***Ref: SSM-D-20-00623***

***Manuscript Title: The role of alcohol in the link between national football tournaments (soccer) and domestic abuse - evidence from England***

***Social Science & Medicine***

***Dear Miss Trendl,***

***Thank you for submitting your manuscript to Social Science & Medicine (SSM). We have now completed its review; we apologize for the delay in processing your manuscript. Nonetheless, attach the comments of the reviewers, who we thank for their constructive comments. There is enough consensus among the reviewers to encourage a revision, although it is clear that it will take a significant amount of work. If you feel able to respond to these suggestions, we would be willing to consider a revised submission. Of course there is no guarantee that a revision will prove publishable. Please submit your revision through the on-line system by Aug 20, 2020.***

***If we have not heard from you by this date, then we will assume you do not wish to submit a revision and your manuscript will be withdrawn. If you feel you will need more time to revise and re-submit your paper, then please let us know immediately. Extensions to resubmission deadlines are only granted in exceptional circumstances.***

***To submit a revision, visit this webpage and click 'log in' at the top of the page. There you will see a menu item called "Submissions Needing Revision". You will find your submission record there. When submitting your revision, you will be asked to upload a Response to the reviewers' comments. Please also include a document that highlights the tracked changes made to your original submission.***

***If you do not wish to revise your submission please follow the instructions above to log in to your "Submissions Needing Revision" space where you will have the option to decline this invitation to revise.***

***We ask all our authors to consider the points below as a guide to submitting revised submissions:***

***Required files***

***When submitting your revised paper, we ask that you include the following items:***

***1. Response to Reviewers: A separate file labelled "Response to Reviewers" that carefully addresses, point-by-point, the issues raised in the comments appended below, including those of the Editorial Office, if any. You should also include a suitable rebuttal to any specific request for change that you have not made. Mention the page, paragraph, and line number of any revisions that are made. Please do not include any author identifying information in this file as it is viewed by reviewers.***

***2. Manuscript and Figure Source Files: At revision stage, we cannot accommodate PDF files for production purposes. Figures and tables may be embedded within the main manuscript file as long as they are of sufficient resolution for Production. For any figure or table that cannot be embedded within the source file (such as \*.PSD Photoshop files), the original figure needs to be uploaded separately. Please do not upload figures and tables both ways. Refer to the SSM Guide for Authors for additional information.***

***3. Highlights: A short collection of bullet points that convey the core findings of the article and should be submitted as a separate file. Please use 'Highlights' in the file name and include 3 to 5 bullet points (maximum 85 characters, including spaces, per bullet point). See the following website for more information.***

***For additional details regarding acceptable file formats, please refer to the SSM Guide for Authors.***

***Further considerations for revised submissions:***

***1. There must be NO author identifying information in the main text manuscript and supporting documents i.e., Response to Reviewers. Acknowledgements should be submitted as a separate file, which reviewers will not see.***

***2. Keep in mind that standard SSM style when citing multiple citations is to do so alphabetically. For assistance on formatting references, please visit our Guide for Author’s page here.***

***3. Please remember that the combined word length of your abstract, tables, and references as well as the main text of all resubmissions should remain within our word limit. Exceeding these limits should only occur with the Editor’s consent.***

***4. Please remember that SSM does NOT publish endnotes or footnotes.***

***5. When uploading new documents to replace old ones, please remove the old ones, as we already have these saved in our system.***

***6. Please ensure your manuscript is double-spaced and each page is numbered. Line numbering will be automatically generated by the system.***

***With kind regards,***

***Lori A. J. Scott-Sheldon, PhD***

***Associate Editor***

***Social Science & Medicine***

*Dear Dr Scott-Sheldon,*

*Please find attached our revision of “The role of alcohol in the link between national football tournaments (soccer) and domestic abuse - evidence from England”. We feel confident that we have been able to address all of the reviewers’ comments in the manuscript. Please see our point-by-point responses below.*

