

Manuscript version: Working paper (or pre-print)

The version presented here is a Working Paper (or 'pre-print') that may be later published elsewhere.

Persistent WRAP URL:

<http://wrap.warwick.ac.uk/115170>

How to cite:

Please refer to the repository item page, detailed above, for the most recent bibliographic citation information. If a published version is known of, the repository item page linked to above, will contain details on accessing it.

Copyright and reuse:

The Warwick Research Archive Portal (WRAP) makes this work by researchers of the University of Warwick available open access under the following conditions.

Copyright © and all moral rights to the version of the paper presented here belong to the individual author(s) and/or other copyright owners. To the extent reasonable and practicable the material made available in WRAP has been checked for eligibility before being made available.

Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge. Provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.

Publisher's statement:

Please refer to the repository item page, publisher's statement section, for further information.

For more information, please contact the WRAP Team at: wrap@warwick.ac.uk.

Old Firm football matches and traffic crashes

George Dunbar

University of Warwick

Author Note

Acknowledgements: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Abstract

Previous research has identified an association between a particular soccer match between long-standing rivals, and domestic violence. On match days, police records of domestic violence increased compared to control days. The present study investigated whether there was also a link in traffic crash data, where driver aggression is believed to contribute to the risk of an incident. Police recorded incidents were compared between match days and control days one week before and one week afterwards, for the period 2005-2014 in the Strathclyde region of Scotland, UK. Evidence was found only for a rise in total incidents, including all levels of injury severity, compared to one week before. When data was limited to serious or fatal injury, there was no evidence for a link.

Keywords: sporting rivalry, traffic crash, accident, driver aggression, psychology of religion

Old Firm football matches and traffic crashes

Williams, Neville, House, & Donnelly (2013) demonstrated a link between “Old Firm” football matches and domestic violence. Old Firm matches take place between the two major, evenly matched, clubs based in Glasgow, Scotland, who have played each other regularly since the late 19th century. The rivalry has sectarian religious components, each club being traditionally, though crudely, linked to different strands of Christian religion (Rangers, protestant; Celtic, Catholic), and the division is aligned with Irish sectarian politics. Williams et al. (2013) found that on the day of a match between these teams, domestic violence increased in the Strathclyde police region, the region including Glasgow and its surrounds. That is, police records of men being violent towards their partners increased locally in the wake of these matches, compared to the corresponding day one week later. After reviewing past research on the psychology of sports team support and rivalry, the present study extends this analysis to road accidents.

Sports Team Supporters

Why might there be a link between a sports contest and aggressive behavior in the community? A great deal of psychological research has investigated the relationship supporters have with sports teams, and this work suggests some plausible mechanisms. It is important to bear in mind that supporters of sports teams are not a homogenous group. They vary among themselves in degree of fervour and commitment. This section reviews evidence for such differences, describes the principal psychological framework relating team support to identity, and situates the rivalry between Celtic and Rangers in that context.

Identification with the team

Supporters vary in the degree and nature of their identification with the team, and this is associated with different psychological responses to team performance (e.g. Sloan, 1979; Wann & Branscombe, 1990). Wann and Branscombe (1990) explored two complementary

processes, Basking in Reflected Glory (Cialdini et al., 1976) and Cutting off Reflected Failure (Snyder, Lassegard, & Ford, 1986). These processes, respectively, involve aligning more closely with successful groups, to raise self-esteem, and distancing from groups that are not successful, as an ego defence. Supporters who identified more strongly with a team were more like to bask in reflected glory and less likely to distance themselves from the team when it did poorly. They found that supporters who identified highly reported greater enjoyment than those with lower identification from following the college basketball team, whether the team was successful or not successful. Wann and Branscombe (1993) studied supporters of a particular college basketball team enjoying a successful season. They found that those with higher identification made more internal attributions, attributing success to qualities of the team, and were more likely to believe that fellow supporters of the team are special.

Subsequent research has shown that highly identifying fans are more likely to attend games against a rival, and to gain more satisfaction from victory (Havard, Eddy, & Ryan, 2016). Fans with lower identification prefer entertainment and sociability, while those with higher identification have more self-defining motives (Gau, James, & Kim, 2009). In response to defeat, low identifiers feel sad, high identifiers feel anger (Crisp, Heuston, Farr, & Turner, 2007).

Supporters who identify strongly with a team also have more negative attitudes towards rivals. Wann and colleagues have shown that high identifiers are more willing to say that they would injure a rival team member if they could do it anonymously (Wann, Carlson & Schrader, 1999; Wann, Haynes, McLean, & Pullen, 2003; Wann, Peterson, Cothran, & Dykes, 1999), particularly in response to a defeat (Wann, et al., 2005). Importantly, there appears to be no overall correlation with trait aggression (Wann, Fahl, Erdmann, & Littleton, 1999). Furthermore, willingness to anonymously attack sports rivals is not related to general

willingness to murder (Wann, Peterson, Cothran, & Dykes, 1999). That is, this aggression is specific to the sports context.

Research in the Czech Republic has found that more active soccer supporters, those leading singing for instance, were more tolerant of vulgar chants directed at the opposition or game officials, and the illicit detonation of fireworks at matches (Scholz, 2016b). Using an experimental design, van der Meij et al. (2015) showed soccer fans highlights of a match in which their team lost to rivals, and measured aggression by asking what dose of “hot sauce” they would oblige a rival fan to eat. Aggression was increased when the fairness of refereeing was in question. It was also lowered if they attributed failure to their own team.

Neuropsychological research has demonstrated a similar effect. Fans of rival baseball clubs showed a response in the ventral striatum, an area associated with pleasure and reward, when viewing either their own team succeed or the rival fail (Cikara, Botvinik, & Fiske, 2011).

This response correlated with a self-reported rating of how likely it was they would be aggressive towards a rival fan. Support for a team and denigration of its rival are inter-linked.

Social identity theory

This evidence of varying team identification and aggression towards others has been analysed in a number of specific ways, often drawing on the core ideas of social identity theory (Tajfel & Turner, 1979). On this view, people evaluate their own merit or situation in part on the basis of their membership of certain social groupings. The fate of the group thus influences their self-perception. In a similar way, evaluations of others are made on the basis of categorisation as members of particular social groups. Self-categorisation and comparison with members of other groups creates a social identity. For example, someone who supports a successful club can recruit the status of the club to enhance their own self-esteem, Basking in Reflected Glory as described above (Cialdini et al., 1976; Snyder et al., 1986; Wann & Branscombe, 1990). For these supporters, failure of the rival can have similar value (Cikara

et al., 2011; Havard, 2014). Conversely, success of a rival can be a threat to this identity. There are various ways in which a group can respond to this success, but it can lead to conflict and competition, particularly since the rival can directly frustrate the group's own ambition in an arena such as sport.

Group membership, history and the Old Firm

Experiments using the minimal group paradigm have demonstrated that even nominal and arbitrary differences in group membership can affect behaviour (Tajfel, Billig, Bundy, & Flament, 1971). For sports supporters, however, the affiliation is often long-term, enduring, and framed within a historical narrative (cf. Scholz, 2016b). In a study of a re-structured competition in which former rivals no longer competed directly, supporters retained negative perceptions of the rival, with a minority remaining willing to say they would commit anonymous acts of aggression towards fans and team members of the rival, even after three or four years of the new arrangement (Havard, Wann, & Ryan, 2013, 2017).

History is important to the supporters of Celtic and Rangers (e.g. Finn, 1991). The rivalry between them has existed since the Celtic club, set up by the Catholic community to raise money for the poor, played its first match, against Rangers, in 1888. Rangers, a predominantly protestant club, had been founded 15 years earlier in the same city. Scottish society then was dominated by the protestant religion, and a large portion of the Catholic community were economic migrants from Ireland, obliged to live in poorer districts (Handley, 1947). Celtic and Rangers both became highly successful in national soccer competitions. Since 1890, approximately 85% of Scottish league titles have been won by one or other club, each victorious in about 50 seasons. These circumstances, frequency of competition, geographical closeness, cultural difference and sporting parity, have been found to enhance rivalry (Tyler & Cobbs, 2015).

