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## Working Paper

# Why do referees end their careers and which factors determine the duration of a referee's career?

Diskussionspapiere des Europäischen Instituts für Sozioökonomie e.V., No. 19

## Provided in Cooperation with:

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*Suggested Citation:* Rullang, Christian; Emrich, Eike; Pierdzioch, Christian (2017) : Why do referees end their careers and which factors determine the duration of a referee's career?, Diskussionspapiere des Europäischen Instituts für Sozioökonomie e.V., No. 19, Europäisches Institut für Sozioökonomie e. V., Saarbrücken, <https://doi.org/10.22028/D291-27042>

This Version is available at:

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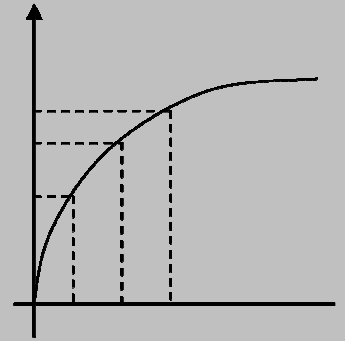
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Nr. 19

Jahr 2017

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# **Why do referees end their careers and which factors determine the duration of a referee's career?**

Christian Rullang, Eike Emrich, Christian Pierdzioch

## **Abstract**

Against the background that the number of referees has been falling in recent years, the German Football Association (DFB) needs to answer two key questions: (i) Why do referees end their careers, and, (ii) which factors determine the duration of referee careers? We studied these questions using data from a questionnaire study of former referees. Results of estimating linear regression models and a Cox model show that the duration of a typical referee career depends, among other factors, on how a referee thinks that the career developing according to his or her plan, and on whether the referee is successful in coping with insults, threats, and violence. The “survival rate” of a referee increases in the subjective evaluation of the importance of football-specific know-how. Approximately 39 % of the former referees stated that the end of their referee career could have been prevented.

**Keywords:** football referee, career duration, end of career, survey data

## **1. Introduction**

Referees and umpires are essential for many sporting competitions because they are a neutral party that monitors players' compliance to the rules of the game. A particularly large number of referees and linesmen officiate at football matches in Germany and in many other countries. With football being the most popular sports in Germany, the German Football Association (Deutscher Fußball-Bund, DFB) is the largest sports association in Germany with approximately 6.9 million members organised in 25,324 clubs<sup>1</sup>. Not a single match, and the DFB organises matches for approximately 162,000 teams in different leagues, could take place without a referee, and the winner of each single match only can

be determined if the rules of the DFB apply to every team in the league and in every match.

In total, 71,521 referees were registered with the DFB as of January 1<sup>st</sup> 2015, including 2,543 female referees. However, the official referee statistics<sup>2</sup> reveal that, in recent years, an absolute annual decrease in total numbers has taken place since 2011 despite the fact that more than 8,000 new referees have been recruited and trained every year. The decrease in the number of referees is a major problem for the DFB because match operations and league competitions can only be maintained if the number of referees remains sufficiently large.

While the DFB and the state-football associations are responsible for the training of referees and the organisation of a referee-monitoring system, the football clubs must delegate a certain number (depending on the number of their teams) of members to act as referees, and the clubs must support the referees by financing their training and/or equipment (kit, tickets, etc.). The result of the interplay between the DFB and the football clubs is a multi-level process that aims at making sure that the number of referees is sufficiently large. Maintaining this process is particularly difficult when, as has been the case in Germany in recent years, media reporting of violence against referees make it rather unattractive to become a football referee<sup>3</sup>.

Against this background, we study empirically why German football referees end their career. We also study factors that determine the duration of a referee career. While most of the earlier literature has used data on active referees, we look at former referees. We pay particular attention to experiences of insults, threats, and violence as factors that may motivate a referee to end his or her career. While our empirical results are of essential importance for the DFB, its state associations, and for German football clubs, our empirical results should be equally interesting for football associations in other countries.

## 2. Earlier research

In recent years, several researchers have analysed stress, burnout, and coping strategies among sports officials in different sports<sup>4</sup>. Results shed light on the influence of numerous factors of stress (i.e., interpersonal conflicts, time pressure, fear of physical harm, etc.) on the intention to end a referee career. Sources of stress like interpersonal conflicts and time pressure are correlated with burnout experiences and age and burnout experiences are linked to turnover thoughts. Taylor et al.<sup>6</sup> report indirect effects of fear of failure, role-culture, and interpersonal conflict on the intention to quit. According to results reported by Dosseville, Rioult and Laborde<sup>7</sup> decision to continue officiating is linked to the main reason for starting officiating: the needs and obligation for sport clubs and sport associations. Interpersonal conflicts, such as threats and verbal aggressions, or a lack of commitment to the sport (no other function such as player, coach or supervisor)<sup>8</sup> can have negative effects on referees' motivation and their performance.

