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Misconduct and Leader Behaviour in Contests

– New Evidence from European Football[*]

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Abstract: This paper provides an empirical investigation of severe misconducts in contests based on data from European football championships. We differentiate between two types of severe misconducts both resulting in a yellow card, namely dissents with the referee and other misconducts, and between sanctioned behaviour of team captains and other players. Confirming the existing literature, we find that sabotage against the opponent is used more frequently by players from teams with lower ability. In addition, we find that dissents with the referee are significantly more likely in the case of an unfavourable score. We further find that captains, in contrast to other players, seem to use sabotage less impulsively and more strategically, as they do not seem to participate in retaliatory escalation of conflict behaviour. However, compared to other players, captains increase their sabotage in important matches.

Keywords: Contest; Dissent; Leadership; Sabotage; Football

JEL: D74, L83, M52

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1. Introduction

Contests are situations in which competing individuals or teams expend scarce resources to win prizes. Because of the importance of winning contests for economic success in our highly competitive market economy, much previous research has tried to identify individual and team-level factors affecting the likelihood of success in contests. For example, early theoretical work on rank-order tournaments, mainly building on Lazear and Rosen (1981), suggests that exerting higher effort compared to the opponent increases the probability to win a contest and that this incentive increases with the prize-spread. In addition to increasing their own chances to win by exerting more effort, however, contestants often also have the opportunity to reduce their opponents' chances of winning (Lazear, 1989). Such destructive behaviour is usually referred to as sabotage in the literature and can observed, e.g., in marketing or political campaigns (Chowdhury & Gürtler, 2015).

Sabotage in contests has been investigated in various experimental studies (see, e.g., Carpenter, Matthews, & Schirm, 2010; Harbring & Irlenbusch, 2011; for reviews see Chowdhury & Gürtler, 2015; Dechenaux, Kovenock, & Sheremeta, 2015). Ecologically more valid, non-experimental studies on sabotage, however, are rare. One obvious reason is that sabotage is usually associated with immoral and/or illegal activities. Hence, individuals engaged in sabotage try to conceal such actions, rendering it difficult to observe in the field (Balafoutas, Lindner, & Sutter, 2012).

A noticeable exception to this are sports contests, most prominently in professional football (soccer), which are frequently used for empirical analyses (Chowdhury & Gürtler, 2015). The main advantages of studying behaviour in sports tournaments are data availability and the direct observability of behaviour. Very detailed information on the attributes of the competing contestants in sports is also available. Sports contests are also suitable to study sabotage, because destructive actions against the opponent team aiming to reduce the opponent's chances of winning can be observed quite directly and reliably. Thus, in previous sport studies on destructive contest behaviour, any actions that violate the rules of the respective game have been used to study sabotage (Deutscher & Schneemann, 2015).

Hence, we use sports contests, i.e. European football championships, to empirically investigate severe misconducts. We add to previous findings by differentiating between two types of severe misconducts both resulting in a yellow card, namely dissents with the referee and other misconducts (fouls), and between sanctioned behaviour of team captains and other players.

Overview of previous literature

Balafoutas et al. (2012), e.g., analyse the effect of the relative skill level of contestants on sabotage as well as the cost of engaging in sabotage in judo world championships. As a measure of sabotage, the authors use *shido*, i.e., an action against the rules of the competition that aims at hindering the opponents attack. Their results show that contestants with lower ability use sabotage more often than contestants with greater ability. Furthermore, Balafoutas et al. (2012) examine the effect of a rule

change in Judo introduced in 2009. Prior the rule change, a shido was penalised with one point for the opponent. This penalty was abolished in 2009. Using this rule change as a natural experiment, the authors show that sabotage significantly increased after the rule change that decreased the cost of sabotage.

The natural experiment of a rule change is also the basis for the studies of del Corral, Prieto-Rodriguez, and Simmons (2010) and Garicano and Palacios-Huerta (2014) who analyse the effect of changing the reward for winning a football match from two to three points. Using match-level data, Garicano and Palacios-Huerta (2014) find that the increase in prize spread led to significantly higher sabotage compared to the period prior the rule change. del Corral et al. (2010) examine the change in the probability of red cards being awarded after the increase in prize spread. Controlling for within-match dynamics, such as the minute of the match and the goal score, they find an increased probability for sabotage in teams that are in a winning position.