Aggression in the community

There is evidence that aggression increases in a community in the wake of a major team sport event. Coons, Howard-Hamilton, and Waryold (1995) found an increase in student disciplinary cases on weekends when the college football team played, particularly following home victories. A more recent study, carried out over seasons 2000-2005 found an increase in assaults, vandalism, disorderly and drunken behaviour in places where college football matches were staged, especially following unexpected results (Rees & Schnepel, 2009). Aggressive behavior and violence among supporters have routinely accompanied Old Firm matches, even if some reports have exaggerated the prevalence of such extreme acts as murder (Bruce, 2014). Their supporters have also been involved in mass riots at games involving different opponents (Millward, 2009). Williams et al. (2013) have confirmed an association between Old Firm matches and domestic violence. The present study examines whether this spillover can be demonstrated in another situation of potential conflict, away from the immediate context of the match and direct confrontation with rivals.

Aggressive driving has been identified as an important factor in traffic accidents (e.g. AAA Foundation for Traffic Safety, 2009), although Nabi et al. (2006) found only limited evidence for any role of trait aggression or hostility. While domestic violence tends to occur 'behind closed doors', unseen outside the immediate family, driving occurs in the public road environment. Nevertheless, it is clear that drivers, and particularly aggressive drivers, perceive a degree of relative anonymity, and that this can be associated with increased aggressive behavior (Harris & Houston, 2010; Wiesenthal & Janovjak, 1992). It is therefore plausible that the psychological mechanisms converting those feelings aroused by a football match into aggression within the home could also influence driving.

The present study takes a population-based approach, following Williams et al. (2013). The dataset used is the police record of road incidents resulting in injury. These will, of course, include incidents where there is no aggressive behavior involved. However, given

the high estimate of the involvement of aggressive behavior in crashes (AAA Foundation for Traffic Safety, 2009), if population aggression increases on a given day, and we have evidence of that from Williams et al. (2013), then we can anticipate a relative increase in road incidents.

Method

Following Williams et al. (2013), crashes on Old Firm match days were contrasted with crashes on the corresponding day one week later. In addition they were contrasted with the same day one week earlier. Williams et al. (2013) had used this alternative control for one data point because their dataset did not include data for that day one week later. Here, both are presented for the full dataset. Crash data were taken from STATS19 records, 2005-2014, and were based on the Strathclyde region, for comparability with Williams et al. (2013). The STATS19 records are police reports of injury accidents in Great Britain, published by the Department for Transport, UK (<https://data.gov.uk/dataset/road-accidents-safety-data>).

In this period there were 33 matches between Rangers and Celtic, a slightly longer dataframe than was available to Williams et al. (2013). For consistency, the 24 hour 'day' was started at midday for all matches. STATS19 differentiates three levels of accident severity: killed, seriously injured, and slightly injured. Typically, analysis focuses on "Killed or seriously injured" (KSI) events, since the reliability of recording is high for these. The usual alternative is "All severities", which includes all recorded injury accidents. Both are considered.

Results

Non-parametric analysis was planned, following Williams et al. (2013). A Wilcoxon test with continuity correction was employed. Data analysis was carried out using R (Version

3.3.3; R Core Team, 2013) and in particular the lubridate package (Grolemund & Wickham, 2011). Dates of match days and control days, and the R scripts used for analysis, can be obtained from the author. Two sets of comparisons were made. The first involved only KSI crashes, the second included All severities. Descriptive statistics are shown in Table 1. Wilcoxon tests compared each match day with the control days one week earlier and one week later. As the p -values in Table 1 indicate, only one comparison was significant, the comparison with one week earlier for All severities.

An additional exploratory analysis was undertaken, to see whether it made a difference which club had won, and so data were divided into cases where Celtic had won, versus the remaining matches. Using ANOVA in an exploratory fashion, cases on match day were separately compared to either the control day before or, in a second analysis, the control day after, to determine whether the difference depended on which team had won. This was repeated separately for both KSI and All severities. A series of four 2 (Time, within) x 2 (Winner, between) ANOVAs found no significant interactions ($p > .10$ in all cases). Means are shown in Table 2.

Discussion

There is good evidence from previous research that domestic violence increases at the time of Old Firm football matches (Williams et al., 2013). The present study finds only limited evidence that the effect extends to driving. There are no significant effects in KSI data. In UK road safety research, one prefers KSI data. KSI numbers are relatively reliably recorded, while incidents of low severity are under-recorded. However, here the number of recorded KSI incidents per day is low, and comparable to the SD . There is therefore little power. For All severities incidents there is a significant increase on the match day compared to a control day one week before. However it would be a mistake to generalise this result on

its own too greatly. There is no difference with the corresponding day one week later. It should be emphasised that the outcome measure used is indirect. Incidents are not exclusively caused by aggressive driving. Conversely, many forms of aggressive driving, and the great majority of aggressive acts, do not lead to a recorded incident (see e.g. Harris & Houston, 2010 for illustration of different forms of driving aggression).

These findings complement previous research addressing the link with domestic violence, and provide suggestive but not conclusive evidence of a small increase in aggressive driving behavior. Given this result, it would be worth carrying out field studies to observe driving behavior in this region, comparing aggressive behavior in the lead up to and following match days. The study also adds to previous research on the influence of situational effects on aggression on driving, or, in the terms of individual differences psychology, state as opposed to trait aggression. As Williams et al. (2013) argued, such findings suggest the need for greater understanding of the mechanisms that lead from the football match to increased community aggression.

Research on driver behaviour suggests potential explanations. Aggressive driving is directly linked to anger (Bogdan, Măirean, & Havârneanu, 2016; Zhang & Chan, 2016) and for both trait anger and anger arising in the traffic context (Bogdan et al., 2016). Research in Canada has demonstrated a pathway from intentionality to anger, and from anger in turn to aggressive driving behaviour (Vallières, Bergeron, & Vallerand, 2005; Vallières, Vallerand, Bergeron, & McDuff, 2014). Intentionality in this sense is an attribution by the driver that another road user who has done something frustrating did it deliberately. These results suggest possible mechanisms that could explain the increase in road accidents on matchday. Emotional responses created in the atmosphere of the match could carry over to the driving situation, generating aggression. This might affect defeated high identifying supporters most strongly, since they have been found to feel anger (Crisp et al., 2007). Alternatively,

attributions of driving behaviour could shift towards an increase in intentional attribution, leading to more anger and therefore aggressive driving behaviour. This, of course, would tend to ripple as other drivers respond to these aggressive behaviours.

The literature reviewed in the Introduction includes examples from European soccer and North American sports such as football and basketball. Findings across these studies are by no means contradictory, but there is scope for further research to directly compare the manifestation of supporter aggression across cultures. In the case of Rangers and Celtic, there are organised supporter groups outside Scotland, for instance in Ireland and North America. The North American supporters do not generally have an aggressive rivalry, and some are conscious of this contrast with supporters living in Scotland (Giulianotti & Robertson, 2006). These fan groups tend to have relatively small numbers of members, and exist within larger communities that have no interest in the rivalry. This contextual difference is likely to be important. The link between anger and driver aggression is known to vary between countries (Bogdan et al., 2016; Zhang & Chan, 2016).

The exploratory part of the data analysis found no dependence of crash data on which team had won. Although a study based in the USA found that disappointing match results increased the occurrence of domestic violence (Card & Dahl, 2011), and adverse results have been linked to more unruly behaviour in Swedish soccer (Priks, 2010), this pattern has not been consistently found in UK research. Assault injuries in Cardiff, Wales have been shown to increase on days when the Welsh national team won an international match, soccer or rugby union, and this occurred whether the match took place in Cardiff or at the opponent's ground (Sivarajasingham, Moore & Shepherd, 2005; for a similar finding in the USA, see Coons et al., 1995). Dickson, Jennings, and Coop (2015), using a similar data frame to Williams et al. (2013), found that for the most part there was no link between domestic violence and the outcome of Old Firm matches. The present finding of no link with outcome

is broadly consistent with Dickson et al. (2015). These diverse patterns underscore the importance of cross-situational studies to make more fine-grained analyses of cultural and contextual differences that might explain contrasting findings, and to identify variables that may differentially mediate effects as circumstances vary. The degree of disappointment in a match outcome has proven to be an important variable in specific situations (Card & Dahl, 2011; Dickson et al., 2015; Rees & Schnepel, 2009), and a number of reports indicate that refereeing decisions perceived to be unfair are provocative (Scholz, 2016a, 2016b; van der Meij et al., 2015). Another important factor widely mentioned is alcohol (e.g. Ostrowsky, 2014; Rees & Schnepel, 2009; Sivarajasingham et al., 2005; Williams et al., 2013).

