The next grand challenge in psychology is … theory building and testing

Eiko Fried, October 2021, contribution APS Observer piece written by Leah Thayer (https://www.psychologicalscience.org/observer/grand-challenges).

Psychology is hyper-empirical. We are good at testing things, but not good at theorizing. There is no shame in that, and there is great value in establishing phenomena: robust features in the world that require explaining (i.e. explananda). But such explanations happen in the form of theories that explain them (i.e. explanantia), and there are two grand theory challenges that psychological science must urgently address.

First, we don't have many great explanations in psychology. As Robert Cummins put it in 2000: "We are overwhelmed with things to explain, and somewhat underwhelmed by things to explain them with". Recent reforms in psychological science were focused on improving methodological and statistical practices to establish more replicable findings. That helps with the explananda part of psychology, but not at all with the explanantia part.

Second, psychological theories are often weak theories, narrative descriptions that do not allows us to precisely deduce how data would look like if the theory was true. This makes it difficult to decide in many psychological studies whether data actually support a theory or not. Often, we simply have to take the theorist's word for it.

Both challenges can be addressed by drawing on the rich disciplines of cognitive and mathematical psychology, and other areas outside of psychology, which feature strong theories: precise axioms or assumptions aiming to explain phenomena. Such theories can be represented via mathematical notation as formal theories, with several advantages. For one, the theory and all its auxiliary assumptions are now spelled out clearly and unambiguously. The theory, not its theorist, makes predictions via simulations. Further, formal theories are inter-disciplinary, enabling collaborations. Everybody can take such a theory, such as the formal theory for panic disorder by Robinaugh et al. (2019), and modify it, or try to corroborate or falsify it. A final advantage is that formal theories make it possible to know what data is predicted by a given theory. Simulation studies show that even in fairly simple multivariate systems, it is very hard to predict how the system will evolve over time based on intuition alone, and it is impossible to do so for more complex systems, which is likely an adequately characterization of attributes, traits, processes, and mental health problems psychological science deals with.