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METHODS FOR MEASURING BREADTH AND DEPTH OF KNOWLEDGE

Doris J. F. McIlwain and John Sutton

Eccles's challenge: verbal reports of expert knowledge

In elite sport, the advantages demonstrated by expert performers over novices are sometimes due in part to their superior physical fitness or to their greater technical precision in executing specialist motor skills. However, at the very highest levels, all competitors typically share extraordinary physical capacities and have supremely well-honed techniques. Among the extra factors, which can differentiate between the best performers, psychological skills are paramount. These range from the capacities to cope under pressure and bounce back from setbacks to knowledge of themselves, opponents, and the domain, which experts access and apply in performance. In the companion chapter on breadth and depth of knowledge in expert sport (see Chapter 9), we discussed the forms or kinds of knowledge deployed by elite athletes, and described some lines of research that seek to tap and study such expert knowledge (McPherson & MacMahon, 2008; McRobert *et al.*, 2011). In this chapter we focus more directly on questions about methods for measuring or more accurately assessing expert knowledge, in particular addressing a wider range of methods to help us understand what experts know. Suggesting that sport researchers can productively adopt and adapt existing qualitative methodologies for integration with more standard quantitative methods, we introduce and survey a number of areas of qualitative research in psychology.

Since the cognitive revolution, mainstream psychologists have been increasingly cautious about the utility of verbal reports of cognitive processes. Since the bulk of processing occurs at lower levels in the cognitive system and is not consciously accessible, it is thought that we need objective observational methods to catch the system in action. But in a trenchant, recent review of work on verbal reports in sport psychology, David Eccles (2012) argues that the field has not taken this theoretical skepticism seriously enough, and is still overreliant on reports of verbal data collected in poorly controlled ways. Reviewing classical studies of people's significant inaccuracy in reporting the thoughts mediating their decisions and actions (Nisbett & Wilson 1977), Eccles argues that in general much of cognition is "inaccessible to consciousness:" he quotes Dennett's claim that "consciousness of the springs of action is the exception, not the rule" (2003, p. 246). Many apparent reports of cognitive processes are in fact confabulations, arising from implicit cultural or subculturally sanctioned theories, which involve causal claims that may be quite disconnected from the actual causal processes underlying action.

But Eccles sees this pessimism as tempered by the possibility of using clear guidelines to access what individuals can accurately report. Following Ericsson and Simon (1980; see also Fox *et al.*, 2011), Eccles suggests that the only material that can be accurately reported is that which was attended to, or heeded, in short term memory (STM) during the execution of a task. This can either be directly verbalized or recoded "into a verbal mode" (Eccles, 2012, p. 105). The best ways to elicit such legitimate verbal data are to ask practitioners to think aloud during performance ("concurrent reporting") or – as will often be required in dynamic sport tasks – collecting reports straight after task performance (immediately retrospective reporting). Experts should ideally be asked questions that are not overly directive, and do not constrain the participant to interpret his/her thoughts or to report only about some particular target interest of the researcher (like coping efforts, or self-talk strategies). Instead, undirected probes, which merely ask for the thoughts the individual remembers having, can provide information with more optimal scope and of sounder validity. Participants can be trained swiftly to report only on what they are, or have been, thinking rather than to interpret, theorize, or comment on their own cognitive processes. These methods can also aim at gathering verbal reports of specific episodes rather than general reports about how experts usually think or make decisions.

Eccles (2012) performs a critical content analysis of an array of sport research that used verbal report data in studies of psychological skill. He found that many of them did not use prompts, which optimized the validity of the reports given. Most studies in his sample used interview methods, but employed directive probes, tapped only general states rather than particular episodes, and involved longer delays between the episode and the report. In summarizing the quotations provided as results in these research articles, Eccles suggests "these studies provided no evidence of a participant having recalled any actual thought from any specific episode" (2012, p. 112).

Other recent work, of course, does adhere more closely to the research guidelines Eccles outlines. In the work by McPherson and by McRobert, Roca, Ward, and colleagues, which we discussed in the chapter on breadth and depth of knowledge (Chapter 9), verbal reports are typically gathered on an immediately retrospective basis – for example, between points in tennis. In one study of anticipation and decision-making in football, for example, Roca and colleagues trained participants on how to think aloud in 30-minute sessions offering practice in "giving immediate retrospective verbal reports by solving a series of both generic and sport-specific tasks" (Roca *et al.*, 2011, p. 307). Nevertheless, Eccles's critical survey raises important questions about the degree of input a researcher should have in shaping the content of self-report, the timing of recall, and the specificity of the event under scrutiny. While we agree that sport researchers should be more aware of these think-aloud protocols, in this chapter we argue for the inclusion of a wider range of methods to tap expert knowledge by way of verbal report.

