Beyond Risk Factors of Sports-Related Match-Fixing: Testing the Applicability of Situational Action Theory

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Notes

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Abstract

Despite the increasing academic interest in match-fixing, little is known about the behavioral determinants of this phenomenon. This study applies key theoretical concepts of situational action theory (SAT) to sportspersons' decision-making process when confronted with sports-related match-fixing (SRMF) propositions. Using a factorial survey, amateur football players (n= 661), and tennis players (n= 609) in Flanders (Belgium) were asked to evaluate hypothetical realistic situations containing match-fixing propositions. Our results show that sportspersons' crime propensity, mostly determined by their moral judgment of SRMF and self-control, and their levels of temptation, together with a number of SAT interactions, were the best predictors of SRMF as a form of sports-related rule breaking. We conclude that SAT provides a valuable theoretical framework to study fraud in sports phenomena such as SRMF, and that factorial surveys have great potential to allow researchers to reach beyond the risk factor stage of research, to efficiently inform prevention initiatives.

Keywords: Match-Fixing, Tennis, Football, Fraud in Sports, Sports Integrity

Introduction

There are currently at least two roaming debates in the scientific field of research surrounding the integrity of sports and its breaches. The first debate concerns the definition of the central concept of integrity, whose pervasive use in the current literature has led to confusion about its actual meaning and conceptualization (Gardiner et al., 2017). Several descriptions of what integrity in sports entails have been formulated in recent years. One of them, coming from the Australian Sports Commission, states that a sport displays integrity when it is 'true to its values, principles, and rules' (Ordway & Opie, 2016). Additionally, recent research has pointed to the socially constructed nature of integrity in sports, and to the importance of the institutional context in which it takes place (Loyens et al., 2021). Integrity has also been described as the antithesis of corruption (Gardiner et al., 2017), and this dichotomy brings us to the second debate. It concerns the conceptualization and definition of the activities that harm the integrity of sports. The academic literature does not agree about the overarching term to be used, and opinions oscillate between using *fraud* or *corruption* in sports (Brooks et al., 2013).

In this study, we focus on one particular breach of the integrity of sports, namely a specific type of match-fixing called sports-related match-fixing (SRMF). Hence, we decided to view SRMF as a type of *fraud* in sports for the following two reasons. Firstly, corruption is frequently linked to acts of bribery when it is criminalized (Gardiner, 2018), but SRMF does not always involve acts of bribery. Additionally, research has shown a substantive disagreement within definitions of corruption as to which activities should be included in its scope or not (Rose, 2017). Moreover, the concept of fraud benefits from a more solid theoretical basis (Brooks et al., 2013), and has been described by Transparency International as “the offence of intentionally deceiving someone in order to gain an unfair or illegal advantage (financial, political or otherwise)” (Transparency International, 2022). In fact, match-fixing involves the intentional use of deception, certainly when it comes to the public who expects a competition to be played in an honest manner (Masters, 2015). In the next section of this introduction, we provide a more detailed explanation of what match-fixing entails and we describe the scope and aim of this study.

Literature Review

Match-Fixing And Its Different Types

Match-fixing is gaining international attention as an important threat to the integrity of sports competitions due to the increasing amount of cases that are being detected and investigated world-wide. In the European Union, a typology was developed as well as a broad definition provided by the Macolin Convention (2014) of what is called *the manipulation of sports competitions*, which is:

> An intentional arrangement, act, or omission aimed at an improper alteration of the result or the course of a sports competition in order to remove all or part of the unpredictable nature of the aforementioned sports competition with a view to obtaining an undue advantage for oneself or for others.

Match-fixing has also been sub-divided in two main categories. The first concerns match-fixing that is related to the betting market, where sports competitions are manipulated with the aim of profiting financially by placing bets on the manipulated outcomes (Spapens & Olfers, 2015). The second category of match-fixing, sports-related match-fixing, consists of manipulating parts of or the final outcome of sports competitions to achieve sporting or competitive goals, such as encountering weaker future opponents (Csató, 2019), or being the first to pick new players for the upcoming season (Bricknell, 2015). However, SRMF is not always regarded as a moral issue by sportspersons (Van Der Hoeven et al., 2020), and could at times even be linked to altruistic motives. For instance, in sumo wrestling, experienced athletes will lose certain fights on purpose to allow younger wrestlers to advance their career, and get a share of the winnings (Ordway & Opie, 2016). As a result, criminal justice systems are more likely to get involved with the former type of match-fixing, betting-related match-fixing, than with SRMF as the latter remains a moral and regulatory issue that not even all sport organizations agree upon (Ordway & Opie, 2016; Vandercruysse et al., 2022).

Harms Associated With Sports-Related Match-Fixing

The harms associated with SRMF are not as straightforward as those that result from betting-related match-fixing. In fact, the latter is frequently linked with money laundering practices and organized crime (e.g., Di Ronco & Lavorgna, 2015; Hill, 2014), which is rarely the case for SRMF. However, both types of match-fixing harm an essential element of any sports competition, the unpredictability of its outcome (Serby, 2015). This means that they transgress the 'play to win' norm, which is one of the governing norms in sports based on which participants are ranked and judged according to their skills and mastery of a specific discipline (Loyens et al., 2021). To follow this norm, sportspersons have to invest their best efforts in each contest. Yet, it is also possible to look at sports from a different perspective, adopting the 'win' norm, which implies that winning is always praised even when it is attained at the cost of fair play (Harvey, 2015). In the case of SRMF, even though the 'play to win' norm is not respected, the 'win' norm is not harmed as sportspersons will manipulate the outcome of a specific contest in order to attain competitive advantages in a (future) competition. This distinction fuels the regulatory debate regarding SRMF. Some scholars have even argued that it is not reasonable to expect sportspersons to always give their best efforts as some competition structures encourage competitive behaviors that are at odds with fair play norms (Sailors et al., 2015).

