

# Case Studies in Exercise and Sport Sciences: A Powerful Tool to Bridge the Science–Practice Gap

Israel Halperin

Despite the progress made by the scientific exercise community in collaborating and communicating with nonscientist coaches, there is room for improvement. Coaches find research difficult to understand, feel that their interests are not being addressed by exercise research, and rely on peer discussion to further their coaching knowledge base while consuming few peer-reviewed articles. One useful strategy to bridge the science–practice gap is with case studies. In addition to furthering our understanding of the physiology, psychology, and training schedules of elite athletes, case studies can serve (1) as a useful communication channel with coaches if presented as narratives and (2) to establish and strengthen relationships between scientists and coaches, leading to fruitful research collaborations. The purpose of this invited commentary is to discuss these 2 less-recognized benefits of case studies and propose a way to incorporate case studies more frequently alongside group-based studies.

**Keywords:** research design, scientific communication, persuasion, translation

In recent years, progress has been made by the scientific exercise and sport community in communicating and collaborating with nonscientist coaches. On the one hand, exercise scientists frequently discuss and explain their research findings in podcasts, articles, and social media channels, such as Twitter and Facebook, and they develop working models to improve the embedment of research in high-performance sport.<sup>1</sup> On the other hand, a growing number of peer-reviewed journals include key points, study highlights, video abstracts, and practical applications sections. Despite this important progress, some gaps remain—primarily, the fact that many sport and strength and conditioning coaches remain reluctant to work alongside exercise scientists and to implement results from scientific studies.<sup>2,3</sup> Coaches regularly rely on peer discussion to further their coaching knowledge base and consume little peer-reviewed research.<sup>2</sup> Coaches have also reported that research is presented in formats that coaches cannot easily use and that their main interests are not being addressed by the research being conducted.<sup>4</sup> Indeed, a recent paper has argued that exercise scientists regularly answer questions that coaches are not interested in,<sup>3</sup> which may perpetuate the cycle of disconnection. Therefore, bridging the gap between exercise scientists and coaches remains an important goal.

Recently, Harper and McCunn<sup>5</sup> recommended that exercise scientists implement qualitative research to better connect research and practice. In this commentary, I will expand on their recommendations by proposing that exercise scientists should more frequently utilize a specific qualitative research design: case studies. In exercise science, case study designs are mostly used to acquire knowledge about the training programs of high-caliber athletes and their physiological and/or psychological characteristics. Because of the relative simplicity of collecting data on one or a few participants, case studies are more logistically suitable for richer and more complex designs, such as longitudinal interventions. Case studies can also contribute to the generation of hypotheses for future research questions. However, case studies have

other advantages that are not commonly recognized. These benefits can assist in bridging the research–practice gap and will be the focus of this commentary. First, case studies can serve as a potent communication strategy to nonscientist coaches if presented as narratives. Second, conducting case studies in conjunction with coaches can serve as a “buy-in” strategy that can establish and strengthen relationships between scientists and coaches and thus create possibilities for future research collaborations.

Exercise scientists usually rely on statistical evidence derived from group-based research to communicate information. Despite its rigorous appeal, statistical evidence is not always the best communication strategy for nonscientists, because it is abstract, difficult to grasp, and not personal.<sup>6–8</sup> Indeed, many people misunderstand basic qualitative information concerning probabilities, percentages, and proportions<sup>9,10</sup>; precisely the type of information presented in group-based research. It should be noted that even scientists with a background in statistics regularly misunderstand concepts of probability (eg, the meaning of *P* value).<sup>11</sup> Conversely, case studies can be considered as narratives, loosely defined as examples, anecdotes, and stories consisting of at least 1 person experiencing at least 1 event.<sup>6–8,12</sup> Narratives are easier to process, comprehend, and recall and are more engaging and persuading.<sup>6–8,12,13</sup> As a result of these insights, health professionals are encouraged to utilize narratives to communicate scientific results and influence health behaviors.<sup>6–8,12,13</sup> For example, to combat the rise of anti-vaccination advocates, health professionals convey the importance of vaccines using booklets that focus on personal stories of families who were affected by vaccine-preventable diseases, rather than emphasizing statistical facts.<sup>12</sup> Since coaches commonly acquire knowledge through informal discussions with peers,<sup>2,4</sup> they are familiar with narrative format and thus are more likely to be influenced by and receptive to case studies.

In addition to a communication and persuasion strategy, case studies can be used to foster and create working relationships between scientists and coaches. Understandably so, coaches are protective of their athletes’ schedules and may not be inclined to collaborate on large-scale, time-consuming research projects. This is especially the case if coaches do not fully understand the benefits of the proposed project, have limited appreciation of scientific

The author is with the School of Human Kinetics and Recreation, Memorial University of Newfoundland, St John’s, Newfoundland and Labrador, Canada. Halperin (Israel.halperin@mun.ca) is corresponding author.

methodology, and/or do not know the scientists and their intentions. These setbacks can be overcome with collaborations on case studies rather than group-based research providing multiple benefits. Case studies require less effort, time, and logistical organization to conduct, which should make coaches more inclined to cooperate. Since case studies are easier to comprehend, coaches may perceive the collaboration opportunity as more interesting, allowing for a sincere dialogue between the coach and the scientist concerning the purpose of the project and its benefits. This dialogue can serve as an opportunity for the scientist to develop a relevant case study question together with the coach, in addition to allowing the scientist to gain experience “in the trenches” that will allow for a deeper understanding of the needs of the coach and athletes. Following collaboration on a case study, when trust and mutual interests have been aligned, more demanding research projects can be sought.