In attempting to give explanatory causal accounts of specific mechanisms underlying expertise, we may need a very specific form of verbal report. But there are many forms of knowledge relevant to expertise – knowing the background form of another player, knowing how to compensate for general personal tendencies in the face of a certain genre of challenge, recently updated knowledge of local conditions and their likely effects on particular kinds of play, and so on. Eccles's admirably narrow conception of valid self-report suggests that all one needs to discover about skill relates to a single occurrent episode, veridically described, as it unfolds in real time. If possible, this is almost self-report as a stand in for a camera. The method is explicitly set up to exclude personal meaning, context, history, experience of embodiment, or knowledge of context. Other levels of knowledge and personal insight among expert performers might, we suggest, be added to and integrated with these recommendations for optimizing valid responses. Experts are not always as ignorant of their own cognitive processes, not so constantly and consistently prone to confabulation, as is suggested by the classical literature cited by Eccles. Indeed,

they are sometimes able to open up their own knowledge base to revision, reorganization, and updating. They can access and discuss some aspects of their own cognitive processes (Chaffin *et al.*, 2002). If certain components of expert knowledge are thus more or less accessible, they are likely also to be shareable with researchers as well as with coaches and peers, provided the researcher establishes a situation of sufficient rapport, asks the right questions, and the practitioner is appropriately motivated and has no reason not to share.

Case study: Bicknell's staircase

At a 2006 Australian national cross-country mountain biking event in Thredbo, the course included a damp and muddy "staircase" section, at which riders took a range of different options. Some jumped off their bikes and ran, some pulled hard on the front brake to force the bike into a nose pivot down a wooden plank, and others slowed so much they were only just moving to steer down the edge of the stairs. Participant researcher Kath Bicknell successfully navigated this section after watching the competitors pass. She wrote later that

> if you asked me right away to describe how I had done this, I wouldn't be able to tell you exactly what I had done differently this time . . . I would probably have said what other riders had told me: "You've just gotta commit".
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> *(Bicknell, 2010, p. 86)*

Cycling experts can often tell you what they did, even if not immediately afterwards. Bicknell (2010) notes that in cycling down such a perilous staircase, you need to "keep your body weight behind the seat of the bike" [so that] the bike stays stable as it hits the flat ground at the exit – meaning the rider's body will not flip over the front wheel" (2010, pp. 87–8). This is background knowledge for most experts. In applying her knowledge to this new situation, Bicknell thinks back:

> When I had tried the stairs previously, I had slowed so much while turning that I had not believed that it was possible to complete the turn before falling off the bike, and I had put my foot out to scoot down the staircase instead. . . . By breaking the conscious direction of the movement into aiming toward the edge of the stairs, followed by looking toward the exit, I was able to successfully negotiate the turn and finish the rest of the complex manoeuvre. It is in this way that I guided my own reinvention of the correct technique. . . .
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> *(2010, p. 88)*

So, while an expert might offer up a general maxim immediately after a ride, with patience and insightful questioning the researcher can move beyond the motto or the press release. The motto – "you've just gotta commit" – conveys the point that

> When a rider has not committed to such a move, often due to doubt, fear, or distraction, their body position will alter due to muscle tension, or looking in the wrong direction (which often affects shoulder movement, which in turn affects steering) and the movement's outcome will alter.
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> *(Bicknell, 2010, p. 88)*

It is a "colloquial shortcut" for a complex phenomenological process of embodying a skill in which cognition is interwoven with motor skill. As Bicknell notes in reflection, her own

experience "watching the men ride the staircase and then being able to do it myself has also revealed that the developmental process underpinning skilled performance does not just come from 'doing' but can be developed through cognitive experiences as well" (2010, p. 87). It is therefore something that can be captured in language and thought about, though not necessarily immediately after, the action itself.