Despite this debate, sportspersons' willingness to lose sports contests on purpose for competitive incentives could allow them to take the leap more easily when they are presented with a similar proposition for financial (or betting) incentives. In fact, morality and moral disengagement play a significant role in the decision-making of sportspersons facing match-fixing (Robertson & Constandt, 2021; Van Der Hoeven et al., 2020). Moral disengagement toward SRMF might render the economic justification toward betting-related match-fixing slightly easier. Through the aforementioned rationales, we show that tackling SRMF is an important step toward the protection of the reputation of sports in general, and the integrity and safety of sportspersons in particular.

Current Research Gaps Concerning SRMF

Match-fixing has benefitted from heightened academic focus in the last decade (Constandt & Manoli, 2023; Masters, 2019). A recent literature review, however, suggests that SRMF has received relatively little attention in comparison to its betting-related counterpart (Vanwersch et al., 2022). As a result, a number of gaps remain in our current knowledge of the phenomenon. Tak et al. (2020), for instance, used a quantitative survey to describe the most prevalent characteristics of SRMF in Korean elite sports. Their findings show that SRMF was mostly initiated by coaches and at a national competition level. However, the authors used secondary sources, such as policy documents, to uncover the mechanisms behind the match-fixing, which prevented them from drawing causal conclusions on that matter. Focusing on the mechanisms behind SRMF in cycling, Christiansen and Hjørngard (2013) interviewed three Danish elite cyclists about the tacit agreements that are often used in their sport. They found that these agreements, usually concerning which cyclist will ultimately be the first to cross the finish line, are common. Additionally, they state that athletes' self-control might be an important trait preventing them from going from these mutual agreements to 'more serious' fraudulent practices. However, the size of the sample used to arrive at these conclusions is an important limitation to their validity. Van Der Hoeven et al. (2021) used a somewhat larger sample of 15 cyclists, and confirmed using qualitative interviews, that SRMF was indeed normalized in the sport, through three processes: institutionalization, normalization, and socialization. Yet, as was acknowledged by the authors, qualitative interviews about such sensitive topics can carry a large socially desirable nature.

Taking all of the above into account and looking at its prevention, we identify an important lack of knowledge about SRMF: little is known about the causal factors associated with SRMF. Moreover, as the research into this phenomenon has not yet reached an advanced stage, the identification of a number of risk factors of this type of match-fixing constitutes the first step toward the formation of a causal model (Wikström, 2020). Therefore, the aim of this article is to use the situational action theory (SAT) as a theoretical basis to identify risks factors of SRMF that could have a causal effect on its commission. Following SAT, we consider SRMF as the result of individuals' crime propensities and their exposure to criminogenic environments, and of their possible interactions (Wikström, 2011). This leads us to the following two central research questions:

RQ1: Which factors influence sportspersons in their decisions to participate or not in sports-related match-fixing?

RQ2: What is the distinct effect of each factor and of the interactions between them on these decisions?

SAT And SRMF

According to SAT, human beings are the source of their actions, and crime is best explained as a moral action, or as the breach of moral rules (Wikström, 2014). Hence, the most important outcome variable according to this theory is the breaking of rules that are defined by law or, more generally, the breaking of rules of conduct (Wikström, 2011). This is especially relevant for SRMF as this type of fraud in sports is mostly, if at all, addressed in sports organizations' codes of conduct, rather than in legislation. Hence, SAT proposes that the breaking of sports-related rules is the result of a *perception-choice process* that is initiated by the interaction between sportspersons' crime propensities and their exposure to criminogenic environments (Wikström, 2011). During this process, a sportsperson decides whether to act upon a temptation or a provocation to commit SRMF depending on whether it is perceived as a viable action alternative. Hence, a sportspersons' propensity to commit SRMF is determined by their sense of morality and moral emotions, and by their capacity to use self-control (Wikström, 2014). In the academic literature, self-control has been described as the amount of efforts that is required to resist the temptation to act in an undesirable way (Burt, 2020; Kotabe & Hofmann, 2015). Moreover, recent empirical research has shown that sportspersons' moral judgment plays a more important role in their participation in SRMF than their motivation to act according to moral rules (Van Der Hoeven et al., 2020). Additionally, the criminogeneity of the sports environment in which they find themselves would be affected by the moral norms that are held within it, and their level of enforcement through deterrence.

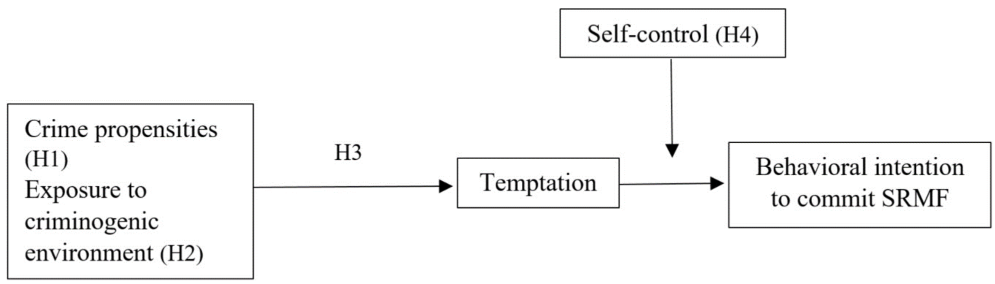
Looking at the evidence from the literature on the decisions of sportspersons when presented with the possibility to break sports-related rules (i.e., to fix the outcome of a sports contest), a number of factors have been theoretically linked to match-fixing. These are: the chance of detection and associated sanctions (i.e., risks[1]), the wealth of the sportsperson (i.e., financial situation/satisfaction), the financial incentives (i.e., rewards), the loss of sportive reputation in the case of flagrant underperformance (i.e., efforts), and individual traits such as an appetite for risk seeking (i.e., self-control), and a disposition to feel guilt (i.e., moral emotion) (Forrest et al., 2008). Moreover, multiple academic contributions have shown that several elements from a sportspersons' environment can have a significant influence on their decision-making regarding the fixing of a sports contest (Vanwersch et al., 2022). For instance, sports competitions can be structured in a way that does not reward best efforts on all levels (Csató, 2020; Schneider et al., 2016). Additionally, power dynamics within teams and external pressures, as well as financial incentives have also been found to play a role in sportspersons' decision-making about match-fixing (Boeri & Severgnini, 2011; Numerato, 2016; O'Shea et al., 2021). Lastly, SRMF can be linked to several sporting incentives/rewards, such as preventing relegation to lower playing leagues (Van Der Hoeven et al., 2020), or avoiding certain opponents in the next rounds of a tournament (Tak et al., 2020).