Frick, Gürtler, and Prinz (2008) analyse how the difference in ability of two teams, determined based on betting odds prior to the respective match, affects sabotage. They find that sabotage, measured as the number of yellow and red cards, increases when teams of similar ability compete. Using data from football and basketball, Stulp, Kordsmeyer, Buunk, and Verhulst (2012) find similar results. Measuring differences in ability as the absolute difference in table ranks for football and as the share of won games per season in the case of basketball, they find that the smaller the difference in the ability of two teams, the higher the number of fouls per match (basketball and football) and the more yellow cards are given per match (football).

Deutscher, Frick, Gürtler, and Prinz (2013) explicitly differentiate between effort compliant to the rules of the game (fair tackles) and sabotage (fouls) in football matches. Their results indicate that weak contestants engage more in sabotage, while contestants with greater abilities exert more compliant effort. Deutscher and Schneemann (2015) further refine the analysis of the effect of ability on sabotage by using information on ex-ante heterogeneity between competing football teams, based on betting odds, and within-game information, namely the goal difference. Like del Corral et al. (2010), the authors control for within-game dynamics and show that both a lower ex-ante ability as well as a negative goal difference increase sabotage (measured as severe misconduct penalised by a yellow card).

Focus of the current study

For this study, we collected detailed data on severe misconducts from various European football leagues. We add to the existing literature on sabotage in sports contests by extending previous empirical analyses in the following ways. First, we differentiate between two types of misconducts both resulting in a yellow card, namely dissents with the referee and other misconducts. According to the *Laws of the Game*, a player is to be cautioned and shown a yellow card for any dissent by word or

action against the referee. The important point here is that dissent targets the referee while other cautioned misconducts, such as severe and repeated fouls, are aimed at opponent players / the opposing team. Thus, our differentiation allows for a more precise empirical analysis of sabotage in sports contests.

For one, in our analyses dissents against referee decisions, which may be considered much less problematic instances of non-compliance than severe foul play intending to harm the opponent, are disentangled from other misconducts leading to yellow cards. This allows for a less confounded analysis of factors affecting the likelihood of destructive misconduct in contests.

For the other, we present a specific analysis of dissents against the authority in charge of the interpretation and enforcement of the contest's rules, i.e. the referee. Thus, in addition to sabotage, we are able to study a second route which contestants might take towards influencing the outcome of a contest: Trying to influence how the rules of the game are implemented.

Third, in a separate analysis of our data, we explicitly distinguish between the behaviour of team captains and other players. Team captains are typically more experienced team members taking on leadership tasks such as on-field motivation and encouragement or tactical decision-making (Fransen, Vanbeselaere, Cuyper, Vande Broek, & Boen, 2014). Psychological research on captains has found them to have specific skills such as remaining positive and controlling their emotions (Dupuis, Bloom, & Loughead, 2006). Also, as Elgar (2016) shows using data from the London 2012 Olympics and Paralympics, team captains often are considerably older than their team mates. However, the specific strategic role team leaders play in contests has become a focus of theoretical and empirical interest in economics only very recently (Eisenkopf, 2014; Gauriot & Page, 2015). By distinguishing between captains and other players, thus, our study is one of the first empirical inquiries which investigates whether holding a leadership role within a team in competition with another affects the likelihood of engaging in sabotage.

Our main results are that, in line with previous findings, destructive actions against the opponent increase with lower team ability. However, dissents with the referee are not affected by ability. Rather, the current state of the match, e.g. an unfavourable goal difference, increases the occurrence of dissent. Differentiating between contestant types shows that captains, in contrast to other players, do not seem to participate in escalations of destructive conflicts. Furthermore, captains seem to exert higher effort in very important matches against neighbouring teams in the table at the end of the season.

The remainder of this paper is organised as follows. In Section 2, the data set and the variables used in the empirical analysis are presented. Section 3 presents the empirical method and reports results. Finally, Section 4 summarises and concludes.

2. Data

For our analysis, we use data from live tickers that are (almost) real-time coverages of an event, in our case football matches.[1] We used data from the German football portal *www.weltfussball.de*, which covers football games of many European football leagues by live tickers and usually contains information on the causes of yellow cards in the respective posts. The advantage of this portal compared to most of its alternatives is that ticker texts stay online after the match. League games with dissents were collected by searching the texts of the available live tickers for yellow cards and German terms for *dissent*.[2] This procedure resulted in a data set containing 236 matches in 10 European football leagues from the seasons 2004/2005 to 2013/2014. The data set includes 1,352 yellow cards. Whenever the cause of at least one caution was not identifiable, the websites *www.kicker.de*, *www.transfermarkt.de*, and *www.fussballoesterreich.at* were used to identify the missing reason(s) and to cross-check the data. Furthermore, these sources were used to identify the captains of the respective teams in all matches.