Potential causes of stress, and thus, reasons for why referees end their careers could be experiences of insults, threats, and violence. Several recent studies have shed light on the extent to which referees have become victims of insults, threats, and violence<sup>9</sup>. Vester<sup>10</sup> finds for a sample of 2,602 DFB referees that many referees feel insulted during refereeing (13.4 % of the referees state that they have never experiences insults), while referees experienced less often threats (61.6 % have never experiences threats) or violence (82.7 % have never been a victim of violence). Rullang et al.<sup>11</sup> find similar results using data from a questionnaire study of active football referees in Germany.

Frick<sup>12</sup> analyses the career duration of Bundesliga referees, where the sample period covers the seasons from 1964 to 2008/2009. The average career duration for such referees is 6.3 years<sup>13</sup>, but 18 % drop out of the Bundesliga just after their first season. The duration of the career of a Bundesliga referee depends on the number of matches refereed and age at the beginning of a referee career.

According to Furst<sup>14</sup>, there is an ideology of challenge, fitness, and competence among referees. Gray and Wilson<sup>15</sup> examine the relationship between commitment to and

organisation, relatedness between officials, and the willingness to continue the role of an official over the next two years in Canadian track and field. The results show that the commitment to a sport association has only a minor influence on the intention to continue as compared to the relatedness to the group of officials and the role commitment.

Results of a study of the National Association of Sports Officials (NASO) show, that the main reason for quitting officiating in the first five years are career and job concerns. In addition "... poor sportsmanship by participants, then by spectators, time away from friends and family, low game fees, and relationship with assignors" are top reasons for quitting officiating<sup>16</sup>.

Other studies address issues related to the recruitment and retention of referees<sup>17</sup>. VanYperen<sup>18</sup> shows that enjoyment is linked to the decision to continue refereeing. In addition, fairness of the promotion system and increases in rewards for refereeing (or cost decreases) could reduce turnover among referees, Wicker and Frick<sup>19</sup> examine the effect of role models for the recruitment and retention of football referees. They find a significant positive trickle-down effect of role models.

Johansen<sup>20</sup> shows that passion-based motives play an important role for professional referees, while physical fitness is an important motive for referees who act in amateur leagues. Building on earlier research on voluntary work<sup>21</sup>, Emrich et al.<sup>22</sup> study the motives of active DFB referees from an economic perspective, where they differentiate between altruistic motives (public-goods model) and non-altruistic motives (private-consumption model and human-capital model). They show that particularly those referees who interpret their refereeing as a voluntary activity tend to have stronger altruistic motives than those referees who do not see their refereeing as a voluntary activity. Consistent with the public-goods models, referees with strong altruistic motives express that they are willing to end their career in case their club can recruit a sufficiently large number of other referees.

Rullang, Emrich and Pierdzioch<sup>23</sup> study the self-perception of referees, particularly the factors that referees think are important for being a good referee. In their study, they differentiate between four factors (knowledge of the rules and confident demeanour;

interpretation of the rules and specific refereeing know-how; physique, and personal appearance) that play an important role in this regard. Across all league levels, knowledge of the rules and confident demeanour is the most important factors. While the significance attributed to the factor physique increases in the league level the importance attributed to personal appearance and interpretation of the rules does not display a uniform tendency in this regard.

Rullang, Emrich and Pierdzioch<sup>24</sup> discuss the role of authority as a specific form of respected power for the acceptance of the referee on the field, building on earlier research by Emrich and Papathanassiou<sup>25</sup>. They differentiate between functional, institutionally derived, and personal authority. Functional authority includes knowledge of rules and confident demeanour as well as interpretation of the rules and knowledge from refereeing experience, i.e., special knowledge and skills in accordance with Hartmann's<sup>26</sup> concept of functional authority. Personal authority comprises the factors physique and personal appearance.

### **3. Method**

Former referees in four football state associations<sup>27</sup> within the DFB were asked questions concerning their referee activity, building on an earlier questionnaire study by Rullang et al.<sup>28</sup>. The online questionnaire was available between January 23<sup>th</sup> and March 16<sup>th</sup> 2014. The former referees were contacted by the state associations, which encouraged them to participate in the survey. A total of 1,148 former referees<sup>29</sup> participated in the questionnaire. The questionnaire comprised a total of five topic blocks (recruitment, course of career, problems and pressures, drop out, and sociodemographic data).

### **4. Results**

Several authors have shed light on factors which determine the recruitment, retention and dropping out of referees in different sports. Most of these authors, however, have derived their results based on data for active referees, whereas we report in this research results based on data for former referees. The referees who took part in our questionnaire study



ended their referee career between the years 2000 and 2013. They refereed at all league levels within the DFB (3 worked on the FIFA level, 16 on the DFB level, 45 on the national, 193 on the state level, 365 on the regional level and 496 on the district level). On average, they refereed 8.41 ( $\pm 9.06$ ) years. The average age when starting refereeing was 22.03 ( $\pm 9.63$ ) and the average age at the end of the referee career was 29.95 ( $\pm 14.21$ ) years. In total, 38.68 % of the referees stated that the end of their career could have been prevented. A total of 60 referees changed their state association during their career. The change was unproblematic for 40 of these referees, while 20 reported problems (i.e., a referee-league licence is not accepted by the new state association; referees have to restart again refereeing at the lowest league level; no matches are allocated to them).

