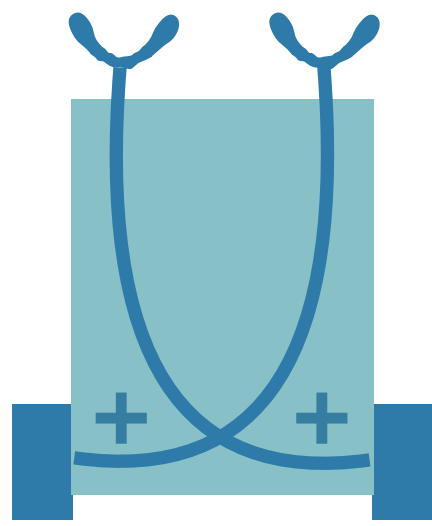


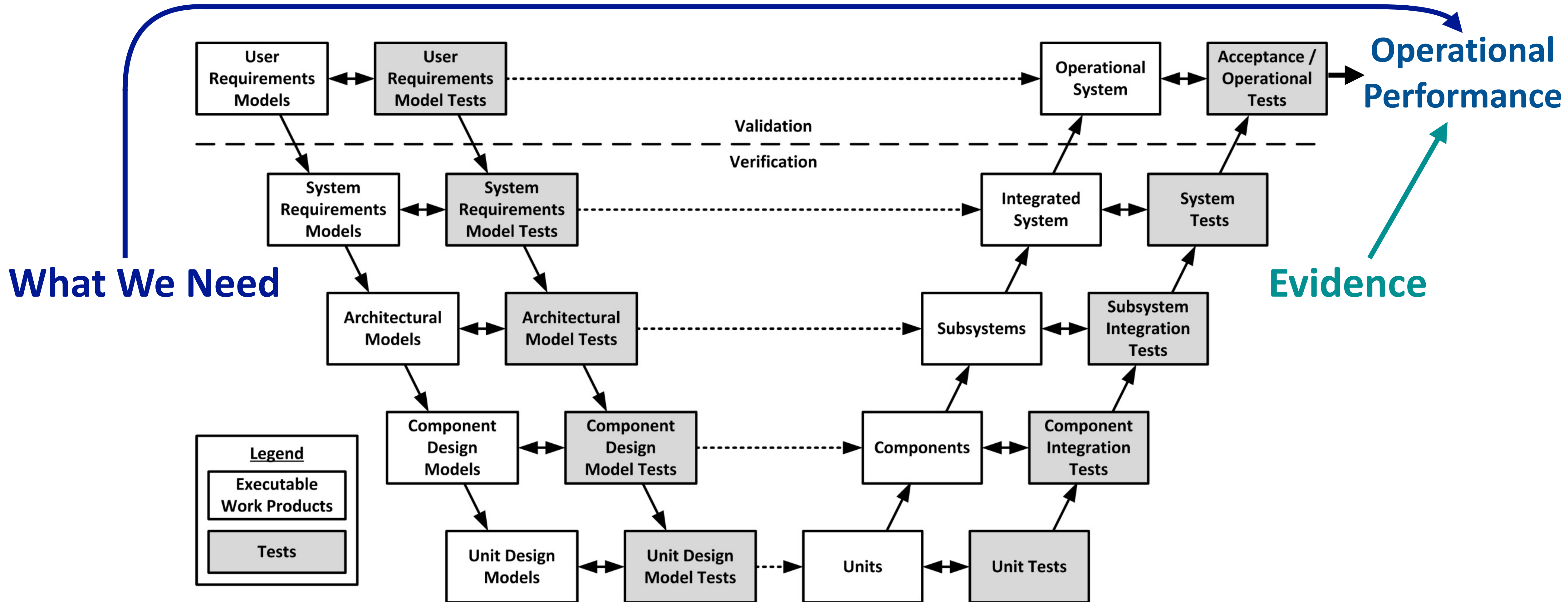
Verification and the Scientific Method

Position Statement

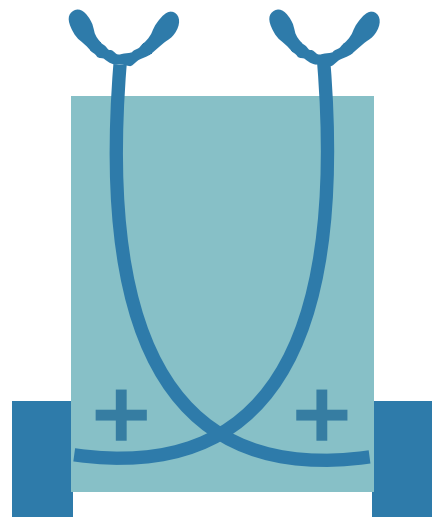
Dr. Signe A. Redfield



Why Do We Verify?