Since both statistical and narrative results are important, and since some journals are reluctant to publish case studies, a useful and logistically feasible publication strategy is to combine group and case studies as a 2-part article.<sup>14,15</sup> This rarely utilized design can increase the number of published case studies and allow for both breadth and depth within a given article. For practical and logistical reasons, the group will normally include low- to medium-level athletes examined over shorter durations, and the case study will include elite athlete(s) examined over longer durations with more complex designs. Consistent results across the group and case indicate stronger findings and afford the opportunity to communicate results using both a statistical and narrative approach. Inconsistent results provide directions for future research aiming to investigate the origin of the discrepancy. For example, using this 2-part study design, Halperin et al<sup>14</sup> examined whether providing combat sport athletes with a choice concerning the order of delivered punches would influence punching forces and velocities. The case was a world-champion kickboxer who completed the test conditions over 6 days, and the group included amateur competitive athletes who repeated the testing procedures over 2 testing days. The effects were consistent in direction in both parts, with slight differences in magnitudes. A dissimilar response between the case and the group would likely have led to a follow-up question attempting to understand the discrepancy.

While the *International Journal of Sports Physiology and Performance* does publish case studies, the numbers are low, with only 3 published in 2017. It would be beneficial for the exercise community to see more of them, not only to enhance our understanding of elite athletes, but also to create stronger coach–scientist relationships and to generate effective communication and persuasion strategies so that results of studies will be used more frequently by applied practitioners.

## References

1. Coutts AJ. Working fast and working slow: the benefits of embedding research in high-performance sport. *Int J Sports Physiol Perform.*

- 2016;11(1):1–2. PubMed ID: 26752203 doi:10.1123/IJSPP.2015-0781
2. Stoszowski J, Collins D. Sources, topics and use of knowledge by coaches. *J Sports Sci.* 2016;34(9):794–802. PubMed ID: 26222481 doi:10.1080/02640414.2015.1072279
3. Buchheit M. Houston, we still have a problem. *Int J Sports Physiol Perform.* 2017;12(8):1111–1114. PubMed ID: 28714760 doi:10.1123/ijssp.2017-0422
4. Reade I, Rodgers W, Spriggs K. New ideas for high performance coaches: a case study of knowledge transfer in sport science. *Int J Sports Sci Coach.* 2008;3(3):335–354. doi:10.1260/174795408786238533
5. Harper LD, McCunn R. “Hand in Glove”: using qualitative methods to connect research and practice. *Int J Sports Physiol Perform.* 2017;12(7):990–993. PubMed ID: 28714750 doi:10.1123/ijssp.2017-0081
6. Hinyard LJ, Kreuter MW. Using narrative communication as a tool for health behavior change: a conceptual, theoretical, and empirical overview. *Health Educ Behav.* 2007;34(5):777–792. PubMed ID: 17200094 doi:10.1177/1090198106291963
7. Dahlstrom MF. Using narratives and storytelling to communicate science with nonexpert audiences. *Proc Natl Acad Sci.* 2014; 111(suppl 4):13614–13620. doi:10.1073/pnas.1320645111
8. Martinez-Conde S, Macknik SL. Opinion: finding the plot in science storytelling in hopes of enhancing science communication. *Proc Natl Acad Sci.* 2017;114(31):8127–8129. PubMed ID: 28765506 doi:10.1073/pnas.1711790114
9. Lipkus IM, Samsa G, Rimer BK. General performance on a numeracy scale among highly educated samples. *Med Decis Making.* 2001;21(1):37–44. PubMed ID: 11206945 doi:10.1177/0272989X0102100105
10. Galesic M, Garcia-Retamero R. Statistical numeracy for health: a cross-cultural comparison with probabilistic national samples. *Arch Intern Med.* 2010;170(5):462–468. PubMed ID: 20212183 doi:10.1001/archinternmed.2009.481
11. Haller H, Krauss S. Misinterpretations of significance: a problem students share with their teachers. *Methods Psychol Res.* 2002;7(1): 1–20.
12. Cunningham RM, Boom JA. Telling stories of vaccine-preventable diseases: why it works. *S D Med.* 2013.
13. De Wit JB, Das E, Vet R. What works best: objective statistics or a personal testimonial? An assessment of the persuasive effects of different types of message evidence on risk perception. *Health Psychol.* 2008;27(1):110–115. PubMed ID: 18230021 doi:10.1037/0278-6133.27.1.110
14. Halperin I, Chapman DW, Martin DT, Lewthwaite R, Wulf G. Choices enhance punching performance of competitive kickboxers. *Psychol Res.* 2016;81(5):1051–1058. PubMed ID: 27465395 doi:10.1007/s00426-016-0790-1
15. Blanchfield A, Hardy J, Marcora S. Non-conscious visual cues related to affect and action alter perception of effort and endurance performance. *Front Hum Neurosci.* 2014;8:967. PubMed ID: 25566014 doi:10.3389/fnhum.2014.00967

## Queries

- Q1.** Please ensure author information is listed correctly here and within the byline.
- Q2.** Please check if the edits to the sentence “Indeed, a recent paper...” retain the intended meaning and correct if necessary.
- Q3.** Kindly provide volume number and page range for Ref. 12.

AUTHOR PROOF