Which research is valuable enough to do well?

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AMMODO SCIENCE AWARD
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AMMODO

What do you think?

Which skills do you need to learn as a PhD student to do high quality research?

What do you think?

How much time would you need to develop sufficient expertise in each skill?

What do you think?

Would it be helpful if your research team had the following experts, that you could approach for help at any moment:

Uli Schimmack for data analysis, Lisa DeBruine and Filipo Gambaroto to help you create a computationally reproducible paper and share data and code, Jessica Flake to develop your scale, Dorothy Bishop to help you spot questionable papers, Livio Finios to help you design your experiment, and me to cheer you on when things get tough?

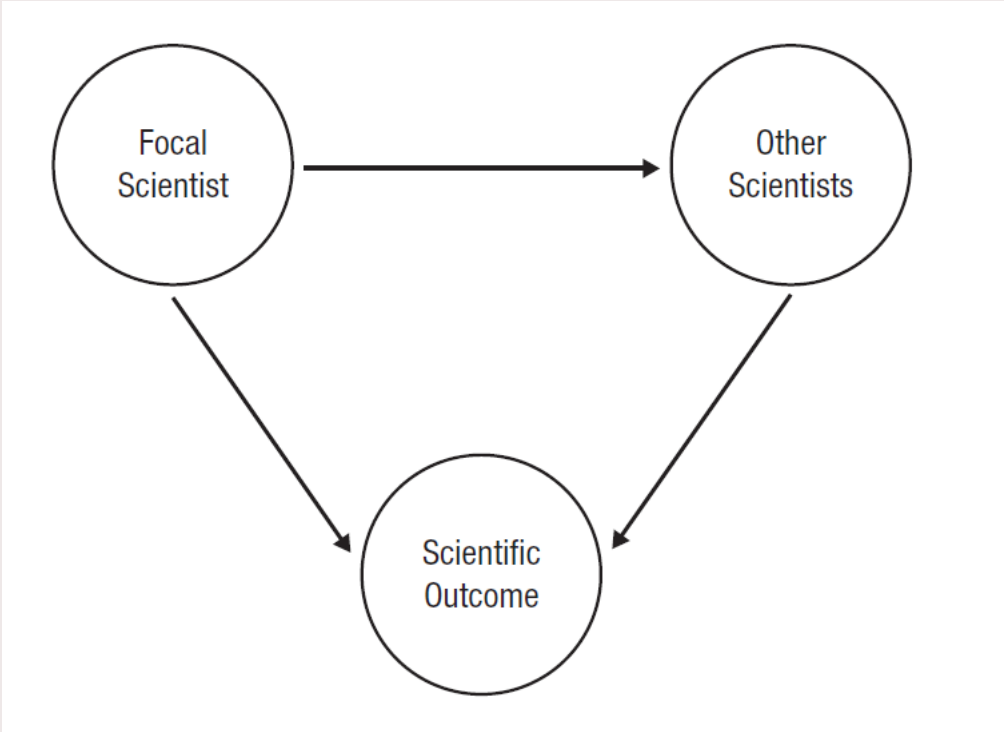
What do you think?

Is there room in a university for experts who help others, without focusing most of their time on their own research?

If we only reward scientists for what they do as individuals, they will compete with each other, instead of helping each other to do better work together.

Tiokhin, Panchanathan, Smaldino, Lakens, 2023

Shifting the level of selection will reward indirect effects of scientists (e.g., helping others)



Tiokhin, Panchanathan, Smaldino, Lakens, 2023

What do you think?

Does it cost more time to do higher quality research?

What do you think?

Does it cost less time to do lower quality research?

If it isn't worth doing, it isn't worth doing well.

Each of us can readily think of an ongoing controversy in philosophy whose participants would be out of work if Hebb's dictum were ruthlessly applied, but we no doubt disagree on just which cottage industries should be shut down. Probably there is no investigation in our capacious discipline that is not believed by some school of thought to be wasted effort, brilliance squandered on taking in each other's laundry. Voting would not yield results worth heeding, and dictatorship would be even worse, so let a thousand flowers bloom,

Dennett, 2006

What do you think?

