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Groupstrapping, Bootstrapping, and Oops-strapping: A Reply to Boyd

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Kenneth Boyd's paper "Epistemically Pernicious Groups and the Groupstrapping Problem" (2019) is an excellent example of how philosophers can contribute to social sciences through conceptual engineering. Boyd introduces what he calls *groupstrapping*. The idea begins with the claim that *groups* can be sources of testimony separate from (or in addition to) the individual members of groups.

Boyd rightly avoids metaphysical questions about the nature of groups. He requires only that it can be said that a group's warrant in a proposition is a function of the relevant warrants of its members. Given that groups can be sources of testimony, Boyd then demonstrates that a particular kind of epistemically pernicious process can occur when a member of a group uses that group as a source of information. This is not to say that every case of asking one's own group for information is pernicious, but many are.

Illustrating Groupstrapping

Here is an example. Suppose that Nick asks the Ultrarunning community on Reddit.com, of which he is a member, what shoe is best suited for a 100-mile endurance race. Some community members point to a ranking of shoes on one of their discussion forums that has been endorsed by the Ultrarunning community. Looking at that list, Nick forms the belief that Altra shoes are best and is willing to endorse them. As a result, the Ultrarunning community gains the appearance of additional credibility when a week later, Bert, a new member of the Ultrarunning community, sees Nick's endorsement in addition to those of other members and the group ranking.

Let us suppose that Bert thereby forms the same belief, whereas he may not have had Nick or another member not made their endorsement. What makes this an example of an epistemically pernicious process is that no new evidence about Altra shoes has been injected into the situation, and yet the group's apparent warrant increases. Had Nick tested the shoes and reported his findings to the group, that would be a different story, but as it stands the group has increased the appearance of its credibility by the addition of Nick's endorsement without the addition of new information related to the quality of the shoe.

One important contribution of the groupstrapping concept is that it provides conceptual resources that go beyond the ideas of filter bubbles or echo chambers. These latter concepts are solely about relations between individuals. In the example above, individual members are endorsing some shoe brand based on its quality. But there is also the group (the Ultrarunning community) that is contributing to belief revisions. Hence the motivation for the concept of groupstrapping: a feedback that can occur not just between individuals, but also between individuals and the group that the individuals form.

In the spirit of Boyd's paper, I'm going to compare Boyd's introduction of the groupstrapping concept to the idea of bootstrapping more generally. My reasons for this are threefold.

☞ The first reason is to pay homage to an idea that Boyd was presumably inspired by, but did not bring up in his paper.

☞ The second reason is to provide what I think is an important illustration of how a structurally similar process to groupstrapping is not necessarily pernicious. This is something Boyd acknowledges when he claims that it is not necessarily illicit to seek information from a group that one is also a member of, but I think the illustration I will provide is additionally helpful.

☞ The third reason, most importantly, is that the comparison to bootstrapping emphasizes the iterative nature of groupstrapping. Boyd’s definition can give the impression that the perniciousness of groupstrapping happens in a single step. Most cases of groupstrapping are unlikely to be so transparent in their perniciousness. Rather, there is an iterative process in which the “outrunning” of the testimonial warrant of a group happens one small step at a time, not by one massive leap.

On to the comparison then.

Groupstrapping and Bootstrapping

The concept *groupstrapping* is presumably inspired by *bootstrapping*. Bootstrapping, roughly speaking, is a self-starting process that proceeds without the help of some external input. While the term “bootstrapping” can be found across a variety of disciplines, its meaning in statistics is a fruitful way of thinking about what Boyd has in mind. But unlike groupstrapping, which is pernicious, the statistical procedure of bootstrapping is not.

What is bootstrapping in the statistical context? It’s quick to explain with an example. Suppose we want to measure the average foot size of the world’s population. It’s not feasible to measure every person’s foot, so we sample the population instead, i.e., we pick some number N individuals, measure their feet, and then take the average. What we ultimately want to be able to do is say something about the average foot size of the population, that is, we want to make some inference from the sample to the population. To do that we need to estimate how close the average of the sample is to the average of the population (i.e., we want to be able to quantify error). To do that, however, we need to know the variability of our sample average. Ideally, we would collect additional samples of size N , taking the mean of each, and then look at the dispersion of those means. But let us suppose that we have already used up our resources in collecting the initial sample. Bootstrapping is a way to get a sense of the variability of the sample mean without having to collect additional information.

A simple bootstrapping procedure for this context would be to *resample* the original sample with a process known as *sampling with replacement*. For example, suppose our initial sample of foot sizes is {10, 11, 12, 9, 9}. A resample of this sample might be {10, 10, 9, 12, 11}. The 10 is in the resample twice because after we drew it out of the initial sample we went back and “replaced” it so that it was possible to draw it again when building the resample. (Side note: as the size of N grows, we approach a zero probability that the resample will be identical to the original sample.) By repeating this process of resampling numerous times and taking the mean of each resample—the *bootstrap mean*—we can get a sense of the variability of the mean of our initial sample. We could, for example, draw a histogram of the bootstrap

means and look at the shape of their distribution. So, what bootstrapping allows us to do is use resampling from the original sample itself to get information about how the original sample relates to the population.