In our analysis, we use the minute of the match as the unit of observation, which is a relatively novel approach in the analysis of football matches (Buraimo, Forrest, & Simmons, 2010; Buraimo, Simmons, & Maciaszczyk, 2012; del Corral et al., 2010). A main strength of this approach is that it allows capturing within-game dynamics in detail as it precisely covers the order of all events of interest occurring throughout the game. The binominal dependent variable takes the value 1 when a yellow card (of specific type) is awarded in the respective minute and 0 otherwise. In contrast to the previous studies that analysed all yellow cards jointly, we extend the analysis of aggression in contests in two directions. First, we differentiate between two types of misconducts resulting in a yellow card, namely dissents, i.e. misconducts directly aimed at the referee, and other misconducts, i.e. illegal actions against opponent players. Second, we separately analyse the cautioned illegal behaviour of captains and of other players. Descriptive statistics are reported in Table 1.

For the analysis, we use the following set of independent variables. The variable *goal difference* measures the current difference in goals at the occurrence of a caution from the offending player's perspective. When the current score is 2-0, for example, this variable takes the value 2 if a player of the home team receives a yellow card and -2 for the case of a cautioned guest team player. It is expected that teams lagging behind in score increase their effort and that this leads to an increase in illegal activities, hence to an increasing propensity of receiving yellow cards. It is possible that with

[1] Live tickers are usually offered by online news/sports media. The tickers consist of stenotype short comments in varying degrees of frequency (also based on the type of broadcasted sport) with information on decisive game events as well as important plays. In individual cases, live tickers are enriched with statistical materials for both participants (lineups, player data, etc.).

[2] These terms are "meckern", "protestieren", and "beschweren"; typical German expressions for protesting in football.

high goal differences, i.e. when a match is almost certainly decided, the effort of players and hence the likelihood of a yellow card decreases. In order to capture these possible non-linear effects of the goal difference on players' behaviour and hence on award of yellow cards, we introduce the control *goal difference squared*.

Table 1: Descriptive Statistics

	Card by Player Type				Card by Reason			
	Captain		Other Player		Dissent		Other Misconduct	
	M	SD	M	SD	M	SD	M	SD
Minute	58.70	22.67	56.57	24.10	59.59	22.92	55.93	24.22
Minute squared	3955.62	2507.78	3780.85	2605.00	4074.54	2574.84	3714.36	2596.27
45th minute	0.01	0.12	0.01	0.08	0.01	0.10	0.01	0.08
90th minute	0.06	0.23	0.05	0.22	0.07	0.25	0.05	0.21
Yellow cards last 3 min	0.15	0.38	0.12	0.35	0.17	0.39	0.11	0.34
Opponent yellow cards last 3 min	0.14	0.35	0.15	0.38	0.13	0.34	0.16	0.39
Yellow cards prior	1.29	1.34	1.23	1.26	1.31	1.27	1.21	1.27
Opponent yellow cards prior	1.52	1.45	1.33	1.30	1.33	1.30	1.36	1.32
Goal difference	-0.25	1.15	-0.14	1.12	-0.47	1.15	-0.06	1.10
Goal difference squared	1.37	2.13	1.27	2.17	1.54	2.68	1.21	1.98
Difference in bookmaker probability	-0.01	0.32	-0.04	0.34	-0.01	0.35	-0.05	0.33
Difference in bookmaker probability squared	0.10	0.15	0.12	0.15	0.12	0.17	0.11	0.15
Competitiveness	0.38	0.49	0.57	0.99	0.55	0.92	0.55	0.96
Attendance	9.55	1.30	9.42	1.47	9.43	1.38	9.44	1.47
Derby	0.09	0.29	0.09	0.29	0.09	0.28	0.10	0.30
Observations	139		1213		317		1035	

The variable *minute* captures the minute of the regular playing time. Hence, for all events that happened in the stoppage time of the first half and the second halves of a match, *minute* takes the values 45 and 90, respectively. Hence, the 45th and 90th minute are 'longer' minutes compared to the other minutes in the data set. Although the exact minutes in the respective stoppage time are in the data set, it is problematic to use this information in this analysis. If a yellow card is given in the first minute of stoppage time at the end of the first half, *minute* would take the value 46. The value would be the same for events in the first minute of the second half, although the situation is considerably different. Hence, *minute* contains only the minutes of the regular game time. Following Buraimo et al. (2010) and Buraimo et al. (2012), the information on minutes in stoppage time is captured by two dummy variables, *45th minute* and *90th Minute*, where *45th minute* takes the value 1 whenever a

yellow card was given in the stoppage time of the first half while *90th minute* is 1 for all yellow cards in the stoppage time of the second half.