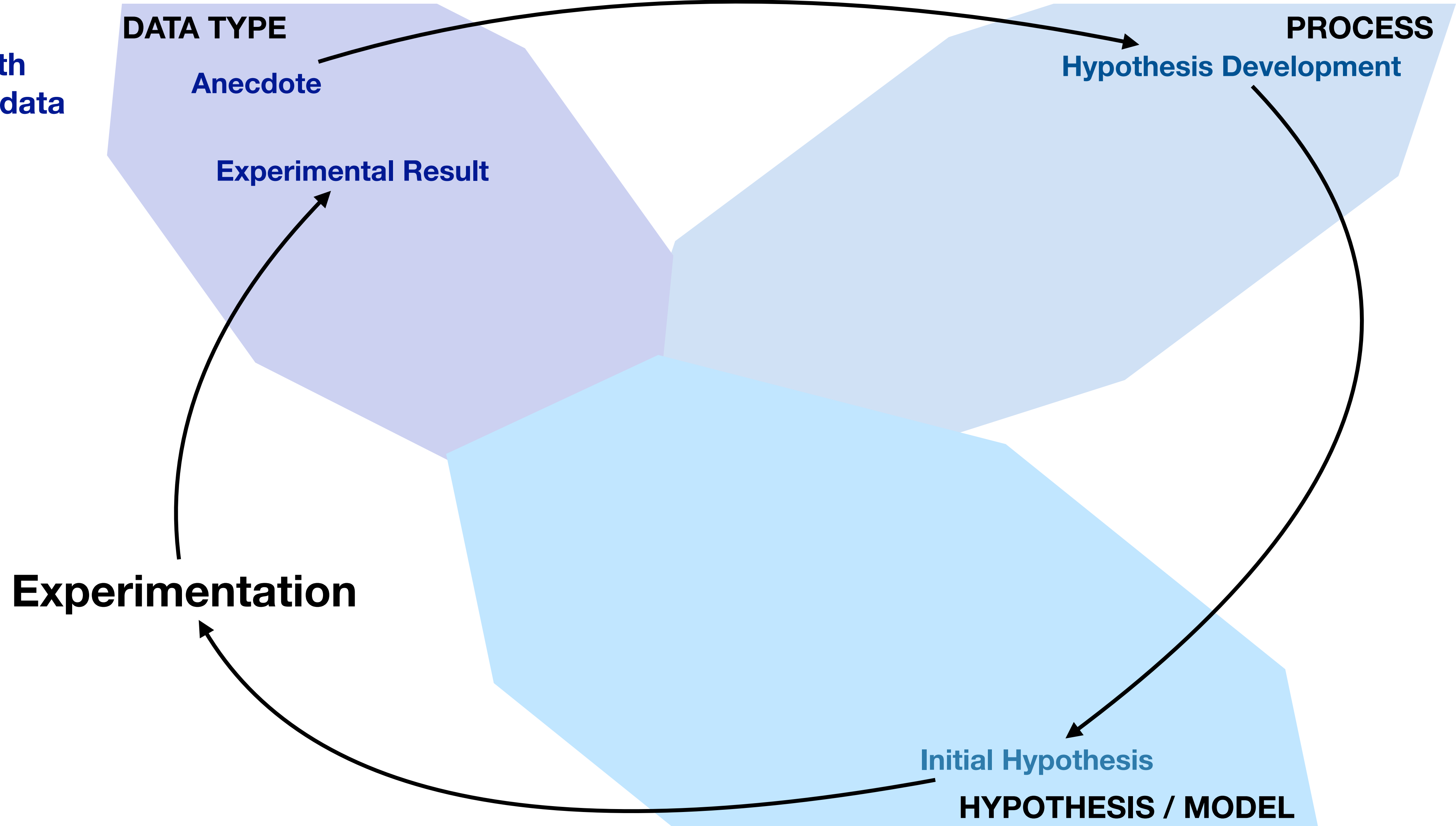


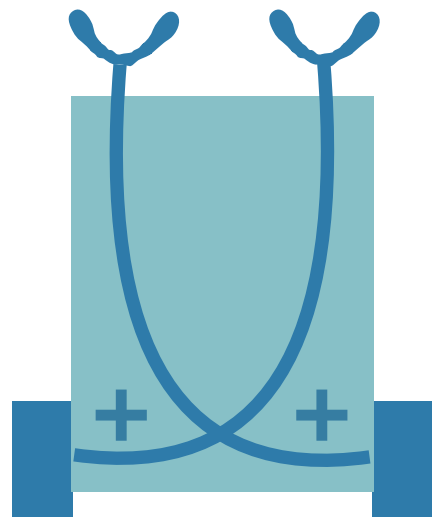
CMU Double V Model



Scientific Method