The apparent diversity of environmental influences on SRMF cannot be entirely encompassed by the aspects of SAT as mentioned above. Therefore, we also relied on situational crime prevention (SCP) as a framework of crime opportunity to accommodate the environmental aspects linked to SRMF. In view of its focus on crime prevention, SCP offers a list of five categories of actions to be used to reduce crime (Eck & Clarke, 2019). These five categories are: (1) increasing the risks associated with the commission of the crime, (2) taking away or impeaching the collection of a reward after the commission of the crime, (3) increasing the amount of efforts required to successfully commit the crime, essentially rendering potential offenders' task more difficult, (4) decreasing the amount of provocation present in a specific situational, and that might influence candidate offenders toward taking action, and (5) decreasing the individuals' possibilities to excuse their commission of a crime either before, during or after the act can also influence their propensity toward committing it. To evaluate sportspersons' decision-making with regards to SRMF, we will therefore look at their decisions based on the theoretical framework provided by SAT, while manipulating the sports environment according to SCP's five categories.

Hypotheses

Looking at these findings in light of our research questions, we formulated three main hypotheses (see Figure 1). Firstly, we hypothesize that sportspersons' crime propensities will influence their behavioral intentions to accept SRMF propositions by increasing their temptation to commit SRMF (H1). Secondly, we hypothesize that the criminogeneity of the sports environment in which they find themselves will influence sportspersons' behavioral intentions to accept SRMF propositions by increasing their temptation (H2). Consequently and following the axioms of SAT, we posit that the interactions between an existing opportunity for SRMF, rendering the sports environment criminogenic, and sportspersons' propensities to break sports-related rules, determining how they judges and reasons morally about SRMF, will influence their behavioral intentions to commit SRMF (H3). Lastly, we expect sportspersons to act upon their temptation and translate it into actual behavioral intention depending on their levels of self-control (H4). In this case, elements of self-control (i.e., impulsivity and risk seeking) would act as moderators in the relationship between temptation and behavioral intention.

Figure 1. Basic theoretical model of the decision-making process in the face of a SRMF proposition



Methods

To address these research questions and test these hypotheses, a factorial survey design was used. These designs are mostly used in theory-testing research in the field of social and behavioral sciences (De Buck & Pauwels, 2020), and have been used recurrently to measure respondents' behavioral intentions (Auspurg & Hinz, 2015). Though behavioral intentions cannot be considered to predict future behavior perfectly, they are considered important determinants in individuals' decision-making processes toward specific behaviors (Petzold & Wolbring, 2019). Moreover, especially in the case of criminal behavioral intentions, research has shown an interesting correspondence between individuals' intentions as reported through factorial surveys and actual criminal behavior (Eifler, 2010). The factorial survey design is especially suited to study a sensitive topic such as SRMF, as it allows researchers to experimentally manipulate a number of variables within realistic scenarios that are presented to the respondents. This experimental manipulation would otherwise not be possible due to ethical concerns, and allows us to reach past the risk factor stage in studying SRMF (Wikström, 2011). Consequently, factorial surveys' most important advantages are their high internal validity associated with the experimental design they contain, and the high external validity that can be attained through their large-scale distribution (De Buck & Pauwels, 2020). Lastly, factorial surveys can potentially decrease the socially desirable nature of respondents' answers due to their rather complex set up, rendering the manipulation of the independent variables less detectable (Auspurg & Hinz, 2015).

Sampling

We decided to study the phenomenon of SRMF on the amateur level. While most studies on SRMF are focused on elite sports, lower levels of competition usually do not benefit from the same scrutiny from authorities and regulators, rendering them more attractive for match-fixers (Opie & Steele, 2017). In fact, this choice has allowed us to reach a large number of respondents from a variety of sports levels. One of the results of this large sample size was the ability to study the effect of our independent variables from a more reliable perspective. Both a team sport (football) and an individual sport (tennis) were included in our sample. Both sports were addressed separately as their competitions and incentives are organized differently. Firstly, most amateur tennis players do not receive a fixed salary (Boniface et al., 2012), while many amateur football players do. This difference in the players' financial situation could be expected to play a role in their decision-making processes when confronted with SRMF. Additionally, losing a match on purpose is more costly for tennis players than for football players from a sporting perspective. This is due to the fact that in most tennis tournaments, losing one match disqualifies the players from playing subsequent matches in that same tournament. On the other hand, tennis players can sign up to multiple tournaments per month which might mitigate the cost of being disqualified from one of them.

Before distributing our survey, both the situations described in the vignettes, and later the entire survey were pre-tested using (cognitive) interviews of members of the target group. The interviewees were recruited using a convenience sample of students from the department of Movement and Sports Sciences of XXX University. The first author also visited a number of football and tennis clubs to attain the desired number of participants. All participants met the inclusion criteria of the study. All interviews were conducted over the course of July and August 2021.

