

Will systematic reviews facilitate translational behavioral ecology? With a few conditions: a comment on Berger-Tal et al.

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As scientists striving to nurture linkages between fundamental and applied outcomes (Griffin, Netto, et al. 2017; Griffin, Tebbich, et al. 2017), we support Berger-Tal et al.'s (2018) argument that systematic reviews provide a promising vehicle to appraise, collate and synthesise scientific findings in behavioural ecology and to condense them into a more accessible 'ready-to-use' format for conservation, management and policy making. The authors have highlighted the benefits and the steps involved and pointed to useful resources effectively. Consequently, we highlight some complementary issues that may broaden the discussion.

An important hurdle to the marriage between Behavioral Ecology and conservation/management is the ability of behavioural ecologists to identify 'on-the-ground problems'. To quote Caro (2007), "...researchers need to begin with a conservation issue. Start by talking to those on the front line of conservation to discover their specific

concerns...” We see one of the major benefits of systematic reviews as providing a platform to stimulate a dialogue between academic scientists and practitioners. In working together to identify a specific question and to develop the review methodology, the systematic review process will help behavioral ecologists adopt a more conservation-centered approach. The challenge will be in how best to make contact with field practitioners and stakeholders in the first place, and also in how to ensure that the appropriate experts are comprehensively involved. Without a track record of publication, valuable practitioners might be overlooked. One possibility would be to create a central registry and to couple registration with public calls for expert/stakeholder input.

Berger-Tal et al. (2018) highlights the significant effort to write a systematic review. However, with no other cost than time and perhaps some travel, undertaking a systematic review might well be a cheaper option than conducting research on the ground. Systematic reviews also have the potential to be published in high impact journals and to attract very high citation indices. With institutional researcher performance indicators and government research excellence assessments morphing into real-world impact metrics, systematic reviews fit well with demands on academic scientists to generate translational research. Hence, incentives could be high for behavioural ecologists to adopt the new approach. More generally, systematic reviews fit into a future where academics expand their growing societal function as research service providers. These transitions might help improve public trust in science more generally.

We envisage a future where behavioural ecologists could be commissioned by public and private sectors to undertake systematic reviews, potentially providing new sources of

research funding. There will be an increased need to build safeguards to protect researcher independence against industry and political influence, however, and ensure that the probability of future funding is not tied to review outcomes. Transparent availability and close scrutiny of review methodologies will need to be guaranteed and conflicts of interest divulged, not just from authors but all parties involved.

The effectiveness of systematic reviews depends first and foremost upon information being available to review. Behavioural ecology is a low-cost science and many student projects survive on a shoestring. With publishers increasingly passing publication costs to authors, disseminating the results of good quality, but low impact (from a journal editor's perspective), studies will become progressively more difficult, particularly in light of almost universal government cuts to research funding. Yet, this work contributes to an incremental accumulation of species-specific knowledge of the kind that is fundamental as input to systematic review. We need to ensure lower ranking, taxon specific outlets do not disappear in the current journal impact race. This includes agreeing to review and edit for them. We predict that these journals, rather than the high ranking ones, are and will become the repository of data critical to systematic review and ultimately, ironically, have the greatest impact on the ground.

In behavioral research, much is achieved by volunteers and community groups (e.g., many amateur bird clubs undertake very systematic, often long-term observations of avian populations). The concern is that many of these findings are not communicated in writing and therefore will never make way into systematic reviews. Similarly, many conservation interventions remain unevaluated and unpublished. We need to support data collection and

dissemination by non-academic agencies by creating platforms in which information can be recorded easily and effectively. Within this context, embracing the systematic review needs to be coupled with support for the citizen science movement.

We flag the need for systematic review methodology to be embedded within undergraduate education programmes. All too often, university undergraduate students are taught the same methods as their aging professors were taught and used (Cohen 2018), so there is often a very slow uptake of new and more robust knowledge and methods (Hayward et al. 2015). Extending this, we need to ensure that the lessons of published systematic reviews are heeded by managers or alternative evidence refuting the review is provided by scientists addressing the deficiencies identified in the review.

Our final point is that we should acknowledge that systematic reviews require a narrative synthesis. It can be a subjective exercise to attribute weight to behavioral research with small sample sizes and without adequate controls, and studies with negative results. Even though scientists are trained to counter interpretation biases, evaluating a large, disparate body of work objectively remains challenging and becomes even more difficult when funding comes from industry. Hence, the synthesis of a systematic review might be vulnerable to interpretation, and that might also be the section most read by time-poor managers and policy makers.

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