

# ReproducibiliTea Reading List on Theory in Psychological Science



One precursor to the reproducibility crisis in psychology has been the haste to conduct empirical research, rather than rigorously develop theory and its connection to the research. These ten papers were selected to provide an introduction to theoretical psychology. They are separated by themes that your journal club may choose to explore in further detail in following meetings! We have also provided a brief summary, keywords and additional online resources to help inform your discussions.

Order	Block	Paper	Summary	Keywords	Resources
1	What is a theory?	Fried, E. I. (2020). Theories and models: What they are, what they are for, and what they are about. <i>Psychological Inquiry</i> , 31(4), 336-344. <a href="https://doi.org/10.1080/1047840X.2020.1854011">https://doi.org/10.1080/1047840X.2020.1854011</a>	<b>What is a theory?</b> An overview on the role of theories and models in science, including a brief commentary on the weakness of theories in the psychological sciences and how to make them better.	introductory, theory development	Eiko Fried on "Theory building and testing in psychological research" for the RIOT Science Club: <a href="https://youtu.be/vB1Hk3c-IZY">https://youtu.be/vB1Hk3c-IZY</a>
2	Does psychology have a theory problem?	Meehl, P. E. (1978). Theoretical Risks and Tabular Asterisks: Sir Karl, Sir Ronald, and the Slow Progress of Soft Psychology. <i>Journal of Consulting and Clinical Psychology</i> 1978, Vol. 46, 806-834. <a href="https://www3.nd.edu/~ghaeffel/Meehl(1978).pdf">https://www3.nd.edu/~ghaeffel/Meehl(1978).pdf</a>	<b>The lack of theory development in psychology.</b> An astute criticism of the excessive use of null hypothesis significance testing in 'soft psychology' that left psychological theories lacking "the cumulative character of scientific knowledge because they tend to be neither refuted nor corroborated, but instead merely fade away as people lose interest."	NHST, statistical testing, scientific inference	A video recording of the first lecture by Paul Meehl in his course on philosophical psychology from 1989, where he contrasts the role of theory in the 'hard sciences' like physics and the 'soft science' of psychology. <a href="https://youtu.be/AEPbzCTneDs">https://youtu.be/AEPbzCTneDs</a>
3		Klein, S. B. (2014). What can recent replication failures tell us about the theoretical commitments of psychology?. <i>Theory &amp; Psychology</i> , 24(3), 326-338. <a href="https://doi.org/10.1177/0959354314529616">https://doi.org/10.1177/0959354314529616</a>	<b>A crisis in replication or beyond?</b> Determining success or failures of replications necessitates that theories be well-specified – clearly defining the relation between theory and prediction by linking rigorously established constructs to physical observations and detailing the essential conditions of experiments.	reproducibility crisis, replications, theory development	A personal commentary by Daniel Nettle on the pretense of having a theory in psychology: "Theories and models are not the only fruit" <a href="https://leonidtiokhin.medium.com/theories-and-models-are-not-the-only-fruit-a05c7cf188f6">https://leonidtiokhin.medium.com/theories-and-models-are-not-the-only-fruit-a05c7cf188f6</a>
4		Scheel, A. M., Tiokhin, L., Isager, P. M., & Lakens, D. (2021). Why hypothesis testers should spend less time testing hypotheses. <i>Perspectives on Psychological Science</i> , 16(4), 744-755. <a href="https://doi.org/10.1177/1745691620966795">https://doi.org/10.1177/1745691620966795</a>	<b>Are we ready to test?</b> Psychologists have been trained with a recipe: the hypothetico-deductive method – formulate a hypothesis from theory, devise a study to test the hypothesis, collect and analyze data, and finally evaluate whether there is support for or against the theory. However, without the groundwork strengthening the 'derivation chain that links theory to hypothesis test, the confirmatory testing that is prized by the recent reform movement may be premature.	exploratory versus confirmatory, derivation chain	Anne Scheel on "Equivalence testing for psychological research" for the RIOT Science Club <a href="https://youtu.be/T9pzORPTXFU">https://youtu.be/T9pzORPTXFU</a>
5	How to improve psychological theory	Borsboom, D., van der Maas, H. L., Dalege, J., Kievit, R. A., & Haig, B. D. (2021). Theory construction methodology: A practical framework for building theories in psychology. <i>Perspectives on Psychological Science</i> , 16(4), 756-766. <a href="https://doi.org/10.1177/1745691620969647">https://doi.org/10.1177/1745691620969647</a>	<b>A framework for theory construction.</b> An alternative to the hypothetico-deductive scheme, a theory construction methodology (TCM) is proposed that includes five steps: identifying a relevant phenomena, formulating a proto-theory, developing a formal model, checking the adequacy of the formal model, and evaluating the overall worth of the constructed theory.	derivation chain, theory building, formal modelling	A keynote presentation by Olivia Guest on "What makes a good theory, and how do we make a theory good?" <a href="https://youtu.be/67X0TpnQeO0">https://youtu.be/67X0TpnQeO0</a>