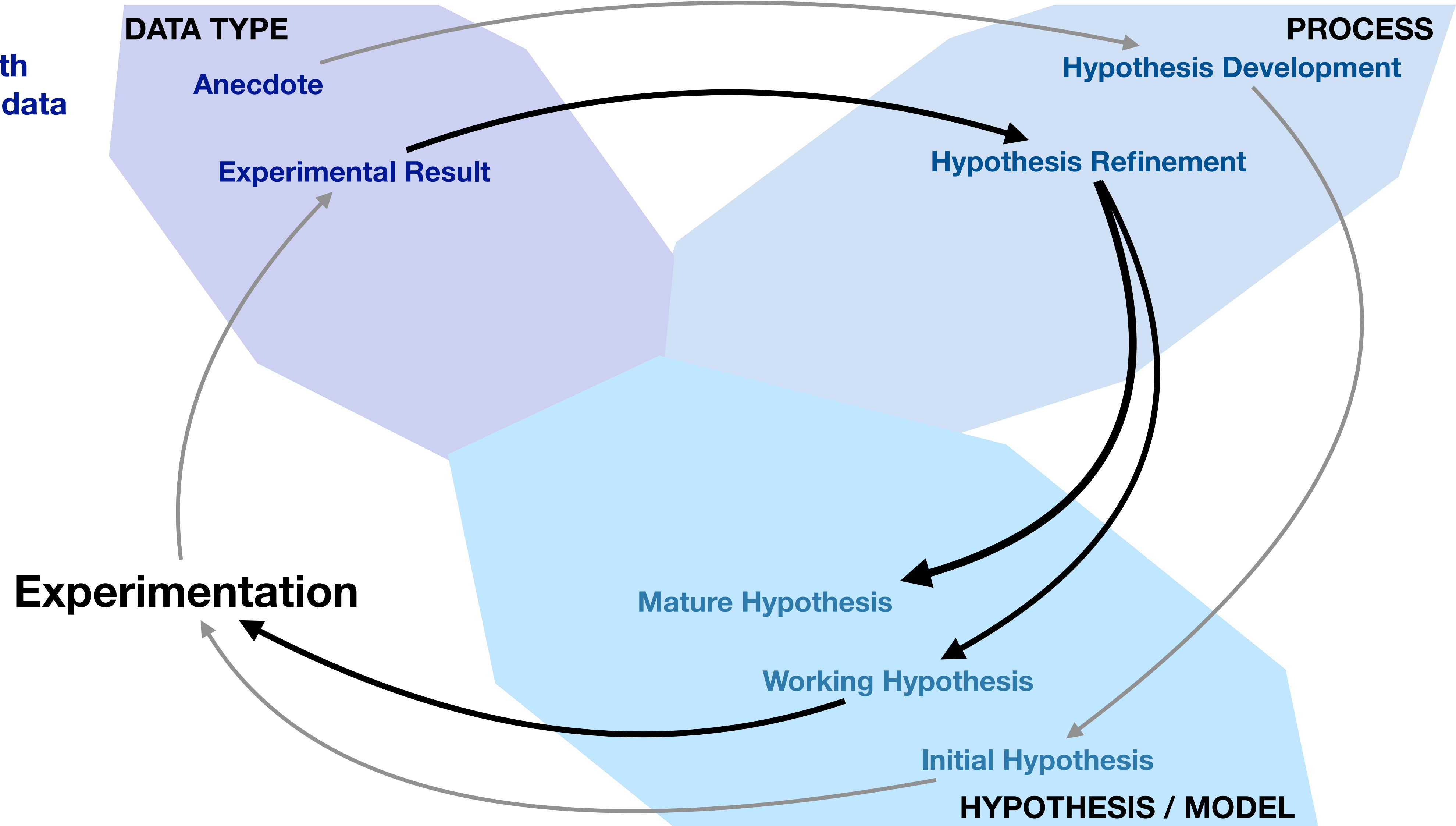
Start with anecdotal data

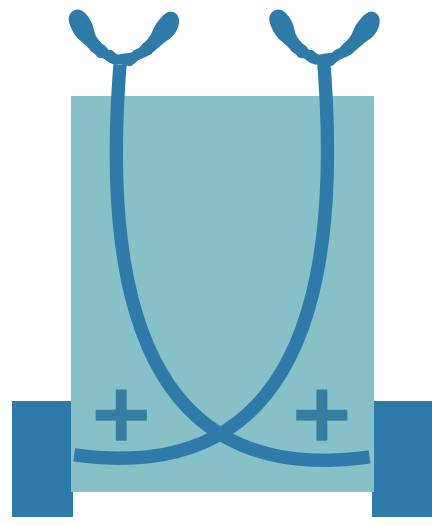




Scientific Method

