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Managing different intellectual personalities in scientific teams

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The importance of working as multidisciplinary teams has taken center stage in health care research. As team science has grown in prominence, so too has the study of team science in an effort to understand the factors that facilitate and frustrate the effectiveness of scientific teams [1, 2]. Factors that have been studied include the formation, composition, and geographic dispersion of teams; institutional and organizational supports for team science; communication processes; goal alignment; trust; and use of shared models [1–6]. This body of work has been useful in suggesting strategies for strengthening team science [3, 7].

While many factors contributing to team effectiveness have been well described, there is one challenge that has not received much attention, perhaps because it is so subtle and thus difficult to diagnose. I am thinking of the many situations in which I have participated in a group attempting to address some scientific issue that does not appear to resolve itself, with colleagues becoming increasingly frustrated with one another's apparent contribution to the circuitous discussion. Some of this is due to different disciplinary languages or differences in the experiences that people bring to the table. But there are many times when these factors are not sufficient to explain why the group goes round in circles, or why issues that were considered resolved at the last meeting are being raised yet again.

I believe the missing factor is an aspect of what one might call *intellectual personality* – a person's preferences for certain ways of thinking and for particular signs that let them know that their thinking has been successful. One approach to understanding intellectual personality is that of American scientist and philosopher William James. Drawing on James' [8] approach, I discuss how (1) people can differ in their approaches to achieving the feeling that everything makes sense, and (2) appreciating these differences can help scientific teams to understand when an intellectual impasse is due to differing emotional commitments rather than a disagreement about facts and/or methodology.

Understanding is Really a Feeling

Research teams in health sciences typically work toward a better understanding of some aspect of health, so that the knowledge can be translated into effective prevention and treatment. But how do researchers recognize when they have sufficient understanding? For example, when does a researcher say, "Thanks to the work we have done, we now understand the causes of Disease X and can begin to develop treatments for it"? Any two people might disagree as to when this type of statement is justified. As a gifted psychologist, James' [8] observed that people recognize when they understand something about the world, that things now make sense, based on a *feeling* they experience: "This feeling of sufficiency of the present moment, of its absoluteness, – this absence of all need to explain it, account for it, or justify it, – is what I call the Sentiment of Rationality" (p. 75). James also added that things feel rational when the thinker's mental movements are unobstructed – a sense of cognitive fluency. Researchers, like all thinkers, are motivated to achieve such a feeling of ease that indicates to the thinker that things make sense now, that they understand. But how do people try to attain this feeling?

People Prefer Different Routes to Achieving the Feeling of Understanding

According to James, people achieve the feeling of understanding by satisfying certain intellectual cravings – cravings to reach an intellectual space that the person identifies as "understanding." But what counts as the mark of understanding for one person is not necessarily the same as for others. People can differ in their pictures of intellectual success. James offered two varieties of intellectual craving for flavors of intellectual success, and I will add a third based on my experiences in several research networks.

The first intellectual craving is toward ***Simplification***[1] – reducing the messiness of a complex array of factors to a parsimonious overarching model, law, or small set of categories. As James notes, "our pleasure at finding that a chaos of facts is the expression of a single underlying fact is like the relief of the musician at resolving a confused mass of sound into melodic or harmonic order" (p. 65). Thus, the researcher who is dominated by this craving will work in earnest to rearrange, reduce, and condense the scientific issues around them until they create the simple characterization that brings them that feeling of ease and a sense that they can move forward unobstructed. At the risk of caricature, if we imagine an extreme version of this type of thinker working at a dry wipe board, they would not feel satisfied until the board contained only a small number of boxes and arrows, or perhaps a single equation.

The second type of intellectual craving is toward achieving ***Clarity about Particulars***[2] – trying to reach a "clear and complete view of the particulars" (p. 66) of some phenomenon, to be intimately familiar with all of the nooks and crannies. James notes that a thinker dominated by this craving will prefer "any amount of incoherence, abruptness, and fragmentariness (so long as the literal details of the separate facts are saved) to an abstract way of conceiving things that, while it simplifies them, dissolves away at the same time their concrete fullness" (p. 66). When offered simplifying frameworks or categories, this type of researcher can often be heard reacting with "But this leaves out X" or "But Y doesn't always behave that way . . ." This person does not see themselves as derailing the discussion; they see themselves as moving toward a kind of understanding that they find more emotionally satisfying than abstract generalizations. While an investigator of the Simplification variety might be eager to construct a parsimonious multivariable model of a health outcome, an investigator who craves Clarity about Particulars might be more interested in also examining those people who are statistical outliers. If we imagine an extreme version of this type of thinker at a dry wipe board, they would not be satisfied until it was covered in many small phrases or pictures reflecting every single thing that makes up the phenomenon under study.

