CAPELLA UNIVERSITY

Knowledge Mapping for Literature Reviews: *A Science of Conceptual Systems Approach*

Steven E. Wallis, Ph.D. Steve@ASKMATT.Solutions

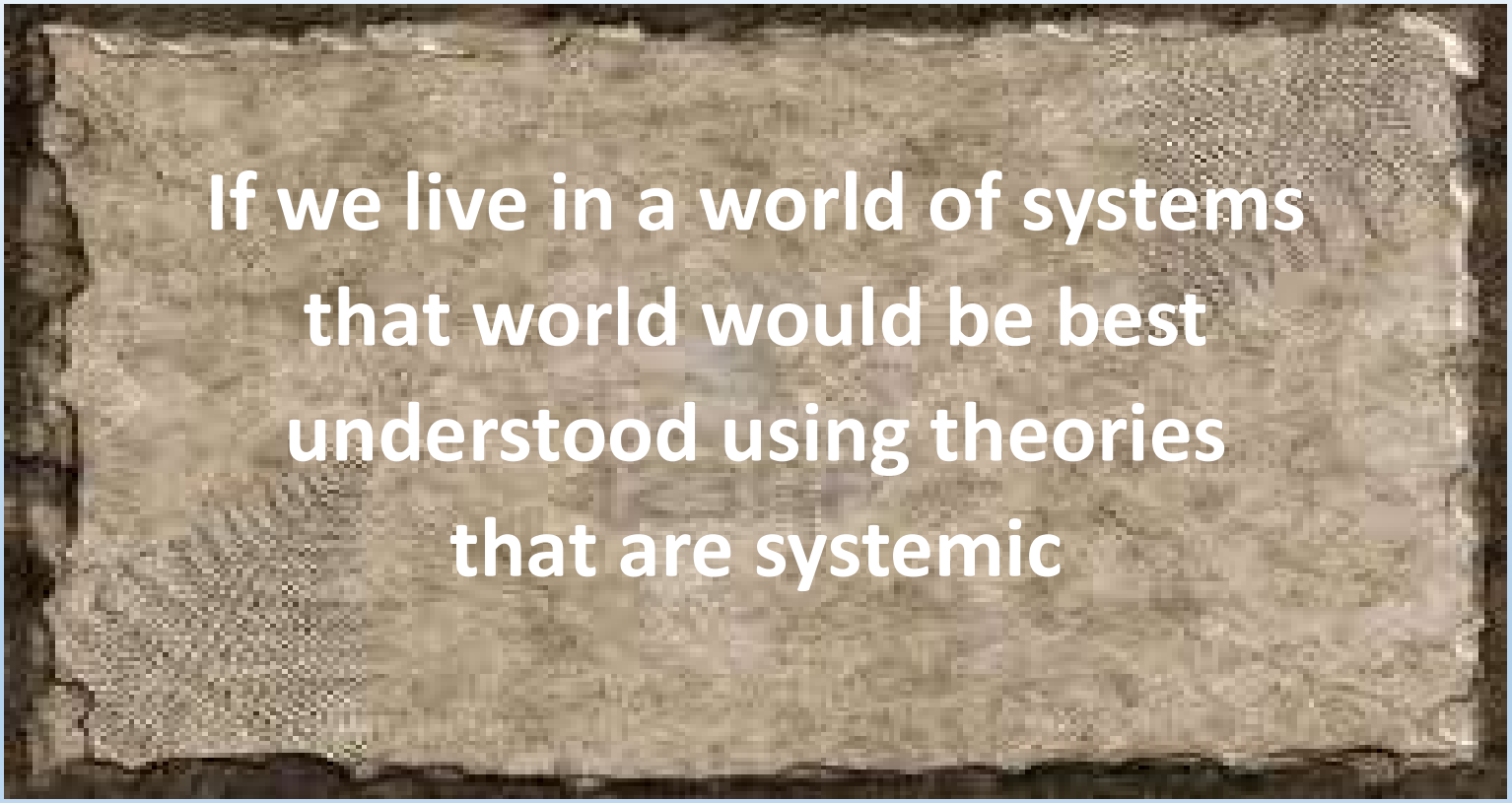
Executive Coordinator, ASK MATT Solutions
Adjunct Faculty, Capella University

