Conducting systematic reviews of applied interventions: A comment on Cabral et al. (2022)

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Abstract

In their recent systematic review and meta-analysis, Cabral et al. (2022) explored the effects of implicit motor learning under pressure conditions. As a stated focus, they aimed to address the previously inconsistent findings in the literature and provide clarity to researchers and practitioners. Although we agree that such clarity is needed, we contend that there are critical methodological and procedural concerns that prevent this systematic review from achieving its objectives. In this commentary, we lay out these specific concerns in light of recent debates in this research area and the demands of real-world sporting contexts. More generally, we also call attention to important principles to consider when planning a systematic review of interventions in order to maximise contributions to the literature and usefulness for applied psychology practice.

Keywords: Explicit Instruction, Analogy, Intervention, Methodology, Applied Practice, PICO
In sport psychology, it is commonly expected that review articles not only provide a summary of the current state of knowledge in a topic, but also provide a critical evaluation of existing studies, including coverage of strengths, weaknesses, and conceptual/methodological limitations (see Coffee & Moran, 2015). Such reviews can produce notable impact because they typically distil, scrutinise, and synthesise many years of research findings, often making them useful to a wide audience (e.g., from novice students to experienced researchers and practitioners). Indeed, systematic reviews can quickly acquaint and orient neophytes, generate new lines of research inquiry, and efficiently inform evidence-based practice (see Ankem, 2008). To achieve this and deliver on their promise, however, systematic reviews must feature a considered, methodical approach that is informed by relevant literature and practice to ensure the validity of their results. For reviews of applied interventions, in particular, important features typically include a reasoned and clear research question/aim, systematic search terms and associated processes (e.g., PICO), appropriate inclusion and exclusion criteria, rigorous assessments of quality, and consideration and analysis of any inconsistencies (Carr, 2002). Without a careful and critical approach that includes such components, systematic reviews can generate unproductive and misleading findings that hinder, or even obstruct, research and practice (Tod et al., 2021). It is with these procedural and methodological points in mind that we comment specifically on the recent systematic review of implicit learning by Cabral et al. (2022), with consideration of its contribution to the literature and utility for practice, while also presenting key principles to consider when systematically reviewing applied interventions in sport psychology more generally.

Research Question and Study Objectives

As research questions determine and guide the method (e.g., setting eligibility criteria, selecting the search terms, assessment of risk, and more; Thomas et al., 2019), “getting the research question right is critical for the success of a systematic review” (Lasserson et al., 2019, p. 4). In their article, Cabral et al. followed commonplace conventions in systematic reviews (e.g., making methods and data publicly available and following PRISMA), but many of these guidelines and frameworks were
developed for other domains (e.g., medicine) and require adaptation or further development to better suit applied sport contexts. For systematic reviews of applied sport psychology interventions, we contend that key considerations for the development of the research question include (a) the identification of key stakeholders, as their needs do not necessarily align with those of the researchers (see Lasserson et al., 2019), and (b) the use of relevant analytical/conceptual frameworks, such as PICO(T) (see Table 1), which help to determine the scope of the review and, in turn, minimise ambiguity, enhance transparency, and reduce bias (McDonagh et al., 2008). For Cabral et al., their research question related to the effectiveness of implicit-learning interventions on performance under psychological pressure. In doing this, the authors suggested that a main contribution of the paper would be to offer insight and clarification on previously inconsistent findings in this area. Without considering potential stakeholders (e.g., coaches, athletes, physical educators, students, etc.) and their intended usage, however, it is not certain how and to whom Cabral et al. intended to offer clarity. We put forward that consideration of practitioners and applied contexts would be critical in a review of implicit learning, as researchers in this area have indicated that implicit motor learning paradigms—such as dual-task, errorless, and subliminal learning—are ecologically challenged, difficult to apply in real-world settings, and result in slower learning than traditional practices (Poolton et al., 2006).

Because practising psychologists, coaches, and physical educators are encouraged to engage directly with the literature, Cabral et al. missed an opportunity to enhance this review’s impact by accounting for applied concerns in the research question. Without clarification on stakeholders and their needs (and corresponding consideration of concerns regarding ecological validity of implicit learning), we posit that the review of Cabral et al. is arguably limited to purely academic questions (i.e., psychology through sport rather than for sport; see Collins & Kamin, 2012).