Would voting really not yield results worth heeding? Why not? Isn’t this what we do all the time when we review papers, grant proposals, and job candidates?

Do you really feel your research is valuable enough to do well?

It’s a question we don’t often discuss out loud. But we should!

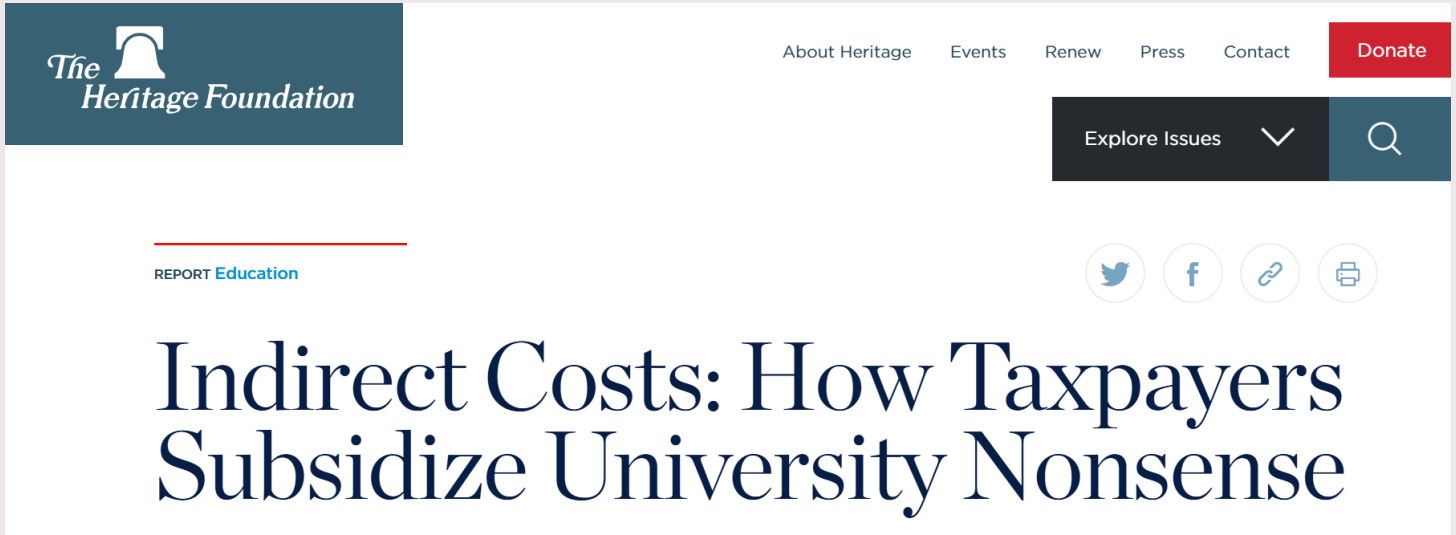
knowledge. As one of us argued a few years ago, an ample proportion of consumer research—possibly as high as 70% according to citation data—is rather pointless (Pham, 2013). Regardless of their repro-

(Because 70% of research is hardly ever cited in one year. We can debate if this is a valid metric).

Lack of Co-ordination of Research

The inefficiency and the imperfect organization of individual research laboratories is by no means the most serious disability from which scientific research suffers. Even more important is the general lack of co-ordination between the different scientific institutes and between individual research workers in different places. The fact is that the general organization of science and the communications between its various parts have remained at a primitive level and consequently fallen far behind the requirements of the enormous expansion of scientific activity which has occurred in the last fifty years. For the most part, science still retains as its only organizational forms the learned societies which, though essential for its first development in the seventeenth century, are quite inadequate to deal with the problems of scientific advance of to-day. The essential defect of the learned society is that it is conceived of as a voluntary association of amateurs each having complete freedom of operation and meeting for mutual edification and for arranging certain common conveniences, such as published journals, to take the place of private letters. Now at one time such associations represented a great and indeed a revolutionary step, as may be judged by the immense enthusiasm and the violent opposition that they aroused. (11) The idea of a voluntary association of gentlemen of means and leisure is no longer adequate to cover the organizational requirements of modern science. Very few scientific workers in any country are now anything but salaried officials of universities, Government or industry. Their apparent freedom depends to a large extent on their ineffectiveness or the ignorance of the ruling powers as to the ultimate results of their work. Existing scientific societies do not, as we have seen, provide an adequate basis for organization, even less for initiative in the direction of research; they have become almost purely publishing houses and honorific corporations.