62nd Meeting of the ISSS (International Society for the Systems Sciences)
July 22 – 27, 2018 – College of Engineering,
Oregon State University, Corvallis, Oregon USA

Basics of Literature Review

1. Choose a topic *(whatever makes you happy)*
2. Choose key papers *(whatever makes your supervisor happy)*
3. Synthesize “existing knowledge” *(often fuzzy!)*
4. Use that synthesis as a base for your study

One Simple Assumption



This approach will help you to:

- Re-think what you think you know
- Organize information
- Clarify research question
- Understand the literature
- Synthesize theories
- Accelerate the advance of science
- Communicate your research findings in a visual way to facilitate learning
- Communicate research findings in a structured way to facilitate learning
- Support collaborative decision making for effective action.

Definitions

A **theory** is a set of interrelated propositions.

(useful for understanding and engaging the world)

A **proposition** is typically made up of concepts (which are, or may be used as, variables) and connections. For example:

The more CATS you have, the fewer MICE you will have.

Importance of Causality

- Improves Understanding (Johnson-Laird, 1980)
- Useful for Creating Knowledge Maps (Axelrod, 1976)
- Best Path for Scientific Understanding (Pearl, 2000)

KEY: Nothing Happens Without Causality.
So… Causality enables application.

Let's remember to differentiate between "simple causality" (leads to unanticipated consequences) and "complex causality" (really confusing – but that's why we're here)

Where to find a theory in a journal article:

NO:

- Methods
- Data
- Abstract

YES:

- Theory
- Literature Review

KEY: You are looking for **propositions**

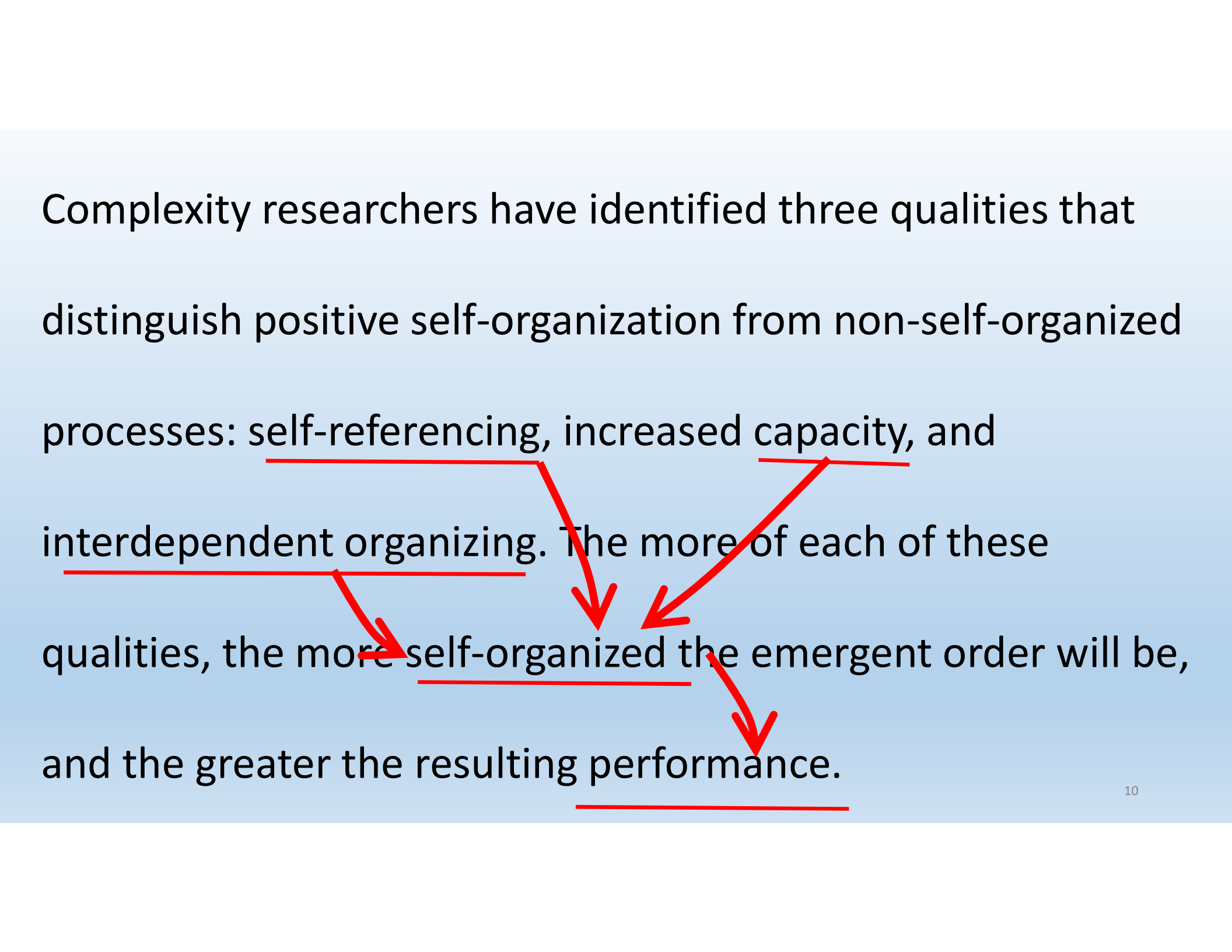
SOMETIMES:

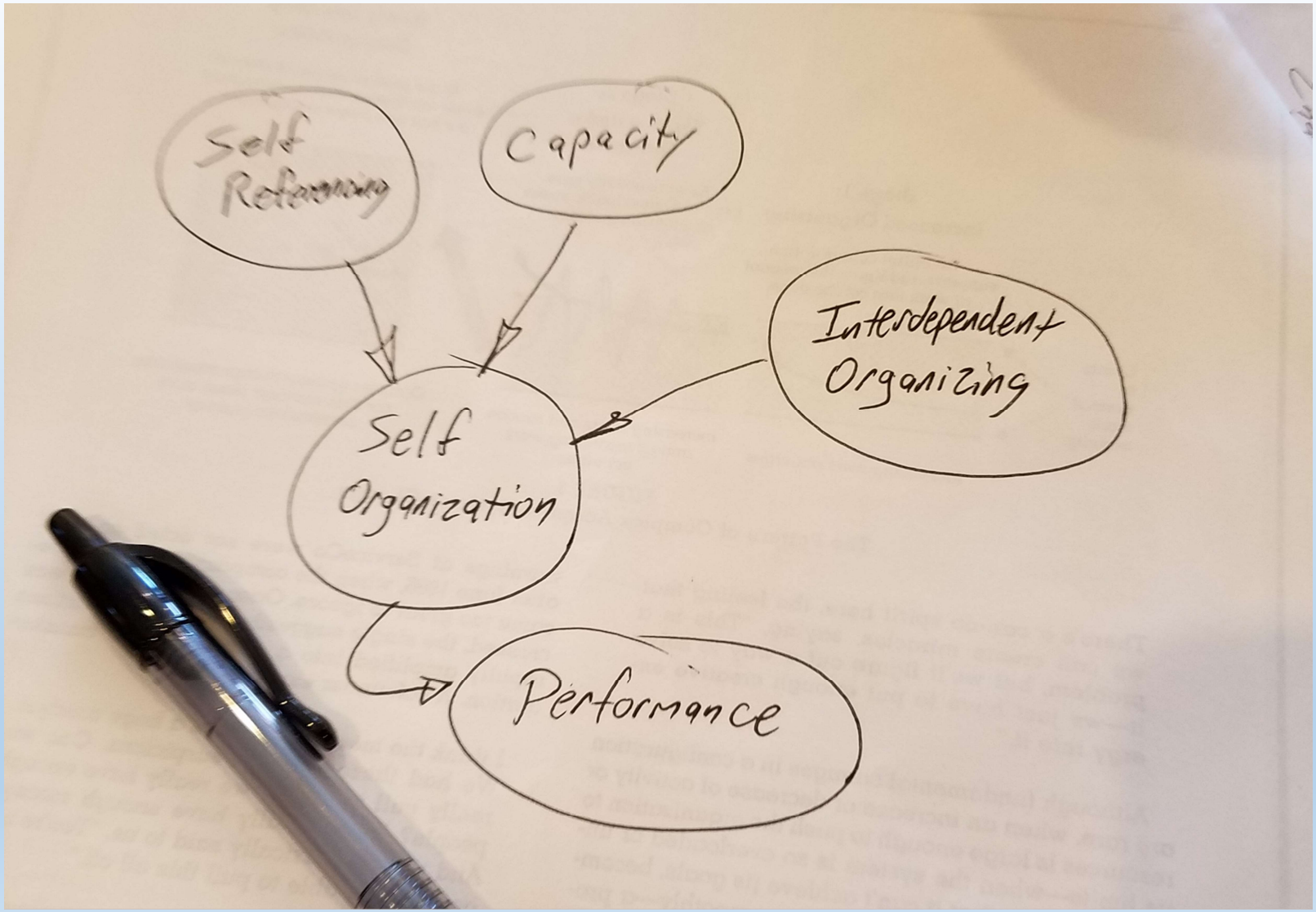
- Diagrams
- Discussion
- Introduction

Complexity researchers have identified three qualities that distinguish positive self-organization from non-self-organized processes: self-referencing, increased capacity, and interdependent organizing. The more of each of these qualities, the more self-organized the emergent order will be, and the greater the resulting performance.

Complexity researchers have identified three qualities that distinguish positive self-organization from non-self-organized processes: self-referencing, increased capacity, and interdependent organizing. The more of each of these qualities, the more self-organized the emergent order will be, and the greater the resulting performance.

Complexity researchers have identified three qualities that distinguish positive self-organization from non-self-organized processes: self-referencing, increased capacity, and interdependent organizing. The more of each of these qualities, the more self-organized the emergent order will be, and the greater the resulting performance.