### **Which factors trigger the end of a referees' career?**

The referees were asked about the reasons for why they had ended their careers. The reasons are shown, separately for those referees who stated that the career end could have been prevented and those who stated that the career end could not have been prevented, in Table 1.

Table 1: Reasons for ending refereeing

	Departure could have been prevented	Departure could not have been prevented
<b>N</b>	<b>429</b>	<b>680</b>
<b>Reasons for dropping out</b>	<b>Percentage</b>	<b>Percentage</b>
Problems with responsible persons (referee observers)	43.59	7.21
Professional reasons	26.11	46.47
Unjustified/subjective assessment of refereeing performance	23.78	5.74
Private reasons	22.14	39.26
Did not want to be insulted any longer	22.14	17.65
Insufficient compensation	21.45	10.88
Wanted more time for other hobbies	21.21	28.38
Not considered for promotion	20.98	2.94
Other	18.18	13.68
Lost interest	14.22	15.59

Experienced violence	6.76	1.91
Injury	6.06	17.21
Could not withstand the pressure	5.13	3.97
Age limit	2.8	5.29

For those referees who stated that their departure could have been prevented the top reasons for dropping out are problems with the responsible persons within the football association<sup>30</sup>. Other frequently mentioned reasons for dropping out within this group are an unjustified or perceived subjective assessment of their refereeing performance, professional or private reasons, being insulted, and insufficient compensation for expenses. For those referees who stated that the departure could not have been prevented the top reasons for their career end are professional or private reasons. Only 7.21 % of these referees mentioned problems with the responsible persons within the association.

#### **Which factors determine the duration of the refereeing career?**

Linear regression models were estimated to examine factors that determine the duration of a refereeing career. Due to the explorative character of our study, a total of five models were estimated, where models differ in terms of the explanatory variables being considered. Model 1 only features personal factors, Model 2 also includes factors related to the experiences made during a referee career, Model 3 adds factors related to the assessment of the referee career, Model 4 adds experiences with insults, threats, and violence, and Model 5 includes motives for starting refereeing and the functional and personal authority as additional factors. Table 2 depicts summary statistics of all variables being used in the regression models. In addition, we estimated Cox models<sup>31</sup> and computed Kaplan-Meier survival curves for the significant explanatory variables. In total, we could estimate the linear regression models and the Cox model on 503 data, after removing missing data.

Table 2: Descriptive statistics

<b>Variable</b>	<b>Scale</b>	<b>Obs.</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min.</b>	<b>Max.</b>
Change of state ass.	3-Point-scale	503	1.07	0.33	1	3
Violence	3-Point-scale	503	1.19	0.45	1	3
Insult	5-Point-scale	502	2.97	0.87	1	5
Threat	5-Point-scale	503	1.91	0.92	1	5
Course of career	5-Point-scale	503	2.86	1.19	1	5
Training	5-Point-scale	502	2.63	1.61	1	5
Expenses	5-Point-scale	502	2.18	0.67	1	4
Match class	6-Point-scale	494	5.47	0.75	2	6
Active footballer	6-Point-scale	503	3.84	1.76	1	6
Sex	dichotomous	503	1.92	0.25	1	2
Voluntary departure	dichotomous	502	1.19	0.40	1	2
Desire for promotion	dichotomous	502	1.19	0.46	1	2
Prevention	dichotomous	501	1.63	0.48	1	2
Family member was a referee	dichotomous	503	1.17	0.37	1	2
Age at start	metric	503	21.06	8.96	14	55
Age at departure	metric	503	29.25	13.26	15	72
Training time	metric	391	3.78	2.46	0	15
Invested time	metric	503	7.74	5.97	0	60

Table 3 summarises the estimation results for the linear regression models. Model 1, which features personal factors like gender, age, and the proportion of expenses to income, has only a limited explanatory power (adjusted  $R^2=0.06$ ). The explanatory power increases when we included the experience as an active football player in the regression model (Model 2). Model 3 shows that, as one would have expected, promotion to the professional level has a significant positive effect on the duration of football career. Those referees who reach the professional level start refereeing at the amateur level and move up in the rankings, which takes time. Additionally, those who only last a short time as a referee only referee at the amateur level. The effect of becoming a victim of threats or violence, is only small (increase of the  $R^2$  from Model 3 to Model 4: 0.02). In Model 5, some personal characteristics have no significant influence on the duration of a referee's career. Conversely, both the evaluation of the level of expenses and the assessment that a referee's

career did not run as planned have significant explanatory power. Duration is negatively linked to a higher level of expenses relative to income. While a referee's labour supply curve can assume complex functional form depending on substitutability and income effects, this result perhaps simply reflects that a low income implies that a referee cannot afford spending much time on refereeing. Duration decreases, as one would have expected, if a referee's career did not run as planned.