*We have also taken care to follow all of the guidelines that you described. We feel that the paper has been significantly improved as a result of the revision. We hope you enjoy the revised version.*

*Yours sincerely*

*Anna Trendl, Neil Stewart, Tim Mullett*

**Reviewer #1: This study uses nearly a decade of police data to determine whether the prevalence of alcohol-involved domestic abuse is associated with football (soccer) matches, specifically whether England wins or loses. The authors find that there is a notable increase in the number of alcohol-involved domestic abuse on days when England wins football matches, and conduct several sensitivity analyses to check the robustness of their results. There is much to like about this article. I focus here on the potential limitations and suggestions to possibly improve it for publication.  
  
Introduction  
1. The authors may wish to consider the role of drinking patterns and intoxication in football and the prevalence and severity of domestic violence, especially considering that the hypothesized mechanism for why the game outcome would be associated with alcohol-involved domestic assault is related to drinking patterns.**

We thank the reviewer for raising this point. Unfortunately, there is a real lack of evidence-based research focusing on the specific issue of alcohol, football, match outcome, and domestic abuse. While strong associations have been observed (including the present study), how exactly England wins result in an increase of alcohol-related domestic abuse remains poorly understood. We included a paragraph to highlight this gap in the literature (pages 18-19 in the Discussion).

*“Despite the evidence for the link between England victories and domestic abuse, the exact pathway through which England wins result in an increase in alcohol-related domestic abuse remains unclear. Anecdotal evidence implies a spike in the number of alcohol poisoning cases following an England victory (Davies, 2018), suggesting that in the case of England, victories of the national football team result in elevated levels of alcohol consumption. This is consistent with the temporal pattern of the England win effect we have seen in our results, suggesting that prolonged, alcohol-fuelled celebrations following an England victory can create an environment where violent behaviours are more likely to manifest. Future research could focus on exploring the mechanism through which post-victory intoxication amongst England football fans translate into increased levels of violence (domestic or not).”*

**Methods  
2. If it is a reasonable number of codes, please list the crime codes included in the category of "domestic abuse." If these span more and less serious crimes, that may be important for readers to know.**

We have now listed the offence class of the domestic abuse cases in the sample, see Table S2 in the Appendix.

**3. Did the authors consider other potential confounders that would influence levels of alcohol consumption at football matches? For example, opponent rankings, temperature, and time of day have been shown to be important in some analyses of sports and intoxication or alcohol-related harms. Similarly, the authors include holidays (i.e., Christmas and New Year's Eve), did they consider adding major drinking holidays? If so, please briefly explain your model building process and/or why these confounders weren't retained.**

We did consider including additional controls, particularly to investigate the effect of surprise results, time of day, and weather. However, due to the lack of variance on these measures within the available dataset (England’s results closely aligned with expectations, particularly on wins, and the tournaments took place at similar times of year with similar seasonal weather), this was unfortunately not possible. In England, Christmas and New Year’s Eve are the only holidays culturally associated with significant drinking, and we indeed see a substantial increase in the number of reported alcohol-related domestic abuse cases on both of these holidays, therefore the inclusion of these controls resulted in a significantly improved overall model fit.   
  
**4. Did the authors test for temporal clustering within the crime data to determine whether it was necessary to nest the observations within months and/or years?**

To explore the extent to which serial correlation affected our results, we reran our core regression models (presented in Table 1) using Newey-West autocorrelation-robust standard errors (see Table S3 in the Appendix). The results from the two approaches lead to the same conclusion.

*“Daily count data can exhibit temporal autocorrelation, which occurs when values of the error term are correlated across time periods, which can lead to biased estimates of the standard errors (Greene, 2002). To investigate the extent to which temporal autocorrelation affects our results, we will compare our core estimates to those obtained when using Newey-West autocorrelation-robust standard errors.” (page 9)*

*“We also estimated the models shown in Table 1 using Newey-West standard error correction (see Table S3 in the Appendix). The CIs presented in the two tables are very similar, suggesting that temporal autocorrelation did not have a significant impact on our original estimates.”(page 11)*

**5. Why did the authors choose to not use an offset (i.e., calculate a rate) or adjust for annual population?**

Population estimates for the West Midlands are only available on an annual level. As all our models include year as a control variable, the effect of population size and change will be reflected by this variable.  
  