6		Guest, O., & Martin, A. E. (2021). How computational modeling can force theory building in psychological science. <i>Perspectives on Psychological Science</i> , 16(4), 789-802. <a href="https://doi.org/10.1177/1745691620970585">https://doi.org/10.1177/1745691620970585</a>	<b>Computational modeling can promote theory development.</b> Creating computational models can promote scientific inferences through enforcing better specification of theories as abstract constructs are formalized, and underlying intuitions and predictions are made open and transparent.	formal theory, computational modeling, scientific inference	A video recording of a talk by Olivia Guest and Andrea Martin on their paper "How computational modeling can force theory building in psychological science". <a href="https://youtu.be/8Aa9_6ahO48">https://youtu.be/8Aa9_6ahO48</a>
7		Maatman, F. O. (2021). Psychology's Theory Crisis, and Why Formal Modelling Cannot Solve It. <a href="https://psyarxiv.com/puqvs/">https://psyarxiv.com/puqvs/</a>	<b>Formal theories are helpful but first be determined.</b> The cause of the theory crisis stems from tests of experiments not being specific enough as to support only one theory and falsify all other alternatives, and many psychological theories containing auxiliary assumptions such that the theories are not severely tested. Better methods that force precise and unlikely predictions from theories will solve the core issue, not necessarily formal modeling alone.	proto-theory, formal theory, theory building, theory specification	A Twitter thread by Freek Maatman (@psychedfreak) summarizing their paper. <a href="https://twitter.com/psychedfreak/status/1414982603082506242">https://twitter.com/psychedfreak/status/1414982603082506242</a>
8	Taking steps to improve psychological theory	Flake, J. K., & Fried, E. I. (2020). Measurement schmeasurement: Questionable measurement practices and how to avoid them. <i>Advances in Methods and Practices in Psychological Science</i> , 3(4), 456-465. <a href="https://doi.org/10.1177/2515245920952393">https://doi.org/10.1177/2515245920952393</a>	<b>Better measures to inform theory building.</b> Developing and testing theories requires construct measures to be scrutinized and valid. Echoing questionable research practices, questionable measurement practices (e.g. the arbitrary summing of subscales) are defined and a list of questions are provided to help the researcher promote the validity of their measures.	guide, measurement, transparency, construct validity	Jessica Flake on "Measurement schmeasurement: Questionably measurement practices and how to avoid them" for the RIOT Science Club: <a href="https://youtu.be/Cq6n7AS_r8w">https://youtu.be/Cq6n7AS_r8w</a>
9		van Rooij, I., & Blokpoel, M. (2020). Formalizing verbal theories: A tutorial by dialogue. <i>Social Psychology</i> , 51(5), 285. <a href="https://doi.org/10.1027/1864-9335/a000428">https://doi.org/10.1027/1864-9335/a000428</a>	<b>Formalizing verbal theories.</b> A guide to translating verbal theories into formal theories starting with basic mathematical definitions and notation before a toy example of building formal theories presented through multiple dialogues between fictional Dr Verbal and Dr Formal.	guide, theory building, formal modeling	Smaldino, P. E. (2020). How to translate a verbal theory into a formal model. <i>Social Psychology</i> , 51(4), 207. <a href="https://osf.io/preprints/metaarxiv/n7qsh">https://osf.io/preprints/metaarxiv/n7qsh</a>
10	Are we ready to test our theories?	Oberauer, K., & Lewandowsky, S. (2019). Addressing the theory crisis in psychology. <i>Psychonomic bulletin &amp; review</i> , 26(5), 1596-1618. <a href="https://doi.org/10.3758/s13423-019-01645-2">https://doi.org/10.3758/s13423-019-01645-2</a>	<b>Discovery-oriented research versus theory-testing research.</b> A critical and comprehensive revisit of the reproducibility crisis and proposed solutions, such as preregistration, formal modeling and stricter statistical standards. A distinction is made between two paths: discovery-oriented research, where it is accepted that theory cannot yet lead to strong inferences and necessitating empirical standards through direct replication, versus theory-testing research, where theories are formulated as precisely as possible as to close the gap between theory and hypothesis.	reproducibility crisis, preregistration, statistical inference, formal modelling, exploratory versus confirmatory, theory specification	Eiko Fried contextualizes and summarizes the field of theoretical psychology in his blogpost "On Theory". The inspiration for this resource, and a good place to inform where to go next to continue learning about psychological theory. <a href="https://eiko-fried.com/on-theory/">https://eiko-fried.com/on-theory/</a>