It is also reasonable to assume that previous cautions affect a player's behaviour concerning illegal actions, although the direction of this effect is not clear. With respect to the incentive to protest against the referee, the number of yellow cards a team has received at a certain point in a match might increase the probability of dissent by players of this team since a large number of cards could be perceived by players as unfair treatment by the referee and hence cause them to protest against a referee's decisions. A high number of previous yellow cards might also be a consequence of an escalation of illegal contest behaviour between the competing teams and hence lead to further sabotage against the opposing team. At the same time, numerous previous cautions for both the own and the opposing team might be perceived as a higher risk of punishment, which should reduce the probability of all misconducts. The variables *yellow cards prior* and *opponent yellow cards prior* were included in order to control for these potential effects. The former gives the number of yellow cards a team has received before the subject caution, whereas the latter measures the number of yellow cards the opponent team has received. As proposed by Buraimo et al. (2010), the variables *yellow cards last 3 min* and *opponent yellow cards last 3 min* are also included to capture potential dynamics in players' reactions to previous cautions. They contain the number of cautions received by the team of the cautioned player and the opposing team, respectively, within the last 3 minutes before an event and are separated from the number of yellow cards received prior to these time horizons.

To control for difference in team quality, we use the difference in the winning probability of both teams. We derive the *difference in bookmaker probability* from betting odds available on the website www.betexplorer.de, as it provides a comprehensive data base of historical betting odds covering all leagues and seasons in our data set. Betting odds have been used frequently in previous studies as a measure of relative team strength and proven to be a good predictor of the match outcome (Buraimo et al., 2010; Deutscher et al., 2013; Forrest, Goddard, & Simmons, 2005). A particular advantage of this measure is that it not only considers the respective teams' latest results, but also other relevant and recent information, such as injuries and fitness of (key) players, dismissals of coaches, etc. Similar to the case of the goal difference, the variable's square, *difference in bookmaker probability squared*, is included to account for potential non-linearities (Buraimo et al., 2012).

Finally, we include a variable to account for the competitiveness of the respective match. Following Witt (2005), we derive the variable *competitiveness* as the absolute difference in table positions of the competing teams prior to the match of interest weighted by the number of remaining matches in the season. The advantage of this measure, compared to relying on the difference in table positions, is that it accounts for the fact that matches against neighbouring teams in the table gain importance towards the end of the season. Such matches are often referred to as "six-pointers" as the winning team not only receives three points itself, but also denies three points to a direct competitor in the table. Hence,

it could be expected that misconducts increase with the competitiveness of the match. However, this effect might be weaker or non-existent for teams in the middle range of tables that do not compete for the qualification for European competitions next season or the promotion into a higher or the relegation into a lower league.

Another factor that might affect the behaviour of contestants is the atmosphere in the stadium (Deutscher & Schneemann, 2015). Hence, we include the log of the number of spectators at the respective match into the model (*attendance*). Furthermore, strong rivalries among teams might increase the intensity of aggressive behaviour in the respective matches. Following Buraimo et al. (2012), we control for this potential effect by including the variable *derby* that takes the value of 1 if both teams are either local rivals (e.g. Manchester City and Manchester United) or harbour historical rivalries (e.g. FC Barcelona and Real Madrid) and 0 otherwise. Due to previous evidence on a home bias of referees (see, e.g., Dohmen, 2008 and Page & Page, 2010), i.e. referees on average award more yellow cards to away teams, we include the dummy variable *away* taking the value of 1 if the team is the away team and 0 for the home team.

3. Results

For our empirical analysis, we combine the method of Deutscher and Schneemann (2015) with the minute-by-minute approach (Buraimo et al., 2010; Buraimo et al., 2012; del Corral et al., 2010). As the respective dependent variables are bivariate, we use probit models to estimate the probability of a yellow card. Following Buraimo et al. (2010) and Deutscher and Schneemann (2015), we cluster the data by match to account for dependencies of observations within matches. To capture fixed effects of seasons and the different leagues, two sets of dummy variables are included in all specifications. First, we estimate two models to analyse the drivers of dissent-behaviour of players and other misconducts. As a comparison to previous studies that have not differentiated between yellow cards or player types, we also include an estimates based on all yellow cards. Subsequently, we distinguish between the behaviour of team captains and other players.

3.1 Dissents vs. Other Misconducts

In order to differentiate between dissents and other misconducts, we estimate two models, where the endogenous variable in Model 1 only contains yellow cards awarded for dissents, whereas Model 2 covers the remaining yellow cards mainly awarded for foul play. For comparison with the results reported in previous literature, Model 3 contains all yellow cards. The results of the probit regressions are shown in Table 2.