As an expert participant observer, Bicknell has the capacity to notice and relay in language much of what a novice observer would miss. She suggests that skill embodiment

> Develops more through a process of emulation and belief rather than practice, error correction and repetition. Like jumping off a diving board for the first time, you cannot half ride a staircase, learning little components of the skill along the way. You need speed, momentum, body position and commitment to the manoeuvre at the beginning of the action, to relax during it, and to know what shape you want to feel yourself in as you finish it off.
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> *(Bicknell, 2010, p. 87)*

When a practitioner who is also a theorist of skill gives an account of skill development, we get a window into higher levels of skill acquisition. While she is able to give a detailed description of the isolated moments of turning the bike wheel down the difficult staircase, the form of self-report offered and the levels and complexity of knowledge in play here go far beyond that alone. Here is a participant theorizing with and for you. A rare case? We suggest that the thoughtfulness of experts about their domain of expertise, or the scope of their expertise, should not be underestimated. Knowledge informs perception-action couplings through shaping what, and how much, one notices, as expert participant observation reveals.

On a wider view of skill, expert knowledge covers the core features of motor execution, perception-action coupling, and the experience of the acquisition of embodied skills. It includes response selection and strategy, which entails knowing one's own form, an opponent's form, how well one's own style has been mapped, and the current competitive context. Novices have much to learn from the moment-to-moment accounts of experience of skilled performance, including how to sustain emotional resilience in the face of stress and challenge (both long-term strain and contingent, local challenges), as well as how to handle the social consequences of fame and public scrutiny. There is on occasion more knowledge folded into a single shot or episode than could perhaps ever be conveyed in concurrent verbalization. Immediate retrospective reporting in most cases would be useful, but such access may not be possible for researchers who seek to study elite sport performance. Further, much of the knowledge may be tacit, in the sense that it is not necessarily operating explicitly at the moment of performance, but yet still informs decision and action. The expert may not be in a position to volunteer it as relevant. Because much thus relies on the insight and skill of the researcher, a wider palette of methodological tools may be useful.

Overview of qualitative methods

Qualitative research is particularly useful in breaking new ground where there is not yet an established body of knowledge or existing theoretical models of the phenomenon of interest, or where there are as yet few existing findings to generate nuanced and specific hypotheses. It can be particularly helpful when all we have to start with is a researcher with a pressing research question that may have arisen from personal experience in a field. So at that stage, to counter possible personal bias, we need to add the views of others to our own implicit theories and hunches about what might be going on. Interviews and focus groups with expert practitioners can function

as a reconnaissance flight over the conceptual terrain, prior to commitment to a more detailed qualitative study, a questionnaire, or taking a relevant parameter experimentally into the lab.

Qualitative theorizing is not for everyone. The component skills are succinctly outlined by Gilgun:

> Skills required to do qualitative theory building and model testing are (a) capacities to draw detailed descriptions of phenomena of interest from respondents, from observations of settings, and from documents of various types; (b) capacities for conceptual thinking, that is, the ability to conceptualize social phenomena and identify them in data; (c) capacities for flexible thinking, where researchers are willing to challenge and undermine their own preconceptions and favorite theories, some of which may be out of their awareness; and (d) the discipline to answer questions such as, 'How do my findings add to, modify, transform, or undermine what is already known?' For many researchers, qualitative research is a way of thinking.
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> *(2009, p. 95)*

Despite its challenges, it is worthwhile achieving expertise in this domain to supplement other methodological skills, even if one does not take the skills all the way through to theory building. For example, science requires the use of established, reliable coding schemes. However, if coding schemes are adapted from other domains or other sports, the trade-off in relevance loss may not be compensated for by the reliability sought. A researcher may need to devise a purpose-built coding scheme in ways that meet the requirements of science: the process is made public, verifiable, and replicable. So what are the relevant considerations with regards to sampling, coding, and analysis?

Moving from one research method to another requires reassessment of expectations: integrating qualitative methods into your research requires revisiting assumptions about sample size, the prior existence of precise hypotheses, at what level generalization of results is possible, and whether one can aspire to universal laws. A common error in moving from quantitative to qualitative research is to assume that sample size hinges on the number of people in a sample rather than the array of experiences sampled. Getting a large sample size is often seen as an issue, and there are often concerns about generalizability. The concern for generalizability arises because many mistakenly believe that the unit of analysis is the person, whereas the unit of analysis is in fact the element of experience. One can canvas a vast array of experiences with 15 interviews if one includes in the sample people who vary along relevant parameters.

