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Publication Date

2022

DOI

10.1017/s0140525x21000844

APA Citation: Ledgerwood, A., Pickett, C., Navarro, D., Remedios, J. D., & Lewis, N. A., Jr. (in press). The unbearable limitations of solo science: Team science as a path for more rigorous and relevant research. *Behavioral and Brain Sciences.*

The Unbearable Limitations of Solo Science:

Team Science as a Path for more Rigorous and Relevant Research

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Abstract

Both early social psychologists and the modern, interdisciplinary scientific community have advocated for diverse team science. We echo this call and describe three common pitfalls of solo science illustrated by the target article. We discuss how a collaborative and inclusive approach to science can both help researchers avoid these pitfalls and pave the way for more rigorous and relevant research.

The Unbearable Limitations of Solo Science:

Team Science as a Path for more Rigorous and Relevant Research

In 1946, Lewin wrote about the importance of conducting "action research" that could improve intergroup relations. Lewin and his contemporaries recognized that to do action research well, psychologists could not work alone. To do so would limit their ability to answer three critical questions regarding the phenomenon under study: "(1) What is the present situation? (2) What are the dangers? (3) And most important of all, what shall we do?" (Lewin, 1946, pp. 34). They learned that rigorous and relevant social psychological research requires collaborating not only with scientists in other disciplines to understand the full range of forces acting upon a person in a social system, but also with community partners, governments, and other local stakeholders who have direct access to information and insights about how those forces operate in the specific context at hand (IJzerman et al. 2020). Indeed, a growing consensus across disciplines recognizes the value of a collaborative, multidisciplinary, and inclusive approach to science (Albornoz et al., 2017; Disis & Slattery, 2010; Ledgerwood et al., 2021; Murphy et al., 2020).

The importance of a collaborative approach was well-known in the early days of psychology but has been neglected in the modern era (Cialdini 2009). Neglecting the true *powers of the situation*—the cultural, economic, historical, political, and sociological forces that affect the mind (including the minds of psychologists)—limits the rigor and relevance of the discipline's research, and hampers psychologists' ability to truly understand the conditions under which our work is or is not relevant for social issues.

In his target article, Cesario discusses challenges he perceives in social psychological experiments on bias, and concludes that we should abandon such experiments. While we agree that many experiments have flaws, our view is that Cesario's own critique suffers from three flaws that render his conclusion premature (Table 1). We further suggest that these flaws could have been avoided by collaborating with multidisciplinary experts—or even experts in other areas of psychology.

The first flaw is the *biased search flaw*: when people's expectations lead them to consider an incomplete set of possibilities or to search through available information in a manner shaped by personal expectations (Cameron & Trope, 2004). This flaw is costly because it leads to mistaken conclusions based on an incomplete survey of possible alternatives. For example, the target article correctly notes that effect sizes depend on the paradigm used to study them (Kennedy et al., 2019; McShane & Bockenholt, 2014). However, it discusses only the possibility that effect sizes observed in the lab would diminish in the world, and omits the possibility that they would be magnified. After all, in the real world, effects of discrimination compound over time (Krieger & Sidney, 1996; Mays et al., 2007); small effects can become large when compounded across many decisions (Funder & Ozer, 2019). Likewise, although lab studies typically only manipulate a single dimension of bias, in the world, dimensions of bias can intersect to produce compounded or unique effects (Berdahl & Moore, 2006; Remedios & Sanchez, 2018; Settles & Buchanan, 2014). Moreover, research suggests that biases can be magnified when people have access to rich information (as in the real world) that can be marshalled to elaborate and rationalize initial expectations (Darley & Gross, 1983; Taber & Lodge, 2006).

Table 1: Three common flaws in solo science illustrated by the target article.

Flaw	Description	How Diverse Team Science Can Help
The Biased Search Flaw	When scholars' expectations lead them to consider an incomplete set of possibilities or to search through available information in a way that is shaped by what they personally expect to find.	By working in teams that include scholars from diverse vantage points, scholars are more likely to encounter and consider different expectations and possibilities.
The Beginner's Bubble Flaw	When scholars know a little bit about a topic but overestimate how well they understand it.	By working with experts in different areas, scholars can leverage each other's deep expertise in specific areas to complement their own. Collaborating with experts in other areas also provides a useful check on whether we understand an area as well as we think we do.
The Old Wine in New Bottles Flaw	When scholars (often unintentionally) approach a well-studied idea without recognizing relevant prior work.	A team of diverse collaborators can pool their expertise to create a more comprehensive and generative set of connections to relevant work across disciplinary boundaries.

The second flaw is the *beginner's bubble flaw:* when people know a little about a topic but overestimate how well they understand it (Sanchez & Dunning, 2018). This flaw is costly

because it leads scholars to misapply or miss insights developed in other areas. For example, the target article relies heavily on the idea that in the real world, people use information that "may be probabilistically accurate in everyday life" and that using demographic information (e.g., race) to fill in the blanks when full information is unavailable is rational in a Bayesian sense and therefore unbiased. This vague and imprecise assertion muddies waters that have already been clarified at length in adjacent literatures, including in-depth discussions by cognitive modelers on the limits of Bayesian theorizing (Bowers & Davis 2012; Jones & Love 2011) and clear distinctions between truth and bias developed in social psychological models of judgment (West & Kenny, 2011). Even advocates of Bayesian cognitive models do not claim a behavior is rational or justifiable simply by virtue of being Bayesian (Griffiths et al, 2012; Tauber et al., 2017). A prior is not the same thing as a base rate, nor is it the same thing as truth (Welsh & Navarro, 2012). Just because a belief can *sometimes* lead to correct decisions does not mean it is accurate or optimal to use that belief for all decisions.

The third flaw is the *old wine in new bottles flaw*: when scholars approach a well-studied idea without recognizing relevant prior work. This flaw is costly because it impedes cumulative and integrative science. For example, discussions of how to connect the world and the lab can and should be grounded in the rich, interdisciplinary work on these questions (Aronson & Carlsmith, 1968; Bauer et al., 2015; IJzerman et al., 2020; Lewin, 1946; Premachandra & Lewis, 2021). Likewise, previous discussions of external validity have inspired considerable research that helpfully spans the "troubling...gap" (p. 42) between highly controlled studies of bias and disparate treatment in complex real-world contexts (e.g., Dupas et al., 2021; Sarsons, 2017).

These three flaws illustrate common pitfalls for researchers who attempt to tackle large and complex problems from a single vantage point, but they can be mitigated or avoided by working collaboratively in diverse teams (Murphy et al., 2020; Ledgerwood et al., 2021). The key to successfully connecting the lab with the real world is not to abandon experiments on socially relevant topics, but instead for social psychologists to form collaborative partnerships with organizations that can provide on-the-ground insights that lead us to design *better* experiments (IJzerman et al., 2020).

Acknowledgements

This work was supported by NSF #BCS-1941440 to A.L and a Faculty Fellowship from the Cornell Center for Social Sciences to N.L. The authors thank Katherine Weltzien, Paul Eastwick, Srilaxmi Pappoppula, Stephanie Goodwin, and Sylvia Liu for their help.

Conflicts of interest: none

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