A total of n = 1270 amateur sportspersons were included in our study; n = 661 football players and n = 609 tennis players. The respondents were recruited between October and December 2021 from sports clubs in Flanders (i.e., the Dutch speaking part of Belgium) using a stratified sampling method. The inclusion criteria used to select the respondents within the selected clubs were: being older than 18 years old, playing amateur football or tennis, regularly taking part in competitions, and having sufficient knowledge of the Dutch language to complete the survey. In the football sample, 87,1% of the respondents were male (and 12,7% female), and they were 23,4 years old on average. Regarding the tennis sample, 63,9% of the respondents were male (and 36,1% female), with a mean age of 35,1 years old. Our respondents reported having played football for an average of 15,9 years. In the tennis sample, respondents had been playing tennis for an average of 17,1 years. Lastly, 39,8% of the amateur football players in our sample declared to earn between €0 and €200 per month playing the sport. This percentage raised to 90% in the tennis sample showing that playing amateur tennis is indeed less profitable than playing amateur football in Flanders.

Factorial survey

The most defining characteristic of factorial surveys is that they contain vignettes (i.e., realistic though hypothetical scenarios). These vignettes are presented to the respondents, who are then asked to formulate a judgment regarding their own behavioral intentions if they would find themselves in the described situation. Each vignette contains dimensions (i.e., the variables that will be measured) that vary randomly on a pre-determined number of levels. Ideally, the vignettes contain seven dimensions (with a margin of two) so as not to under- or overburden respondents (Auspurg & Hinz, 2015).

In the vignettes of our factorial survey, we manipulated six dimensions. The first five pertained to SCP's five categories of preventive actions that we relied on to influence the criminogeneity of the described environment. These were: the risks, the rewards and the efforts associated with a SRMF proposition, the amount of provocation contained in the situation, and possibilities for excusing the commission of SRMF. We also added the aim of the SRMF as a sixth dimension to our vignettes (see Appendix 1 for the operationalization of each dimension, translated from the Dutch version).

Each dimension was operationalized on two levels (i.e., low and high). This orthogonality ensured that number-of levels effects were prevented in our data (Auspurg & Hinz, 2015). These biasing effects can occur when certain dimensions in the vignettes differ significantly from others in the number of levels they contain. The vignette universe (i.e., all possible combinations of levels for all dimensions) can be computed by taking the Cartesian product of the vignette dimensions and their respective amount of levels (Treischl & Wolbring, 2021). In our case, the vignette universe amounted to $2^6 = 64$ different vignettes. According to the current consensus, each of these 64 possible vignettes must be reviewed by at least five respondents (Auspurg & Hinz, 2015). This means that our desired sample size was $n = 320$ respondents per sport ($n = 640$ in total), if only one vignette was shown to each respondent. In our study, we decided to present two vignettes to each respondent. Table 1 shows an example of a vignette where all dimensions are operationalized on the 'high' level. This means that this example portrays a situation in which SRMF would be more risky, associated with higher rewards, requiring more efforts, induced by higher levels of provocation, and with more possibilities for excuses, than if the dimensions were operationalized on the 'low' level (see also Appendix 1 for operationalization on both levels). The order of the dimensions within each vignette was not randomized as this would harm the logical buildup and the realistic nature of the situations. However, the levels of each dimension were randomly presented every time the survey link was opened, and for both vignettes viewed by each respondent. After reading each vignette, respondents were asked to place themselves in the shoes of the sportsperson described in the scenario. They were then asked to rate their temptation to accept the SRMF offer on a seven-point scale with a neutral middle point (with 1 being ‘completely disagree’ and 7 being ‘completely agree’). Then, respondents were asked to rate the likelihood that they would actually accept the offer (i.e., their behavioral intention) on the same scale. The choice for a rating scale instead of an open scale was based on recent research showing that the former causes less missing values and more valid regression estimates than the latter in the context of factorial surveys (Sauer et al., 2020).

After each vignette, respondents also filled in questions about variables linked to their crime propensity and that could play a role in their decision-making process. One of these variables was moral judgment. Respondents were asked to rate a concrete example of SRMF such as described in the vignettes as morally acceptable or not. Here again, a seven-point scale with a neutral middle point was used, 1 being ‘very unacceptable’ and 7 being ‘very acceptable’. Additionally, respondents’ moral emotion (i.e., feeling of guilt) was evaluated, as well as the injunctive social norm surrounding SRMF in their team. In fact, research has shown that social structures can have important influences on individuals’ decision-making with regards to SRMF (Loyens et al., 2021; Van Der

Hoeven et al., 2021). Respondents were therefore asked to evaluate the reaction they would expect from their coach, team mates, and family if they had heard about their participation in SRMF. Once again, a seven-point scale with a neutral middle point was used to measure respondents' moral emotion and perceived social norm, with low values indicating that respondents would not feel any guilt if they accepted the SRMF proposition, and high values indicating they would feel very guilty. This specific question was inversely recoded for the sake of our analyses. To measure the social norms respondents perceived within their team and family, we also used a seven-point scale with a neutral middle point, with low values indicating social norms discouraging SRMF, and high values indicating social norms encouraging SRMF.

Finally, and despite research mentioning their low predictive power in any particular behavior (Fishbein & Ajzen, 2010), control and demographic variables were included such as age, gender, sports level, financial satisfaction, and monthly remuneration through sports. As our theoretical model also hypothesized about the moderating role of self-control, we included a sub-part of Grasmick's self-control scale, focusing on the impulsivity and risk seeking factors[2] (Grasmick et al., 1993). Both concepts have been associated with the commission of crime in existing research (Armstrong et al., 2020; Forrest et al., 2019). The remaining sub-scales of the scale (i.e., simple tasks, physical activities, self-centeredness, and temper) were considered to be of less relevance to the study of SRMF. Lastly, despite the design of the factorial survey, a certain degree of social desirability remains unavoidable when measuring sensitive issues like SRMF (De Buck & Pauwels, 2020). Hence, we included the 13-item short version of the Marlowe-Crowne social desirability scale. This short version has been shown to be a valid alternative to the 33-item original version (Reynolds, 1982). As the realism of the vignettes is a paramount characteristic within factorial surveys (Auspurg & Hinz, 2015), the entire survey was pre-tested during $n = 10$ cognitive interviews with members of the target group.