Self Reference
Capacity
Interdependent Organizing
Self Organization
Performance

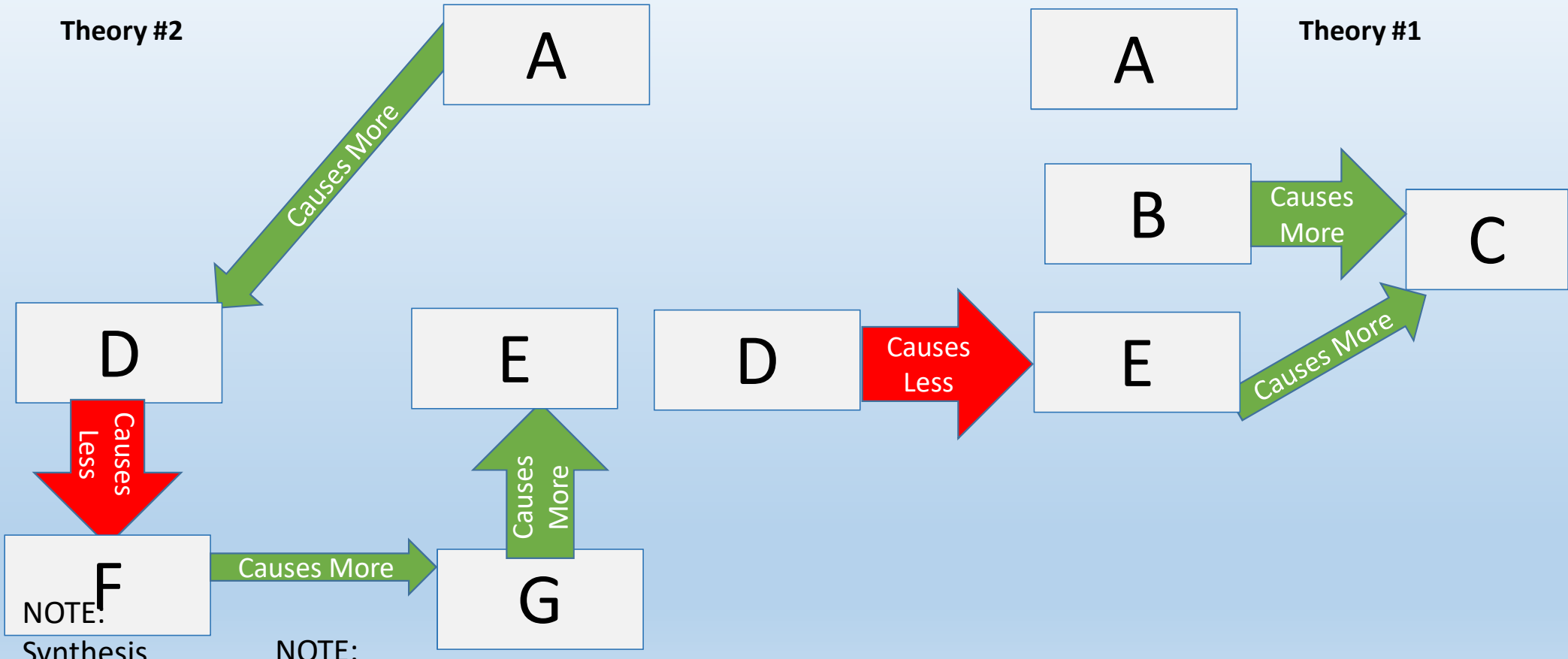
Activity #1: Creating Maps From Text

- Read Theories
- Identify concepts
- Identify causal connections
- Draw maps

Then…

- Share your results with others
  - Did you get the same results?
  - Does the whole process make sense?