The negative coefficient of *goal difference* in Model 1 implies that the probability of a dissent increases when the goal difference decreases from the perspective of the offending player's team, i.e. players in teams lagging behind in a match are more likely to protest against referee decisions. The coefficient of *goal difference squared*, however, is statistically not significant. The effects of both

control variables differ for aggressive behaviour aimed at the opponent. The *goal difference* also negatively affects the probability of other misconducts, but the coefficient is only significant at the .10 level. The square of this variable negatively affects the probability of other misconducts. This result indicates that when a match is mostly decided (high goal difference), the players' incentive to exert effort is reduced, resulting in fewer severe foul plays. This interpretation is supported by the finding that dissents, which are not as clearly linked to effort as fouls, are not affected by *goal difference squared*.

Table 2: Probit Regressions with Yellow Card awarded for Dissent, Other Misconduct, and All Yellow cards as Dependent Variable

	(1)		(2)		(3)	
Covariate Coefficient	Dissent		Other Misconduct		All	
Goal difference	-0.1489***	(5.06)	-0.0246*	(1.85)	-0.0626***	(4.98)
Goal difference squared	-0.0192	(1.50)	-0.0194***	(2.60)	-0.0179***	(2.83)
Minute	0.0189***	(4.54)	0.0153***	(7.08)	0.0173***	(8.41)
Minute squared	-0.0001*	(1.93)	-0.0001***	(3.09)	-0.0001***	(3.58)
45th Minute	1.5087***	(4.34)	1.5206***	(6.87)	1.8599***	(31.00)
90th Minute	1.0399***	(6.85)	1.1269***	(12.77)	1.3110***	(18.97)
Yellow cards last 3 min	0.0982*	(1.83)	-0.0683	(1.54)	-0.0202	(0.51)
Opponent yellow cards last 3 min	0.0311	(0.48)	0.1703***	(4.79)	0.1489***	(4.63)
Yellow cards prior	-0.0923***	(4.09)	-0.0967***	(6.34)	-0.1050***	(7.60)
Opponent yellow cards prior	-0.0349*	(1.70)	0.0137	(0.91)	0.0005	(0.04)
Difference in bookmaker probability	0.0903	(1.40)	-0.2128***	(4.89)	-0.1441***	(3.56)
Difference in bookmaker probability squared	-0.0622	(0.53)	-0.1249	(0.96)	-0.1154	(0.95)
Competitiveness	-0.0056	(0.54)	-0.0102	(0.98)	-0.0099	(1.00)
Attendance	0.0133	(1.01)	-0.0035	(0.26)	-0.0004	(0.03)
Derby	0.0024	(0.04)	0.0854	(1.45)	0.0744	(1.40)
Away	0.0919**	(2.07)	0.0170	(0.60)	0.0393	(1.51)
Constant	-3.2804***	(19.99)	-2.5121***	(17.66)	-2.5065***	(18.65)
League dummies	Yes		Yes		Yes	
Season dummies	Yes		Yes		Yes	
Observations	41268		41268		41268	
Pseudo R^2	0.070		0.044		0.054	

Absolute *t* statistics in parentheses. Significance: * p<0.10, ** p<0.05, *** p<0.01

The positive and significant coefficient of *minute* and the negative coefficient of *minute squared* indicate that the probability of both dissents and other misconducts increases in the course of a match, however, at a decreasing rate. In all models, the likelihood of both dissents against the referee and foul plays increases in the stoppage time of the first and the second halves.

Previous sanctions in the match also affect the behaviour of players. In all specifications, the number of yellow cards a team received prior to the last three minutes of the subject minute reduces the probability of receiving another caution. This indicates that there is a deterrence effect of previous sanctions of the own team (Buraimo et al., 2010). The more yellow cards a team has received previously in the match, the lower the incentive for a player of this team to risk another yellow card by protesting against the referee's decisions or engaging in severe foul play. While the number of prior cards the opponent team received does not affect other misconducts, it negatively affects the likelihood of dissents. This finding is plausible as motives for dissents include misconducts by the opposing team that are not sanctioned by the referee. Hence, the more often the opponent is sanctioned, the lower the incentive for dissents against the referee.