Qualitatively distinct types of supporter have been differentiated in previous analyses (e.g. Giulianotti, 2002; Scholz, 2016a, 2016b). There are important distinctions to be made between the “die hard” committed supporter who will watch rain or shine, the “fairweather” supporter who aligns with a team but attends sporadically, and the hooligan who may identify more with his gang than the team (Scholz, 2016a; Wann & Branscombe, 1990). There may be important demographic and psychological differences between these types, in addition to degree of team identification. For example, 81% of the hooligans studied in Scholz (2016a) were single, and the majority lived with their parents. In understanding the mechanisms through which matchday aggression is transmitted into the community, it will be useful to consider these differences. One recent meta-analysis, for instance, found that anger was linked to aggressive driving more strongly for younger drivers (Zhang & Chan, 2016).

In conclusion, new empirical evidence has been found that demonstrates the potential impact of a sporting event on harmful behaviour in the public environment beyond the arena. This, together with prior evidence for such effects, raises interesting theoretical questions about the mechanisms for transmitting aggression through supporters. Evidence from existing

research on both driving behavior and supporter behavior can inform this analysis, and a number of specific avenues for future research have been identified.

References

- AAA Foundation for Traffic Safety (2009). Aggressive driving: Research update. Washington DC: Author. Retrieved from <https://www.aaafoundation.org/sites/default/files/AggressiveDrivingResearchUpdate2009.pdf>
- Bogdan, S. R., Măirean, C., & Havârneanu, C.-E. (2016). A meta-analysis of the association between anger and aggressive driving. *Transportation Research Part F: Traffic Psychology and Behaviour*, 42, 350-364. <https://doi.org/10.1016/j.trf.2016.05.009>
- Bruce, S. (2014). Scots Catholic growth. In *Scottish Gods: Religion in modern Scotland, 1900-2012* (pp. 41-58). Edinburgh: Edinburgh University Press.
- Card, D., & Dahl, G. B. (2011). Family violence and football: The effect of unexpected emotional cues on violent behavior. *The Quarterly Journal of Economics*, 126(1), 103-143. <https://doi.org/10.1093/qje/qjr001>
- Cialdini, R. B., Borden, R. J., Thorne, A., Walker, M. R., Freeman, S., & Sloan, L. R. (1976). Basking in reflected glory: Three (football) field studies. *Journal of Personality and Social Psychology*, 34(3), 366-375. <https://doi.org/10.1037/0022-3514.34.3.366>
- Cikara, M., Botvinick, M. M., & Fiske, S. T. (2011). Us versus them: social identity shapes neural responses to intergroup competition and harm. *Psychol Sci*, 22(3), 306-313. <https://doi.org/10.1177/0956797610397667>
- Coons, C. J., Howard-Hamilton, M., & Waryold, D. (1995). College sports and fan aggression: Implications for residence hall discipline. *Journal of College Student Development*, 36(6), 587-593.
- Crisp, R. J., Heuston, S., Farr, M. J., & Turner, R. N. (2007). Seeing red or feeling blue: Differentiated intergroup emotions and ingroup identification in soccer fans. *Group Processes & Intergroup Relations*, 10(1), 9-26.

<https://doi.org/10.1177/1368430207071337>

Dickson, A., Jennings, C., & Koop, G. (2016). Domestic violence and football in Glasgow:

Are reference points relevant? *Oxford Bulletin of Economics and Statistics*, 78(1), 1-21. <https://doi.org/10.1111/obes.12105>

Finn, G. P. T. (1991). Racism, religion and social prejudice: Irish Catholic clubs, soccer and

Scottish society: (i) the historical roots of prejudice. *The International Journal of the History of Sport*, 8(1), 72-95. <https://doi.org/10.1080/09523369108713746>

Gau, L.-S., James, J. D., & Kim, J.-C. (2009). Effects of team identification on motives,

behavior outcomes, and perceived service quality. *Asian Journal of Management and Humanity Sciences*, 4, 76-90.

Giulianotti, R. (2002). Supporters, followers, fans, and flaneurs: A taxonomy of spectator

identities in football. *Journal of Sport and Social Issues*, 26(1), 25-46.

<https://doi.org/10.1177/0193723502261003>

Giulianotti, R., & Robertson, R. (2006). Glocalization, globalization and migration: The case

of Scottish football supporters in North America. *International Sociology*, 21(2), 171-198. <https://doi.org/10.1177/0268580906061374>

Grolemund, G. & Wickham, H. (2011). Dates and times made easy with lubridate. *Journal of*

Statistical Software, 40, 1-25.

Handley, J. M. (1947). *The Irish in modern Scotland*. Cork, Ireland: Cork University Press.

Harris, P. B. & Houston, J. M. (2010). Recklessness in context: Individual and situational

correlates to aggressive driving. *Environment and Behavior*, 42, 44-60.

Havard, C. (2014). Glory Out of Reflected Failure: The examination of how rivalry affects

sport fans. *Sports Management Review*, 17, 243-253.

Havard, C. T., Eddy, T., & Ryan, T. D. (2016). Examining the impact of team identification

and gender on rival perceptions and behavior of intercollegiate athletics fans. *Journal*

of Applied Sport Management: Research that Matters, 8, 33-49.

<https://doi.org/10.18666/JASM-2016-V8-I2-6444>

Havard, C. T., Wann, D. L., & Ryan, T. D. (2013). Investigating the impact of conference realignment on rivalry in intercollegiate athletics. *Sport Marketing Quarterly*, 22(4), 224-234.

Havard, C. T., Wann, D. L., & Ryan, T. D. (2017). Reinvestigating the impact of conference realignment on rivalry in intercollegiate athletics. *Journal of Applied Sports Management*, 9, 25-36. <https://doi.org/10.18666/JASM-2017-V9-I2-8029>

Millward, P. (2009). Glasgow Rangers supporters in the city of Manchester: The degeneration of a 'fan party' into a 'hooligan riot'. *International Review for the Sociology of Sport*, 44(4), 381-398. <https://doi.org/10.1177/1012690209344658>

Nabi, H., Consoli, S. M., Chiron, M., Lafont, S., Zins, M., Lagarde, E., & Chastang, J-F. (2006). Aggressive/hostile personality traits and injury accidents: an eight-year prospective study of a large cohort of French employees – the GAZEL cohort. *Psychological Medicine*, 36, 365-373. <https://doi.org/10.1017/S0033291705006562>

Ostrowsky, M. K. (2014). The social psychology of alcohol use and violent behavior among sports spectators. *Aggression and Violent Behavior*, 19(4), 303-310. <https://doi.org/10.1016/j.avb.2014.05.001>

Priks, M. (2010). Does Frustration Lead to Violence? Evidence from the Swedish Hooligan Scene. *Kyklos*, 63(3), 450-460. <https://doi.org/10.1111/j.1467-6435.2010.00482.x>

R Core Team (2013). R: A language and environment for statistical computing [Computer software]. R Foundation for Statistical Computing, Vienna, Austria.

Rees, D. I., & Schnepel, K. T. (2009). College football games and crime. *Journal of Sports Economics*, 10(1), 68-87. <https://doi.org/10.1177/1527002508327389>

Scholz, P. (2016a). Czech football hooligans' behavior. *Journal of Physical Education and*

Sport, 16(2), 1089-1094. <https://doi.org/10.7752/jpes.2016.s2174>

Scholz, P. (2016b). Football fan behavior of the oldest club in the Czech Republic. *Journal of Physical Education and Sport*, 16(1), 694-698.

<https://doi.org/10.7752/jpes.2016.s1112>

Sivarajasingam, V., Moore, S., & Shepherd, J. P. (2005). Winning, losing, and violence. *Injury Prevention*, 11(2), 69.

Sloan, L. R. (1979). The function and impact of sports for fans: A review of theory and contemporary research. In J. H. Goldstein (Ed.), *Sports, games and play: social and psychological viewpoints* (pp. 219-262). Hillsdale, N.J.: Erlbaum.

Snyder, C. R., Lassegard, M., & Ford, C. E. (1986). Distancing after group success and failure: Basking in reflected glory and cutting off reflected failure. *Journal of Personality and Social Psychology*, 51(2), 382-388. <https://doi.org/10.1037/0022-3514.51.2.382>

Tajfel, H., Billig, M. G., Bundy, R. P., & Flament, C. (1971). Social categorization and intergroup behaviour. *European Journal of Social Psychology*, 1(2), 149-178. <https://doi.org/10.1002/ejsp.2420010202>

Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.), *The social psychology of intergroup relations* (pp. 33-37). Monterey, CA: Brooks/Cole.

