

# Scientific research in association football - editors and reviewers get off my case (study).

Christopher Carling<sup>1</sup>

<sup>1</sup>Institute of Coaching and Performance, University of Central Lancashire, UK

Expert Opinion | Case study | Reviewing | Soccer

## Discussion

In 2010, I published my first peer reviewed original research articles (1-7) using data collected in a single professional top-flight association football club setting. Since, I have been fortunate to have written (both as single and co-author) several further papers (8-22) in the same club investigating various research avenues notably in time motion analyses of match-play performance and injury. As stated in my PhD thesis (23) completed concomitantly during my time at the club (journey now completed!), rather than being the result of an initial grand working plan, this body of research was a representation of the evolution and expression of my applied work over a substantial time period. Indeed, the research was shaped and driven by emerging and ever-evolving needs-analyses identified within a work setting, frequently arising from discussion with the club's practitioners, as well as through identification of gaps in the literature at the time. The research was always tailored toward practitioner needs rather than aimed at being published per se (24). I am (humbly) convinced that collectively over the years, these articles generally made a positive impact on informing policy and practice in my former club and a novel contribution to the scientific literature. In my PhD thesis (23) I stated that I hoped the publications would encourage additional research in similar applied contexts and provide foundations upon which other researchers could build on and optimise their study design whilst providing pertinent datasets against which they could compare their findings.

Unfortunately, publishing this body of work has not been without difficulties and battles (which continue to this day)! An issue systematically encountered concerned editorial and reviewer comments and decisions during the peer-review process. Papers submitted for peer-review using data collected in the aforementioned club setting were continually criticised (and on several occasions rejected) by editors and/or reviewers. This was mainly due to the work being performed in a 'single reference club' - a case-study. In a co-authored commentary paper published in 2013 my colleagues and I already stated our concerns that insistence on study designs using large sample sizes meant that potentially important applied small-scale, case-study type work addressing specific performance related questions (i.e. directly relevant to a specific team context and/or situation) were much less acceptable in academic journals (25). Similar concerns were expressed elsewhere at a similar time (26). Fortunately, alternative publication outlets such as the International Journal of Sports Physiology & Performance, Science and Medicine in Football or the emerging web platform "Sport Performance & Science Reports" strongly encourage submission of applied small-scale case study type reports conducted in high performance sports settings. On the home page of Science and Medicine in Football it is clearly stated that authors are particularly invited to submit work considered to be underrepresented in the scientific literature of football, e.g., studies on top-level football players with small sample size. However, my regular exchanges

with fellow researchers, sports scientists, performance analysts etc working in club settings (across a range of team sports) internationally suggest the inverse continues to be the case in numerous sports science/medicine journals. They are in agreement about what they consider to be major hurdles in the peer-review publication process: 1) a fear of rejection by editors without peer-review (strong possibility!), 2) the constant need to justify the 'raison d'être' for their articles simply because these involve a single club, 3) failure of editors and reviewers to acknowledge and seemingly understand the real-world applied nature of the research combined with their uncompromising approach to papers not always using a perfectly controlled study design - yes, it's applied research in a high performance setting, 4) finding a suitable publication outlet - indeed there is often disconnect between many journal manuscripts' focus, format, and accessibility in comparison with applied practitioners' and researchers' needs (27).

Referring back to the body of work I have (co-) authored notably on time motion analysis and injury, one can see that the majority of articles include a study 'limitations' sentence, albeit forcibly, to satisfy reviewer criticisms and help open the golden gateway to publication. Indeed, even the aforementioned Science and Medicine in Football journal states that studies on top-level football players with small sample sizes are acceptable for submission provided the limitations are 'appropriately' addressed and taken into consideration for the discussion. In the papers I have published, these limitations sentences are generally along the lines of "a clear limitation of this study was that the findings are derived from players belonging to a single elite football club and the patterns observed are only a reflection of this particular cohort". In my papers examining injury, the reviewers also frequently expressed concern about the lack of 'statistical power' due to the small sample size (number of participants, injury cases). Again, a limitations sentence responding to this point was typically included. A doubt also expressed by reviewers concerned the generalisation and applicability of such case-study type findings to a 'wider setting' and that solid evidence-based conclusions can only be drawn from publications using a multiple-club approach and eventually impact practice. Some reviewers simply dismissed the potential practical applications presented. The question arises: why should we need to systematically mention in papers that a single club study is a major limitation? In an ideal world surely the majority of journals' readers are intelligent enough to objectively account for the strengths and weakness of this type of study when judging its design, findings and subsequent potential impact and applications? In addition, a point worth mentioning is that only a limited number of the papers published by myself and colleagues at my former club related to time motion analysis and have injury been preceded or replicated albeit using larger sample studies. For example, out of 12 publications related to time motion analysis (1-4, 8-11, 13-15 20), only on 3 occasions (to my knowledge) have similar but larger sample studies been published (28-30). Hence, if our research group had not published the other 9 studies then no other findings would be available! At this

time of writing, the cumulated number of citations on Google Scholar for these 9 papers = 564!