The Heritage Foundation, a conservative think tank, is behind the current decisions in the US to reduce science funding.



- **Congress Should Reduce Federal Research Grant Funding.** Taxpayers are overpaying for the level of scientific progress they receive, as much of the research output from the current system of federal grant funding is waste. Most academic researchers are incentivized to produce quantity over quality, and, as a result, they publish predictable papers answering questions of little importance to society.[31]
- Further, so many research findings have been uncovered as being false that the situation has been dubbed the "reproducibility crisis."[32] The current system of federal government subsidization of research is a major cause of these problems.[33] The private sector would more efficiently direct resources to fruitful and innovative projects with much less bureaucracy and waste. Congress should reduce federal research spending and taxes so that more money flows to organizations that compete in the marketplace of innovation—not the marketplace of writing grant applications.

What would a well-organized science, where we have coordination between scientists, look like?

Let’s look at what Francis Bacon thought in 1627:

These are (my Son) the Riches *of* Salomons-House.

For the several Employments *and* Offices *of our* Fellows, *We have Twelve that Saile into* Foreign Countries *under the* Names *of other* Nations (*for our own we conceale*;) *Who bring us the* Books, *and* Abstracts, *and* Patterns *of* Experiments *of all other* Parts. *These we call* Merchants *of* Light.

We have Three that collect the Experiments, *which are in all* Books, *these we call* Deprepators.

We have Three that Collect *the* Experiments *of all* Mechanical Arts; *And also of* Liberal Sciences; *And also of practices which are not* Arts, *these we call* Mystery-men.

Such as themselves think good. These we call Pioneers *or* Miners.

We have Three that draw the Experiments *of the* Former Four *into* Titles *and* Tables, *to give the better light for the drawing of* Observations *and* Axiomes *out of them, these we call* Compilers.

Bacon, 1627

We have three that bend themſelves, looking into the Experiments *of their* Fellows, *and caſt about how to draw out of them* Things *of* Uſe, *and* Practice *for* Mans life, *and* Knowledge, *as well for* Works *as for* Plain Demonſtration *of* Cauſes, Means *of* Natural Divinations, *and the eaſie and clear* Diſcovery *of the* Vertues *and* Parts *of* Bodies, *theſe we call* Dowry-men *or* Benefactors.

Then after divers Meetings *and* Conſults *of our whole Number, to conſider of the former* Labours *and* Collections, *we have three that take care, out of them, to direct New Experiments, of a Higher* Light, *more* Penetrating *into* Nature *then the* Former. *Theſe we call* Lamps.

We have Three others that do execute the Experiment, *ſo* Directed, *and* Report them. *Theſe we call* Inoculators.

Laſtly, we have three that raiſe the former Diſcoveries *by* Experiments, *into* Greater Obſervations, Axiomes, *and* Aphoriſmes. *Theſe we call Interpreters of* Nature.