Tyler, B. D., & Cobbs, J. B. (2015). Rival conceptions of rivalry: why some competitions mean more than others. *European Sport Management Quarterly*, 15(2), 227-248. <https://doi.org/10.1080/16184742.2015.1010558>

Vallières, E. F., Bergeron, J., & Vallerand, R. J. (2005). The role of attributions and anger in aggressive driving behaviours. In G. Underwood (Ed.), *Traffic and transport psychology: Theory and application* (pp. 181-190). Amsterdam: Elsevier.

- Vallières, E. F., Vallerand, R. J., Bergeron, J., & McDuff, P. (2014). Intentionality, anger, coping, and ego defensiveness in reactive aggressive driving. *Journal of Applied Social Psychology, 44*(5), 354-363. <https://doi.org/10.1111/jasp.12228>
- van der Meij, L., Klauke, F., Moore, H. L., Ludwig, Y. S., Almela, M., & van Lange, P. A. (2015). Football fan aggression: the importance of low Basal cortisol and a fair referee. *PLoS One, 10*(4), e0120103. <https://doi.org/10.1371/journal.pone.0120103>
- Wann, D. L., & Branscombe, N. R. (1990). Die-Hard and Fair-Weather Fans: Effects of Identification on BIRGing and CORFing Tendencies. *Journal of Sport and Social Issues, 14*(2), 103-117. <https://doi.org/10.1177/019372359001400203>
- Wann, D. L., & Branscombe, N. R. (1993). Sports fans: Measuring degree of identification with their team. *International Journal of Sport Psychology, 24*(1), 1-17.
- Wann, D. L., Carlson, J. D., & Schrader, M. P. (1999). The impact of team identification on the hostile and instrumental verbal aggression of sport spectators. *Journal of Social Behavior & Personality, 14*(2), 279-286.
- Wann, D. L., Culver, Z., Akanda, R., Daglar, M., De Divitiis, C., & Smith, A. (2005). The effects of team identification and game outcome on willingness to consider anonymous acts of hostile aggression. *Journal of Sport Behavior, 28*, 282-294.
- Wann, D. L., Fahl, C. L., Erdmann, J. B., & Littleton, J. D. (1999). Relationship between identification with the role of sport fan and trait aggression. *Percept Mot Skills, 88*(3 Pt 2), 1296-1298. <https://doi.org/10.2466/pms.1999.88.3c.1296>
- Wann, D. L., Haynes, G., McLean, B., & Pullen, P. (2003). Sport team identification and willingness to consider anonymous acts of hostile aggression. *Aggressive Behavior, 29*(5), 406-413. <https://doi.org/10.1002/ab.10046>
- Wann, D. L., Peterson, R. R., Cothran, C., & Dykes, M. (1999). Sport fan aggression and anonymity: the importance of team identification. *Social Behavior and Personality:*

an international journal, 27(6), 597-602. <https://doi.org/10.2224/sbp.1999.27.6.597>

Wiesenthal, D. L. & Janovjak, D. P. (1992). Deindividuation and automobile driving behavior. *LaMarsh Research Programme Report Series*, No. 46, LaMarsh Research Programme on Violence and Conflict Resolution, York University, North York, Ontario, Canada.

Williams, D. J., Neville, F. G., House, K., & Donnelly, P. D. (2013). Association between Old Firm football matches and reported domestic (violence) incidents in Strathclyde, Scotland. *SAGE Open*, 3(3), 1-7. <https://doi.org/10.1177/2158244013504207>.

Zhang, T., & Chan, A. H. S. (2016). The association between driving anger and driving outcomes: A meta-analysis of evidence from the past twenty years. *Accident Analysis & Prevention*, 90, 50-62. <https://doi.org/10.1016/j.aap.2016.02.009>

Table 1

Recorded road incidents on match days (N = 33) and the corresponding days one week earlier and one week later

Incident category, and statistic	Control day before	Match day	Control day after
KSI			
<i>M</i>	1.85	2.06	1.81
<i>SD</i>	1.56	1.80	1.93
<i>V</i>	171.5		190.5
<i>p</i>	.54		.45
All severities			
<i>M</i>	9.00	11.1	10.9
<i>SD</i>	4.24	4.20	5.66
<i>V</i>	317		252
<i>p</i>	.03		.95

Note. *p* values are based on contrasts with Match day figures, using the Wilcoxon signed ranks test with continuity correction.

Table 2

Mean number of recorded road incidents separated according to whether Celtic won

Incident category and winner	Control day before	Match day	Control day after
KSI			
Celtic win	1.69	2.00	1.31
Other result	2.00	2.12	2.29
All severities			
Celtic win	9.31	10.5	10.2
Other result	8.71	11.7	11.6

Note. *SDs* range as follows: KSI 1.37-2.18; All severities 3.50-6.32.

Appendix 1 Referee Reports and Correspondence

This ms was submitted for review 12th May 2017. Referee reports were received 14th March 2018 and a revision submitted 11th June 2018. The author withdrew it from review 18th March 2019.

14-Mar-2018

Dear Dr. Dunbar:

Manuscript ID SO-17-0489 entitled "Old Firm football matches and traffic crashes" which you submitted to SAGE Open, has been reviewed. The comments of the reviewer(s) are included at the bottom of this letter.

The reviewer(s) suggest some revisions to your manuscript before it can be considered for publication. Therefore, I invite you to respond to the reviewer(s) ' comments and revise your manuscript.

To revise your manuscript, log into <https://mc.manuscriptcentral.com/sageopen> and enter your Author Center, where you will find your manuscript title listed under "Manuscripts with Decisions." Under "Actions," click on "Create a Revision." Your manuscript number has been appended to denote a revision.

You may also click the below link to start the revision process (or continue the process if you have already started your revision) for your manuscript. If you use the below link you will not be required to login to ScholarOne Manuscripts.

*** PLEASE NOTE: This is a two-step process. After clicking on the link, you will be directed to a webpage to confirm. ***

https://mc.manuscriptcentral.com/sageopen?URL_MASK=f7de174e04e1453e802aa4383267a269

You will be unable to make your revisions on the originally submitted version of the manuscript. Instead, revise your manuscript using a word processing program and save it on your computer. If you choose to highlight or track changes in your document please upload both a clean version and a version that highlights the changes.

Once the revised manuscript is prepared, you can upload it and submit it through your Author Center.

When submitting your revised manuscript, you will be able to respond to the comments

made by the reviewer(s) in the space provided. You can use this space to document any changes you make to the original manuscript. In order to expedite the processing of the revised manuscript, please be as specific as possible in your response to the reviewer(s).

IMPORTANT: Your original files are available to you when you upload your revised manuscript. Please delete any redundant files before completing the submission.

Because we are trying to facilitate timely publication of manuscripts submitted to SAGE Open, your revised manuscript should be uploaded as soon as possible. Please try to submit the requested revisions within 90 days of receiving this decision. If that is not possible please contact the editorial office and we can work out an alternate deadline for you.

Once again, thank you for submitting your manuscript to SAGE Open and I look forward to receiving your revision.

Sincerely,
Dr. Petr Scholz
Article Editor, SAGE Open

Article Editor's Comments:

Dear George,

Thank you for your fullpaper. The topic is interesting, however there are a lot of areas that are missing from your fulltext. There are a lot of researchers focused on rivalry, fan aggression, and other speeches and experiences between football visitors (spectators, fans, supporters, hooligans). Please take a look on the papers of Havard, Wann, Scholz who are experts on this topic. I would be willing to give you another chance at the fullpaper if you can show great improvement.

Best Regards,
Dr. Petr Scholz
SAGE Open

Reviewer(s)' Comments to Author:

Reviewer: 1

Comments to the Author

- In text citations of certain authors the years are not specified (Williams et al.)

- If there are more than 3 authors, it should be written Williams et al. (2013)
- The pages of the publication by Wiesenthal and Janovjak missing

Reviewer: 2

Comments to the Author

The topic is interesting, however there are a lot of areas that are missing from the manuscript. There is a lot of research on rivalry and fan aggression, even sport fan trait aggression. (See the works of Havard along with Wann for more information).

The discussion should do a more thorough job of linking the findings to the existing research. I think looking into rivalry and fan behavior will greatly benefit this attempt. There is not much as far as a literature review is concerned. Adding much more information on rivalry and sport fans would help alleviate this issue. Much of the work on rivalry has been collected within the United States but there are also ample studies collected abroad as well.

Good luck in moving forward with the revision of this paper. It is an interesting paper and I think with work can add information to the literature.

