self and other guilt mediated the difference ~~between~~ self and other doping  
22 likelihood. The indirect effect for guilt on doping likelihood corresponds to a small effect size. This  
23 evidence suggests that individual differences in this self-conscious moral emotion can help explain  
24 why estimates of doping likelihood are lower for self-referenced compared to other-referenced  
25 judgments (cf., Coleman, 2018), highlighting a difference between the direct experience of one's  
26 own emotions and the indirect experience of others' emotions in anticipation of a transgression.

1 In other words, athletes personally expect that they would feel more guilt than they foresee other  
2 athletes would feel in the same situation, presumably because of their imperfect perspective taking  
3 of and empathic concern for others (Eisenberg & Strayer, 1987). It is well established that people  
4 underestimate the negative emotions, such as guilt, experienced by other people (e.g., Jordan et al.,  
5 2011; Sabini et al., 2010). According to Bandura's (1991) *theory of moral thought and action*,  
6 conduct is guided by moral standards and potential deviations from moral standards are typically  
7 constrained by affective self-sanctions, such as feelings of guilt about any planned action. The  
8 existence of this self-sanctioning phenomenon is well established in the context of doping (e.g.,  
9 Kavussanu et al., 2020; Kavussanu & Ring, 2017; Ring & Hurst, 2019). Accordingly, based on this  
10 theoretical framework, the current evidence suggests that the operation of an indirect effect of  
11 perspective on doping likelihood via guilt can be explained by estimates of doping likelihood  
12 measured using other-referenced methods being relatively less constrained by affective self-  
13 sanction compared to those obtained using self-referenced methods.

#### 14 *Moral traits as moderators of self-other divergence in doping likelihood*

15 Our third study purpose was to determine whether the difference between self and other doping  
16 likelihood was moderated by moral traits. In support of our hypothesis, we found that self-other  
17 divergence in doping likelihood was conditional upon moral agency and moral values, with the  
18 difference increasing with higher agency and values. These findings suggest that individual  
19 differences in the importance of morality to the self construct can influence perceptions of self and  
20 other moral action. In line with this notion, we found that moral agency and moral values were  
21 more strongly linked with self doping than other doping. Our data suggest that self-other divergence  
22 in the moral domain is greater for individuals who take more personal responsibility for their  
23 actions and/or place more importance on moral values. Accordingly, our findings provide novel  
24 insights into the boundary conditions of the self-other divergence effect: athletes with higher moral  
25 standards ~~tend to~~ not ~~to~~ overestimate the degree of similarity between themselves and others when  
26 tempted to use banned substances.

1 *Moral traits as correlates of self and other doping likelihood*

2 Our fourth study purpose was to determine the extent to which moral traits were correlated with  
3 self and other doping likelihood. In a broad replication of previous studies, we showed that self  
4 doping likelihood was negatively related to moral agency (Ring & Hurst, 2019), moral identity  
5 (Kavussanu et al, 2020; Kavussanu & Ring, 2017; Ring & Hurst, 2019; Ring, et al., 2019a),  
6 personal moral standards (Ring & Hurst, 2019; Ring, et al., 2019a), and moral values (Ring &  
7 Hurst, 2019; Ring, et al., 2019b). In agreement with past research (Ring, et al., 2019b), the Z test  
8 (Steiger, 1980) provided evidence that the relationships between doping likelihood and moral  
9 agency/values were stronger for self than other measures. In contrast to past research (Ring, et al.,  
10 2019b), we did not find clear evidence that self doping likelihood was more strongly related to  
11 moral identity and personal moral standards than other doping likelihood, however, the current  
12 correlation coefficient for personal moral standards was significant for self doping likelihood and  
13 non-significant for other doping likelihood. Taken together these findings provide evidence to  
14 suggest that unethical conduct, such as intentional doping in sport, is more likely to be avoided in  
15 athletes with a stronger moral self concept, characterized by higher moral agency (Bandura, 2006;  
16 Black, 2015), moral identity (Blasi, 1984; Hardy & Carlo, 2011; Hertz & Krettenauer, 2016),  
17 personal moral standards (Stoeber & Yang, 2016; Yang, et al., 2015), and moral values (Chen,  
18 2008; Yang et al., 2015).