We have alſo, as you muſt think, Novices *and* Apprentices, *that the Succeſſion of the former employed men do not faile; beſides a great Number of* Servants *and* Attendants, Men, *and* Women. *And this we do alſo: We have* Conſultations, *which of the* Inventions *and* Experiences *which we have diſcovered ſhall be Publiſhed, and which not: And take all an* Oath *of* Secrecy, *for the concealing of thoſe which we think meet to keep Secret. Though ſome of thoſe we do reveale ſometime to the* State, *and ſome not.*

In order to use the analogy to articulate an ideal procedure for well-ordered science, we need a clear understanding of the kinds of decisions that will be needed. Let's conceive of ideal inquiry as divided into three phases. At the first phase, decisions are made to commit resources, such as investigators and equipment, in particular amounts to particular projects. The second phase pursues those projects in the most efficient way, subject to moral constraints that rule out certain physically possible options. At the third phase, the results of the various investigations are translated into practical consequences. So there are three different decisions to be made: How are resources initially to be assigned to projects? What are the constraints on morally permissible investigation? How are the results of the investigation to be applied? As we'll see, the first and the third decisions can be approached within a similar framework.

Kitchner, 2001

Sajedeh Rasti **Krist Vaesen**

Rasti, S., Vaesen, K., & Lakens, D. (2025). *The Need for Scientific Coordination*. OSF. https://doi.org/10.31234/osf.io/vjcfk

1. Coordination is necessary to answer complex questions.

The more interdependencies exist between the work that needs to be done to answer a question, the more we need to coordinate.

2. Coordination increases quality through specialization.

Given a fixed amount of time, the expertise that any single researcher can develop is limited.

3. Coordination enables research prioritization.

Let’s define the ability of a research project to answer the question as the **endogenous scientific value**.

Originally organized by the NIH to promote coordination among researchers in a specific field, **consensus conferences** are now self-organized by researchers in health research.

“OMERACT is the acronym for an international, informally organized network initiated in 1992 aimed at improving outcome measurement in rheumatology. Chaired by an executive committee, it organizes consensus conferences in a 2-yearly cycle that circles the globe. Data driven recommendations are prepared and updated by expert working groups. Recommendations include core sets of measures for most of the major rheumatologic conditions.”

Consensus conferences often focus on 1) agreement on the available evidence 2) agreement about which measures a field will use 3) agreement about a smallest effect size of interest.

Abstract

The use of head kinematic measurement devices has recently proliferated owing to technology advances that make such measurement more feasible. In parallel, demand to understand the biomechanics of head impacts and injury in sports and the military has increased as the burden of such loading on the brain has received focused attention. As a result, the field has matured to the point of needing methodological guidelines to improve the rigor and consistency of research and reduce the risk of scientific bias. To this end, a diverse group of scientists undertook a comprehensive effort to define current best practices in head kinematic measurement, culminating in a series of manuscripts outlining consensus methodologies and companion summary statements. Summary statements were discussed, revised, and voted upon at the Consensus Head Acceleration Measurement Practices (CHAMP) Conference in March 2022. This manuscript summarizes the motivation and methods of the consensus process and introduces recommended reporting checklists to be used to increase transparency and rigor of future experimental design and publication of work in this field. The checklists provide an accessible means for researchers to apply the best practices summarized in the companion manuscripts when reporting studies utilizing head kinematic measurement in sport and military settings.