I was always willing to accept criticism for previous (and upcoming) articles investigating aspects of performance in a single team that editors and reviewers felt required improvement: notably study design, data analysis techniques and practical applications. This is of course the purpose of the peer review process! In contrast, I agree with Martin Buchheit's recent editorial (24) that to a certain extent the sports science publishing and peer-review process requires change, and for the specific purposes of the present article, regarding contemporary small-scale applied research. In another recent editorial (31) George Nassis states that a substantial increase in the number of scientific publications related to medical and performance enhancement in association football has been observed in the last 10–15 years. Yet, what proportion of these studies published in mainstream journals have conducted applied case-study research and if so, escaped the habitual criticism and subsequent reviewer versus researcher battle linked to the single club approach?

Thus, in relation to applied small-scale case study type research, should sports science/medicine journals: 1) be clear from the outset that they simply do not accept such papers? 2) create a specific dedicated applied case-study section? 3) ensure 'suitable' editorial staff / reviewers are managing these submission types? Interestingly the example of 3 personality archetypes has recently been used to describe the profile of sports science researchers (32). I'll leave it up to the reader to determine which of these archetype descriptions can regularly be applied to the sports science / medicine peer-review process circuit?

I would like to refer readers to a pertinent article on common misunderstandings about case-study research (33). Complementary to this paper, various points that I feel it is time editors and reviewers need to realise and account for include:

1. Given real-life natural competitive situations are under investigation (e.g. time motion analysis) in a high performance setting the outcomes of single club studies should possess high levels of ecological validity (as long as the tools used are valid, reliable... , definitions are clear, confounding factors controlled for – these points are necessary irrespective of sample size!).
2. The practical outcomes arguably balance out some of the possible methodological flaws/limitations - practical studies with practical results in elite athletes (26)!
3. Contextual influences (results, playing style, form, injury, international call ups, changes in coaching personnel and practices, players leaving/arriving, environmental conditions, opposition standard, individual abilities of players in the sample) can arguably be better controlled and subsequently accounted for when interpreting data derived from single club investigations compared to larger anonymised multi-club datasets. It is worth mentioning that merging data from several clubs will increase sample size, but researchers will often face problems related to technology. For example, differences in tracking devices and running speed zones thresholds, so in the end it's not that easy either! In several of my studies, the club's coaching, medical and physical conditioning staff were unchanged (hence so were training methods, testing and injury prevention protocols etc) over the entire study period (often several years). It is unfortunate that this key contextual issue was frequently unrecognised by the reviewers.
4. It is obvious that obtaining 'large' sample population sizes of elite players and datasets in a single football club setting

is rare! To ensure sufficient statistical power, researchers recommend a minimum sample size of 80 players for time-motion analysis studies (30) and 200 injured participants in epidemiological investigations (34). None of our studies have ever matched these recommendations! Yet how often did reviewers recognise our gathering of prospective continuous longitudinal performance datasets (up to 8-years) - not very! In addition, our studies frequently include repeated measures collected in the same players over several seasons which unless I am proven wrong rarely occurs in large-scale multi-club investigations.

5. Large inter-club disparities exist in the physical, tactical and technical abilities of players making up team squads combined with cultural and philosophical differences in practitioners' approach to training and competition arguably leading to doubts on the pertinence and practical applicability of any large-scale dataset for a single club setting (25).
6. Credit should be given to researchers attempting to publish research frequently conducted within the recognised difficulties of elite applied football contexts (e.g. collection of and or/access to data, sensitivity and permission to publish data, study design concessions linked to player/practitioner willingness to participate...).

In a paper I co-authored on injury risk and match congestion (21). I received the following comments from 3 reviewers (the paper was eventually accepted after several revisions and winning the small versus large sample size battle!). These I feel nicely sum up the inconsistencies and difficulties commonly faced when submitting case-study research.

*'This paper is addressing an area of interest to clinicians and the public alike: the influence of match congestion in Elite level football on injury risk. A strength of this study is the novel approach considering the individual players' exposure to matches, rather than the team which pragmatically addresses the issue of player rotation within a team as a strategy to overcome increased workloads/reduced recovery time associated with congestion. Such a study could only be conducted where meaningful data has been captured over a long period of time, and the playing staff have remained fairly constant. For this, the authors should be congratulated and encouraged.'*

*'Although I commend the authors on this interesting manuscript and their contemporary view on injury risk, I feel this study is greatly hampered by a lack of power. Only a single team with a limited number of players was followed over time in this cohort. It may be that authors find a relationship between game congestion and injury risk, but that then only applies to his team.'*

*'This is a well written manuscript that concerns a topic which is often debated and of high interest in professional football, match congestion. The study finds merit in the thorough methodology which is in line with methodological consensus of the field. I agree with the authors that the topic of match congestion needs more studies and the partly original approach of the paper makes for an interesting read. However, I have some concerns with the study, the small sample size being the major one.'*

To conclude this piece, I feel there is still much potential for sports science researchers and practitioners to extend insight, appraisal and sharing to inform practice through peer-review publication of case-study research papers. To improve opportunities for obtaining fair and objective reviews, it is reason-

able to say that practitioners must offer more of their time and expertise to journals to review scientific articles – editors and reviewers are not all to blame. Yet in my experience the major issue I continue to be faced with currently resides with editor and reviewer opinions and perceptions of applied case-study research in the elite football setting; surely it is time for them to provide us with a better case (no pun intended?) for publishing.

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