Synthesizing multiple theories

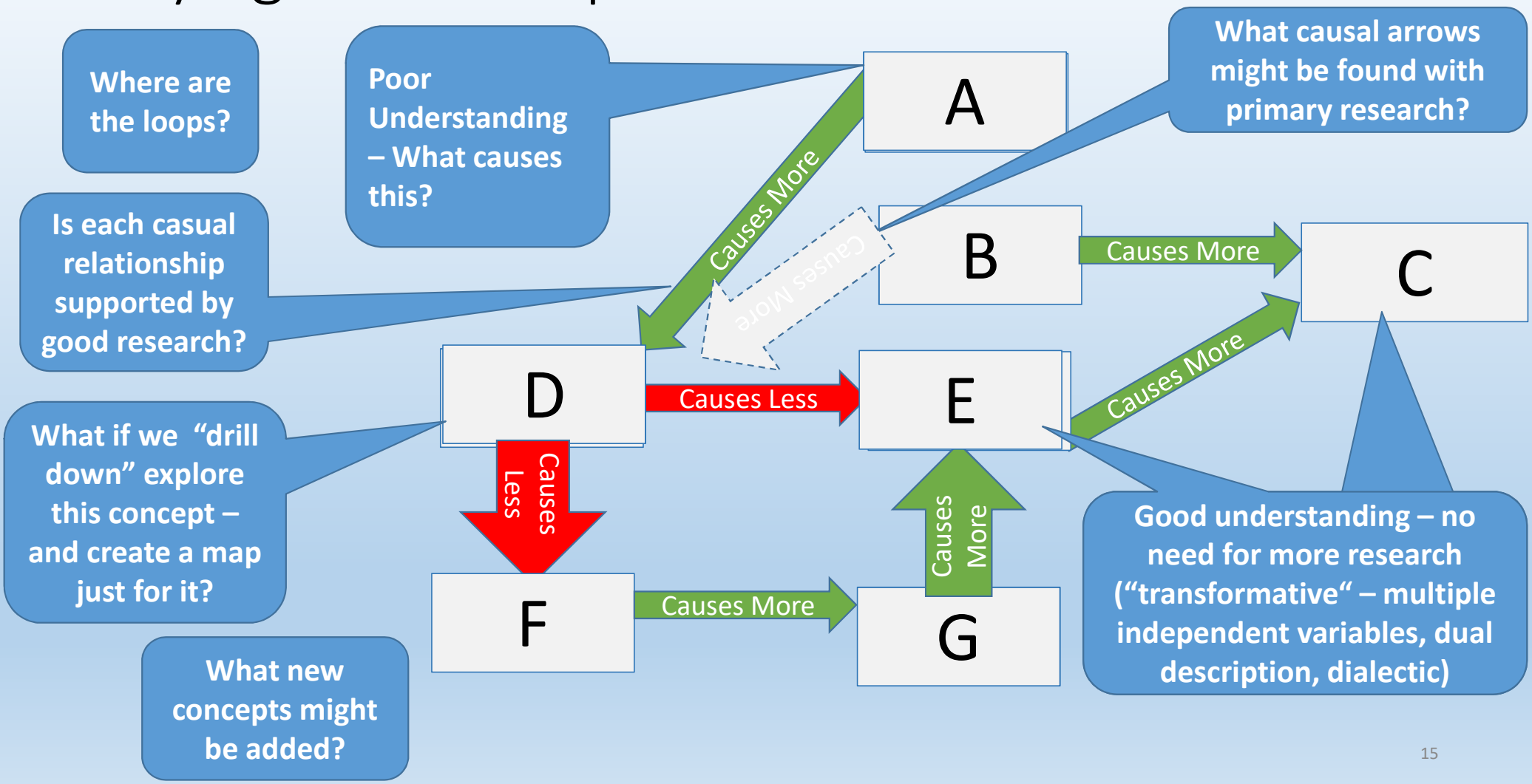


This is what *SYNTHESIS* is all about

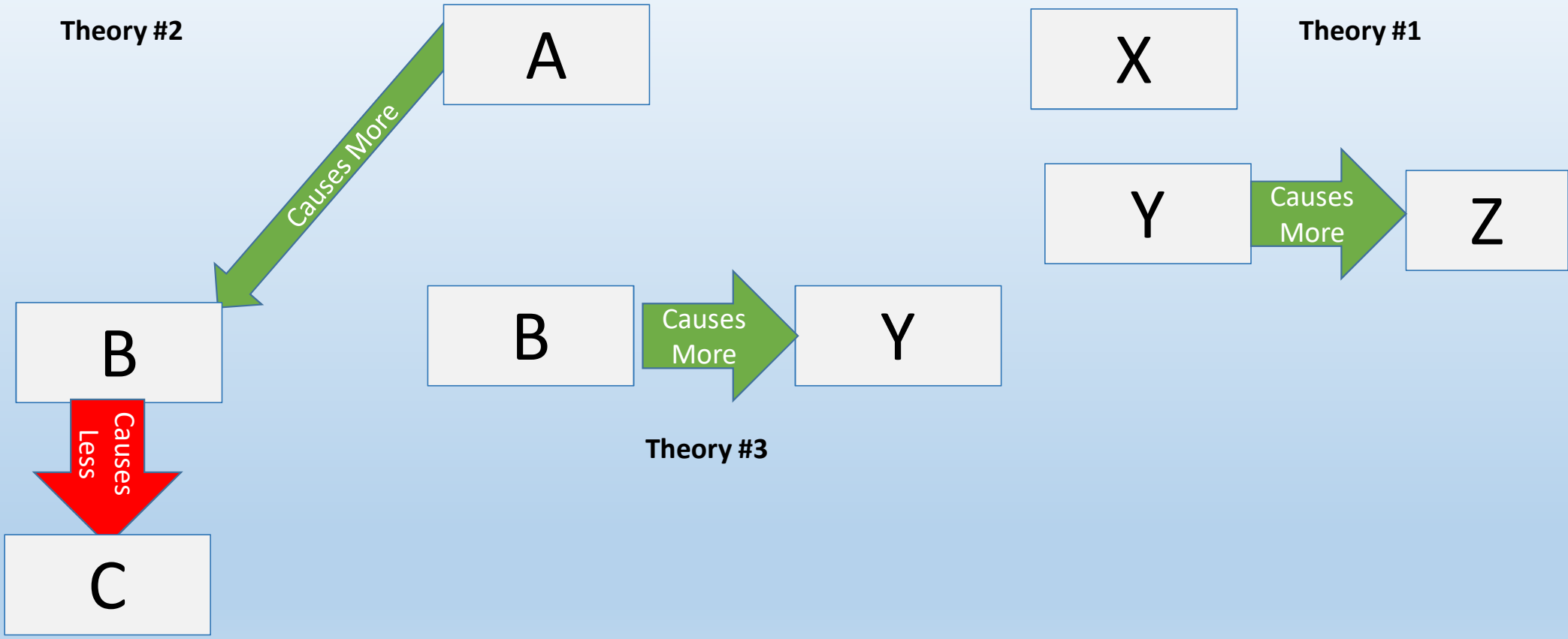
Activity #2: Synthesizing/Integrating Maps

- Connect with another group
- Share maps
- Look for same/similar concepts where maps might overlap
- Redraw… or somehow creatively connect them

Clarifying research questions



Synthesizing multiple theories



Activity #3: Identifying directions for research

1) Look at your maps.
2) What gaps exist in the structure?
3) What research might you do to fill those gaps?