Subsequent email from Sage

Subject: RE: SAGE Open
From: "Puneet Thakur" <Puneet.Thakur@sagepub.in>
Date: Fri, March 1, 2019 6:46 am
To: "George@pedestrianresearch.org" <George@pedestrianresearch.org>
Priority: Normal
Options: [View Full Header](#) | [View Printable Version](#) | [Download this as a file](#) | [View Message details](#)

Dear Dr. Dunbar,

I'm really sorry to hear about your condition. I humbly apologize for not being able to get a decision on your paper yet. However to clarify, the article editor who was working on your paper has turned unresponsive to several of our reminders. This is something inevitable by nature of peer review since we deal with external scholars who agree to evaluate for us and we have no control of their responses or lack thereof.

I would like to be completely transparent here, even if we try to secure a fresh

review team, it might take an extending amount of time. Let me know if you would like me to continue working on the paper. Once again sorry for the inconvenience.

Sincerely,
Puneet Thakur
SAGE Open Editorial Office

Appendix 2 Original manuscript submitted for review in 2017

This is provided for completeness.

SAGE Open

Old Firm football matches and traffic crashes

Journal:	<i>SAGE Open</i>
Manuscript ID	SO-17-0489.R1
Manuscript Type:	SAGE Open - Research Paper
Keywords:	sporting rivalry, driver aggression, traffic crash, accident, Old Firm, psychology of religion
Main Discipline or Subject Area:	Psychology
Abstract:	<p>Previous research has identified an association between a particular soccer match between long-standing rivals, and domestic violence. On match days, police records of domestic violence increased compared to control days. The present study investigated whether there was also a link in traffic crash data, where driver aggression is believed to contribute to the risk of an incident. Police recorded incidents were compared between match days and control days one week before and one week afterwards, for the period 2005-2014 in the Strathclyde region of Scotland, UK. Evidence was found only for a rise in total incidents, including all levels of injury severity, compared to one week before. When data was limited to serious and fatal injury, there was no evidence for a link.</p>

SCHOLARONE™
Manuscripts

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Old Firm football matches and traffic crashes

Anonymised Title Page Version

Author Note

Acknowledgements: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Abstract

Previous research has identified an association between a particular soccer match between long-standing rivals, and domestic violence. On match days, police records of domestic violence increased compared to control days. The present study investigated whether there was also a link in traffic crash data, where driver aggression is believed to contribute to the risk of an incident. Police recorded incidents were compared between match days and control days one week before and one week afterwards, for the period 2005-2014 in the Strathclyde region of Scotland, UK. Evidence was found only for a rise in total incidents, including all levels of injury severity, compared to one week before. When data was limited to serious or fatal injury, there was no evidence for a link.

Keywords: sporting rivalry, traffic crash, accident, driver aggression, psychology of religion

Old Firm football matches and traffic crashes

Williams, Neville, House, & Donnelly (2013) demonstrated a link between “Old Firm” football matches and domestic violence. Old Firm matches take place between the two major, evenly matched, clubs based in Glasgow, Scotland, who have played each other regularly since the late 19th century. The rivalry has sectarian religious components, each club being traditionally, though crudely, linked to different strands of Christian religion (Rangers, protestant; Celtic, Catholic), and the division is aligned with Irish sectarian politics. Williams et al. (2013) found that on the day of a match between these teams, domestic violence increased in the Strathclyde police region, the region including Glasgow and its surrounds. That is, police records of men being violent towards their partners increased locally in the wake of these matches, compared to the corresponding day one week later. After reviewing past research on the psychology of sports team support and rivalry, the present study extends this analysis to road accidents.

Sports Team Supporters

Why might there be a link between a sports contest and aggressive behavior in the community? A great deal of psychological research has investigated the relationship supporters have with sports teams, and this work suggests some plausible mechanisms. It is important to bear in mind that supporters of sports teams are not a homogenous group. They vary among themselves in degree of fervour and commitment. This section reviews evidence for such differences, describes the principal psychological framework relating team support to identity, and situates the rivalry between Celtic and Rangers in that context.

Identification with the team

Supporters vary in the degree and nature of their identification with the team, and this is associated with different psychological responses to team performance (e.g. Sloan, 1979; Wann & Branscombe, 1990). Wann and Branscombe (1990) explored two complementary

1
2
3 processes, Basking in Reflected Glory (Cialdini et al., 1976) and Cutting off Reflected
4
5 Failure (Snyder, Lassegard, & Ford, 1986). These processes, respectively, involve aligning
6
7 more closely with successful groups, to raise self-esteem, and distancing from groups that are
8
9 not successful, as an ego defence. Supporters who identified more strongly with a team were
10
11 more like to bask in reflected glory and less likely to distance themselves from the team when
12
13 it did poorly. They found that supporters who identified highly reported greater enjoyment
14
15 than those with lower identification from following the college basketball team, whether the
16
17 team was successful or not successful. Wann and Branscombe (1993) studied supporters of a
18
19 particular college basketball team enjoying a successful season. They found that those with
20
21 higher identification made more internal attributions, attributing success to qualities of the
22
23 team, and were more likely to believe that fellow supporters of the team are special.
24
25

26
27 Subsequent research has shown that highly identifying fans are more likely to attend
28
29 games against a rival, and to gain more satisfaction from victory (Havard, Eddy, & Ryan,
30
31 2016). Fans with lower identification prefer entertainment and sociability, while those with
32
33 higher identification have more self-defining motives (Gau, James, & Kim, 2009). In
34
35 response to defeat, low identifiers feel sad, high identifiers feel anger (Crisp, Heuston, Farr,
36
37 & Turner, 2007).
38

39
40 Supporters who identify strongly with a team also have more negative attitudes
41
42 towards rivals. Wann and colleagues have shown that high identifiers are more willing to say
43
44 that they would injure a rival team member if they could do it anonymously (Wann, Carlson
45
46 & Schrader, 1999; Wann, Haynes, McLean, & Pullen, 2003; Wann, Peterson, Cothran, &
47
48 Dykes, 1999), particularly in response to a defeat (Wann, et al., 2005). Importantly, there
49
50 appears to be no overall correlation with trait aggression (Wann, Fahl, Erdmann, & Littleton,
51
52 1999). Furthermore, willingness to anonymously attack sports rivals is not related to general
53
54
55
56
57
58
59
60

1
2
3 willingness to murder (Wann, Peterson, Cothran, & Dykes, 1999). That is, this aggression is
4
5 specific to the sports context.

6
7 Research in the Czech Republic has found that more active soccer supporters, those
8
9 leading singing for instance, were more tolerant of vulgar chants directed at the opposition or
10
11 game officials, and the illicit detonation of fireworks at matches (Scholz, 2016b). Using an
12
13 experimental design, van der Meij et al. (2015) showed soccer fans highlights of a match in
14
15 which their team lost to rivals, and measured aggression by asking what dose of “hot sauce”
16
17 they would oblige a rival fan to eat. Aggression was increased when the fairness of refereeing
18
19 was in question. It was also lowered if they attributed failure to their own team.

20
21 Neuropsychological research has demonstrated a similar effect. Fans of rival baseball clubs
22
23 showed a response in the ventral striatum, an area associated with pleasure and reward, when
24
25 viewing either their own team succeed or the rival fail (Cikara, Botvinik, & Fiske, 2011).
26
27 This response correlated with a self-reported rating of how likely it was they would be
28
29 aggressive towards a rival fan. Support for a team and denigration of its rival are inter-linked.
30
31

32 33 **Social identity theory**

34
35 This evidence of varying team identification and aggression towards others has been
36
37 analysed in a number of specific ways, often drawing on the core ideas of social identity
38
39 theory (Tajfel & Turner, 1979). On this view, people evaluate their own merit or situation in
40
41 part on the basis of their membership of certain social groupings. The fate of the group thus
42
43 influences their self-perception. In a similar way, evaluations of others are made on the basis
44
45 of categorisation as members of particular social groups. Self-categorisation and comparison
46
47 with members of other groups creates a social identity. For example, someone who supports a
48
49 successful club can recruit the status of the club to enhance their own self-esteem, Basking in
50
51 Reflected Glory as described above (Cialdini et al., 1976; Snyder et al., 1986; Wann &
52
53 Branscombe, 1990). For these supporters, failure of the rival can have similar value (Cikara
54
55
56
57
58
59
60

1
2
3 et al., 2011; Havard, 2014). Conversely, success of a rival can be a threat to this identity.
4
5 There are various ways in which a group can respond to this success, but it can lead to
6
7 conflict and competition, particularly since the rival can directly frustrate the group's own
8
9 ambition in an arena such as sport.
10