Active playing experience also has a significant influence on the duration of the referee career. Particularly those referees who played football actively before their referee career and who 'sacrificed' this for their refereeing by stopping playing remain referees for longer time than those who never played. The forms of authority also have a significant influence. This is also valid for the variable 'threatened at least once and physically attacked'. The lack of problems in changing state association also seems to play a role.

Table 3: Results of linear regressions

	Model 1	Model 2	Model 3	Model 4	Model 5
Age at start	0.115** (2.73)	0.0936* (2.29)	0.117** (2.92)	0.117** (2.96)	0.0162 (0.37)
Sex (female)	Ref.	Ref.	Ref.	Ref.	Ref.
Male	4.749*** (3.33)	3.060* (2.26)	3.109* (2.39)	2.523+ (1.96)	2.196+ (1.77)
Proportion of expenses to income (in %)	-0.0634** (-2.84)	-0.0629** (-3.00)	-0.0570** (-2.81)	-0.0522** (-2.61)	-0.0469* (-2.41)
Family member was already a referee (No)	Ref.	Ref.	Ref.	Ref.	Ref.
Yes	0.504 (0.52)	0.847 (0.93)	0.887 (1.02)	0.680 (0.79)	0.862 (1.04)
Played actively (never played)		Ref.	Ref.	Ref.	Ref.
Played football before becoming a referee		3.173* (2.23)	3.438* (2.53)	3.174* (2.36)	2.569* (1.97)
Played football during entire referee career		0.851 (0.55)	2.300 (1.56)	2.017 (1.39)	1.127 (0.80)
Played football at the start and stopped playing for the referee role		6.672*** (4.26)	6.852*** (4.58)	6.233*** (4.22)	5.387*** (3.76)
Played at the start and stopped playing for other reasons		4.775** (2.85)	5.364*** (3.36)	4.667** (2.95)	3.494* (2.26)
Still an active player		-2.065 (-1.49)	-0.332 (-0.25)	-0.267 (-0.20)	-1.292 (-0.99)
Course of referee career (completely as planned)			Ref.	Ref.	Ref.
Mostly as planned			-1.777 (-1.63)	-1.825+ (-1.68)	-1.554 (-1.48)
Partly as planned			-1.329 (-1.19)	-1.100 (-0.99)	-0.949 (-0.88)
Hardly as planned			-3.099** (-2.71)	-2.954** (-2.60)	-2.680* (-2.41)
Not at all as planned			-3.196* (-2.28)	-3.336* (-2.41)	-3.380* (-2.52)

Highest performance level (amateur sector)			Ref.	Ref.	Ref.
Professional sector <sup>32</sup>			7.629 <sup>***</sup> (4.86)	7.016 <sup>***</sup> (4.53)	6.718 <sup>***</sup> (4.49)
Change in state assoc. (No)			Ref.	Ref.	Ref.
Yes, without problems			5.952 <sup>**</sup> (3.05)	5.212 <sup>**</sup> (2.70)	5.268 <sup>**</sup> (2.82)
Yes, with problems			4.930 <sup>*</sup> (2.16)	4.145 <sup>+</sup> (1.84)	3.982 <sup>+</sup> (1.83)
Invested time: ... hours per week			0.107 <sup>+</sup> (1.82)	0.0766 (1.32)	0.0746 (1.32)
victimization (totally unaffected)				Ref.	Ref.
Threatened at least once				1.176 (1.61)	0.723 (1.02)
Attacked physically at least once				5.998 <sup>+</sup> (1.80)	4.945 (1.53)
Threatened at least once & physically attacked				4.366 <sup>***</sup> (4.32)	4.152 <sup>***</sup> (4.25)
Altruistic motive					1.702 (1.50)
Functional authority					27.14 <sup>***</sup> (5.45)
Personal authority					-8.978 <sup>+</sup> (-1.94)
Constants	1.830 (1.13)	2.189 (1.12)	1.061 (0.50)	0.825 (0.39)	-12.91 <sup>***</sup> (-3.52)
N	503	503	503	503	503
R <sup>2</sup>	0.063	0.192	0.282	0.312	0.363
Adjusted R <sup>2</sup>	0.055	0.177	0.257	0.283	0.332
<i>t</i> Statistic in brackets; <sup>+</sup> $p < 0.10$ , <sup>*</sup> $p < 0.05$ , <sup>**</sup> $p < 0.01$ , <sup>***</sup> $p < 0.001$					