Alongside the research question, such concerns are compounded by the authors not clearly establishing the review’s objectives. In other disciplines (e.g., medicine), frameworks such as PICO(T) are often expected or even mandated to ensure that relevant factors are identified and then comprehensively and transparently addressed (see Lasserson et al., 2019). Indeed, for reviews of

**** Table 1 near here ****
applied interventions, we assert that it is critical to at least set forth (a) the population to which the
intervention applies, (b) the precise nature of the intervention of interest, (c) the comparison group
against which the intervention will be evaluated, and (d) the outcomes in which the effectiveness will
be measured (see Thomas et al., 2019). These represent a starting point for identifying the key
concepts for examination in a systematic review (see Lefebvre et al., 2019), as factors such as well-
designed comparison groups are regarded as essential for evaluating the effects of any sport
psychology intervention (see Bobrownicki et al., 2021 for a discussion on selection of comparison
groups). Without appropriate consideration of PICO(T), systematic reviews of interventions may
ultimately lead to difficult-to-interpret results and suboptimal recommendations for practice.

For this review more specifically, these steps to identify the objectives would be even more
crucial for several reasons. First, highlighting the necessity of carefully considering the specific
population and interventions for a systematic review, several studies have questioned the relevance
and suitability of some implicit methods for real-world sport (see Poolton & Zachry, 2007). Further to
this, Poolton and Zachry (2007) also suggested that some methods of implicit learning, such as
analogy instruction, are “technically explicit in nature” (p. 68). Despite acknowledging that “there is
no consensus on what interventions promote implicit learning” (p. 3), Cabral et al. (2022) forgo any
critical review of these implicit methods, consideration of possible reasons for the potential lack of
consensus (e.g., issues with how or to whom the methods are applied), or clearly specifying what the
interventions under investigation even are. In fact, the authors depend on differences to the
comparison groups in accrued verbal knowledge to determine what interventions might constitute
implicit learning, rather than any properties of the implicit methods themselves. Perhaps equally
concerning is that there have been previous attempts to systematically review (e.g., Kal et al., 2018)
and establish consensus regarding definitions of implicit and explicit learning (e.g., Kleynen et al.,
2014) that the authors did not explore, which would have been important for furthering discussion,
advancing the literature, and informing their objectives.

In addition to these concerns regarding population and intervention, we contend that the
development of PICO(T)-informed objectives would also have assisted Cabral et al. (2022) in
recognising and accounting for critical issues and debates in the implicit-learning literature relating to
comparison groups. Although unacknowledged in Cabral et al.’s systematic review, there exist several
significant methodological issues concerning comparison groups that have been (a) explicitly laid out
and debated in the implicit-learning literature (e.g., comparison groups are typically provided
instructions of much greater quantity, lesser quality, and different meaning; Bobrownicki et al., 2018),
(b) demonstrated empirically (Bobrownicki et al., 2015), and (c) proposed as likely explanations for
the previously inconsistent findings (Bobrownicki et al., 2019). Notably, even Masters and colleagues
have acknowledged that the long lists of instructions, which have customarily been provided to
comparison groups in the literature since the study of Masters (1992), do not reflect actual practice
(Tse et al., 2017). The unrepresentative comparisons that characterise the past three decades’ worth of
research are thought to have limited ecological validity, influenced effect sizes, and impacted
resulting recommendations for practice (Bobrownicki et al., 2018). Between these longstanding, well-
known issues and the recognised significance of control conditions for evaluating applied
interventions (Bobrownicki et al., 2021), comparison groups demanded careful consideration in the
systematic review of implicit learning of Cabral et al. (2022) that they never received. While we agree
with Cabral et al. that the inconsistencies in the implicit-learning literature required clarification, if
they wanted to achieve this, the authors needed to develop a research question and corresponding set
of objectives that appropriately considered: PICO(T); applied practice concerns; and the current
findings, issues, and debates in the literature. Such principles would be relevant not only for the
review of Cabral et al. (2022), however, but would also apply and be useful for systematic reviews of
applied interventions more broadly.