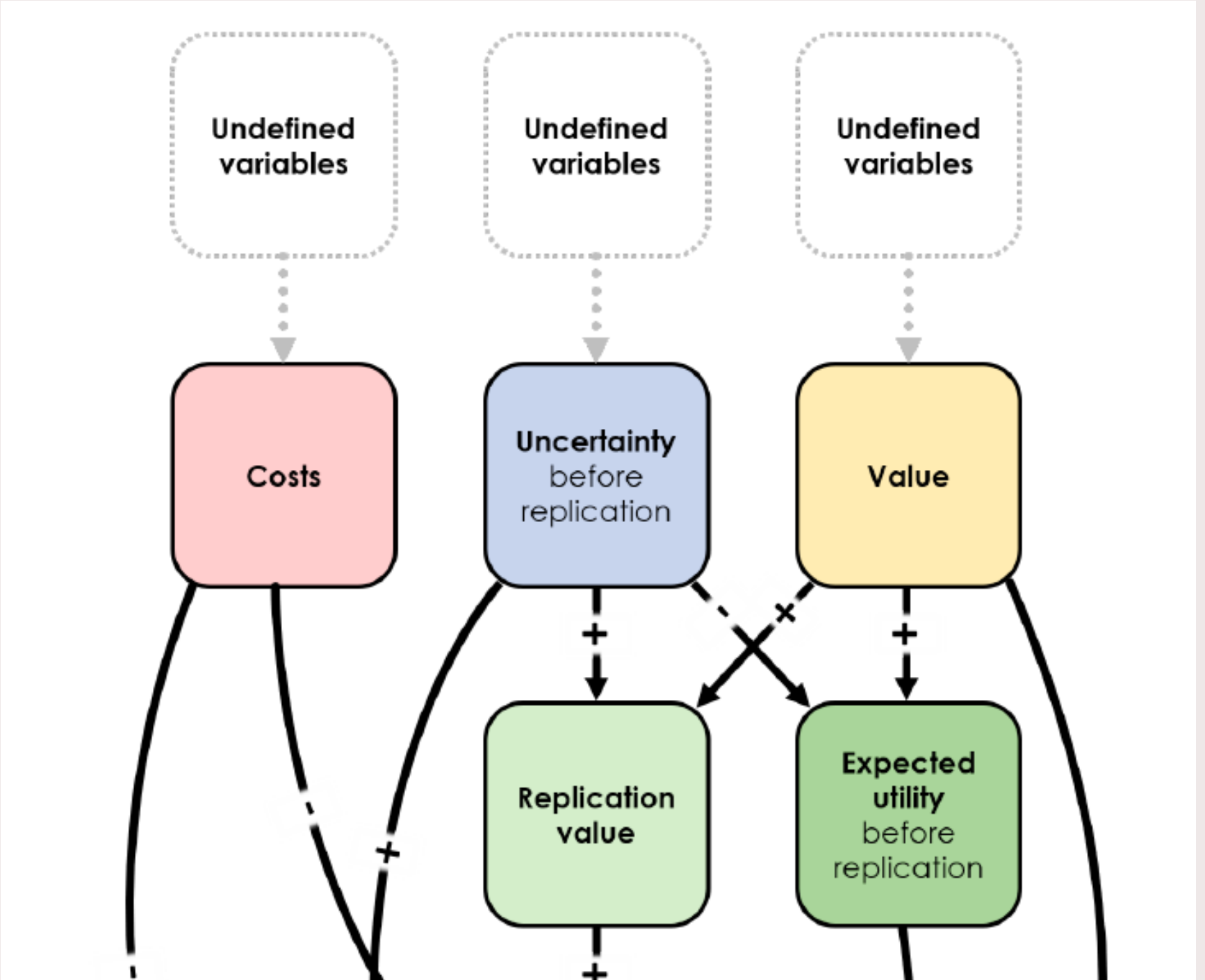
Research projects that provide a more conclusive answer to the research question have more value than research questions that provide less conclusive answers.

This does not take into account whether it is worthwhile to answer the research question to begin with, which we can call the **exogenous scientific value**.

The exogenous scientific value of a research project is determined by the utility of having the answer to a question.

Both these types of value are subjective. But where exogenous value judgments can be irreconcilable, endogenous value judgments can only differ in their rank order.