Grounded theory (Glaser & Strauss, 1967) is one central form of qualitative method to which researchers turn as a generator of theory where existing theory is inappropriate or absent. Theory generated in this way is "derived from data, systematically gathered and analyzed through the research process" (Strauss & Corbin, 1998, p. 12). The aim "is to produce innovative theory that is 'grounded' in data collected from participants on the basis of the complexities of their lived experiences in a social context" (Fassinger, 2005, p. 157). A new field without established findings means hypotheses cannot be devised in advance. As Gilgun notes, "rather than preselecting hypotheses and the concepts on which they are based, grounded theory seeks to discover them through processes of emergence, which occur over the course of data analysis and interpretation" (1995, p. 268).

A variant methodology, which permits a researcher to enter a domain of research with formed hunches and broad hypotheses, is called modified analytic induction (MAI). According to Gilgun (1995), who champions this method, it is permissible to have hypotheses that are "rough and general approximations, prior to entry into the field or, in cases where data already are collected, prior to data analysis. These hypotheses can be based on hunches, assumptions, careful examination of

research and theory, or combinations" (1995, p. 269). Hypotheses are not static, but are "revised to fit emerging interpretations of the data over the course of data collection and analysis" (1995, p. 269). An important attribute of MAI is that one searches for instances that are likely to disconfirm conclusions so far. In this way, one adds enough variability to the sample until one is sure the conclusions are robust.

If one is permitted to revise hypotheses in the light of the data, it is important that one is not just cherry-picking, modifying emphasis to find the conclusion that confirms one's prior convictions. So there are clear ways of approaching acknowledgment of the possible biases of the researcher in devising the sample and the animating question (sensitizing concepts), in interviewing the participants (writing memos about the experience of rapport or absence thereof), and in analyzing the data (via open, axial, and selective coding).

One aim of all forms of qualitative methodology is to let the data speak. Coding schemes need to arise from the data itself rather than personal hunches and pet theories. Coding has subjective elements. For example, a researcher who is also an expert in the domain under study would perhaps see more in the responses than would someone without detailed, domain-relevant, content-based expertise. The inclusion of both coders may have advantages to allow the data to disrupt and reconfigure preconceptions, which an expert may not discern as operating to shape what is seen as salient. It is optimal if, at the end of a study, conclusions do not overlap excessively with the commencing sensitizing concepts.

To address implicit theories and unconscious schemas that may bias coding, it is best to commence qualitative methodology prior to commencing the research, by writing down hunches and sources of interest in a phenomenon as well as processes thought to be operative. This is an important phase. Arcuri (2007) notes four advantages of doing this:

> [F]irst, to elucidate our sensitizing concepts, which would be utilized as points of departure from which to ask questions and make comparisons (but . . . not be utilized as data *per se*); second, to enable us to remain sensitive to and minimize potential areas of bias in our ways of interpreting and analyzing data (commonly referred to as bracketing; Morrow, 2005; Ponterotto, 2005); third, to begin the process of self-reflection, or *reflexivity*, which was to continue throughout the research process (Camic, Rhodes, & Yardley, 2003; Marecek, 2003); and, fourth, to contribute to the reader's ability to identify the lens through which the data were interpreted and analyzed, and thus determine the 'extent to which [he or she] is able to generalize the findings . . . to his or her own context.'
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> *(Morrow, 2005, p. 252; see also Arcuri & McIlwain, 2009)*

Then one selects a sample and commences interviewing. As Eccles (2012) suggests, it is best to use non-directive probes to optimize the scope of what can be included in a response. In devising probes, the researcher decides to what degree the research focuses on the landscape of action or the landscape of meaning – whether the aim is to assemble a causal account of what happens, or to understand the person's viewpoint on the experience and why it matters to him/her to the degree it does. Sometimes, meanings have consequences. If the experience of the yips was felt to be a devastating, career-ending moment, for example, it may well have that effect.

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A researcher can then decide how much comparability across subjects is sought, and with what economy of time. Standardizing probes and prompts enhance the comparability of interviews across participants. Some interviewers see it as important to be free to go more deeply into certain issues that arise with a participant and then modify the probes for subsequent interviewees to accommodate unexpected, valuable, new material.