Table 1. | Vignette example[3]

Football

Chris plays football at club X and is asked by *his coach* to *influence his next match to such extent that his team certainly loses the match* (e.g. by making a high number of severe mistakes).

Chris is promised by his coach *the sum of 190€* is he accepts this proposition.

The reason behind this proposition is that the team Chris will be opposing in his next match *is on the brink of being relegated to a lower playing division*. The opposing team must win the match in order to avoid this.

For Chris' team, the match in question is not of the highest importance as it has already gathered enough points this season.

The federation has recently purchased *a detection system* that is able to trace suspected match-fixing, which heightens the athlete's chance of being sanctioned if discovered.

It is *clearly mentioned* in the club's code of conduct that the manipulation of sports competitions is against the rules.

Tennis

Julie plays tennis at club X and is asked by *her opponent* to *influence her next match to such extent that she certainly loses the match* (e.g. by making a high number of severe mistakes).

Julie is promised by her coach *the sum of 50€* is she accepts this proposition.

The reason behind this proposition is that the opponent Julie will be opposing in her next match *is on the brink of being promoted to a higher playing series*. The opponent must win the match in order to avoid this.

For Julie, the match in question is not of the highest importance as she has already gathered enough points this season.

Data analysis

After careful considerations, and based on the hands-on experience acquired during the survey distribution, only the first of the two vignettes shown to each respondent was analyzed. This decision was made in order to ensure the validity of the results, as a number of respondents indicated that they did not notice a difference between the two presented vignettes. This was probably due to the fact that the operationalization of some dimensions contained full sentences, which might have seemed repetitive for the respondents. The variables were therefore only analyzed between-subjects. To this end, Gamma Log Link Generalized Linear Models[4] with robust estimators were constructed using the software SPSS Statistics 27.

Results

The four models that were built on the basis of the collected data are reported in Table 2 for the football sample and in Table 3 for the tennis sample. Model 1 examines the effect of the independent variables that constitute sportspersons' crime propensity on their SRMF behavioral intentions. In both the football and the tennis sample, moral judgment, moral emotion, and temptation were found to significantly predict behavioral intention. Namely, for each increase of one unit on the moral judgment variable (i.e., with increasing perceived acceptability of SRMF), behavioral intention in the football sample increases by a factor of 1.065, or by 6.5%, and in the tennis sample by 8.3%. Looking at the role of moral emotion in sportspersons' decision-making process, each increase in one unit (i.e., with decreasing feelings of guilt associated to SRMF), behavioral intention in the football sample increases by 3.7%, and in the tennis sample by 3.9%. Lastly, temptation was found to be an important predictor of behavioral intention in both samples. More specifically, each increase of one unit in sportspersons' temptation to commit SRMF was associated with increased behavioral intention by 30.6% in the football sample, and 31.1% in the tennis sample.

In model 2, we introduced the variables linked to the criminogeneity of the sports environment to evaluate their role in sportspersons decision-making processes toward SRMF. Those were the six vignette dimensions, and the social norm variable. In both samples, the vignette variable had relatively low effect sizes on the outcome variable, and none was found to be a significant predictor of SRMF behavioral intention. However, social norm had a significant effect on behavioral intention in both sports. Namely, each unit increase in social norm (i.e., with increasing acceptance of SRMF from sportspersons' coach, team mates, and family), behavioral intention to accept the SRMF proposition increase by 2.6% in the football sample, and by 1.3% in the tennis sample.

In model 3, we measure the effect of theoretically relevant interaction terms on the outcome variable. According to SAT's *principle of the conditional relevance of controls,* self-control and deterrence only play a role when individuals deliberate about whether to break rules or not, or when one's moral rules are inconsistent with the setting's moral norms (Wikström, 2011). In line with this principle, we examined the effect of interactions between self-control variables (i.e., impulsivity and risk seeking), and variables containing deterrence elements (i.e., excuses and risks), and sportspersons' moral emotion and moral judgment about SRMF. Additionally, we hypothesized that self-control played a moderating role between temptation and behavioral intention, which was also measured by including the relevant interactions to our analyses. Lastly, as our operationalization of the provocation variable described the role of coaches in the SRMF proposition, and our measure of social norm also contained a specific reference to sportspersons' coach, we decided to also include the interaction between both variables to this third model. In fact, the importance of the perceived social norms about SRMF on behavioral intention might depend on whether the coach is involved in the match-fixing or not. Our results show that, in the football sample, only one interaction was found to have a significant effect on the outcome variable. Namely, the effect of moral judgment on behavioral intention differed depending on sportspersons' level of impulsivity. In the tennis sample, the effect of moral judgment was also found to be significantly moderated by sportspersons impulsivity and risk seeking traits. Additionally, impulsivity was also found to be a significant moderator on the relationship between temptation and behavioral intention. Lastly, in accordance with SAT, we found that the relationship between the risks associated with SRMF and amateur tennis players' behavioral intentions also depended on their moral emotions toward SMRF.

In model 4, we added demographic and control variables to examine whether these possible correlates of SRMF would retain predictive power in a model containing SAT's theoretical variables (Shadmanfaat et al., 2020). In both the football and the tennis sample, the results show that none of these variables (i.e., age, gender, sports level, sports salary, and length of sports career) significantly predicted behavioral intention towards SRMF.