Dissents and foul plays are adversely affected by yellow cards that both competing teams were recently awarded. In the case of dissents, the coefficient of *yellow cards last 3 min* is positive and weakly significant. This indicates that immediately after a cautioned sabotage of a player from the own team, there is an increased probability for protesting behaviour. In contrast, the number of yellow cards the opponent team received in the last three minutes (*opponent yellow cards last 3 min*) does not affect dissents. With respect to other misconducts, the results are reversed. While recently received yellow cards by the own team are statistically insignificant, the number of yellow cards the opponent received in the last three minutes positively affects the likelihood of other misconducts. This could indicate an escalation of aggressive misconducts among both teams.

According to Model 2, the *difference in bookmaker probability*, which is a measure for the difference in pre-match abilities of both teams, has a significant and negative effect on the probability of a severe foul. The more inferior a team is with respect to its ability compared to the opponent, the more sabotage is used to compensate this disadvantage. In contrast, the *difference in bookmaker probability* does not affect the dissent behaviour of contestants. These findings support previous findings on the effect of ability on sabotage (Balafoutas et al., 2012; Deutscher et al., 2013; Deutscher & Schneemann, 2015). However, our results provide more detailed information on the proposed underlying mechanism – contestants with a lower ability engage more in sabotaging the opponent. This effect can be observed for misconducts aimed at the opposing team directly, i.e. fouls, but not for misconducts aimed at the contest's referee, i.e. dissents.

The reminder of control variables are, with one exception, not statistically significant. The non-significance of the control *competitiveness* might indicate that, on average, incentives for many teams remain constant throughout the course of the season as they do not compete for the qualification to European competitions next season or the promotion into a higher or the relegation into a lower league (Witt, 2005). Like Deutscher and Schneemann (2015), we do not find an effect of *attendance* on misconducts. Furthermore, *derby* has no effect on the probability of any type of cautioned misbehaviour supporting the results of Buraimo et al. (2010) for the German Bundesliga and Buraimo

et al. (2012) for the Spanish Primera Division. Finally, for away teams, we only find an increased probability for dissents, but not for other misconducts.

3.2 Captains vs. Other Players

We now turn to the analysis of differences in the behaviour of captains and other players. The control variables are the same as in our investigation of dissents and other misconducts. However, we now divide the data into yellow cards for any misconduct by team captains and yellow cards for other players. Table 3 summarises the results of this analysis.

Table 3: Probit Regressions with Yellow Card awarded to Captains and Other Players as Dependent Variable

	(4)		(5)	
Covariate Coefficient	Captain		Other Player	
Goal difference	-0.0813***	(3.29)	-0.0559***	(4.35)
Goal difference squared	-0.0131	(0.91)	-0.0176***	(2.91)
Minute	0.0186***	(3.51)	0.0163***	(7.69)
Minute squared	-0.0001*	(1.94)	-0.0001***	(3.19)
45th Minute	1.4744***	(4.39)	1.6229***	(8.10)
90th Minute	0.8453***	(4.18)	1.2473***	(17.15)
Yellow cards last 3 min	0.0366	(0.47)	-0.0300	(0.70)
Opponent yellow cards last 3 min	0.0716	(0.88)	0.1500***	(4.52)
Yellow cards prior	-0.0926***	(2.97)	-0.1005***	(7.06)
Opponent yellow cards prior	0.0271	(1.03)	-0.0045	(0.31)
Difference in bookmaker probability	-0.0356	(0.39)	-0.1507***	(3.62)
Difference in bookmaker probability squared	-0.4173*	(1.81)	-0.0615	(0.51)
Competitiveness	-0.0909**	(2.53)	-0.0023	(0.23)
Attendance	0.0838**	(1.97)	-0.0087	(0.66)
Derby	-0.0384	(0.39)	0.0849	(1.51)
Away	0.0029	(0.05)	0.0427	(1.58)
Constant	-4.2505***	(10.03)	-2.4335***	(17.30)
League dummies	Yes		Yes	
Season dummies	Yes		Yes	
Observations	41268		41268	
Pseudo R^2	0.060		0.050	

Absolute *t* statistics in parentheses. Significance: * p<0.10, ** p<0.05, *** p<0.01

Most of the pre-match and within-match covariates have qualitatively the same effect on the sabotage behaviour of captains and regular players. There are, however, some notable differences between these two contestant types. In contrast to team captains, other players' behaviour is affected by the number of yellow cards the opponent team has received in the last three minutes prior to the subject minute (positive and significant coefficient of *opponent yellow cards last 3 min*). This result could indicate that captains do not participate in retaliatory escalations of conflicts during the match compared to

other players. An explanation could be, e.g., that team leaders are more capable of controlling their emotions (Dupuis et al., 2006).