11 **Group membership, history and the Old Firm**

12
13 Experiments using the minimal group paradigm have demonstrated that even nominal
14
15 and arbitrary differences in group membership can affect behaviour (Tajfel, Billig, Bundy, &
16
17 Flament, 1971). For sports supporters, however, the affiliation is often long-term, enduring,
18
19 and framed within a historical narrative (cf. Scholz, 2016b). In a study of a re-structured
20
21 competition in which former rivals no longer competed directly, supporters retained negative
22
23 perceptions of the rival, with a minority remaining willing to say they would commit
24
25 anonymous acts of aggression towards fans and team members of the rival, even after three or
26
27 four years of the new arrangement (Havard, Wann, & Ryan, 2013, 2017).
28
29
30

31
32 History is important to the supporters of Celtic and Rangers (e.g. Finn, 1991). The
33
34 rivalry between them has existed since the Celtic club, set up by the Catholic community to
35
36 raise money for the poor, played its first match, against Rangers, in 1888. Rangers, a
37
38 predominantly protestant club, had been founded 15 years earlier in the same city. Scottish
39
40 society then was dominated by the protestant religion, and a large portion of the Catholic
41
42 community were economic migrants from Ireland, obliged to live in poorer districts
43
44 (Handley, 1947). Celtic and Rangers both became highly successful in national soccer
45
46 competitions. Since 1890, approximately 85% of Scottish league titles have been won by one
47
48 or other club, each victorious in about 50 seasons. These circumstances, frequency of
49
50 competition, geographical closeness, cultural difference and sporting parity, have been found
51
52 to enhance rivalry (Tyler & Cobbs, 2015).
53
54
55

56 **Aggression in the community**

1
2
3 There is evidence that aggression increases in a community in the wake of a major
4
5 team sport event. Coons, Howard-Hamilton, and Waryold (1995) found an increase in student
6
7 disciplinary cases on weekends when the college football team played, particularly following
8
9 home victories. A more recent study, carried out over seasons 2000-2005 found an increase in
10
11 assaults, vandalism, disorderly and drunken behaviour in places where college football
12
13 matches were staged, especially following unexpected results (Rees & Schnepel, 2009).
14
15 Aggressive behavior and violence among supporters have routinely accompanied Old Firm
16
17 matches, even if some reports have exaggerated the prevalence of such extreme acts as
18
19 murder (Bruce, 2014). Their supporters have also been involved in mass riots at games
20
21 involving different opponents (Millward, 2009). Williams et al. (2013) have confirmed an
22
23 association between Old Firm matches and domestic violence. The present study examines
24
25 whether this spillover can be demonstrated in another situation of potential conflict, away
26
27 from the immediate context of the match and direct confrontation with rivals.
28
29

30
31 Aggressive driving has been identified as an important factor in traffic accidents (e.g.
32
33 AAA Foundation for Traffic Safety, 2009), although Nabi et al. (2006) found only limited
34
35 evidence for any role of trait aggression or hostility. While domestic violence tends to occur
36
37 'behind closed doors', unseen outside the immediate family, driving occurs in the public road
38
39 environment. Nevertheless, it is clear that drivers, and particularly aggressive drivers,
40
41 perceive a degree of relative anonymity, and that this can be associated with increased
42
43 aggressive behavior (Harris & Houston, 2010; Wiesenthal & Janovjak, 1992). It is therefore
44
45 plausible that the psychological mechanisms converting those feelings aroused by a football
46
47 match into aggression within the home could also influence driving.
48
49

50 The present study takes a population-based approach, following Williams et al.
51
52 (2013). The dataset used is the police record of road incidents resulting in injury. These will,
53
54 of course, include incidents where there is no aggressive behavior involved. However, given
55
56
57
58
59
60

1
2
3 the high estimate of the involvement of aggressive behavior in crashes (AAA Foundation for
4 Traffic Safety, 2009), if population aggression increases on a given day, and we have
5 evidence of that from Williams et al. (2013), then we can anticipate a relative increase in road
6 incidents.
7
8
9
10

11 12 13 **Method**

14
15
16 Following Williams et al. (2013), crashes on Old Firm match days were contrasted
17 with crashes on the corresponding day one week later. In addition they were contrasted with
18 the same day one week earlier. Williams et al. (2013) had used this alternative control for one
19 data point because their dataset did not include data for that day one week later. Here, both
20 are presented for the full dataset. Crash data were taken from STATS19 records, 2005-2014,
21 and were based on the Strathclyde region, for comparability with Williams et al. (2013). The
22 STATS19 records are police reports of injury accidents in Great Britain, published by the
23 Department for Transport, UK (<https://data.gov.uk/dataset/road-accidents-safety-data>).
24
25
26
27
28
29
30
31
32

33 In this period there were 33 matches between Rangers and Celtic, a slightly longer
34 dataframe than was available to Williams et al. (2013). For consistency, the 24 hour ‘day’
35 was started at midday for all matches. STATS19 differentiates three levels of accident
36 severity: killed, seriously injured, and slightly injured. Typically, analysis focuses on “Killed
37 or seriously injured” (KSI) events, since the reliability of recording is high for these. The
38 usual alternative is “All severities”, which includes all recorded injury accidents. Both are
39 considered.
40
41
42
43
44
45
46
47
48
49

50 **Results**

51
52 Non-parametric analysis was planned, following Williams et al. (2013). A Wilcoxon
53 test with continuity correction was employed. Data analysis was carried out using R (Version
54
55
56
57
58
59
60

1
2
3 3.3.3; R Core Team, 2013) and in particular the lubridate package (Grolemund & Wickham,
4 2011). Dates of match days and control days, and the R scripts used for analysis, can be
5 obtained from the author. Two sets of comparisons were made. The first involved only KSI
6 crashes, the second included All severities. Descriptive statistics are shown in Table 1.
7
8 Wilcoxon tests compared each match day with the control days one week earlier and one
9 week later. As the p -values in Table 1 indicate, only one comparison was significant, the
10 comparison with one week earlier for All severities.
11
12
13
14
15
16
17

18 An additional exploratory analysis was undertaken, to see whether it made a
19 difference which club had won, and so data were divided into cases where Celtic had won,
20 versus the remaining matches. Using ANOVA in an exploratory fashion, cases on match day
21 were separately compared to either the control day before or, in a second analysis, the control
22 day after, to determine whether the difference depended on which team had won. This was
23 repeated separately for both KSI and All severities. A series of four 2 (Time, within) x 2
24 (Winner, between) ANOVAs found no significant interactions ($p > .10$ in all cases). Means
25 are shown in Table 2.
26
27
28
29
30
31
32
33
34
35
36
37

38 Discussion

39 There is good evidence from previous research that domestic violence increases at the
40 time of Old Firm football matches (Williams et al., 2013). The present study finds only
41 limited evidence that the effect extends to driving. There are no significant effects in KSI
42 data. In UK road safety research, one prefers KSI data. KSI numbers are relatively reliably
43 recorded, while incidents of low severity are under-recorded. However, here the number of
44 recorded KSI incidents per day is low, and comparable to the SD . There is therefore little
45 power. For All severities incidents there is a significant increase on the match day compared
46 to a control day one week before. However it would be a mistake to generalise this result on
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Running head: FOOTBALL AND DRIVER AGGRESSION

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

10

its own too greatly. There is no difference with the corresponding day one week later. It should be emphasised that the outcome measure used is indirect. Incidents are not exclusively caused by aggressive driving. Conversely, many forms of aggressive driving, and the great majority of aggressive acts, do not lead to a recorded incident (see e.g. Harris & Houston, 2010 for illustration of different forms of driving aggression).

These findings complement previous research addressing the link with domestic violence, and provide suggestive but not conclusive evidence of a small increase in aggressive driving behavior. Given this result, it would be worth carrying out field studies to observe driving behavior in this region, comparing aggressive behavior in the lead up to and following match days. The study also adds to previous research on the influence of situational effects on aggression on driving, or, in the terms of individual differences psychology, state as opposed to trait aggression. As Williams et al. (2013) argued, such findings suggest the need for greater understanding of the mechanisms that lead from the football match to increased community aggression.