Table 4: Cox model

	coefficient	t-value
Age at start	-0.004	-0.59
Sex (female)	Ref.	Ref.
Male	-0.705***	-3.78
Proportion of expenses to income (in %)	0.010***	3.40
Family member was already a referee (No)	Ref.	Ref.
Yes	-0.191	-1.53
Played actively (never played)	Ref.	Ref.
Played before role as referee	-0.376+	-1.96
Played during entire referee career	-0.113	-0.56
Played football at the start and stopped playing for the referee role	-0.665**	-3.17
Played football at the start and stopped playing for other reasons	-0.333	-1.47
Still an active player	0.310	1.62
Course of referee career (completely as planned)	Ref.	Ref.
Mostly as planned	0.178	1.14
Partly as planned	0.102	0.64
Hardly as planned	0.327*	(1.96)
Not at all as planned	0.582**	2.94
Highest level (amateur sector)	Ref.	Ref.
Professional sector	-0.770***	-3.41
Change of state assoc. (No)	Ref.	Ref.
Yes, without problems	-0.503+	-1.82
Yes, with problems	-0.344	-1.08
Invested time: ... hours per week	-0.015+	-1.66
victimization (totally unaffected)	Ref.	Ref.
Threatened at least once	-0.217*	-2.09
Physically attacked at least once	-0.520	-1.10
Threatened at least once and physically attacked	-0.552***	-3.88
Altruistic motive	-0.267	-1.50
Functional authority	-3.847***	-5.18
Personal authority	1.410*	2.07
N	503	

Table 4 summarises the estimation results for the Cox model. Estimation results resemble the estimation results for the linear regression model (Model 5) with regard to the significance of the coefficients. The Cox model has the advantage, however, that we can compute Kaplan-Meier survival curves to illustrate our empirical results. Figure 1 shows the Kaplan-Meier curves for the explanatory variables that refer to the experience as an active football player and the assessment of the course of the referee career. The Kaplan-Meier curve assumes the largest value for those referees who gave up their football career for refereeing, that is, those referees who very likely made a ‘sacrifice’ for refereeing. The survival rates for the group of referees who are still playing active football and for those referees who never played football are comparatively the lowest. The first group may prefer to choose their beloved football while the second group may be lacking loyalty to football as a sport, or the loyalty is less pronounced as compared to referees who are former active football players. The survival rates are largest, in turn, for those referees who stated that their career had progressed (completely) as planned. The curve is lowest for those referees who stated that their career had not progressed at all according to their plans.

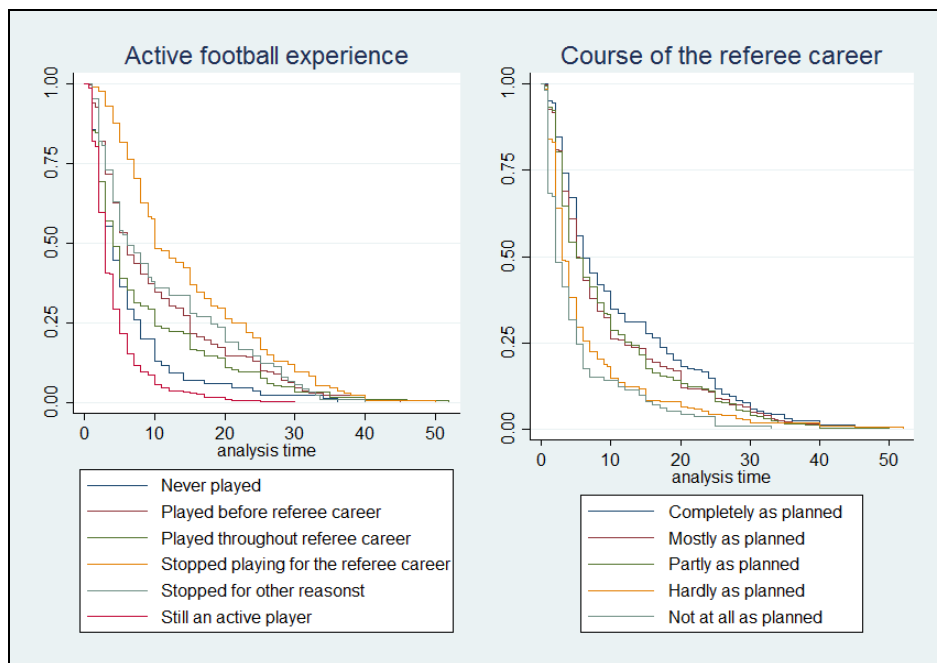


Figure 1: Kaplan-Meier survival curves for the variables active player experience and course of the refereeing career

Figure 2 shows the survival rates for the variables ‘change in state association’ and ‘victimization’. Referees who had changed the state association during their career stayed on average for a longer time as referee who never changed. An interesting result is that the survival rate is higher for those referees for whom the change involved problems than for those without problems. An explanation for this result is that the occurrence of problems (that is, bureaucratic obstacles) drives ambition, so that the



activity is continued because of the problems that were mastered. With regard to the variable victimization, the survival rate increases from ‘totally unaffected’ to threatened at least once and physically attacked’. In this regard, it seems that those referees who had experienced rejection in the form of threats or violence had developed coping strategies<sup>33</sup>. Thus, referees seem to continue their career for a longer period of time once they know that they can cope with the negative experiences they had made.