Furthermore, team captains' sabotage behaviour is not affected by the relative ability of the contesting teams (*difference in bookmaker probability* is not significant). This indicates that the overall result of weaker contestants' more intensive engagement in sabotage seems not to hold for team captains. However, the captains' propensity to receive a yellow card decreases with *difference in bookmaker probability squared*. Hence, in matches with large ability differences, where the own team's ex-ante ability is either notably higher or lower than the opponent's, captains tend to engage more in destructive misconduct. The *attendance* rate seems to only increase the captains' likelihood of receiving a yellow card.

Finally, only team captains are affected by the absolute difference in the table rank of competing teams relative to the remaining matches in the season. The negative and significant coefficient of *competitiveness* suggests that captains increase their effort and also their misconducts in important games. This finding could be related to the effect of prize spread on the behaviour of contestants: the wider the prize spread, the higher the incentives to engage in sabotage (Chowdhury & Gürtler, 2015). del Corral et al. (2010) and Garicano and Palacios-Huerta (2014) provide evidence for increased sabotage after the points for winning a football match were increased from two to three points. The covariate *competitiveness* could measure a similar effect. A match against a neighbouring team in the table, particularly towards the end of the season, does not only provide the chance to receive three points itself, but also to deny three points to a direct competitor in the table (making the game a so called 'six-pointer'), which is a widening of the prize spread compared to other matches.

For completeness, we also combined both approaches presented in Sections 3.1 and 3.2 by differentiating between captains and other players for both dissents and other misconducts. The results are displayed in Table 4 in the Appendix. In the case of other misconducts, the results for captains and other players are similar. However, the results indicate that two of the main effects for other players presented above – the negative effect of ability and the positive effect of a recent yellow card for the opponent on the likelihood of a severe misconduct – are based on aggressive behaviour against the opponent team. Both *difference in bookmaker probability* and *opponent yellow cards last 3 min* have no effect on dissent by other players. The main difference in dissent behaviour between captains and other players relates to both contestant types' reaction to recent sanctions of the own team. The number of yellow cards recently awarded to the own team increases the propensity to dissent by captains, while it has no effect on the dissent behaviour of other players. Finally, when differentiating between contestant types, the statistically weak effect of the goal difference on other misconducts disappears.

4. Discussion and Conclusion

We examine sanctioned misconducts in sports contests. With the analyses presented here, we extend previous insights into sabotage behaviour in sports in two ways: (i) we explicitly differentiate between destructive actions directly aimed at the opposing team, i.e. fouls sanctioned with a yellow card, and (ii) dissents sanctioned with yellow cards, i.e. behaviour aimed at the authority responsible for enforcing the rules of the contest, the referee. This differentiation allows for a more precise analysis of sabotage in sports contests, defined as destructive actions against the opponent. Previous research found that contestants with lower ability engage more in sabotage than stronger athletes/teams (Balafoutas et al., 2012; Deutscher et al., 2013; Deutscher & Schneemann, 2015). We do not find this effect of ability on dissent with the referee, but we find it for misconducts against the opposing team, further supporting the assumption that low ability provides incentives to lower the opponent's output through sabotage.

With respect to dissents, we find that strong/repeated criticism of the referee increases in the case of an unfavourable score. This finding could indicate self-serving (or team-serving) attribution as, e.g., predicted by the attributional theory of motivation and emotion (Weiner, 1985, 1986, for a review, see Allen, Coffee, & Greenlees, 2012). One main prediction of this theory is that individuals attribute success to internal factors, e.g. abilities, and failure to external factors, e.g. bad refereeing (Rees, Ingledew, & Hardy, 2005). Most previous evidence on the attribution effect in sports was derived from surveys of athletes after competitions. In their meta-analysis of 22 questionnaire-based studies in sports settings, Mullen and Riordan (1988) found evidence for the self-serving bias whereas the significance and magnitude was found to be larger for teams than individual athletes. Martin and Carron (2012) compared studies using questionnaires based on the attribution dimensions of Weiner's theory and those using the team-oriented attribution scale developed by Greenlees, Lane, Thelwell, Holder, and Hobson (2005). They confirmed the robustness of the team-serving bias. Lau and Russell (1980) provide evidence on the team-serving bias by analysing comments of players and coaches in newspaper articles on major sports events. Here, we show that this effect can also be observed in the behaviour of players during competitions. Our result that the likelihood of protesting against a referee increases with lagging behind in a match could indicate self-serving attribution during contests.