**Search Strategy and Inclusion Criteria**

Much like the research question and objectives, the search strategy employed by the authors is
also similarly impacted by their decisions to neither employ a framework such as PICO(T) nor
account for contemporary debates and known issues in the literature. Frameworks like PICO(T)
inform the structure and development of appropriate search strategies and search terms so that the
aims of the systematic review are suitably addressed (Lefebvre et al., 2019). As McDonagh et al.
(2008) put it, it is “essential” to specify exactly which individual interventions and comparators are of interest, otherwise systematic reviews may over- or underestimate the benefits or detriments of the intervention or even lead to uninterpretable results (pp. 9–10). It is also important to specify relevant outcomes, including measurement methods and time points, for fear of biasing conclusions, particularly in domains where there is considerable variability in measures such as psychology (see McDonagh et al., 2008). Timing may be a particularly important factor to consider when reviewing implicit motor learning because research has indicated that explicit and implicit learners perform similarly in delayed retention tests (e.g., one-year after learning; Poolton et al., 2007), suggesting that any benefits from implicit learning are hard earned (due to ecological and logistical challenges), but short lived (possibly due to “decay of declarative knowledge”, Poolton et al., 2007, p. 456) and, consequently, of potentially limited utility. These issues notwithstanding, there can be reasonable arguments made that some elements of PICO(T) (e.g., comparator) should be excluded from the search term in some instances (e.g., because studies in a particular area may not explicitly mention comparison groups in the title or abstract; Lefebvre et al., 2019). If such exclusions are necessary, however, we recommend that authors of systematic reviews of interventions indicate this in the text and adjust their eligibility criteria accordingly so that the relevant factors are instead considered during the assessment of the full-text articles in line with the PRISMA flow chart.

Assessment of Bias and Quality

The authors wisely followed a commonly used method for assessing bias in eligible studies from a systematic search (i.e., Cochrane risk-of-bias tool, RoB 2). It is important to point out however, that the selected risk-assessment tool was designed for medical interventions where the comparison group is “usual care” (Higgins et al., 2019, p. 215), which does not align well with the suboptimal, unrealistic comparison groups that often exemplify the implicit-learning literature specifically (see Bobrownicki et al., 2018), let alone a comparison with best practice. For us, this means that authors reviewing applied interventions in sport psychology need to adhere not only to conventions regarding the assessment of bias, but should also consider the quality and relevance of the eligible studies. Indeed, to produce a high-quality and informative review, it is critical to carefully
scrutinise the findings from eligible studies so that readers can, for instance, readily evaluate the results, develop or refine associated theory, or integrate findings into practice (Tod et al., 2021). According to Liabo et al. (2017), to assess the quality of eligible papers, it is important to consider (a) the relevance of each paper’s topic to the research question, (b) the appropriateness of the study type to the research question, and (c) the soundness of the study methods. Given that there have been several papers questioning the methodological practices in implicit-learning research, Cabral et al. (2022) needed to carefully evaluate the methodological soundness of the included articles. As concerns relating to comparison groups represent a broader issue for sport psychology and motor learning research as well (see Bobrownicki et al., 2021), such advice would apply more generally too.