**6. A multiple testing correction is needed.**

We thank the reviewer for raising this very important point. We updated all regression tables to make it clear which coefficients survive the multiple testing correction.  
  
**7. The authors make several statements toward establishing causality. One way to buttress these statements would be to adjust their regression coefficient for under-reporting if there are data to suggest the proportion of domestic assaults that are reported in England using quantitative bias analysis.**

Unfortunately, there is very little data on the extent of under-reporting of domestic abuse in the UK. The best source of information is an annual survey called Crime Survey for England and Wales (CSEW), which contains a self-completion module on domestic abuse. According to the CSEW, only 17% of victims who experienced domestic abuse in the year ending March, 2018 have reported it to the police. We report this in the main text. Assuming that England football matches do not affect reporting behaviour (our analysis of newly reported cases by victim-perpetrator pairings suggest this is the case), our estimate of the increase in alcohol-related cases on England football days should be an accurate reflection of the increase in the true number of cases.  
  
**Results  
8. There are methods described in the results section; these should appear in the methods section.  
  
9. There are results for analyses and outcomes that are not described anywhere. Please describe these in the methods section.**

We thank the reviewer for pointing these issues out. We have now updated the manuscript to mention and define all outcome variables in the Data section. All regression model types (negative binomial, Poisson, and logistic regression) are described in the Methods section in detail, and for each regression table, we make explicit mention of the type of model used. In addition, we have removed all methodological or other information from the results section, and moved it into either the Data or the Discussion section.

**Discussion  
10. For the authors consideration: It may help readers grasp the significance of the findings to multiply your rate (0.53 per 100,000) by the population of WMP (2.9 million) to generate an approximate count of additional alcohol-involved domestic assaults?**

We chose to report our results by 100,000 people to facilitate the generalisation of our estimates to other areas of England.  
  
**11. The authors may also want to mention that it is a limitation that alcohol-involvement was subjective; there may be cases where alcohol was reported where it was not involved and vice versa, although the authors tried to mitigate this by incorporating data from the incidents.**

We thank the reviewer for raising this point. We now explicitly list this as one of the limitations of the study (see page 19).

**12. Do the authors have a set of focused recommendations for how to reduce the odds of alcohol-involved domestic assault after football matches?**

We hope that our study will be considered a useful addition to existing evidence on the link between football, alcohol, and domestic abuse in England. However, as empirical data scientists, we don’t feel we are sufficiently qualified to elaborate on the policy implications of this complex relationship, our aim with the present work is to contribute to the evidence base policymakers rely upon.

**Overall, nice work!**

Thank you.

**Reviewer #2: General comment:  
An interesting study, revealing that the experience of a national success in an international football tournament substantially increases the likelihood of alcohol-related violent behaviors manifesting in domestic (and other) settings.  
  
Originality:  
The study is original in the sense that it, to the best of my knowledge and in line with the authors' claim, for the first time explores the role alcohol plays in the link between football and domestic abuse in a large-scale quantitative research design.  
  
International relevance:  
The study is relevant since football is the most popular sport in the world and alcohol consumption and related problem is high in connection to games and tournaments. These problems are a public health concern and results in negative consequences both for the society as a whole, as well as for the individual and brings harms to others.  
  
Significance of contribution:  
The study makes an interesting contribution to the research field by showing a connection between football games, game outcome, and alcohol-related violence, specifically domestic abuse.  
  