Table 2. | Effects of crime propensity, the criminogenic nature of the environment, and control variables on behavioral intention to participate in SRMF in **football**[a]				
Models	1	2	3	4
SAT variables				
Crime propensity				
Moral judgment	.063** (.024)	.058* (.024)	.423** (.159)	.471** (.156)
Moral emotion	.036** (.013)	.025* (.012)	-.118 (.090)	-.119 (.090)
Temptation	.267** (.020)	.251** (.020)	.505** (.124)	.527** (.127)
Impulsivity	.009 (.006)	.008 (.007)	.044** (.011)	.047** (.011)
Risk seeking	-.034 (.019)	-.034 (.018)	.043 (.032)	.059 (.034)
Criminogenic environment				
Efforts (high = 1)		-.035 (.031)	-.027 (.031)	-.028 (.030)
Risks (high = 1)		.036 (.033)	-.047 (.069)	-.038 (.067)
Rewards (low = 1)		-.015 (.032)	-.018 (.030)	-.016 (.029)
Provocations (low = 1)		-.012 (.035)	-.083 (.059)	-.085 (.057)

Excuses (low = 1)		.020 (.031)	-.001 (.066)	-.007 (.066)
Aim (promotion = 1)		.038 (.033)	.043 (.031)	.040 (.030)
Social norm		.026** (.007)	.021* (.009)	.022* (.009)
SAT interactions				
Temptation* impulsivity			-.008 (.007)	-.009 (.007)
Temptation* risk seeking			-.032 (.021)	-.036 (.022)
Social norm* provocations			.014 (.010)	.015 (.010)
Risks* moral judgment			.045 (.036)	.045 (.036)
Risks* moral emotion			.009 (.018)	.007 (.018)
Excuses* moral judgment			-.025 (.036)	-.015 (.037)
Excuses* moral emotion			.030 (.018)	.027 (.019)
Impulsivity* moral judgment			-.022* (.010)	-.024* (.010)
Impulsivity* moral emotion			.005 (.004)	.005 (.005)
Risk seeking* moral judgment			-.030 (.022)	-.037 (.021)
Risk seeking* moral emotion			.013 (.014)	.014 (.014)
Control variables				
Age				.002 (.004)
Gender (male = 1)				-.356 (.268)
Length football career				-.005 (.004)

Football level				.006 (.007)
Football remuneration				-.009 (.011)
Constant	-.134 (.125)	-.202 (.134)	-.896** (.213)	-.603* (.281)

[a]Note: Significant coefficients with *p < .05; ** p < .01; standard errors in parentheses

Table 3. Effects of crime propensity, the criminogenic nature of the environment, and control variables on behavioral intention to participate in SRMF in **tennis**[a]				
Models	1	2	3	4
SAT variables				
Crime propensity				
Moral judgment	.080** (.030)	.077** (.030)	-.057 (.072)	-.038 (.073)
Moral emotion	.038** (.014)	.031* (.015)	.063 (.047)	.052 (.045)
Temptation	.271** (.017)	.264** (.017)	.432** (.059)	.435** (.059)
Impulsivity	.008 (.009)	.007 (.008)	.012 (.010)	.009 (.010)
Risk seeking	-.001 (.008)	-.002 (.008)	.011 (.009)	.018* (.009)
Criminogenic environment				
Efforts (high = 1)		-.019 (.030)	-.024 (.027)	-.025 (.026)
Risks (high = 1)		-.053 (.030)	.042 (.047)	.037 (.047)
Rewards (low = 1)		-.014 (.030)	-.021 (.027)	-.016 (.027)
Provocations (low = 1)		-.029 (.031)	-.013 (.054)	-.010 (.053)
Excuses (low = 1)		.005 (.031)	-.023 (.051)	-.042 (.053)
Aim (promotion = 1)		.004 (.031)	.001 (.028)	.005 (.027)
Social norm		.013* (.007)	.017* (.007)	.015* (.007)

SAT interactions				
Temptation* impulsivity			-.023** (.008)	-.023** (.007)
Temptation* risk seeking			.004 (.007)	.004 (.007)
Social norm* provocations			-.004 (.009)	-.004 (.009)
Risks* moral judgment			.016 (.038)	.018 (.038)
Risks* moral emotion			-.046* (.021)	-.048* (.021)
Excuses* moral judgment			.036 (.044)	.043 (.044)
Excuses* moral emotion			-.014 (.021)	-.009 (.020)
Impulsivity* moral judgment			.033** (.008)	.032** (.008)
Impulsivity* moral emotion			-.007 (.006)	-.006 (.005)
Risk seeking* moral judgment			-.020** (.006)	-.021** (.006)
Risk seeking* moral emotion			.005 (.005)	.006 (.005)
Control variables				
Age				.002 (.001)
Gender				-.055 (.032)
Length tennis career				.001 (.001)
Tennis level				.000 (.001)
Tennis remuneration				.027 (.016)
Constant	-.381** (.058)	-.358** (.076)	-.556** (.093)	-.685** (.108)

[a]Note: Significant coefficients with *p < .05; ** p < .01; standard errors in parentheses

However, during the analysis phase and the creation of the different models, we noticed the relatively high predictive value of crime propensity variables compared to variables linked to the criminogeneity of the environment, and control variables. This led us to the creation of a model for each sport with which we aim to predict respondents' behavioral intentions to accept SRMF propositions as accurately as possible (based on the models' Goodness-of-Fit indices). These models are represented in Table 4, and show that crime propensity variables and their interactions are the most efficient predictors of SRMF in both amateur football and tennis.

