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Invited Commentary

Prioritizing conservation behavior research: a comment on Wong and Candolin

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Wong and Candolin (2014) have written a stimulating review of the potential role behavioral plasticity plays in understanding how individuals, populations, and communities may respond to one of the greatest unplanned experiments of our time—massive and consequential anthropogenic environmental change. I particularly liked how they clearly developed the logical links between how individual responses may have population consequences, and how individual responses can affect linkages between species, and hence influence community structure and dynamics. I believe (and have written elsewhere) that behavioral ecologists have a lot to contribute to conservation biology (e.g., Blumstein and Fernández-Juricic 2010), and this review provides fodder for the sorts of important research that can help. My comments below are meant to be constructive.

One of the shortcomings of conservation behavior is that it often fails to take the potentially relevant ideas and links between behavior and management to actual management outcomes. Managers are often faced with having to make decisions without sufficient information, time, or money. Thus, they must understand what interventions have the potential to be cost-effective. For this reason, I believe that it is important to understand the magnitude of the behavioral effects Wong and Candolin discuss; because by doing so, it will be possible to better understand how to prioritize both research and management interventions to where they will be most effective.

For instance, one might expect that direct effects of environmental change on individuals will be stronger than the indirect effects on communities which act through individuals. This does not mean that community-level effects do not exist (Wong and Candolin illustrate profound ones!), but rather that a manager tasked with either helping recover a population of a threatened species, or one tasked with managing a now over-abundant species will likely have the most success working on those links with relatively large effects. We must move beyond a compendium of anecdotes that clearly show that there are effects of behavioral responses to environmental change on populations and communities and begin to identify the effect sizes of these effects. Systematic reviews will be very helpful here (see www.ConservationEvidence.com).

The authors were wise to highlight the importance of phenotypic plasticity. Behavioral ecologists are extremely well-positioned to make consequential contributions to this literature; because, we follow individuals over time. Documenting phenotypic reaction norms (Dingemanse et al. 2009) and using the animal model (Kruuk 2004) to decompose variance and identifying heritable variation on traits with fitness consequences is an essential task. Again, however, I believe that

we must move beyond the anecdote towards developing predictive models that will give managers insights as to which sorts of fitness-influencing traits are more likely to have sufficient heritable variation and which may not. Perhaps, as the authors have suggested, traits under sexual selection may respond differently than other traits. It is insights like this which will be particularly useful when searching for generalizations. It is possible that generalizations may not be forthcoming, but that does not mean that we should not try to identify them.

I believe that it is essential to understand more about community resilience. Specifically, what are the consequences of anthropogenic changes acting on individuals on community structure? The authors pointed out that changes in resource dynamics have consequences. But it is likely that not all changes in resource dynamics have such consequences. And, it is unlikely that simply because a species changes its diet that the entire community will change. Some species are more important than others. How can we better understand which systems are likely to amplify the effects of environmental change on individual behavior which lead to changes in community structure? What are the effect sizes of this and can we prioritize our search for specific types of interactions that are likely to be consequential? Again, systematic reviews will be important tools for prioritizing action.

In sum, I think there is an important role for systematic reviews and meta-analyses to calculate effect sizes and help search for generalizable patterns. Identifying those species and interaction types which are likely to have strong effects between behavior and population and community processes will help managers prioritize research. Additionally, this might also help managers realize when and how behavioral interventions and insights can successfully manage behavior to influence population and community dynamics.

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