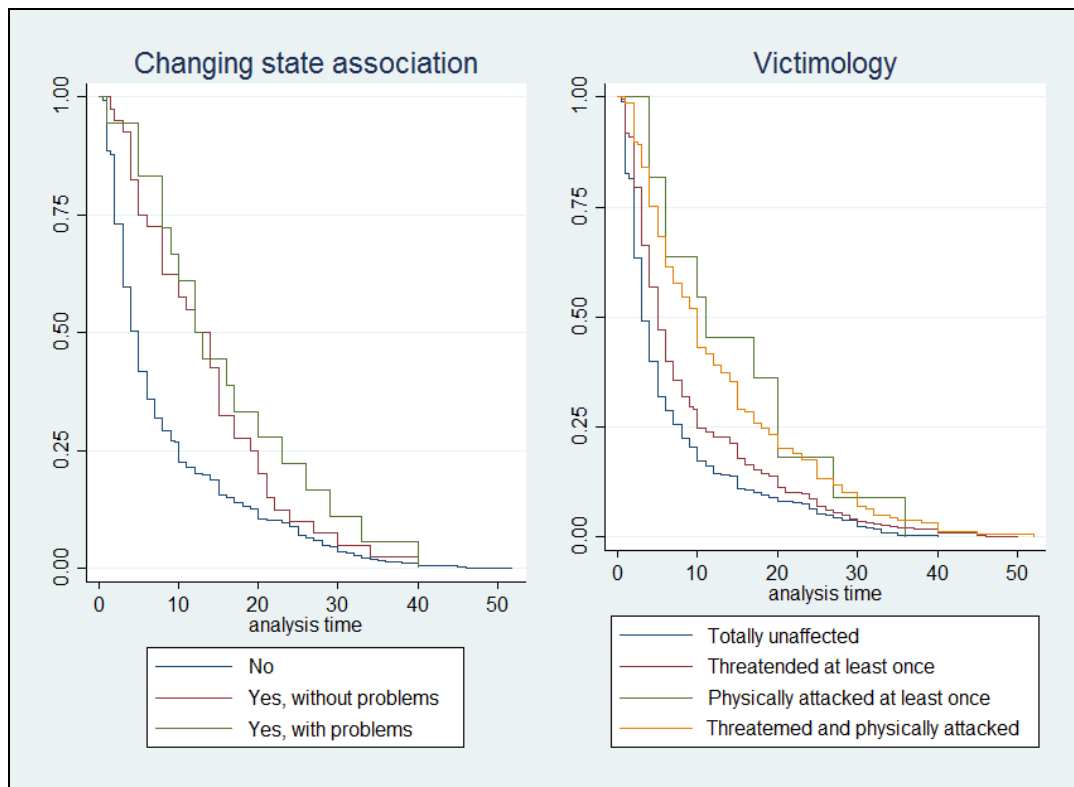


Figure 2: Kaplan-Meier survival rates for the variables change of state association and becoming a victim

Figure 3 summarises the influence of several significant variables. The variables ‘invested time’ and ‘personal and functional authorities’ were summarised in four categories for the graphic depiction. The category limits were placed at the quartile limits of each variable. The survival rate (see figure 3 top left) for male referees is higher than for female referees. The referees who spent a lot of time (more than 10 hours per week) in their referee activity have the lowest curve while we observe the highest curve for those referees who spent between one and three hours per week on refereeing. Considerations regarding time restrictions and the opportunity costs of refereeing, thus, seem to play a role for the decision to continue refereeing. The referees who reach the professional sector (DFB list or national level) stay on average longer than the referees who stay in the amateur sector (moving up in the rankings takes time).

The survival rate increases as the subjective values of personal and functional authority increase. Those referees who state that functional authority is particularly important have the highest survival rate. Thus, a special referee-specific knowledge, trained and accumulated in many games, combined with a high level of conscientiousness increases the duration of a referee career.