Is the manuscript likely to stimulate wider debate if published?  
The manuscript is likely to stimulate a wider debate since football is the largest sport in the world with high levels of alcohol consumption and related problems. This has been a problem for decades and as a matter of fact during the last European championship in France 2016 sales of alcohol were banned as a consequence of a number of alcohol-related violent incidents. That football events also have consequences for alcohol-related domestic violence is also a matter that I believe should be interesting both for the research community as well as the public. A wide debate, however, probably depends on active work with the third mission.**

We are also hoping that our findings will be of interest to a wider audience. We have already communicated these results back to the West Midlands Police (with whom we are still working closely) and an earlier version of this manuscript had been shared with the National Centre for Domestic Violence (a UK-based domestic abuse charity who previously ran an awareness campaign on the link between football and domestic abuse).Once the peer-review is complete we plan to further disseminate our findings amongst other charity organisations.  
  
**Coverage of appropriate existing literature;  
I note that there are 26 references, whereof 11 are not research papers. Since there is a body of research reporting on sporting events, alcohol consumption, and related problems (such as violence), there should be room to add more references. This would also help the paper in the sense of putting it into a larger context. For instance, there are papers reported that have demonstrated high levels of alcohol consumption at both football events (e.g., Durbeej et al. PlosOne, 2017) and other sporting events (e.g., Erickson et al. ACER, 2011; Glassman et al. J Alc Drug Edu, 2011). The paper would benefit from incorporating references to high levels of alcohol consumption at sporting events, in particular football.**

We thank the reviewer for suggesting these references and we agree it is important to incorporate previous evidence on the link between sporting events and alcohol. To this end, we included a paragraph in the introduction on the link between sports spectatorship and alcohol consumption, and also added references from the literature on football fandom, alcohol consumption, and violence in England (see page 2).

**In addition, I'm missing a discussion with regard to the implications of the study findings, specifically the implications to policy and prevention. There are a number of studies being conducted around the world attempting to reduce alcohol consumption and related problems at sporting events. The paper would benefit from referencing some of these studies, e.g., Kingsland et al. Syst Rev, 2016; Durbeej et al. BMC Publ Health, 2016; Elgán et al, ACER, 2018. That being said, the paper would benefit from highlighting where alcohol is consumed, i.e., in the home setting, pubs and bars, and the sport arena setting, and these are all potential settings for prevention that in the end should decrease different types of alcohol-related violence, including domestic violence.**

We agree that knowing where the alcohol is consumed is key for designing effective interventions. Unfortunately, our data does not allow us to make assumptions about this. We only have information regarding where the domestic abuse has occurred. We tested whether on England game days we see more cases occurring at home or in public, but we found no evidence for any difference compared to non-match days.

The suggested studies are all focusing on interventions at the sporting event, but England only hosted the World Cup or the European Championship twice in the past several decades (in 1966 and 1996). While we choose not to offer a set of policy recommendations, we hope policymakers (who are certainly more qualified than us to design such interventions) will find our study a useful addition to the evidence base they rely upon.

**(if applicable) adequacy of methodology, analysis and interpretation:  
The chosen statistical methods used in the current study seems appropriate given the research question and data.**

Thank you. We have taken extreme care on this.

**The causal chain of events proposed by the authors is that the game outcome predicts the level of alcohol consumption, which in turn affects violence. However, this study, for obvious reasons, has no information about the level of alcohol consumption or intoxication levels, which then is a limitation.**

Yes, we agree this is sadly a limitation of the available data. We have made sure to explicitly mention this as a limitation (see page 19), noting however that the conclusions are supported by the random allocation of matches to days, and that the increase in domestic abuse is unique to alcohol related.

**I think that it is interesting that the obtained results stand in contrast to those obtained in the American study were loss of the local National Football League (NFL) team resulted in a 10% increase in the rate of reported male to female intimate partner violence. A somewhat elaborated discussion of this circumstance would make an interesting contribution in the discussion section.**

We now explicitly address this discrepancy in the discussion and highlight the potential reason behind these differences.