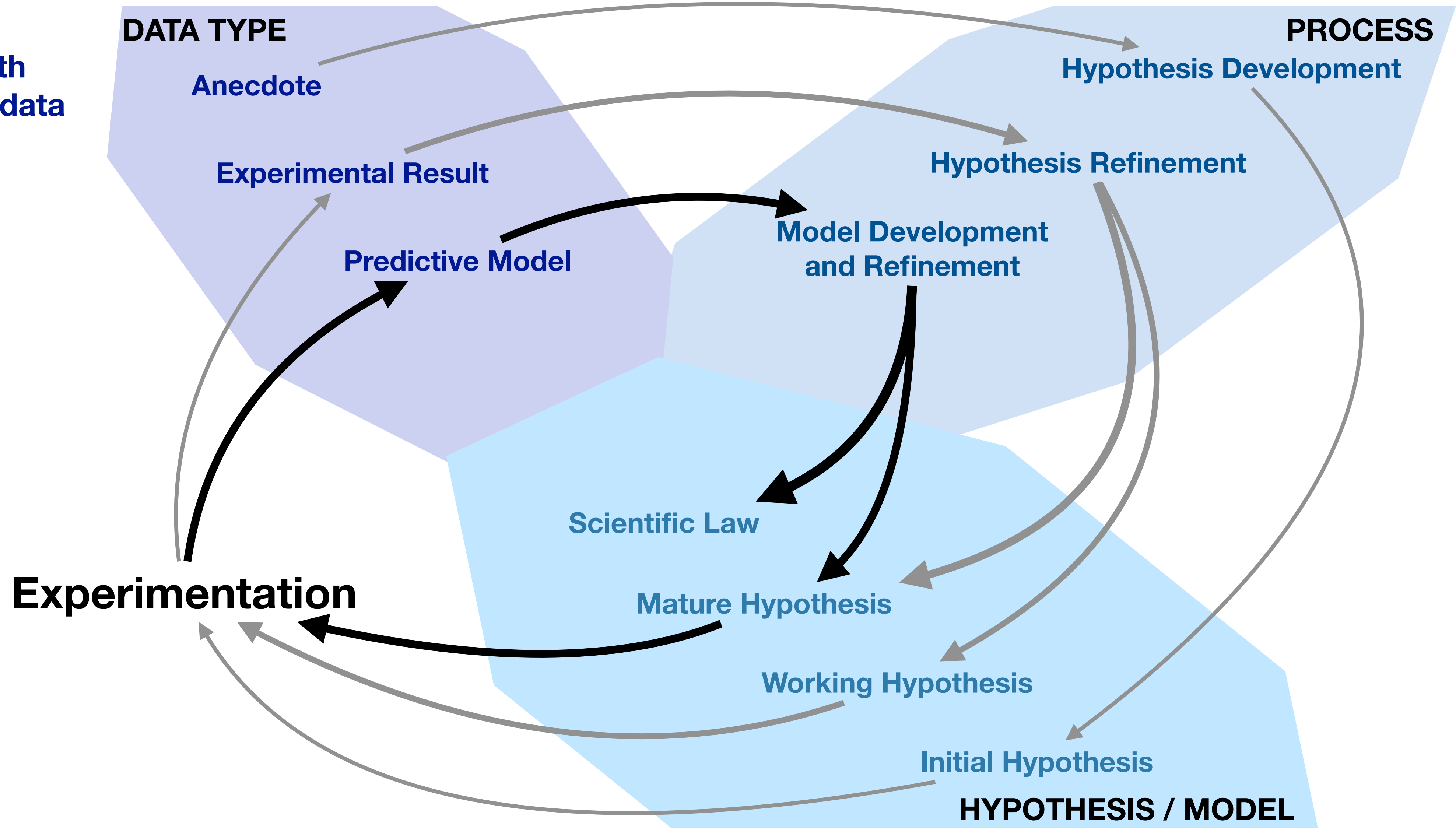
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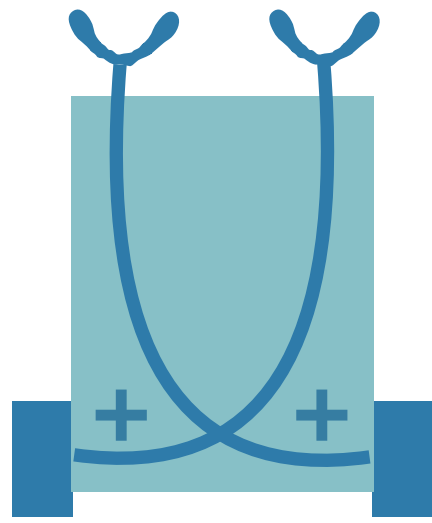