**Results and Discussion**

It is the results section where the issues raised in the preceding sections become most apparent. As shown in Table 2, the number of instructions for the comparison groups in Cabral et al.’s included studies outnumbered those for the implicit conditions by a substantial ratio of approximately 8:1. Because systematic reviews should include critical appraisal, we contend that such unwarranted discrepancies between conditions demanded and required attention from Cabral and colleagues. As practising coaches, they also suggest to us that the observed differences in the literature may well have arisen due to the volume of instruction rather than the type of learning. Further supporting this point, where data are available, the instructions for the comparison groups included approximately 3–14 times as many words compared to the implicit interventions. As the number of instructions for the comparison groups likely exceeded working memory capacity and conflicted with real-world recommendations for coaching practice (Mannie, 1998; McQuade, 2003), we argue that the authors needed *at a minimum* to acknowledge these important limitations somewhere in their review. Indeed, it is even conceded in one of the included studies of the systematic review that, because of the number of instructions provided to the explicit learners, the verbal knowledge of these participants was “artificially enlarged” (Masters, 1992, p. 349). From this, we do not think it is much of a leap to suggest that participants with artificially enlarged pools of verbal knowledge may demonstrate impaired performance or report more declarative knowledge. Unfortunately, Cabral et al. not only
based their key inclusion criterion on one of these arguably compromised measures (i.e., significant
differences in declarative knowledge between implicit and comparison groups), which is problematic
given the data displayed in Table 2, but they then also deliberately selected “the implicit learning
group showing the least amount of declarative knowledge accrual and the comparison group showing
the most” (p. 3), which raises further issues given the impact of control-group selection on effect sizes
as shown in Table 3.

**** Table 2 near here ****

For us, these decisions mean that Cabral et al.’s search methodology generated results that
arguably reinforce questionable, unjustified, and restrictive research practices. Moreover, with their
reliance on a key eligibility criterion that is steeped in those questioned practices, their review by
design would likely have excluded any studies that attempted to redress the unnecessary and
unrealistic differences in instruction volume (e.g., Bobrownicki et al., 2015, 2019; Meier et al., 2020;
Schlapkohl et al., 2012; Zeniya & Tanaka, 2021). Alongside this, it is important to acknowledge that
better designed comparison groups would be less likely to generate the larger pools of verbal
knowledge required to meet Cabral et al.’s inclusion criteria. Given the criticisms and debates in the
literature beginning with Bobrownicki et al. (2015), research published thereon should be expected to
control for instructional differences between the intervention and comparison groups to enhance
internal validity and better reflect real-world sport. Indeed, this may also explain why the majority of
studies from Cabral et al. are also relatively dated with 80% published more than a decade ago and
none more recently than 2013. We do agree with Cabral et al.’s recognition that the relatively small
sample sizes require attention, which has been an issue for studies old and new, although similar
concerns regarding sample size and underpowered studies have already been laid out in this very
research area (see Bobrownicki et al., 2018). In addition, future research will not be able to provide
any clearer insight or evidence through increased sample sizes or preregistered reports, as Cabral et al.
(2022) assert in their paper, unless the ongoing issues and limitations that pervade the implicit-
learning literature (e.g., inequitable and unrepresentative comparisons) are first appropriately
addressed. Reflecting on the weight of all these points, we contend that the results of this systematic
review reinforce the concerns presented earlier in this paper and highlight the importance of the
principles we have set forth (e.g., consideration of stakeholders; scrutiny of existing literature; use of
PICO to inform development of research question, objectives, and search term; assessment of quality)
to ensure meaningful results that can advance scholarship and practice.

**** Table 3 near here ****

**Future Directions**

The next step might be to pursue a collaboration between groups of authors for a systematic
review of implicit learning that addresses the concerns and principles discussed in the preceding
sections. In following the guidelines for adversarial collaboration (see Mellers et al., 2001), both sets
of authors could work together under mutually agreed protocols to conduct an ever-more rigorous
review. That said, we are concerned that even the most rigorously and carefully designed systematic
review might struggle to overcome the significant methodological and conceptual limitations in the
implicit-learning literature. Indeed, in defence of Cabral et al., the fundamental issue in this specific
instance may ultimately rest with the inherent limitations of the original research itself (e.g., concerns
regarding choice of tasks, ecological validity, comparison groups, sample sizes, and more). With this
in mind, there may be scope to collaborate to establish what constitutes an implicit-learning
intervention and how such interventions might be developed and validated.