*“The most comprehensive investigation of the link between sports and domestic abuse by Card and Dahl (2011) used NFL data, and found that a surprise loss of the home team leads to a 10% increase in the rate of IPV cases reported to the police. They found no evidence for the modulating role of alcohol (i.e., the same increase was observed for alcohol- and non-alcohol-related cases). This result is clearly in contrast with our findings, which instead suggest that England victories have the largest effect on the reported number of alcohol-related domestic abuse cases.*

*While we can only hypothesise about the reason for this discrepancy, it is worth noting that there several key differences between these studies (e.g., country, sport, type of tournament), all of which are likely to impact on the link between sports fixtures and domestic abuse. Card and Dahl’s results suggest that in the context of NFL, the negative emotional shock experienced by the fan who expected his team to win ultimately manifests in violence. We argue that in the case of England’s participation in international football tournaments, the historical context is key to understand why victories have the largest impact on alcohol-related domestic abuse.*

*Based on the pre-match betting odds, all of the England victories were expected in our dataset. This suggests that in the context of England and national football tournaments, it is living up to the expectations of the fans that results in the largest emotional effect (as opposed to an unexpected loss). Illustrating the national importance of a victory, English newspapers’ narratives about the team’s performance in these tournaments are often characterised with high levels of optimism, expectation and yearning for the glory of the 1966 World Cup which was won by England (Vincent, Kian, Pedersen, Kuntz, & Hill, 2010). We conjecture that in the case of England, the fulfilment of these expectations can have a substantial impact on fans’ alcohol consumption through post-match nationwide celebrations, resulting in disinhibitory effects increasing the likelihood of violent behaviours.”*

**The significance levels are reported as thresholds, however, I think it would be more valuable to the reader if exact p-values are reported.**

We have now updated the regression tables and report the exact p-values.  
  
**Clear, concise and jargon-free writing style:  
The manuscript should benefit from a more clear structure, see below.  
  
Structure and organization:  
In what way are the results from this study relevant from a social or public health perspective?  
The hypothesis of the study could be more clearly expressed in the introduction. On page 3 it says: "To test our hypothesis…", however, the hypothesis has not been clearly presented/expressed in the previous text.**

We thank the reviewer for pointing this out. We now have updated the introduction to make our hypothesis clearer.

*“Despite the evident links between alcohol and domestic abuse, the role alcohol plays in the link between football and domestic abuse has not yet been explored in a large-scale quantitative study. Given the strong association between drinking culture and football in England (Dixon, 2014), a relationship continuously reinforced by the marketing practices of the alcohol industry (Gornall, 2014), we conjecture that alcohol acts as an aggravating factor in the link between football and domestic abuse in England.*

*Specifically, we hypothesize that when the England national football team plays, the number of reported alcohol-related domestic abuse cases increases. Based on previous research focusing on the link between the football World Cup and domestic abuse in England (e.g., Brimicombe & Cafe, 2012; Kirby et al., 2014), we expect the effect to be stronger on England loss and win days. Exploring the link between football, alcohol, and domestic abuse will deepen our understanding of the pathway through which football (and more specifically the outcome of the match) increases propensity for violence in domestic settings.”*

**The result section presents a mix of method descriptions, normative phrases, and discussion of the results, such as (p. 11): "less surprising", "probably" etc., and references to previous research: "more consistent with previous findings…", which creates confusion for the reader. And (p.14): "If we only observe an increase…", which might belong to the discussion section. Thus, the authors could consider to be more concise as to what belongs in the results section and the discussion section, respectively.**

We thank the reviewer for pointing this out. We updated manuscript, and made the results section more focused and moved all normative discussions to the discussion section.

**Please elaborate more on the limitations. For instance, the actual intoxication level is not known as well as if the game took place on a weekday as opposed to a weekend, and during the day or evening. For instance if a game take place during a week day during the day, one could hypothesize that people are drinking less which would lead to less domestic violence.**

We now explicitly address the limitations of not knowing the actual intoxication level (see page 19). All our analyses take day of week into account, and we now added time of day to the list of factors we list as potential important modulators of the link between football matches and domestic abuse.