Table 4. Most efficient prediction models of SRMF behavioral intentions[a]	
	β (Std Error)
Football	
Intercept	-.565* (.245)
Crime propensity	
Moral judgment	.442** (.138)
Temptation	.404** (.099)
Risk seeking	.061 (.032)
Impulsivity	.044** (.012)
Criminogenic environment	
Social norm	.028** (.007)
Aim	.043 (.031)
SAT interactions	
Risks*moral judgment (low risks=1)	.034 (.018)
Excuses* moral emotion (low excuses=1)	.032* (.013)
Excuses* moral emotion (high excuses=2)	.014 (.014)
Moral judgment*impulsivity	-.025** (.008)
Moral judgment*risk seeking	-.031 (.020)
Temptation*risk seeking	-.027 (.018)
Control variables	

Gender (male=1)	-.434 (.250)
Gender (female=2)	-.502* (.248)
Length football career	-.005 (.002)
Tennis	
Intercept	-.681** (.090)
Crime propensity	
Moral judgment	-.026 (.071)
Temptation	.436** (.051)
Risk seeking	.023** (.008)
Criminogenic environment	
Social norm	.013* (.006)
SAT interactions	
Temptation*impulsivity	-.019** (.006)
Risks*moral emotion (low risks=2)	.032 (.040)
Risks*moral emotion (high risks=1)	.006 (.038)
Moral judgment*impulsivity	.032** (.008)
Moral judgment*risk seeking	-.019** (.006)
Moral emotion*impulsivity	-.006 (.005)
Moral emotion*risk seeking	.007 (.004)
Control variables	
Age	.003** (.001)
Gender (male=1)	-.065* (.031)
Tennis remuneration	.026 (.017)

[a]Note: Significant coefficients with *p < .05; ** p < .01

Lastly, the socially desirable nature of our responses was evaluated. The results from both samples were extremely similar. The scale used contained 13 items scored binarily (1= low socially desirable answers; 2= high socially desirable answers). Respondents could therefore have a total score between 13 and 26. The mean scores in both samples were 19,47 in football, and 19,79 in tennis. We then separated all respondents into three groups: individuals with low social desirability (i.e., scores between 13 and 16), individuals with medium social desirability (i.e., scores between 17 and 21), and individuals with high social desirability (i.e., scores between 22 and 26). The frequency distributions in both samples were, again, extremely similar. 4,8% of respondents scored in the low group, 79% in the medium group, and around 16% in the high group. Though these results are not alarming, they should be kept in mind when interpreting our study's other findings.

Discussion

SRMF is a sports integrity breach and a sub-type of fraud in sport that is increasingly being studied empirically in different sports (e.g., Tak et al., 2020; Van Der Hoeven et al., 2021). In this study, we aimed to reach beyond the risk factor approach to this phenomenon by experimentally manipulating six dimensions within our factorial survey's vignettes. To this aim, SAT provides a comprehensive theoretical framework that contains testable implications (Wikström & Treiber, 2016). Additionally, according to Haberfeld and Abbott (2013), a comprehensive framework of match-fixing can only be obtained by including its cognitive, structural, and relational dimensions. This study addresses both the cognitive and relational dimensions from an empirical quantitative perspective, which contributes to its highly innovative character.

SAT posits that rule breaking should be studied on the situational level, which is the result of individuals' crime propensity and their exposure to a criminogenic environment, as well as the interaction between these aspects (Wikström & Treiber, 2016). In this study we found that sportspersons' crime propensities such as their moral judgment of SRMF and temptation to accept a SRMF proposition significantly, and directly influenced their reported behavioral intentions toward the commission of SRMF (both in tennis and in football). This finding confirms our first hypothesis. Looking at the criminogeneity of the sports environment, we found that the six manipulated dimensions of our vignettes, based on SCP, had very little, if at all, predictive power on individuals' behavioral intentions. Social norms (i.e., sportspersons' team mates, coach, and family's perceptions of SRMF) did, however, significantly predict their behavioral intentions. This finding only partly confirms our second hypothesis. Additionally, our results show the moderating effect of self-control traits (i.e., risk seeking and impulsivity) on the relationship between temptation and behavioral intention in both samples, and on the relationship between moral judgment and behavioral intention (H4). This finding confirms SAT's view of self-control as a protective factor against rule breaking when deliberation is required in the decision-making process (Wikström, 2011).

Based on our results, we also point to the paramount role of coaches and of their influence on the criminogenic nature of the sports environment as sportspersons were more likely to accept SRMF propositions when the social norms surrounding them condoned this action. As previous research has shown that SRMF is often initiated by coaches (Tak et al., 2020), these findings are a clear indicator of direction for future preventive endeavors. Namely, they should be targeting the moral decision-making of not only sportspersons, but coaches and sports teams as well. In fact, recent research has shown that match-fixing propositions made by persons in a higher power position than the sportsperson were more likely to be accepted (O'Shea et al., 2021).

The important role of moral judgment about SRMF found in this study might also point toward a deeper problem. In fact, SRMF is not consistently considered a moral issue by sportspersons in contrast to betting-related match-fixing (Van Der Hoeven et al., 2020). Additionally, when considering SRMF as a moral issue in sports, one must know what the adequate moral behavior is when faced with a match-fixing proposition. Additionally, we wish to emphasize that, in our vignettes, we have used instances of SRMF that was not in contradiction with the 'win' norm, though did surely harm the 'play to win' norm mentioned above (Harvey, 2015). However, in the academic literature, instances of SRMF contracting both of these norms have also been found, to which our results might not apply. In these cases, sportspersons would, for instance, lose on purpose to avoid the logistic and financial burden of traveling to distant locations (Numerato, 2016). Hence, morality might play a lesser role in this type of SRMF as individuals are most likely unaware that they are facing a moral issue (Van Der Hoeven et al., 2020).

Moreover, an important element of SAT is the attention it devotes to interactions between crime propensities and criminogenic inducements (Wikström, 2020). In this study, we also found evidence for the applicability of this element of the theory to SRMF, which confirms our third hypothesis. Namely, in football, we found that the relationship between sportspersons' moral emotion toward SRMF and their behavioral intentions depended on their possibilities to excuse their act. In tennis, the interactions between moral emotion and the risk element of the vignette situations were close to being significant, and valuable predictors of behavioral intentions. Here, a parallel can be drawn with findings from the study of another type of rule-breaking in sports. In fact, research on doping has shown that the moral identity of athletes was directly related to their likelihood of using performance enhancing drugs, only when this behavior was perceived as costly for the athletes (Ring et al., 2018). This suggests that including a validated scale such as Black and Reynolds' Moral Identity Questionnaire to the study of SRMF as a type of immoral behavior might contribute to the disentanglement of these effects (Tissot et al., 2022). Lastly, a noticeable result of our study is the lack of predictive power of certain crime propensity variables when considered outside of their interaction with variables linked to self-control and the criminogeneity of the sports environment (see Table 4). This finding might indicate that sportspersons' crime propensities are *activated* by characteristics of the setting that render it criminogenic, and by their self-control traits (Wikström, 2020). This means that the crime propensity of sportspersons alone is not sufficient for them to accept propositions of SRMF.