Scientific Method

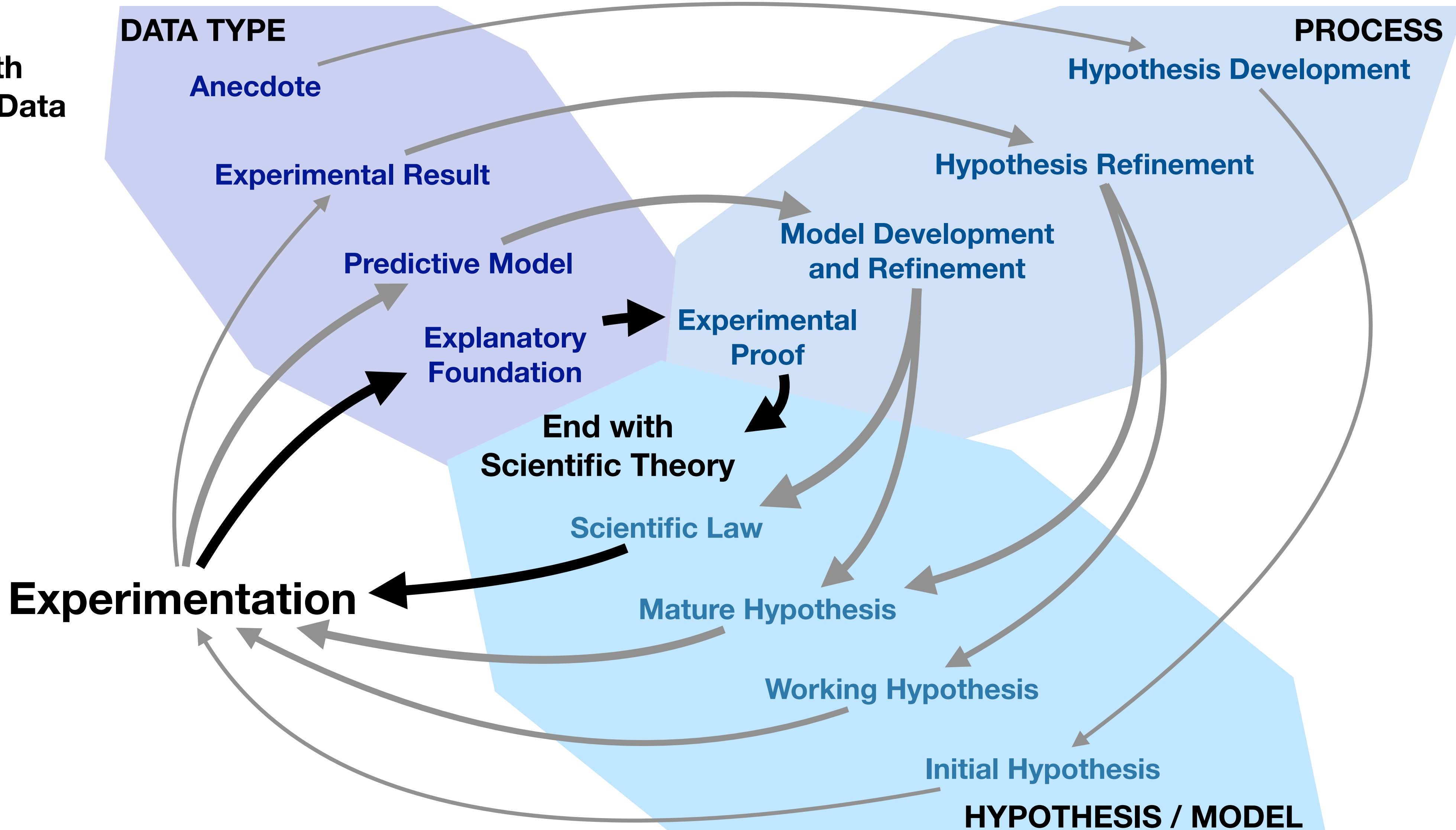
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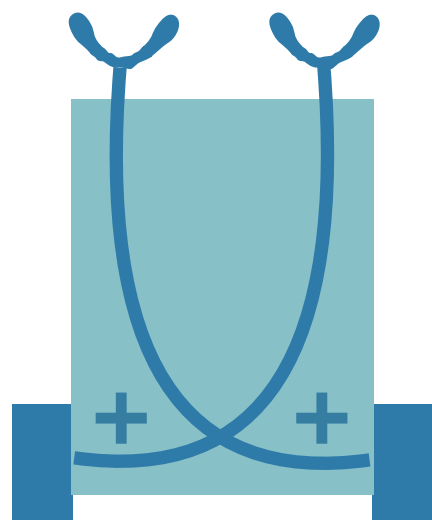