IPA (Integrative Propositional Analysis)

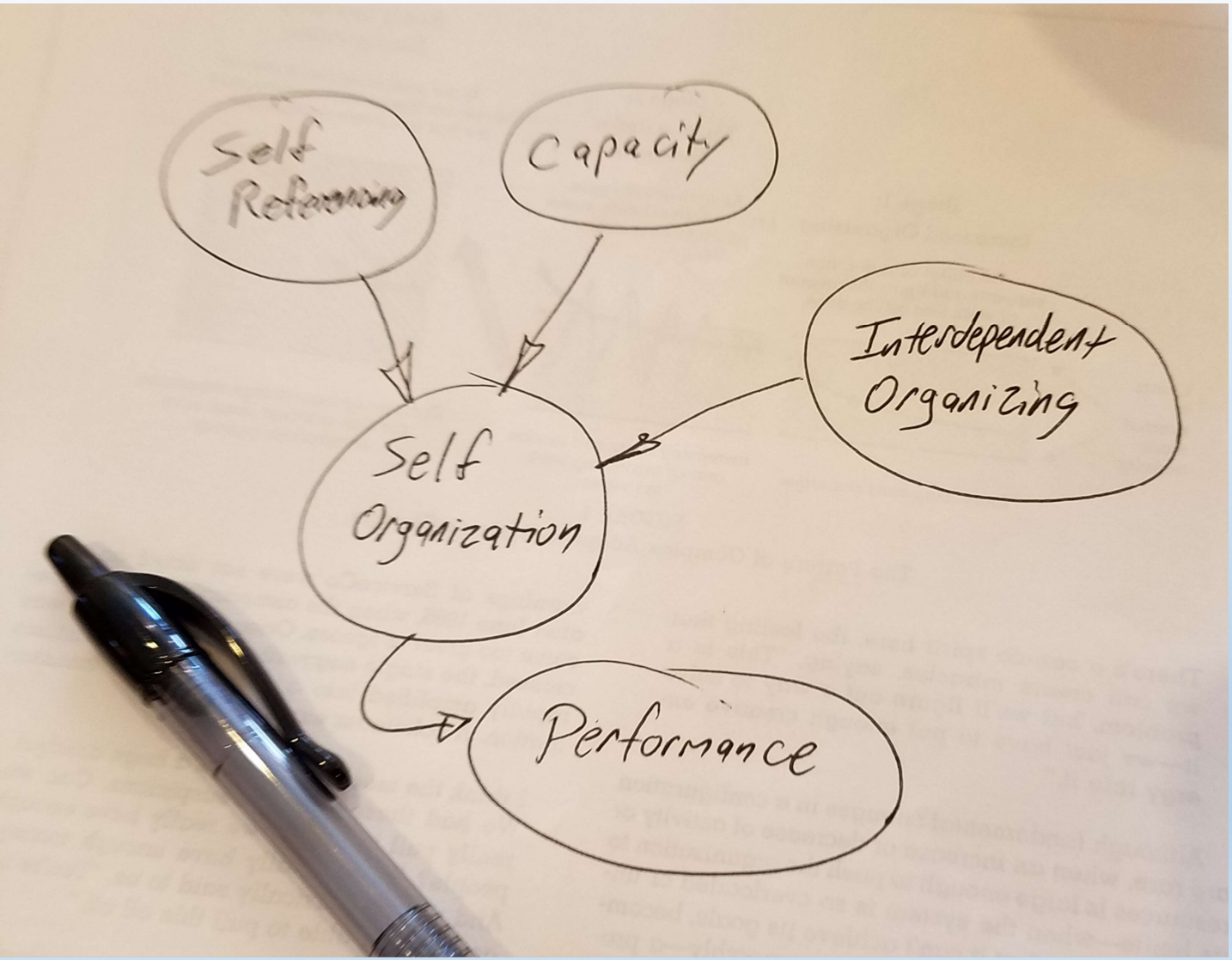
Divide the number of concatenated concepts by the total number of concepts