This study contributes to the much needed theorization of SRMF, in order to better understand and explain this field of research (Constandt & Manoli, 2023; Numerato, 2016). Our findings demonstrate the value of SAT in the study of fraud in sports phenomena. Although, this theory has already been applied to explain the use of performance enhancing drugs in professional athletes (Shadmanfaat et al., 2020), its application to examine other sports integrity breaches remains nonexistent. This study applies SAT for the first time to the phenomenon of match-fixing and attempts to bridge the risk factor stage.

Limitations and future research

Although the use of a factorial survey has allowed us to address the trade-off between internal and external validity quite effectively (Dickel & Graeff, 2018), our results' generalizability might be restricted to the Flemish context and amateur football and tennis. However, future research is encouraged to replicate these findings in different (national) contexts. Additionally, as the realism of the vignettes is a paramount characteristic of any factorial survey (Auspurg et al., 2015), all our vignettes were thoroughly pre-tested. However, a small possibility remains that the situations described did not sound realistic for some of the respondents, producing artificial responses.

Moreover, two sportive aims that could be attained through SRMF were selected to ensure the orthogonality of our data (i.e., losing a game to help another team avoid degradation to a lower playing division, or attain a promotion to a higher playing division). However, during our cognitive interviews, we were informed about a third type of practice used in both tennis and football, namely losing games on purpose in order to avoid promoting to a higher playing division. In this specific case, no additional incentives are necessary for sportspersons to participate in SRMF as they are losing for their own benefits. In fact, the rationale behind such purposeful losses can sometimes be as practical as not wanting to make the trip to a faraway opponent team (Numerato, 2016). Our study did not include this case of SRMF, which is without a doubt an interesting avenue for future research.

Additionally, the statistical test used to create our models did not allow us to identify mediation effects between our variables. We believe that applying structural equation modeling to the study of SRMF will contribute greatly to theory-building in this field. This technique allows researchers to construct a predictive model of behavioral intention based on theoretical hypotheses. Unfortunately, the nature of our data (i.e., positively skewed and several categorical predictors) did not allow us to fit such model.

Furthermore, a greater focus should be allocated to the study of the normative and social contexts in which SRMF takes place. In fact, our findings confirm the strong social and relational character of SRMF (Loyens et al., 2021), showing that the way sportspersons view potential behaviors is also based on social norms within their environment, which is determined partially on the basis of social cues, plays a determining role in their decision-making process. This phenomenon should therefore be studied within the cultural and structural boundaries pertaining to specific sports and leagues (Jancsics, 2014), rather than starting from a broad international lens.

Lastly, this study constituted an innovative attempt to experimentally manipulate variables that might influence sportspersons' decision-making toward or away from SRMF. As our study shows that environmental variables based on SCP concepts did not constitute satisfactory predictors for SRMF, future research should use the promising technique of factorial surveys to experimentally manipulate SAT variables linked to crime propensity and the criminogeneity by applying them specifically to different sports environments, which will undoubtedly contribute to theory-building and prevention in this field.

Conclusion

Despite the aforementioned limitations, this study is amongst the first to apply a complex empirical quantitative design to better understand and explain the phenomenon of match-fixing. The use of a factorial survey has allowed us to manipulate variables that could not have been manipulated in a usual field setting. We have shown the significance of crime propensity, mostly linked to morality and self-control, and SAT interactions in the decision-making process of amateur football and tennis players when facing SRMF.

These results constitute a gateway to further theory-based and empirical research on the moral decision-making processes of sportspersons on all performance levels.

Foot notes

[1] The factors mentioned by Forrest and McHale (2008) are linked to the risk factors measured in our study in parentheses. These parallels have been drawn in the context of this study.

[2] Both factors were confirmed in our data using a confirmatory factor analysis. In both samples the goodness of fit indices of the structural equations modeled on both sub-scales showed acceptable values.

[3] All scenarios were pre-tested during $n = 5$ interviews with sportspersons from the target group.

[4] Given the lack of consensus about whether to consider ranking scales that are not part of multi-item Likert scales as continuous or ordinal during data analysis, the Gamma Lok Link was chosen above the Ordinal GLM due to its higher performing Goodness of Fit values. However, both types of models were compared, and found to yield similar results. Therefore, we do not consider this choice to have far-reaching consequences.

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Appendix 1. Operationalization of the six vignette dimensions

	Levels	
Dimensions	Low	High
Risks	*Blank*	The federation has recently purchased a detection system that is able to trace suspected match-fixing, which heightens the athlete's chance of being sanctioned if discovered.
Efforts	Invest somewhat less efforts in the contest (e.g. run somewhat slower, make a few mistakes).	Influence the contest to such extent that one or one's team loses the contest (e.g. by making a high number of severe mistakes).
Rewards	The confirmation that the opponent will return the favor if the opportunity presents itself.	50% of the respondent's self-reported monthly financial gains through sports.

Provocations	An opposing team or athlete suggests match-fixing during their future encounter.	The athlete's own coach suggests match-fixing during their future encounter.
Excuses	*Blank*	It is clearly mentioned in the club's code of conduct that the manipulation of sport contests is against the rules.
Goal	The opposing team or athlete is on the brink of attaining a higher playing division, if they were to win the following encounter.	The opposing team or athlete is on the brink of being relegated to a lower playing division, if they were to lose the following encounter.