19 Finally, concern over moral mistakes was positively correlated with both self and other doping  
20 likelihood, with small effect sizes. The two previous studies (Ring & Hurst, 2019; Ring et al.,  
21 2019b) to have investigated the relationship between perfectionism and doping likelihood have  
22 found that out of the moral traits examined, concern over moral mistakes correlated least with  
23 doping likelihood. For instance, Ring and colleagues (2019b) found that self doping likelihood was  
24 uncorrelated with concern over moral mistakes whereas it was significantly negatively correlated  
25 with moral agency, moral values, moral identity, and personal moral standards. Given that this

1 moral perfectionism characteristic has a heterogeneous relationship with doping, the influence of  
2 this construct warrants further investigation.

### 3 *Study limitations and future directions*

4 Our study findings should be interpreted in light of potential issues. First, the proportion of males  
5 and females in the sample was not equal. Although the current ratio of 88:12 resembles the relative  
6 numbers of males and females who play rugby in England, where the ratio is 91:9 (Scrum Queens,  
7 2019), studies could recruit equal numbers of male and female athletes to determine whether gender  
8 moderates our findings. Second, we examined only one potential mediator of self-other divergence,  
9 namely, guilt. Future studies could measure cognitive and affective variables from both self and  
10 other perspectives, such as moral reasoning and empathy. Moreover, they could also measure other  
11 moderators of self-other divergence, such as team/club moral atmosphere and cohesion. Finally,  
12 without proof of doping by athletes we cannot determine the extent of the bias in self and other  
13 estimates of doping from indirect methods.

### 14 *Conclusions*

15 Athletes perceive themselves to be less likely to use banned substances and to feel more guilt  
16 than other athletes, and, their moral traits are more strongly related to their own doping than doping  
17 by others. Such manifestations of self-other divergence in doping argue against using methods that  
18 involve social projection, such as the other-referenced approach, to examine doping in hypothetical  
19 situations. Indeed, we found that the other-referenced method does not reveal the same full  
20 complement of relationships between personal morality and moral conduct as the self-referenced  
21 method. Together with previous evidence of self-other divergence in doping, our findings imply  
22 that sporting bodies, such as the Rugby Football Union and World Rugby, wishing to evaluate the  
23 effectiveness of their anti-doping programs using indirect assessments of doping should favor self-  
24 referenced measures.

25

26

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Notes

1. In line with past research (Hybers & Mazanov, 2012), the hypothetical scenario referred to “an athlete who plays your sport at your level and is at your stage of career” (for details see Supplementary File).
2. No order effects were found using order by perspective ANOVA.
3. Cohen (1992) provides guidelines to help interpret effect sizes. With  $d$ , the standardized difference between means, values of 0.20, 0.50, and 0.80 correspond to small, medium, and large effects, respectively. With  $r$ , the correlation between scores, values of 0.10, 0.30, and 0.50 correspond to small, medium, and large effects, respectively.

**Table 1***Descriptive statistics, alpha coefficients, and zero-order correlations.*

Variable	<i>M</i>	<i>SD</i>	<i>a</i>	1	2	3	4	5	6	7	8
1. Self doping likelihood	2.97	0.83	.94								
2. Other doping likelihood	3.80	0.77	.92	.68***							
3. Self guilt	5.76	0.86	.82	-.35***	-.10						
4. Other guilt	4.94	0.82	.78	-.45***	-.36***	.51***					
5. Moral agency	5.04	0.69	.81	-.38***	-.23* <sup>1</sup>	.30**	.18				
6. Moral identity	5.03	1.33	.89	-.48***	-.45***	.27**	.33***	.65***			
7. Personal moral standards	4.75	1.15	.92	-.23*	-.14	.33***	.34***	.69***	.67***		
8. Concern over moral mistakes	4.69	1.32	.94	.24*	.23*	.20*	.14	.48***	.31**	.76***	
9. Moral values	5.29	0.62	.85	-.32***	-.18 <sup>1</sup>	.38***	.40***	.45***	.59***	.51***	.30**

*Note.* Possible range of scores: 1-7. The mean of the ratings were computed for all scales. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

The superscript <sup>1</sup> indicates a significant difference between self and other coefficients for correlations between doping likelihood and moral traits based on *Z* test (Steiger, 1980).

**Figure 1.** The direct effects of perspective (self minus other) on doping likelihood and guilt, and the indirect effect of perspective on doping likelihood via guilt. Unstandardized coefficients are reported, with 95% confidence intervals in brackets. Solid lines indicate significant paths.