At the same time, given the well-established critiques of implicit learning strategies, there may
even be cause to re-evaluate the concept, application, and merit of implicit learning within sport and
performance settings more generally. For instance, while implicit learning had traditionally been
treated as universally effective in the literature (see Bobrownicki et al., 2018 for discussion), there is
greater acceptance and use of explicit methods in practice and coaching frameworks (e.g., Five-A
Model; Carson & Collins, 2011). Moreover, recent studies suggest that conscious motor processing
may possess tenuous links to choking in competitive rowers (Sparks et al., 2021) and may even
enhance performance in novice golfers (Malhotra et al., 2015), which together challenge the
mechanistic foundations of implicit learning. Based on this, the best approach going forward may
instead relate to a methodological discussion or consensus paper for systematic reviews or meta-
analyses. Either way, whether it is an adversarial collaboration for a reformulated review, a more applied examination and validation of implicit methods, or a methodological discussion between both sets of authors, the concerns and principles discussed in this paper will also apply and be relevant to systematic reviews of applied interventions more broadly.

**Concluding Thoughts**

In this review, we have raised procedural and methodological concerns regarding the systematic review of Cabral et al. (2022). As Grant and Booth (2009) put it, the essence of the systematic review is “gathering research, getting rid of rubbish, and summarising the best of what remains” (p. 92). To deliver on this, it is our position that the authors needed to provide greater clarity regarding their paper’s aims, better account for current debates and issues in the literature, and then address these accordingly through their methodology (e.g., PICO, resulting search terms, etc.). As it stands, the systematic review compared an undefined intervention against poor-quality and unrepresentative comparison groups without acknowledging any of the key debates in this research area. In doing this, rather than address the previously “inconsistent findings” (p. 3), we are concerned that the authors have instead added to the inconsistencies and confusion in the literature. As systematic reviews are widely utilised by sport and performance psychologists to guide and inform their work, the quality of systematic reviews can have serious implications for practice, athlete outcomes, and the discipline more generally (Tod et al., 2021). Going forward, we hope that the points raised here highlight important principles to consider when planning a systematic review of interventions in order to maximise contributions to the literature and applied practice.

**Data availability statement**

There is no data set associated with this manuscript.
References


A Comment on Cabral et al. (2022)