In addition to the advantages of non-directive probes, there is also an advantage to using a partly structured stimulus as a probe that has an open-ended element requiring the subject to respond in a way that reveals personal material (Loevinger, 1985). An example of the successful use of sentence completion stems is Rafaelli *et al.*'s (2001) exploration of the experience of "the street" by homeless, Brazilian youth. In-depth interviews might not have been possible in this research context, and shorter questions got quick replies. Examples of their sentence stems are: "In the street, I feel . . . ," "In the street, people . . . ," and "The street is not . . . ." This provides a comparability of focus across participants through the use of standard stems, while permitting individual uniqueness to be divulged in the way that stem sentences are completed by each participant. One uses both a direct and an indirect probe at the same time.

Challenges of qualitative methods

As Eccles (2012) notes, not all accounts offered in response to interview probes address the unfolding of a single event in time, even if one asks for highly specific material. Sometimes the researcher is not being told what happened, or what the player thought at the time, or even what the player thinks now. Sport experts may pass on to researchers received wisdom, or material more like "press releases" – "apparently misleading, irrelevant and stereotyped initial self-report statements [which] prevent appropriate reference to personal experience" (Wiersma, 1988, p. 205). In reporting received wisdom, an expert may avoid referring to personal experience by offering instead decontextualized maxims arising in the relevant subculture: "keep it simple," "focus on what you can control," or "move on from failure." These maxims may reflect broadly held ideals about how one should handle failure, for instance, or may be tailored to counter or optimize a particular player's existing tendencies. They do not necessarily convey how to do what the injunction conveys as ideal, such as how one moves on from failure. That aspect of experience may be lost unless there is a follow-up question. An interviewer should pursue specific, detailed content respectfully.

Yet even these "press releases" from experts may reveal much to a researcher once they are interpreted in context (Wiersma, 1988). If one has not managed to establish rapport with an interviewee, or if there is some concern about how a researcher is affiliated or where funding is from, press releases may be offered. They may be the first level of information a person offers, and patience is required to go more deeply into experience. To go more deeply, researchers need to recognize them in the moment: what is being given and (perhaps) why. Press releases may also reflect cultural taboos about acknowledging emotions, particularly negative emotions like rivalry, self-doubt, and anger; to bypass envy about being a tall poppy (Feather, 1989), luck rather than personal ability may be attributed as the cause of a player's selection.

If, as interviewer, one can establish rapport across diverse participants and a range of experience levels, interviews can open up a world of insight into skill and its context-relevant attributes. Rapport is variously defined as including a "frank and open discussion," as entailing the "acceptance of and co-operation with the research project" on the part of the interviewee, and the researcher's "capacity to engage with the language and culture of the respondent in a way that gains a level of trust" (Dundon & Ryan, 2010, p. 564). It is not just a feel-good variable; it directly affects the nature and validity of the information that the researcher is given.

Kinds of coding: integrating qualitative and quantitative methods

Once data are in hand – across grounded theory, modified analytic induction, and sentence completion stems – the next phase is coding. An appropriate starting point is often a detailed form of coding called open coding, which involves a line-by-line analysis of everything said. In

open coding one identifies concepts and their properties and dimensions, before moving to axial coding, which relates concepts to each other on the basis of their properties and dimensions (Strauss & Corbin, 1998).

We can suggest how such thematic exploration might contribute to the understanding of sport expertise. Bawden and Maynard (2001) conducted a study based on semi-structured interviews of cricketers who had experienced the yips (involuntary movements occurring repeatedly in the execution of a skill). They used lead questions with standardized probes in interviews with eight bowlers to capture a broad range of experience and a wide array of parameters (level of cricket played, pace of bowling, years of experience, age). Their insightful article offers statements from each bowler that constitutes the "raw data," and then two levels of higher order themes. Above that they list the "general dimensions," which are the domains of interest and probes that they used. They do not attempt to derive a theoretical model from their data, but contribute to the literature at a descriptive level, integrating their findings with contemporary theories of the yips and of choking. Further, this research offers a vivid window into the experience of the yips with affecting specificity. There is surprise and shock at its occurrence: participants said they had no idea it was about to happen, and that helplessness was experienced, as one suggested the ball felt "stuck in his hand." In the moment, it is emotions that are highlighted, especially the emotions of trauma: pure shock, feeling destroyed, anxiety, panic, a wish to escape but an inability to "get out," "can't finish the over until you get six legal balls, and trapped until you do," negative thoughts of others' perceptions, etc. Participants found it "terrifying that they couldn't do a simple task" and reported a loss of personal agency "like I'd been taken over" and a loss of ownership, where "[your] arm feels like it isn't yours." This kind of data gives specific, experiential insight like no other.