Research on driver behaviour suggests potential explanations. Aggressive driving is directly linked to anger (Bogdan, Măirean, & Havârneanu, 2016; Zhang & Chan, 2016) and for both trait anger and anger arising in the traffic context (Bogdan et al., 2016). Research in Canada has demonstrated a pathway from intentionality to anger, and from anger in turn to aggressive driving behaviour (Vallières, Bergeron, & Vallerand, 2005; Vallières, Vallerand, Bergeron, & McDuff, 2014). Intentionality in this sense is an attribution by the driver that another road user who has done something frustrating did it deliberately. These results suggest possible mechanisms that could explain the increase in road accidents on matchday. Emotional responses created in the atmosphere of the match could carry over to the driving situation, generating aggression. This might affect defeated high identifying supporters most strongly, since they have been found to feel anger (Crisp et al., 2007). Alternatively,

Running head: FOOTBALL AND DRIVER AGGRESSION

11

attributions of driving behaviour could shift towards an increase in intentional attribution, leading to more anger and therefore aggressive driving behaviour. This, of course, would tend to ripple as other drivers respond to these aggressive behaviours.

The literature reviewed in the Introduction includes examples from European soccer and North American sports such as football and basketball. Findings across these studies are by no means contradictory, but there is scope for further research to directly compare the manifestation of supporter aggression across cultures. In the case of Rangers and Celtic, there are organised supporter groups outside Scotland, for instance in Ireland and North America. The North American supporters do not generally have an aggressive rivalry, and some are conscious of this contrast with supporters living in Scotland (Giulianotti & Robertson, 2006). These fan groups tend to have relatively small numbers of members, and exist within larger communities that have no interest in the rivalry. This contextual difference is likely to be important. The link between anger and driver aggression is known to vary between countries (Bogdan et al., 2016; Zhang & Chan, 2016).

The exploratory part of the data analysis found no dependence of crash data on which team had won. Although a study based in the USA found that disappointing match results increased the occurrence of domestic violence (Card & Dahl, 2011), and adverse results have been linked to more unruly behaviour in Swedish soccer (Priks, 2010), this pattern has not been consistently found in UK research. Assault injuries in Cardiff, Wales have been shown to increase on days when the Welsh national team won an international match, soccer or rugby union, and this occurred whether the match took place in Cardiff or at the opponent's ground (Sivarajasingham, Moore & Shepherd, 2005; for a similar finding in the USA, see Coons et al., 1995). Dickson, Jennings, and Coop (2015), using a similar data frame to Williams et al. (2013), found that for the most part there was no link between domestic violence and the outcome of Old Firm matches. The present finding of no link with outcome

Running head: FOOTBALL AND DRIVER AGGRESSION

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

12

is broadly consistent with Dickson et al. (2015). These diverse patterns underscore the importance of cross-situational studies to make more fine-grained analyses of cultural and contextual differences that might explain contrasting findings, and to identify variables that may differentially mediate effects as circumstances vary. The degree of disappointment in a match outcome has proven to be an important variable in specific situations (Card & Dahl, 2011; Dickson et al., 2015; Rees & Schnepel, 2009), and a number of reports indicate that refereeing decisions perceived to be unfair are provocative (Scholz, 2016a, 2016b; van der Meij et al., 2015). Another important factor widely mentioned is alcohol (e.g. Ostrowsky, 2014; Rees & Schnepel, 2009; Sivarajasingham et al., 2005; Williams et al., 2013).

Qualitatively distinct types of supporter have been differentiated in previous analyses (e.g. Giulianotti, 2002; Scholz, 2016a, 2016b). There are important distinctions to be made between the “die hard” committed supporter who will watch rain or shine, the “fairweather” supporter who aligns with a team but attends sporadically, and the hooligan who may identify more with his gang than the team (Scholz, 2016a; Wann & Branscombe, 1990). There may be important demographic and psychological differences between these types, in addition to degree of team identification. For example, 81% of the hooligans studied in Scholz (2016a) were single, and the majority lived with their parents. In understanding the mechanisms through which matchday aggression is transmitted into the community, it will be useful to consider these differences. One recent meta-analysis, for instance, found that anger was linked to aggressive driving more strongly for younger drivers (Zhang & Chan, 2016).

In conclusion, new empirical evidence has been found that demonstrates the potential impact of a sporting event on harmful behaviour in the public environment beyond the arena. This, together with prior evidence for such effects, raises interesting theoretical questions about the mechanisms for transmitting aggression through supporters. Evidence from existing

Running head: FOOTBALL AND DRIVER AGGRESSION

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

13

research on both driving behavior and supporter behavior can inform this analysis, and a number of specific avenues for future research have been identified.

For Peer Review

References

- AAA Foundation for Traffic Safety (2009). Aggressive driving: Research update. Washington DC: Author. Retrieved from <https://www.aaafoundation.org/sites/default/files/AggressiveDrivingResearchUpdate2009.pdf>
- Bogdan, S. R., Măirean, C., & Havârneanu, C.-E. (2016). A meta-analysis of the association between anger and aggressive driving. *Transportation Research Part F: Traffic Psychology and Behaviour*, 42, 350-364. <https://doi.org/10.1016/j.trf.2016.05.009>
- Bruce, S. (2014). Scots Catholic growth. In *Scottish Gods: Religion in modern Scotland, 1900-2012* (pp. 41-58). Edinburgh: Edinburgh University Press.
- Card, D., & Dahl, G. B. (2011). Family violence and football: The effect of unexpected emotional cues on violent behavior. *The Quarterly Journal of Economics*, 126(1), 103-143. <https://doi.org/10.1093/qje/qjr001>
- Cialdini, R. B., Borden, R. J., Thorne, A., Walker, M. R., Freeman, S., & Sloan, L. R. (1976). Basking in reflected glory: Three (football) field studies. *Journal of Personality and Social Psychology*, 34(3), 366-375. <https://doi.org/10.1037/0022-3514.34.3.366>
- Cikara, M., Botvinick, M. M., & Fiske, S. T. (2011). Us versus them: social identity shapes neural responses to intergroup competition and harm. *Psychol Sci*, 22(3), 306-313. <https://doi.org/10.1177/0956797610397667>
- Coons, C. J., Howard-Hamilton, M., & Waryold, D. (1995). College sports and fan aggression: Implications for residence hall discipline. *Journal of College Student Development*, 36(6), 587-593.
- Crisp, R. J., Heuston, S., Farr, M. J., & Turner, R. N. (2007). Seeing red or feeling blue: Differentiated intergroup emotions and ingroup identification in soccer fans. *Group Processes & Intergroup Relations*, 10(1), 9-26.

Running head: FOOTBALL AND DRIVER AGGRESSION

15

<https://doi.org/10.1177/1368430207071337>

Dickson, A., Jennings, C., & Koop, G. (2016). Domestic violence and football in Glasgow: Are reference points relevant? *Oxford Bulletin of Economics and Statistics*, 78(1), 1-21. <https://doi.org/10.1111/obes.12105>

Finn, G. P. T. (1991). Racism, religion and social prejudice: Irish Catholic clubs, soccer and Scottish society: (i) the historical roots of prejudice. *The International Journal of the History of Sport*, 8(1), 72-95. <https://doi.org/10.1080/09523369108713746>

Gau, L.-S., James, J. D., & Kim, J.-C. (2009). Effects of team identification on motives, behavior outcomes, and perceived service quality. *Asian Journal of Management and Humanity Sciences*, 4, 76-90.

Giulianotti, R. (2002). Supporters, followers, fans, and flaneurs: A taxonomy of spectator identities in football. *Journal of Sport and Social Issues*, 26(1), 25-46. <https://doi.org/10.1177/0193723502261003>

Giulianotti, R., & Robertson, R. (2006). Glocalization, globalization and migration: The case of Scottish football supporters in North America. *International Sociology*, 21(2), 171-198. <https://doi.org/10.1177/0268580906061374>

Grolemund, G. & Wickham, H. (2011). Dates and times made easy with lubridate. *Journal of Statistical Software*, 40, 1-25.

Handley, J. M. (1947). *The Irish in modern Scotland*. Cork, Ireland: Cork University Press.

Harris, P. B. & Houston, J. M. (2010). Recklessness in context: Individual and situational correlates to aggressive driving. *Environment and Behavior*, 42, 44-60.

Havard, C. (2014). Glory Out of Reflected Failure: The examination of how rivalry affects sport fans. *Sports Management Review*, 17, 243-253.

Havard, C. T., Eddy, T., & Ryan, T. D. (2016). Examining the impact of team identification and gender on rival perceptions and behavior of intercollegiate athletics fans. *Journal*

Running head: FOOTBALL AND DRIVER AGGRESSION

16

of Applied Sport Management: Research that Matters, 8, 33-49.