<table>
<thead>
<tr>
<th>PICO(T) Criterion</th>
<th>Explanation</th>
<th>Significance for systematic reviews in sport psychology generally</th>
<th>Significance for the systematic review of Cabral et al. (2022)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
<td>Sets forth relevant population of interest for intervention (e.g., learners, elite athletes, etc.)</td>
<td>The efficacy of interventions may vary depending upon the population to whom it is applied (e.g., novices or adolescents may be more receptive than adults or elite athletes). Moreover, there is considerable variability in participant characteristics in sport psychology (e.g., novices, adolescents, university students, older adults, elite athletes, etc.). As such, it is important for systematic reviews of interventions to clearly set out the population of interest so that results are informative and interpretable.</td>
<td>Without clarity on the population of interest, it is not certain whom this review is designed to impact, leaving potential for misleading (e.g., over- or under-estimation) or uninterpretable results. This is particularly important for Cabral et al.’s review because results suggest that implicit learning is not universally effective with, for instance, language or culture influencing its impact (e.g., an analogy that was successful with English speakers in Liao &amp; Masters, 2001 proved ineffective for Chinese-speaking participants in Poulton et al., 2003).</td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
<td>The specific intervention under investigation</td>
<td>Researchers should indicate what the intervention is and then operationally define the intervention using relevant evidence, precedent, or justification. Without undertaking this step, there may be interventions that are included in a review that, for instance, are not relevant (e.g., to the population) or differ in meaningful ways, which may compromise the results.</td>
<td>There have been questions raised in the literature regarding the utility and relevance of some implicit methods (e.g., dual-task, subliminal, or errorless learning). Indeed, in some cases, there are questions of whether the interventions should be considered implicit methods at all (e.g., Poulton and Zachry, 2007 stated that analogies were “technically explicit in nature”). As such, it would be important for Cabral et al.’s systematic review of implicit methods that clarity is provided by setting out what actually constitutes an implicit-learning intervention.</td>
</tr>
<tr>
<td><strong>Comparator</strong></td>
<td>The comparison group against which the intervention is being evaluated.</td>
<td>The comparison group is essential to understand the effects of any intervention (see Bobrownicki et al., 2021 for review) as their selection can impact effect sizes (see Goginsky &amp; Collins, 1996 and Winter &amp; Collins, 2013 for empirical demonstration). Without specifying at least one meaningful and relevant comparison for the intervention, the results have limited meaning and it is difficult to draw any conclusions to inform research or practice.</td>
<td>There are recognised long-term, pervasive issues in the implicit-learning literature of studies comparing implicit methods to poor-quality control groups (see Bobrownicki et al., 2018 for discussion). Despite these issues and the acknowledged importance of comparison groups, the systematic review of Cabral et al. (2022) does not account for these debates at any point in their review and do not specify against what implicit methods were to be compared. Given the variable quality of comparison groups in the literature, we contend that findings from this systematic review should be interpreted very cautiously.</td>
</tr>
<tr>
<td><strong>Outcome</strong></td>
<td>The outcomes that are being used to determine intervention effectiveness</td>
<td>Without a clarification and operationalisation of meaningful outcome measures and pressure manipulations, a review of effectiveness is difficult to deliver and place in context. For both empirical research and systematic reviews, it is important to consider what the results are actually saying about real-world performance and practice.</td>
<td>Implicit measures have been investigated using a number of different measures (e.g., outcome-based, kinematic, physiological, psychological, etc.) and pressure manipulations (e.g., money, observation, random letter generation, etc.). For an intervention, however, it is important for the authors to set out how the effectiveness of implicit learning will be judged and under what conditions. Even where dependent variables have been similar (e.g., Liao &amp; Masters, 2001; Masters, 1992), such measures can still have much different meanings for the tasks involved (e.g., target accuracy to a pre-planned spot is less meaningful in table tennis than it is in golf), which makes interpretation of results more difficult.</td>
</tr>
<tr>
<td><strong>Timeframe</strong></td>
<td>The expected timetable for evaluating the intervention's effectiveness</td>
<td>For interventions, it is important to understand its effects over time. For instance, in evaluating a vaccine, researchers and doctors would want to know not only if it is effective and safe shortly after administering the intervention, but if the benefits persist over months and years. By extension, there is similar value in sport psychology in knowing if an intervention is useful for only a week or for many years.</td>
<td>Research suggests that the benefits of implicit learning do not persist over time (e.g., in a delayed- retention test, explicit and implicit learners perform similarly due to a possible “decay in verbal knowledge”; Poulton et al., 2007, p. 466). Given that persistence is considered a critical characteristic of learning (see Magill, 2014), timeframe should have constituted an important consideration for Cabral et al. (2022) if they were interested in evaluating the efficacy and utility of learning via implicit methods as purported.</td>
</tr>
<tr>
<td><strong>Setting</strong></td>
<td>The location of the data collection</td>
<td>This component is not always included with PICO(T), but it might be of greater importance for systematic reviews in sport psychology, as research and practice may take place in a wide variety of settings (e.g., laboratory, locker room, training facility, competition contexts, etc.), which might impact participants’ behaviour and the representativeness of the task.</td>
<td>Although there is a place for laboratory studies, research must at some point begin to give way to the demands and questions of real-world sport (see Bobrownicki et al., 2015). To this point, research in implicit learning has focused on more academic questions (i.e., psychology through sport rather than for sport; Collins &amp; Kamin, 2012) with more limited consideration of how such methods might be applied or might impact the field.</td>
</tr>
</tbody>
</table>
### Table 2

Comparison of studies included in systematic review and meta-analysis of Cabral et al. (2022).