The third type of intellectual craving, which was not in James' original formulation, is toward achieving ***Clarity about Next Steps*** – trying to reach the point where I know exactly what step I should take next to do this scientific work. In contrast to the prior two types of intellectual cravings – which both strive toward some representation of the phenomenon at hand – this type of craving strives to achieve the sense that things are in order through knowing what needs to be done next. The sense of peace, ease, and sufficiency that James described cannot be felt for someone of this ilk until they personally have something to do next. Thus, during longer discussions about challenging and complex issues, someone with this craving might sound dismissive and impatient, offering suggestions about what the group should *do* rather than contributing to an evolving understanding of how things are. "Can't we just . . .?" "Why don't we just . . .?" If we imagine an extreme version of this type of thinker at a dry wipe board, they would not sit down until the board contained a To Do list.

It is important to note that team science requires all three orientations – Simplification, Clarity about Particulars, and Clarity about Next Steps – to advance successfully. Many researchers have a mix of all three cravings, but there are other researchers for whom one craving is dominant. And when there is more than one investigator with dominant cravings that differ, then there is the potential for the team's scientific discourse to become confusing, circuitous, and frustrating.

[1]Note that James called this variety the "theoretic." I have tried to create labels that are more intuitive in the context of research.

[2]James referred to this type as the "distinguishing."

Working Effectively with Different Intellectual Personalities in Scientific Teams

No definitive solutions for these challenges will be found here, but I offer a few options for consideration based on personal experience.

The Power of Acknowledging and Validating

All three cravings arise from a sense of unease or even mild anxiety. So, like in other situations that create unease, it is sometimes helpful to validate and share a concern publicly. For example, consider a scientific team attempting to discover whether people with a particular condition comprise different biological subtypes. Imagine an Investigator S on the team who is dominated by cravings for Simplification. After some initial data are collected and analyzed, Investigator S is ready to conclude that there are three types of patients with the condition under study, whereas others on the team believe this is premature. Addressing this concern while acknowledging and validating the key craving of Investigator S might sound something like this:

> I agree that it would be great if we could identify a few well-defined subgroups of patients. It feels like we're still sorting some of that out now, so perhaps we should first work on X, Y, and Z before we try to finalize these groupings.

Imagine another Investigator C on the same team who is dominated by cravings for Clarity about Particulars and who is concerned that the group is ignoring some data that represent an exception to the group's working model. To acknowledge Investigator C's fundamental craving while still moving along, we might say something like:

> I agree that we're not accounting for that detail within the current working model, and I agree that it might be important. I wonder if we can add that variable to our statistical plan as a sensitivity analysis to make sure that our findings are robust even after we account for that. Can you work with [biostatistician] to write something up in our plan that addresses your concern?

Finally, imagine an Investigator N who has a strong craving for Clarity about Next Steps. Researchers such as Investigator N who are driven to implement can be important members of the team. Investigator N's relentless drive to do something is a refreshing balm for spiraling discussions. To take advantage of Researcher N's cravings and not allow them to prematurely end fruitful discussions directed toward improving our understanding of something, make a practice of ending every discussion with next steps. Over time, the person who is driven solely by Clarity about Next Steps will learn that the group also values next steps and that those steps will be coming eventually.

Redirecting the Goal from True Understanding to Pragmatic Understanding

Many of the tensions between investigators who are strongly driven by Simplification and those driven by Clarity about Particulars can be resolved by abandoning endless arguments between these extreme intellectual personalities about the "correct" representation of the phenomenon at hand – simple, general model versus a rich collection of observations. Instead, the group can borrow from another of James' ideas – pragmatism [9] – and ask what representation of the phenomenon at hand will work best

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to advance the prevention and treatment of the disease under study. That is, refocus the more extreme intellectual personalities away from attaining "true" understanding and toward attaining an understanding that is sufficient to improve the well-being of some population of people with a health condition. The group can work from a common view that whatever approach the group is taking now is provisional and will be reassessed in terms of how helpful it was in addressing the practical health problem under study.

For Investigator S (craving Simplification), we might say things like,

> I agree this isn't the most elegant looking model right now, but it's helping us to select the best treatment for each and every patient. So, I propose we work with this for now as long as it's useful, and in the meantime we can have a subset of the team work on developing a more parsimonious model for the future.

For Investigator C (craving Clarity about Particulars), we might say something like

> I agree we can do a lot more to understand the nuances of patients with this condition and we should keep working on that. At the same time, the working model we have now is already a major advance over the way we've been thinking about this group of patients and might translate into important improvements in care. So, I propose we move ahead with this model, but know that we'll keep learning and adding more details to our working model as we progress.

Conclusion

The interplay among different intellectual personalities can be a useful feature of team science, but not when it causes gridlock. I have suggested some approaches for managing the influence of stronger intellectual personalities that relies on acknowledging sources of concern and appealing to a pragmatic standard for evaluating the reasonableness of the group's strategy at any given time during the course of research. Teams benefit from a variety of styles and views, and it is my hope that the ideas discussed here will help other teams to reap the rewards and avoid some of the perils of different intellectual personalities.

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