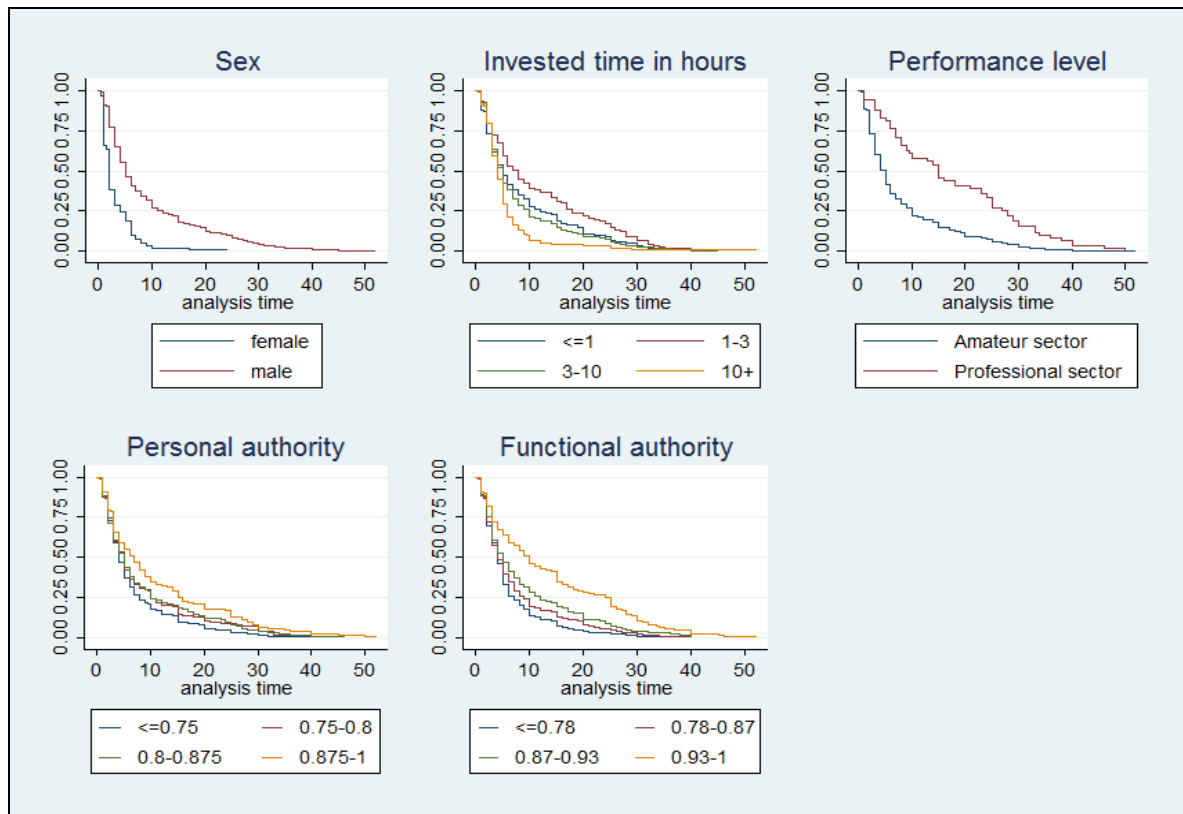


Figure 3: Kaplan-Meier survival rates for the variables sex, invested time, performance level, personal and functional authority

## 5. Discussion

Referees are essential for any league and cup match organised by football associations. Referees ensure that the rules are upheld during every game and, thus, that championship and cup competitions can take place. League and cup competitions would not be possible without a neutral party, the referee. A key problem of the German football association is that, as official statistics show, the number of referees has been decreasing in recent years, even though a substantial number of referees have been recruited and trained every year.

We studied the reasons for why former referees ended their career and we analysed the factors which determine the duration of a referee career. Approximately 39 % of the former referees stated that the end of their referee career could have been prevented. While one should take into account when

interpreting these results that people who quit a job would likely say their departure could have been prevented (which does not necessarily mean it could), it is interesting to note that personal problems with the responsible persons (like referee observers) in the association, professional reasons, and a subjective impression that performance assessments were not justified were named frequently by referees as reasons for why they ended their referee career. These reasons for departure could be resolved easily in part by the associations, for example by appointing a contact person for referees. A transparent system for the promotion and relegation of referees would also be help to reduce the feeling of having been passed over. As for the referees who stated that their departure could not have been prevented, the reasons that were named most frequently for end the career were professional and private reasons. Such referees could perhaps be convinced to continue refereeing if there was a possibility to take a timeout, which is already possible in some places, or if the duty matches could be reduced on short notice for certain periods.

The Kaplan-Meier survival curves demonstrate that, with the exception of those referees who stopped playing football in order to start refereeing and who reached the professional sector, many referees end refereeing in the first few years. These dropouts are particularly problematic for the associations and the clubs because the time and money invested in the training of the referees is lost. The analysis of the Kaplan-Meier curves further shows that referees who have no experience as active football player have the lowest curve while those who stop playing football actively in order to take up a refereeing position have the highest curve. Thus, it would be advisable for a successful, longer-term recruitment of new referees to contact active players who may be at the end of their active playing career or who no longer have the opportunity to invest time in training during the week but who would like to stay with football. In this regard, it is interesting to note that the highest curve can be observed for those referees who invest a total of one to three hours per week in the refereeing position. This is substantially less than active players generally invest.