Not every researcher wishes to devise a full theory from qualitative data. There are statistics that can take to the next level what is revealed by the frequency of codes' occurrence in light of other attributes and experiences of those in the research sample. This optimizes the generality of findings from specific interviews and codes. One can use factor analysis to look at the intercorrelation of codes to reveal strategies (Harris *et al.*, 2011). Or, one can use cluster analysis. For this procedure one needs first to look at the relative frequency of occurrence of certain codes across the whole sample. The use of cluster analysis to do this is well represented in sport science (Ball & Best, 2007; Gaudreau & Blondin, 2004) where clusters are generated from data gathered using scales – i.e., data that are already quantitative. We could not find a mixed method approach in sports where cluster analysis was used to determine profiles based on codes derived from interview or qualitative data. Therefore, we use an example from outside the sport content domain, because Wohl, Kuiken, and Noels (2006) outline their procedure in detail and offer clear advice about selection of statistics for a cluster analysis. We briefly describe their procedure here as illustration of how clusters form and might be used. Wohl *et al.* analyzed narratives of forgiveness and focused on codes that were neither rare (occurring in less than 10 per cent of the narratives) nor ubiquitous (occurring in over 90 per cent of the narratives). They then carried out a cluster analysis to see how the different codes clustered. Their results gave a three-cluster solution. Each participant is accorded a cluster number as an output of this analysis. This reflects the cluster within which their narrative fits. Results show the proportion of cluster members expressing a phrase within their narratives that attracted a particular code. One can then use the cluster number as a way of forming groups that may be used in analysis of variance or t-tests to see whether there are differences between clusters on certain outcome variables like well-being, relationship satisfaction, and so on. Attributes which defined the clusters of forgiveness styles in this study illustrate how clusters differ from each other. Cluster one included those whose forgiveness began when they brought their feelings into the open with the transgressor; they

were then able to let go of their negative feelings, and to see things in light of broader well-being concerns. Those in cluster two saw forgiveness as a private moral issue, and were able to return to a normal relationship even in the absence of an apology. Cluster three included those who tried to maintain a positive relationship despite the wrong done to them, but could not forget: in contrast to the other two clusters, they did not see wider implications of forgiveness for their own well-being, and the relationship never really recovered.

Bawden and Maynard (2001) might have done a cluster analysis on their data. In addition to the qualitative codes derived from their interview data about experiences of the yips in cricket as potential clustering variables (e.g., the conditions before the yips happened, the first experience of the yips, descriptions of subsequent bowling, perceived characteristics of good bowling, and personal explanations of the yips), they might also have included, as cluster determinants, other variables they assessed like age, handedness, pace, and level of cricket. Cluster analysis would permit them to see if there were different forms of yips within their group and whether there were outcomes linked to that form of experience. By recommending integration of the use of statistics with detailed experiential studies of individuals, we hope to address two rarely integrated trends in research.

Triangulating methods: nomothetic and idiographic research

We want to understand the law-like features of performance that generalize across participants (the nomothetic approach). But we also may sometimes wish to adopt the idiographic approach: to track an individual's profile of strengths or difficulties, their ways of achieving excellence and resilience, or of experiencing performance breakdown, which may be quite unexpected and idiosyncratic. Sometimes there is a trade-off in research, but scientific understanding requires both approaches. In areas like sport where expertise often takes unique forms, involving precise, stylistic features unlikely to transfer across individuals, the mapping of the uniqueness of the individual has more to offer than in many domains. Even when abilities or difficulties are highly individual, theory may identify levels of abstraction at which seemingly unique experiences or style might generalize to other players. Really understanding the forms of expertise – what optimizes and sustains them, as well as what causes them to be momentarily lost – requires both forms of knowledge.