Oops-strapping

Like groupstrapping, bootstrapping is a procedure whereby a call is made internally. In groupstrapping an individual calls upon the group that the individual is also a member of. In bootstrapping, the procedure calls upon the same initial sample without collecting new ones. Groupstrapping, however, is pernicious, while bootstrapping is not. We could create a version of bootstrapping that is pernicious in a similar fashion. Suppose that instead of creating every resample from the same initial sample, we create resamples from previous resamples that have been built (with the exception of the first one, which has to be built from the initial sample). In this procedure, call it *oops-strapping* (due to a minor coding error in the program), resamples will over time become increasingly homogenous due to the possibility that the same values can be selected multiple times. As a consequence, we will get the appearance of a decrease in variability among the resamples the longer we run oops-strapping. From that we will get the impression that the variability of our initial sample mean is lower than it really is.

The problem generated by oops-strapping is akin to the increase in credibility that groups receive through the groupstrapping procedure. It also suggests a way to avoid the groupstrapping cycle that creates the issue. Consider the shoe example from above. Suppose that Nick, after forming his belief in the quality of Altra shoes, withholds his own endorsement of the shoe. When asked by Bert about what shoes he should wear for an endurance race, Nick points Bert to the same ranking and discussion board that Nick himself used to form his own belief. Crucially, Nick does not add his new belief to the existing discussion board that Bert consults. In effect, both Nick and Bert form their beliefs on the same body of information, just as resamples are built from the same initial sample in the bootstrapping procedure.

I find it helpful to think of the structure of these procedures diagrammatically.

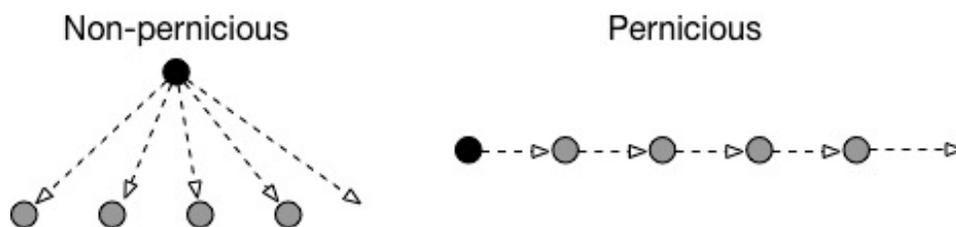


Figure 1: Iterative Structure of Bootstrapping (left), and Groupstrapping and Oops-strapping (right)

Figure 1 illustrates how the iterative structure of groupstrapping and oops-strapping form a chain. New iterations in the procedure are built from previous ones, and thereby lend themselves to being pernicious. The non-pernicious versions of the procedures do not form

a chain. This is because new iterations are built from the same initial body of information (in the case of virtuous version of the shoe example) or initial sample (in the case bootstrapping).

Regarding Iteration

I turn now to the final reason for the comparison between groupstrapping and bootstrapping, which has to do with iteration. A typical case of bootstrapping will involve hundreds, if not thousands, of resamples from the initial sample. Doing the procedure many times over provides a rich histogram of the dispersion of the bootstrap means. A few iterations of the procedure, however, will not provide us with much information. Moreover, given a sufficiently large initial sample, there will not be a significant difference between the first few iterations of bootstrapping and the pernicious version of oops-strapping. It is not until the procedures are iterated many times over that we will be able to detect a difference. This is because the range of dispersion in the earlier iterations for oops-strapping will be very similar to those of bootstrapping. But after oops-strapping is iterated many times the range of the dispersion will decrease and deviate in an easily detectable manner in relation to the bootstrapping analog.

Something relevantly similar happens in the case of groupstrapping. If the group is sufficiently large, as I suspect is the case for many of the communities that Boyd has in mind, then the increase in apparent credibility of the group given a member's newly endorsed belief will be hardly noticeable. That is, the "distance" that the apparent credibility of the group outruns its proper warrant is small. However, as this procedure iterates, these small steps accumulate, eventually begetting a sizable gap between apparent credibility and proper warrant.

That groupstrapping probably occurs over many iterations of small steps suggests an important lesson. The small steps make it more difficult to detect when groupstrapping is occurring. This requires us to be extra vigilant in determining the credibility of a group. This vigilance is especially important if it turns out that groupstrapping generates beliefs that are far more entrenched than warranted. This is highlighted by the discussion of echo chambers in the earlier part of Boyd's paper. Unlike filter bubbles (or epistemic bubbles), which occur simply as a matter of restricted access to information (such as a highly curated news source), echo chambers have the additional component that when individuals are exposed to an increased range of information, they become even more entrenched or reinforced in their beliefs, rather than less so. If the groupstrapping problem is more like echo chambers than filter bubbles, it requires us to be even more cautionary in our assessment of group credibility to ensure that we are not being swept up in groupstrapping.

References

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