We further distinguish between the behaviour of captains and other players in the team. Our results indicate that captains use destructive behaviour more strategically and less impulsively. In contrast to other players, captains' misconducts are not affected by relative abilities, i.e. captains of weaker teams do not engage more in sabotage. Captains further do not seem to participate in escalations of foul play, which is in line with previous findings that team captains are better at controlling their emotions (Dupuis et al., 2006). However, particularly in important matches, i.e. matches with a high prize spread, captains seem to exert more effort, resulting in a higher probability of sabotage. Furthermore, only captains are more likely to dissent with the referee if the own team has recently been sanctioned.

Tournaments in other contexts, e.g. tournaments within firms, are often used to provide incentives to exert effort or select the best contestants. However, in line with previous findings, our results show that contests also incentivise undesirable sabotage. A possible measure to prevent, or at least reduce, sabotage is punishment. Our results show that previous sanctions of illegal activities of a team, i.e. the number of yellow cards a team received prior to the subject minute, reduce the probability of misconduct. This indicates that punishments of team members, as long as they can be observed, also lead to a reduction of illegal activities in non-punished individuals.

In spite of the detailed information on within-match dynamics gathered, our study has limitations. Although field studies based on sports contests have the advantage that behaviour can be well observed, information is still not perfect. Analyses based on fouls or yellow cards only contain illegal activities actually observed and interpreted as illegal by the referee. Hence, this information includes wrong referee decisions (false positives) and misses activities not sanctioned by the referee (false negatives). Thus, an interesting aim for further research could be to include information on wrong referee decisions and unpunished sabotage. This information could further prove meaningful in explaining players' dissents with the referee and provide insights into how the effectiveness and fairness of punishment of sabotage affects behaviour in contests.

Appendix

Table 4: Probit Regressions with Yellow Cards for Dissents awarded to Captains and Other Players and Yellow Cards for Other Misconducts awarded to Captains and Other Players as Dependent Variable

	Dissent		Other Misconduct	
	(6)	(7)	(8)	(9)
	Captain	Player	Captain	Player
Goal difference	-0.1312**	-0.1449***	-0.0432	-0.0213
	(2.16)	(5.26)	(1.39)	(1.51)
Goal difference squared	-0.0197	-0.0186	-0.0110	-0.0193**
	(0.69)	(1.57)	(0.79)	(2.51)
Minute	0.0345***	0.0151***	0.0096*	0.0154***
	(3.61)	(3.49)	(1.66)	(6.99)
Minute squared	-0.0002***	-0.0000	-0.0000	-0.0001***
	(2.60)	(1.08)	(0.57)	(3.10)
45th Minute	no obs.	1.5783***	1.6424***	1.2201***
		(4.48)	(4.90)	(4.68)
90th Minute	0.9629***	0.9678***	0.6931**	1.1024***
	(3.66)	(6.46)	(2.57)	(12.05)
Yellow cards last 3 min	0.1850**	0.0613	-0.1241	-0.0596
	(2.00)	(1.03)	(1.08)	(1.30)
Opponent yellow cards last 3 min	-0.0364	0.0396	0.1234	0.1675***
	(0.28)	(0.59)	(1.31)	(4.51)
Yellow cards prior	-0.0813*	-0.0886***	-0.0864**	-0.0933***
	(1.66)	(3.86)	(2.07)	(6.04)
Opponent yellow cards prior	-0.0424	-0.0302	0.0632*	0.0057
	(0.92)	(1.38)	(1.91)	(0.38)
Difference in bookmaker probability	0.0646	0.0917	-0.0903	-0.2157***
	(0.48)	(1.32)	(0.70)	(4.89)
Difference in bookmaker probability squared	-0.4746	0.0438	-0.3827	-0.0946
	(1.29)	(0.41)	(1.42)	(0.71)
Competitiveness	-0.1136*	0.0060	-0.0749*	-0.0047
	(1.67)	(0.57)	(1.79)	(0.43)
Attendance	0.0515	0.0042	0.1111*	-0.0108
	(0.90)	(0.30)	(1.84)	(0.76)
Derby	-0.2362	0.0511	0.0436	0.0833
	(1.11)	(0.78)	(0.42)	(1.31)
Away	0.0708	0.0914*	-0.0440	0.0234
	(0.77)	(1.93)	(0.57)	(0.80)
Constant	-4.5265***	-3.1804***	-4.4940***	-2.4583***
	(7.77)	(19.23)	(7.38)	(16.17)
Observations	41250	41268	40540	41268
Pseudo R^2	0.087	0.065	0.061	0.042

Absolute *t* statistics in parentheses. Significance: * p<0.10, ** p<0.05, *** p<0.01. The variable *45th Minute* is omitted in Model (6) as there are no yellow cards awarded for dissent to captains in the stoppage time of the first half in our data set.

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