With regard to victimization it is remarkable that referees who became victims of threats and violence have the highest survival curves. This result indicates that the referees have learnt to cope with such negative experiences. For referee training, this means that the association should prepare the referees for this kind of scenario. The trainee referees should also be shown realistic courses of 'referee careers' during training. This is also shown in the graphic depiction of the variable 'course of career'. Those who had careers that ran according to plan, so those who had a realistic view of the course of their refereeing careers and for whom this view as fulfilled, remained longer in their positions than those who had been disappointed by the course and may have had inflated expectations of their referee career beforehand.

The referees for whom functional authority was particularly important for a good referee have a higher survival curve than those for whom functional authority was not of great importance. This is also a point that should be noted in the training of new referees. Knowing about their function and their significance for the game and the competition thus appears to strengthen referees and helps to reduce the probability of them dropping out. Overall, our empirical results thus lead to the supposition that the duration of referee careers could be extended through alterations of the training system.

## Notes

<sup>1</sup> DFB, *statistics of members 2015*

<sup>2</sup> DFB, *statistics of referees 2015*

<sup>3</sup> see Dürr, *referee gets beat up*; Eberle and Neumann, *Violence Against Referees Spikes in Germany*; Owen, *Violence at children's football game "out of control"*; and others

<sup>4</sup> see Rainey and Hardy, *Sources of Stress among Basketball and Softball Umpires*; Taylor, Daniel, Leith and Burke, *Perceived stress, psychological burnout and paths to turnover intentions among sport officials*; Voight, *Sources of stress and coping strategies of US soccer officials*

<sup>5</sup> Raney and Hardy, *Sources of Stress, Burnout and Intention to Terminate among Rugby Union Referees*

<sup>6</sup> Taylor et al., *Perceived stress, psychological burnout and paths to turnover intentions among sport officials*

<sup>7</sup> Dosseville, Rioult and Laborde, *Why do Sports Officials Dropout?*

<sup>8</sup> Dosseville et al., *Why do Sports Officials Dropout?*, p. 8

<sup>9</sup> see Lützenkirchen, *aggression and violence in football*; Lützenkirchen, *football and violence*; Vester, *new policies against violence*; Vester, *referee as target*; Vester, *more often, more violence*; Rullang, Emrich and Pierdzioch 2015a, *How often are referees victims of insults, threats and violence*

<sup>10</sup> Vester, *referee as target*

<sup>11</sup> Rullang et al. *how often get referees victim*

<sup>12</sup> Frick, *Career Duration on Professional Football*

<sup>13</sup> Frick, *Career Duration on Professional Football*, p. 489

<sup>14</sup> Furst, *Career Contingencies*, p. 100

<sup>15</sup> Gray and Wilson, *Relationship Between Organizational Commitment, Perceived Relatedness, and Intentions to Continue*

<sup>16</sup> Sabaini, *How to get & keep officials*, p. 15

<sup>17</sup> see VanYperen, *Predicting Stay/Leave Behaviour*; Titlebaum, Haberlin and Titlebaum, *Recruitment and Retention of Sports Officials*; Wicker and Frick, *Recruitment and Retention of Referees*

<sup>18</sup> VanYperen, *Predicting Stay/Leave Behaviour*, p. 437

<sup>19</sup> Wicker and Frick, *Recruitment and Retention of Referees*

<sup>20</sup> Johansen, *Reasons for officiating soccer*

<sup>21</sup> see Emrich et al., *Motives of volunteers in football*; Flatau et al., *Empirical tests of the homo (socio-) economicus model*; Emrich and Pierdzioch, *Testing economic models of volunteer labor supply*

<sup>22</sup> Emrich et al., *For the Love of football?*

<sup>23</sup> Rullang, Emrich and Pierdzioch, *With a Carrot and a Whistle*

<sup>24</sup> see note 23

<sup>25</sup> Emrich und Papathanassiou, *The referee as the keeper of the rules*

<sup>26</sup> Hartmann, *functional authority*

<sup>27</sup> In Germany, there are 21 state associations that are responsible for the organization of football matches up to the regional leagues. The football clubs are members of the state associations.

<sup>28</sup> see note 23 and Rullang et al., *How often are referees victims of insults, threats and violence*

<sup>29</sup> The four state associations had 8,290 e-mail addresses of former referees. We do not have information on how many former referees did not receive the e-mail.

<sup>30</sup> according to the results of Sabaini, *How to get & keep officials*

<sup>31</sup> Cox, *Regression models and life table*

<sup>32</sup> Professional sector are FIFA-list, DFB-list or national level. In the model there are only 10 person (1 DFB-list, 9 national level; no international level) who have refereed on professional sector.

<sup>33</sup> see Vester, *referee as target*; Rullang et al., *How often are referees victims of insults, threats and violence*

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