Recently, Isager et al (2021) developed a model for the replication value of a study, defined as the maximum expected utility we could gain by conducting a replication.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Costs
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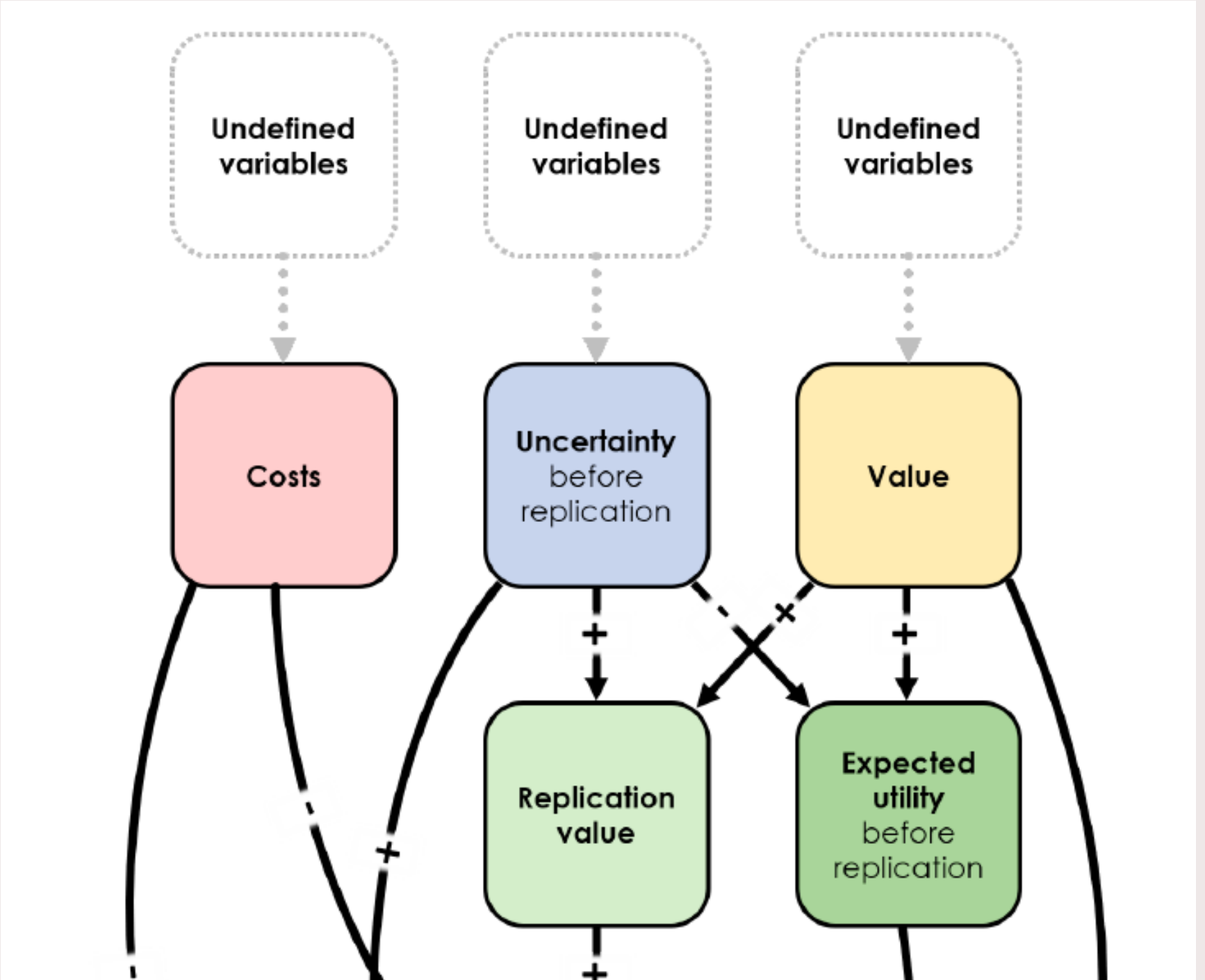
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Costs
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Value
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Replication value
Expected utility before replication
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If you have decided to perform any replication study in a field (an exogenous value judgement) the choice for a specific replication is based on an endogenous value judgement.

If a finding has already been replicated extensively, adding a replication matters very little. If no one cares about the original study, a replication also matters very little.

4. Coordination creates careers for team players.

People want to do work that matches their values. A competitive system turns people away from academia (regrettably, not all places in academia work like Psicostat!).

5. Coordination can help to resolve longstanding disagreements.

Adverserial collaborations, Red Teams, actually engaging with criticism.