<table>
<thead>
<tr>
<th>Study</th>
<th>Task</th>
<th>Conditions</th>
<th>Number of words in instructions</th>
<th>Number of rules for instructions</th>
<th>Number of reported verbal rules (SD)</th>
<th>Other notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schücker et al. (2013)</td>
<td>Golf putting</td>
<td>Analogy</td>
<td>6</td>
<td>1 †§</td>
<td>2 (1.01)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explicit</td>
<td>86</td>
<td>6 §</td>
<td>3.38 (1.23)</td>
<td></td>
</tr>
<tr>
<td>Vine et al. (2013)</td>
<td>Golf putting</td>
<td>Analogy</td>
<td>22</td>
<td>1</td>
<td>&lt; 1 (n/r) *</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explicit</td>
<td>n/r</td>
<td>6</td>
<td>≈ 4.8 (n/r) *</td>
<td></td>
</tr>
<tr>
<td>Zhu et al. (2011)</td>
<td>Golf putting</td>
<td>Errorless</td>
<td>n/a</td>
<td>n/a</td>
<td>0.72 (0.44)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Errorful</td>
<td>n/a</td>
<td>n/a</td>
<td>1.67 (1.12)</td>
<td></td>
</tr>
<tr>
<td>Lam et al. (2009b)</td>
<td>Seated basketball shooting</td>
<td>Analogy</td>
<td>19</td>
<td>1</td>
<td>1.88 (1.28)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explicit</td>
<td>78</td>
<td>8</td>
<td>6.17 (2.21)</td>
<td></td>
</tr>
<tr>
<td>Koedijker et al. (2007)</td>
<td>Table tennis topspin forehand</td>
<td>Analogy</td>
<td>≈ 33</td>
<td>2 ‡</td>
<td>2.63 (1.30)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explicit</td>
<td>88</td>
<td>14 ‡</td>
<td>6.78 (2.68)</td>
<td></td>
</tr>
<tr>
<td>Liao and Masters (2001)</td>
<td>Table tennis topspin forehand</td>
<td>Analogy</td>
<td>≈ 29</td>
<td>2 ‡‡</td>
<td>≈ 1.5 (n/r) *</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explicit</td>
<td>n/r</td>
<td>12 ‡‡</td>
<td>≈ 7 (n/r) *</td>
<td></td>
</tr>
<tr>
<td>Bright &amp; Freedman (1998)</td>
<td>Golf putting</td>
<td>Dual-task</td>
<td>n/a</td>
<td>n/a</td>
<td>≈ 3 (n/r) *</td>
<td>Replication of Masters (1992)</td>
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<tr>
<td></td>
<td></td>
<td>Explicit</td>
<td>n/r</td>
<td>13 ‡</td>
<td>≈ 4.8 (n/r) *</td>
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<tr>
<td>Hardy et al. (1996)</td>
<td>Golf putting</td>
<td>Dual-task</td>
<td>n/a</td>
<td>n/a</td>
<td>2.75 (1.38)</td>
<td>Replication of Masters (1992)</td>
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<td></td>
<td></td>
<td>Explicit</td>
<td>n/r</td>
<td>13 #‡</td>
<td>5.63 (1.51)</td>
<td></td>
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<td>Masters (1992)</td>
<td>Golf putting</td>
<td>Dual-task</td>
<td>n/a</td>
<td>n/a</td>
<td>≈ 0.8 (n/r)</td>
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<td></td>
<td></td>
<td>Explicit</td>
<td>n/r</td>
<td>13 #‡</td>
<td>≈ 6 (n/r)</td>
<td></td>
</tr>
</tbody>
</table>

One study from the systematic review (i.e., Koedijker et al., 2008) is not listed as access could not be obtained.
n/a = does not apply  n/r = not reported. † Participants also provided additional visual demonstrations or verbal instructions § Participants also received pictures demonstrating technique * Data were depicted graphically without providing exact figures ‡ Exact wordings of instructional groups not provided ‡‡ Numbers obtained from Bright & Freedman, which purported to replicate Masters' (1992) methodology
Table 3

<table>
<thead>
<tr>
<th>Study</th>
<th>Task</th>
<th>Pressure manipulation</th>
<th>Measure</th>
<th>Comparison group</th>
<th>Number of rules</th>
<th>Number of words</th>
<th>Effect size compared to analogy condition (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bobrownicki et al. (2015)</td>
<td>High jumping</td>
<td>Rising high-jump bar</td>
<td>Technique efficiency</td>
<td>Traditional explicit (n = 7)</td>
<td>8</td>
<td>96</td>
<td>1.44</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Explicit light (n = 7)</td>
<td>3</td>
<td>20</td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Analogy (n = 7)</td>
<td>2</td>
<td>20</td>
<td>-</td>
</tr>
</tbody>
</table>