The triangulation of methods is a rare and joyous thing. In our chapter on breadth and depth of knowledge (Chapter 9), we discussed cases in which verbal report data are integrated with other measures such as eye movements. Sebanz and Shiffrar (2009) also found a compelling link between self-report and perception. Generalizing from literature on deceptive signals that leak out without the performer's awareness of deceptive displays that are strategies, their study used stimuli that were constructed, where the player decided in advance whether to fake or make a pass. They used as their experimental stimuli only the fakes where the defender had been completely deceived. The defender was then edited out of the videos, thus ensuring the quality of the deceptive display. Experts were better than novices when movement was present, but there were no significant differences with static posture alone. At the end of the study they distributed questionnaires, finding an overlap between self-report and observational data in terms of the emphasis on kinematics vs. postural cues in the groups. The relevance of retaining what people could actually do was still underscored: they found that only experts could detect deception from kinematics alone (point-light displays), while novices relied on chance. If Bruce, Farrow, Raynor, and Mann (2012) had only *observed* what a person had been able to do in their study that sought to determine, across three tiers of expertise, whether strategic response selection was limited by motor skill capacity, they would have missed the fact that when asked for verbal reports on the

optimum strategy, even less-skilled people suggested a long pass would be optimal even where a long pass could not be reliably performed.

In an area that is already rippling with insightful research designs to capture features of a dynamically unfolding and highly contingent set of skills, it is hard to suggest that there might be supplementary methods. Yet, there are levels of skill that are beyond motor execution and perception-action coupling, but which inform them. The full picture of skill includes some dispositional forms of knowledge, which are regularly updated, about self, other, and game. Knowledge about self includes knowledge of current form, strength, speed, injury status and risk, how one handles risk and failure, and about one's capacity to come back from failure. Knowledge about one's competitors includes knowledge of their current form, stylistic strengths, and weaknesses, as well as an awareness of the degree to which they might have mapped one's own form, strengths, and weaknesses. There is also knowledge about context: the meaning of this game, what hinges on it, whether one is playing at home or away, and how much leeway there is for underperformance. Once skill is contextualized in this way, it is apparent that the motor and perceptual components of skill are an important part, embedded in a wider story. We have attempted to canvas what we can add to the methodological toolkit of research into sport expertise that addresses this wider story about forms of knowledge that feed into core skill features.

References

Arcuri, A. (2007) 'Psychotherapists' handling of sexual attraction to clients: A grounded theory', unpublished thesis, New South Wales, AU: Department of Psychology, Macquarie University.

Arcuri, A., & McIlwain, D. J. F. (2009) 'Psychotherapists' handling of sexual attraction to clients: A grounded theory', in L. Richards (ed) *Handling qualitative data*, 2nd ed., London: Sage. Retrieved from http://www.uk.sagepub.com/richards/homeP2.htm

Ball, K. A., & Best, R. J. (2007) 'Different centre of pressure patterns within the golf stroke I: Cluster analysis', *Journal of Sports Sciences*, 25(7): 757–70.

Bawden, M., & Maynard, I. (2001) 'Towards an understanding of the personal experience of the "yips" in cricketers"', *Journal of Sport Sciences*, 19: 937–53.

Bicknell, K. (2010) 'Feeling them ride: Corporeal exchange in cross-country mountain bike racing', *About Performance*, 10: 81–91.

Bruce, L., Farrow, D., Raynor, A., & Mann, D. (2012) 'But I can't pass that far! The influence of motor skill on decision making', *Psychology of Sport and Exercise*, 13: 152–61.

Camic, P. M., Rhodes, J. E., & Yardley, L. (2003) 'Naming the stars: Integrating qualitative methods into psychological research', in P. M. Camic, J. E. Rhodes, & L. Yardley (eds) *Qualitative research in psychology: Expanding perspectives in methodology and design*, Washington, DC: American Psychological Association, 3–15.

Chaffin, R., Imreh, G., & Crawford, M. (2002) *Practicing perfection: Memory and piano performance*, New York: Lawrence Erlbaum Associates.

Dennett, D. C. (2003) *Freedom evolves*, New York: Allen Lane.

Dundon, T., & Ryan, P. (2010) 'Interviewing reluctant respondents: Strikes, henchmen, and Gaelic games', *Organizational Research Methods*, 13: 562–81.

Eccles, D. W. (2012) 'Verbal reports of cognitive processes', in G. Tenenbaum, R. Eklund, & A. Kamata (eds) *Measurement in sport and exercise psychology*, Champaign, IL: Human Kinetics, 103–17.