6. Coordination can create a more cumulative science.

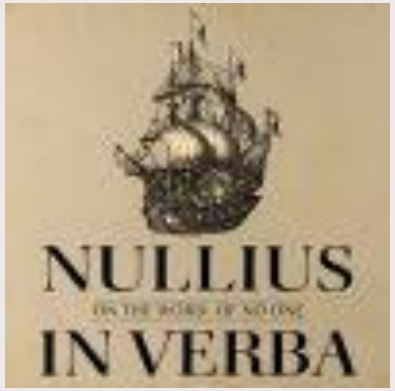
“There is an awful lot of talk about ground breaking research, which I find an interesting comparison. Because ground breaking is what you do when you start a building. You go into a field and you dig a hole into the ground. If you are only rewarded for ground breaking research there is going to be an awful lot of fields with a small hole in, and no buildings.”

Ottoline Leyser

And so it happened that the land became flooded with bricks. It became necessary to organize more and more storage places, called journals, and more and more elaborate systems of bookkeeping to record the inventory. In all of this the brickmakers retained their pride and skill and the bricks were of the very best quality. But production was ahead of demand and bricks no longer were made to order. The size and shape was now dictated by changing trends in fashion. In order to compete successfully with other brickmakers, production emphasized those types of brick that were easy to make and only rarely did an adventuresome brickmaker attempt a difficult or unusual design.

It became difficult to find a suitable plot for construction of an edifice because the ground was covered with loose bricks. It became difficult to complete a useful edifice because, as soon as the foundations were discernible, they were buried under an avalanche of random bricks. And, saddest of all, sometimes no effort was made even to maintain the distinction between a pile of bricks and a true edifice.

BERNARD K. FORSCHER
Mayo Clinic, Rochester, Minnesota



Forscher, 1963, Chaos in the Brickyard

Building an edifice requires a research *line*, not a *study*, which requires that a **concept is defined** well, a good **measure** is developed, a larger set of **moderators and boundary conditions is explored**, the **generalizability** of the effect is established, and perhaps even some **applied research** to demonstrate that the theoretical knowledge can be used to generate useful interventions.

The extent to which this necessary work is performed is often uncertain, as it requires a certain level of coordination.

7. Coordination improves transparency.

Working together means communicating openly, allowing others to re-use your work.

Now, let's go ahead and consider the challenge of exogenous value.

> Unfortunately, an inestimable amount of psychological research energy has been dissipated in fighting brush fires spawned by faddish theories—which careful research might better have refuted at their inception.

Dunnette, 1965

Richard Hamming used to enjoy asking researchers: "What is the most important open question in your field, and why aren't you working on it?"

One concern of giving researchers complete freedom in their choice of research topic is that it limits their resources to what they can study individually.

What do you think?

Which studies would be performed if you were the boss of 100 of your peers for the next decade?

What do you think?

Which studies will you performed for the next decade?

There is a difference between the 100 most valuable research projects a researcher can do, and the most valuable research projects 100 researchers can do.

Talking about the value of our research might be a bit of a taboo. As PhD students, we discussed how the worst possible question you could get after a talk was ‘Why is this interesting?”

But maybe it is time we take this question a bit more seriously.
Some scientists might be happier if they do coordinated research.
And maybe we could prevent research waste.

Why would we do pointless work? It has become our brand, switching has too high costs, we follow fads, truly innovative work is too risky, or it is not what will be funded.

Researchers might worry so much that giving up some autonomy will reduce their freedom of choosing what to do that they have failed to see how giving up some autonomy can increase their freedom of choosing what to do.

sailed of his kindness and goodness to admit the human spirit for his playfellow at that game. Lastly, I would address one general admonition to all; that they consider what are the true ends of knowledge, and that they seek it not either for pleasure of the mind, or for contention, or for superiority to others, or for profit, or fame, or power, or any of these inferior things; but for the benefit and use of life; and that they perfect and govern it in charity. For it was from lust of power that the angels fell, from lust of knowledge that man fell; but of charity there can be no excess, neither did angel or man ever come in danger by it. [Bacon, 1620]

The requests I have to make are these. Of myself

Grazi!

https://osf.io/ejqa2/