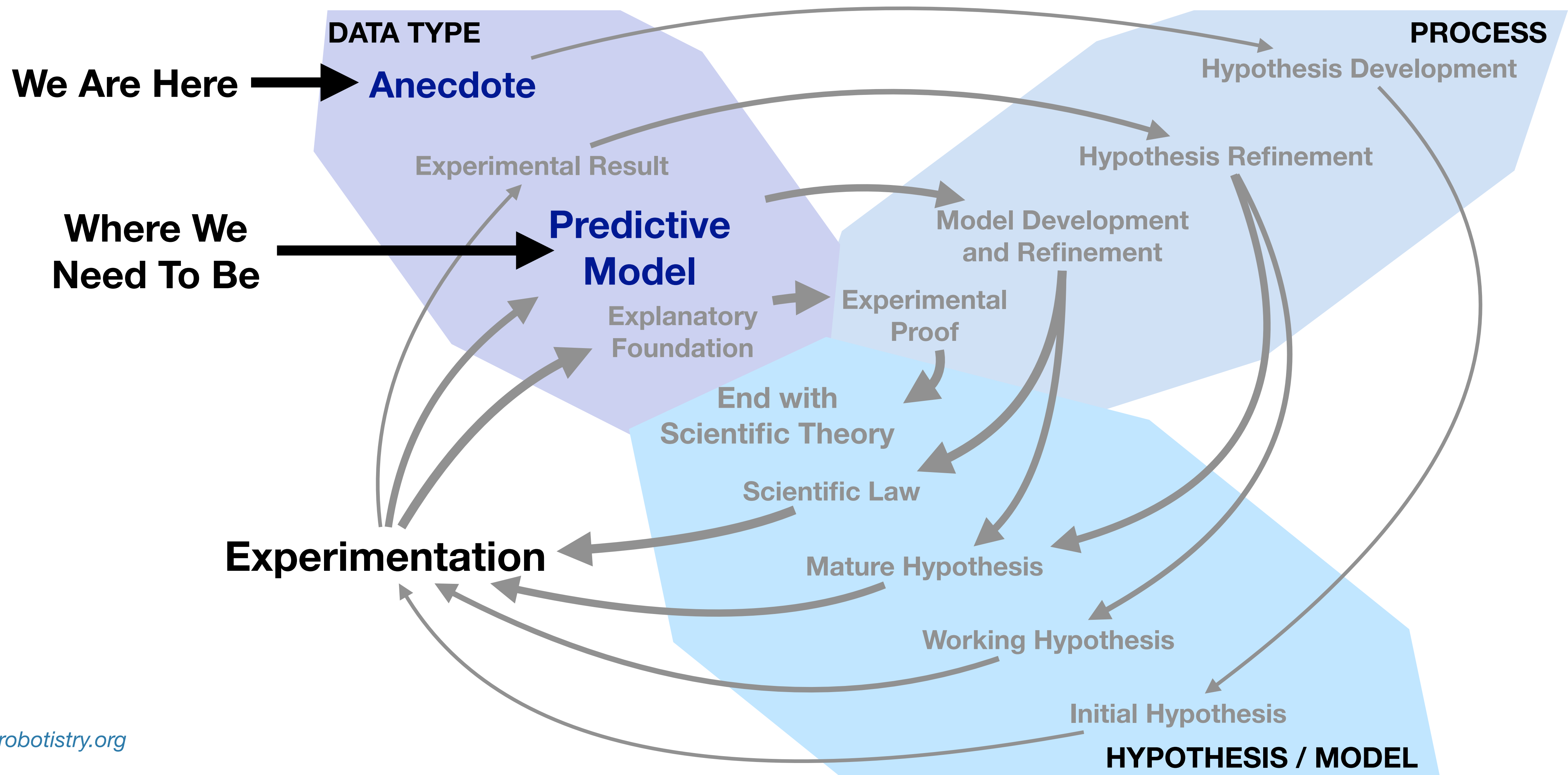
Scientific Method

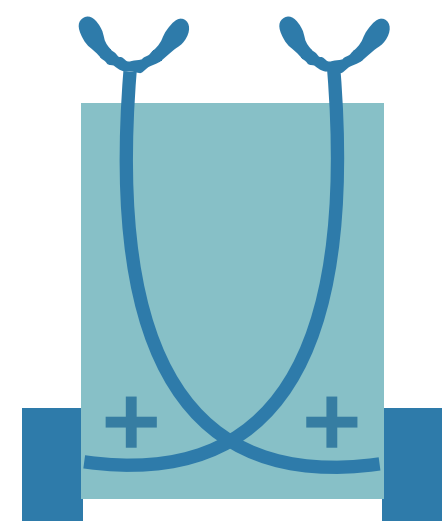
Start with Anecdotal Data





Scientific Method



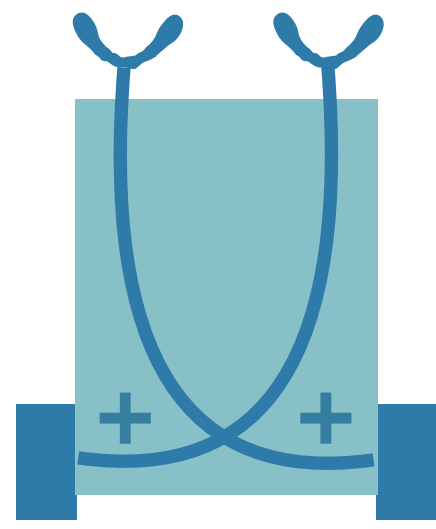


Foundations of the Scientific Method

Reproducibility, Replicability and Robotics Experimentation

- **Reproducibility** is the ability to run the *same* experiment again and get the same *results*
- **Replicability** is the ability to run a *new* experiment and draw the same *conclusions*
- Reproducibility in robotics is the ability to run a *similar* experiment and obtain the same *outcome*
- **Generalizability** in robotics is the ability to predict the outcome under new circumstances

Reproducibility	Robotics Experimentation	Replicability	Generalizability
Same experiment	Similar experiment	New experiment	New circumstances
Same results	Same outcome	Same conclusions	Predicted outcome



Position Statement

We should be using the scientific method in collaboration with specialists in the science of biological behavior to develop experimental methods, metrics, and tools that can enable us to develop predictive models for autonomous system behavior.