<https://doi.org/10.18666/JASM-2016-V8-I2-6444>

Havard, C. T., Wann, D. L., & Ryan, T. D. (2013). Investigating the impact of conference realignment on rivalry in intercollegiate athletics. *Sport Marketing Quarterly*, 22(4), 224-234.

Havard, C. T., Wann, D. L., & Ryan, T. D. (2017). Reinvestigating the impact of conference realignment on rivalry in intercollegiate athletics. *Journal of Applied Sports Management*, 9, 25-36. <https://doi.org/10.18666/JASM-2017-V9-I2-8029>

Millward, P. (2009). Glasgow Rangers supporters in the city of Manchester: The degeneration of a 'fan party' into a 'hooligan riot'. *International Review for the Sociology of Sport*, 44(4), 381-398. <https://doi.org/10.1177/1012690209344658>

Nabi, H., Consoli, S. M., Chiron, M., Lafont, S., Zins, M., Lagarde, E., & Chastang, J-F. (2006). Aggressive/hostile personality traits and injury accidents: an eight-year prospective study of a large cohort of French employees – the GAZEL cohort. *Psychological Medicine*, 36, 365-373. <https://doi.org/10.1017/S0033291705006562>

Ostrowsky, M. K. (2014). The social psychology of alcohol use and violent behavior among sports spectators. *Aggression and Violent Behavior*, 19(4), 303-310. <https://doi.org/10.1016/j.avb.2014.05.001>

Priks, M. (2010). Does Frustration Lead to Violence? Evidence from the Swedish Hooligan Scene. *Kyklos*, 63(3), 450-460. <https://doi.org/10.1111/j.1467-6435.2010.00482.x>

R Core Team (2013). R: A language and environment for statistical computing [Computer software]. R Foundation for Statistical Computing, Vienna, Austria.

Rees, D. I., & Schnepel, K. T. (2009). College football games and crime. *Journal of Sports Economics*, 10(1), 68-87. <https://doi.org/10.1177/1527002508327389>

Scholz, P. (2016a). Czech football hooligans' behavior. *Journal of Physical Education and*

Running head: FOOTBALL AND DRIVER AGGRESSION

17

Sport, 16(2), 1089-1094. <https://doi.org/10.7752/jpes.2016.s2174>

Scholz, P. (2016b). Football fan behavior of the oldest club in the Czech Republic. *Journal of*

Physical Education and Sport, 16(1), 694-698.

<https://doi.org/10.7752/jpes.2016.s1112>

Sivarajasingam, V., Moore, S., & Shepherd, J. P. (2005). Winning, losing, and violence.

Injury Prevention, 11(2), 69.

Sloan, L. R. (1979). The function and impact of sports for fans: A review of theory and

contemporary research. In J. H. Goldstein (Ed.), *Sports, games and play: social and*

psychological viewpoints (pp. 219-262). Hillsdale, N.J.: Erlbaum.

Snyder, C. R., Lassegard, M., & Ford, C. E. (1986). Distancing after group success and

failure: Basking in reflected glory and cutting off reflected failure. *Journal of*

Personality and Social Psychology, 51(2), 382-388. [https://doi.org/10.1037/0022-](https://doi.org/10.1037/0022-3514.51.2.382)

[3514.51.2.382](https://doi.org/10.1037/0022-3514.51.2.382)

Tajfel, H., Billig, M. G., Bundy, R. P., & Flament, C. (1971). Social categorization and

intergroup behaviour. *European Journal of Social Psychology*, 1(2), 149-178.

<https://doi.org/10.1002/ejsp.2420010202>

Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G.

Austin & S. Worchel (Eds.), *The social psychology of intergroup relations* (pp. 33-

37). Monterey, CA: Brooks/Cole.

Tyler, B. D., & Cobbs, J. B. (2015). Rival conceptions of rivalry: why some competitions

mean more than others. *European Sport Management Quarterly*, 15(2), 227-248.

<https://doi.org/10.1080/16184742.2015.1010558>

Vallières, E. F., Bergeron, J., & Vallerand, R. J. (2005). The role of attributions and anger in

aggressive driving behaviours. In G. Underwood (Ed.), *Traffic and transport*

psychology: Theory and application (pp. 181-190). Amsterdam: Elsevier.

Running head: FOOTBALL AND DRIVER AGGRESSION

18

- Vallières, E. F., Vallerand, R. J., Bergeron, J., & McDuff, P. (2014). Intentionality, anger, coping, and ego defensiveness in reactive aggressive driving. *Journal of Applied Social Psychology, 44*(5), 354-363. <https://doi.org/10.1111/jasp.12228>
- van der Meij, L., Klauke, F., Moore, H. L., Ludwig, Y. S., Almela, M., & van Lange, P. A. (2015). Football fan aggression: the importance of low Basal cortisol and a fair referee. *PLoS One, 10*(4), e0120103. <https://doi.org/10.1371/journal.pone.0120103>
- Wann, D. L., & Branscombe, N. R. (1990). Die-Hard and Fair-Weather Fans: Effects of Identification on BIRGing and CORFing Tendencies. *Journal of Sport and Social Issues, 14*(2), 103-117. <https://doi.org/10.1177/019372359001400203>
- Wann, D. L., & Branscombe, N. R. (1993). Sports fans: Measuring degree of identification with their team. *International Journal of Sport Psychology, 24*(1), 1-17.
- Wann, D. L., Carlson, J. D., & Schrader, M. P. (1999). The impact of team identification on the hostile and instrumental verbal aggression of sport spectators. *Journal of Social Behavior & Personality, 14*(2), 279-286.
- Wann, D. L., Culver, Z., Akanda, R., Daglar, M., De Divitiis, C., & Smith, A. (2005). The effects of team identification and game outcome on willingness to consider anonymous acts of hostile aggression. *Journal of Sport Behavior, 28*, 282-294.
- Wann, D. L., Fahl, C. L., Erdmann, J. B., & Littleton, J. D. (1999). Relationship between identification with the role of sport fan and trait aggression. *Percept Mot Skills, 88*(3 Pt 2), 1296-1298. <https://doi.org/10.2466/pms.1999.88.3c.1296>
- Wann, D. L., Haynes, G., McLean, B., & Pullen, P. (2003). Sport team identification and willingness to consider anonymous acts of hostile aggression. *Aggressive Behavior, 29*(5), 406-413. <https://doi.org/10.1002/ab.10046>
- Wann, D. L., Peterson, R. R., Cothran, C., & Dykes, M. (1999). Sport fan aggression and anonymity: the importance of team identification. *Social Behavior and Personality:*

Running head: FOOTBALL AND DRIVER AGGRESSION

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

19

an international journal, 27(6), 597-602. <https://doi.org/10.2224/sbp.1999.27.6.597>

Wiesenthal, D. L. & Janovjak, D. P. (1992). Deindividuation and automobile driving behavior. *LaMarsh Research Programme Report Series*, No. 46, LaMarsh Research Programme on Violence and Conflict Resolution, York University, North York, Ontario, Canada.

Williams, D. J., Neville, F. G., House, K., & Donnelly, P. D. (2013). Association between Old Firm football matches and reported domestic (violence) incidents in Strathclyde, Scotland. *SAGE Open*, 3(3), 1-7. <https://doi.org/10.1177/2158244013504207>.

Zhang, T., & Chan, A. H. S. (2016). The association between driving anger and driving outcomes: A meta-analysis of evidence from the past twenty years. *Accident Analysis & Prevention*, 90, 50-62. <https://doi.org/10.1016/j.aap.2016.02.009>

Running head: FOOTBALL AND DRIVER AGGRESSION

20

Table 1

Recorded road incidents on match days (N = 33) and the corresponding days one week earlier and one week later

Incident category, and statistic	Control day before	Match day	Control day after
KSI			
<i>M</i>	1.85	2.06	1.81
<i>SD</i>	1.56	1.80	1.93
<i>V</i>	171.5		190.5
<i>p</i>	.54		.45
All severities			
<i>M</i>	9.00	11.1	10.9
<i>SD</i>	4.24	4.20	5.66
<i>V</i>	317		252
<i>p</i>	.03		.95

Note. *p* values are based on contrasts with Match day figures, using the Wilcoxon signed ranks test with continuity correction.

Table 2

Mean number of recorded road incidents separated according to whether Celtic won

Incident category and winner	Control day before	Match day	Control day after
KSI			
Celtic win	1.69	2.00	1.31
Other result	2.00	2.12	2.29
All severities			
Celtic win	9.31	10.5	10.2
Other result	8.71	11.7	11.6

Note. *SDs* range as follows: KSI 1.37-2.18; All severities 3.50-6.32.