Ericsson, K. A., & Simon, H. A. (1980) 'Verbal reports as data', *Psychological Review*, 87: 215–51.

Fassinger, R. E. (2005) 'Paradigms, praxis, problems, and promise: Grounded theory in counseling psychology research', *Journal of Counseling Psychology*, 52: 156–66.

Feather, N. T. (1989) 'Attitudes towards the high achiever: The fall of the tall poppy', *Australian Journal of Psychology*, 41: 239–67.

Fox, M. C., Ericsson, K. A., & Best, R. (2011) 'Do procedures for verbal reporting of thinking have to be reactive? A meta-analysis and recommendations for best reporting method', *Psychological Bulletin*, 137: 316–44.

Gaudreau, P., & Blondin, J. P. (2004) 'Different athletes cope differently during a sport competition: A cluster analysis of coping', *Journal of Personality and Individual Differences*, 36: 1865–77.

Gilgun, J. (1995) 'We shared something special: The moral discourse of incest perpetrators', *Journal of Marriage and Family*, 57: 265–81.
Gilgun, J. (2009) 'Qualitative research and family psychology', in J. H. Bray & M. Stanton (eds) *The Wiley-Blackwell handbook of family psychology*, London: Wiley, 85–99.
Glaser, B. G., & Strauss, A. L. (1967) *The discovery of grounded theory: Strategies for qualitative research*, Hawthorne, NY: Aldine Publishing Company.
Harris, C. B., Keil, P. G., Sutton, J., Barnier, A. J., & McIlwain, D.J.F. (2011) '"We remember, we forget": Collaborative remembering in older couples', *Discourse Processes*, 48: 267–303.
Loevinger, J. (1985) 'Revision of the sentence completion test for ego development', *Journal of Personality and Social Psychology*, 48: 420–7.
Marecek, J. (2003) 'Dancing through minefields: Toward a qualitative stance in psychology', in P. M. Camic, J. E. Rhodes, & L. Yardley (eds) *Qualitative research in psychology: Expanding perspectives in methodology and design*, Washington, DC: American Psychological Association, 49–69.
McPherson, S. L., & MacMahon, C. (2008) 'How baseball players prepare to bat: Tactical knowledge as a mediator of expert performance in baseball', *Journal of Sport & Exercise Psychology*, 30: 755–78.
McRobert, A. P., Ward, P., Eccles, D. W., & Williams, A. M. (2011) 'The effect of manipulating context-specific information on perceptual-cognitive processes during a simulated anticipation task', *British Journal of Psychology*, 102: 519–34.
Morrow, S. L. (2005) 'Quality and trustworthiness in qualitative research in counseling psychology', *Journal of Counseling Psychology*, 52: 250–60.
Nisbett, R. E., & Wilson, T. C. (1977) 'Telling more than we can know: Verbal reports on mental processes', *Psychological Review*, 84: 231–59.
Ponterotto, J. G. (2005) 'Qualitative research in counseling psychology: A primer on research paradigms and philosophy of science', *Journal of Counseling Psychology*, 52: 126–36.
Raffaelli, M., Koller, S., Reppold, C., Kuschick, M., Krum, F., Bandeira, D., & Simões, C. (2001) 'Gender differences in Brazilian street youth's family circumstances and experiences on the street', *Child Abuse & Neglect*, 24: 1431–41.
Roca, A., Ford, P. R., McRobert, A. P., & Williams, A. M. (2011) 'Identifying the processes underlying anticipation and decision-making in a dynamic time-constrained task', *Cognitive Processing*, 12: 301–10.
Sebanz, N., & Shiffrar, M. (2009) 'Detecting deception in a bluffing body: The role of expertise', *Psychonomic Bulletin & Review*, 16: 170–5.
Strauss, A., & Corbin, J. (1998) *Basics of qualitative research: Techniques and procedures for developing grounded theory*, 2nd ed., Thousand Oaks: Sage Publications.
Wiersma, J. (1988) 'The press release: Symbolic communication in life history interviewing', *Journal of Personality*, 56: 205–38.
Wohl, M. J. A., Kuiken, D., & Noels, K. A. (2006) 'Three ways to forgive: A numerically-aided phenomenological study', *British Journal of Social Psychology*, 45: 547–61.