Number of Concatenated Concepts = 1

Total Number of Concepts = 3

Systemicity = 0.33

(result of one divided by three)



Total Number of Concepts = 5

"simple complexity" or Conceptual Breadth

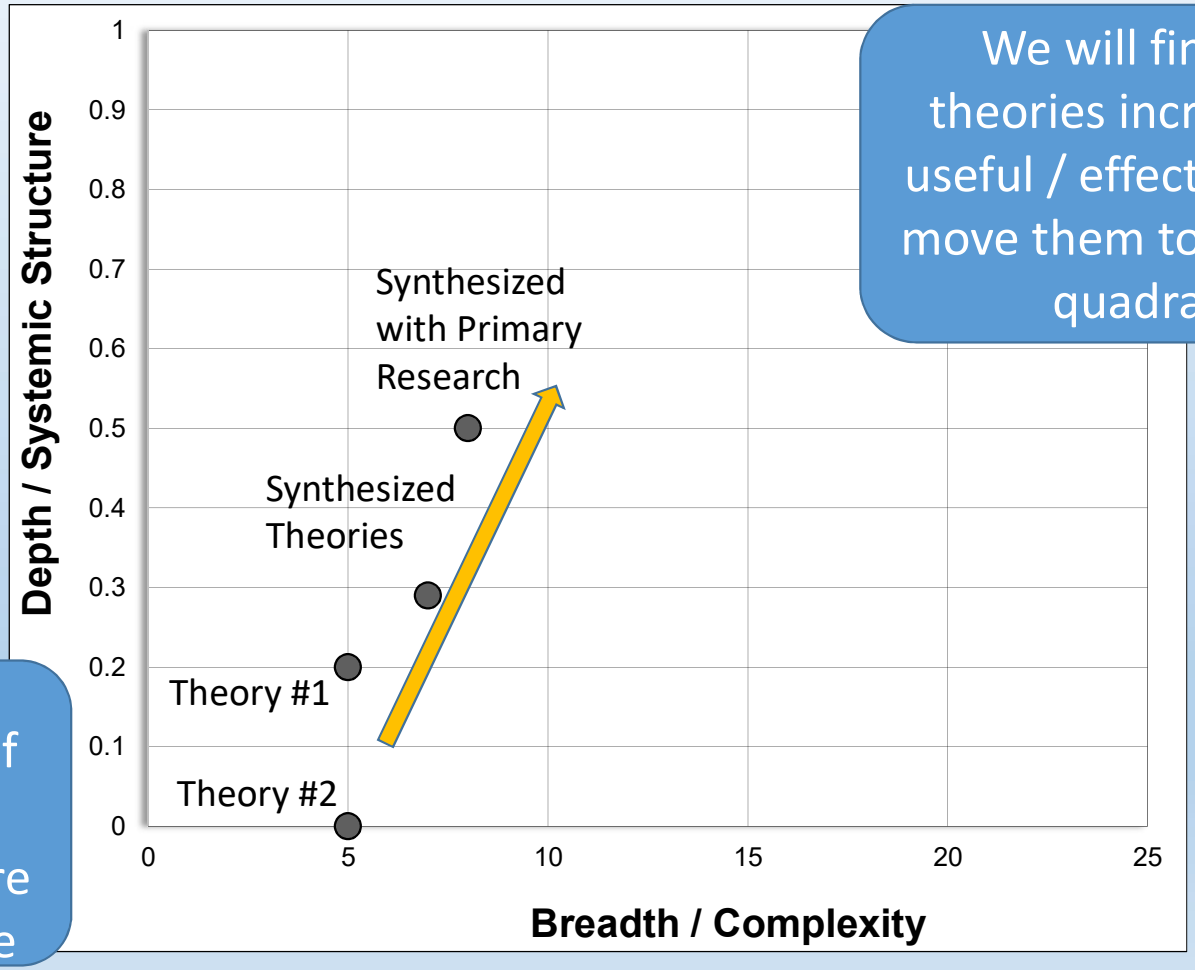
Number of Concatenated Concepts = 1

Systemicity = 0.20

(result of one divided by five)

Showing Progress in Creating Knowledge

(not simply adding to dusty "storehouse" of human knowledge)



We will find our theories increasingly useful / effective as we move them toward this quadrant

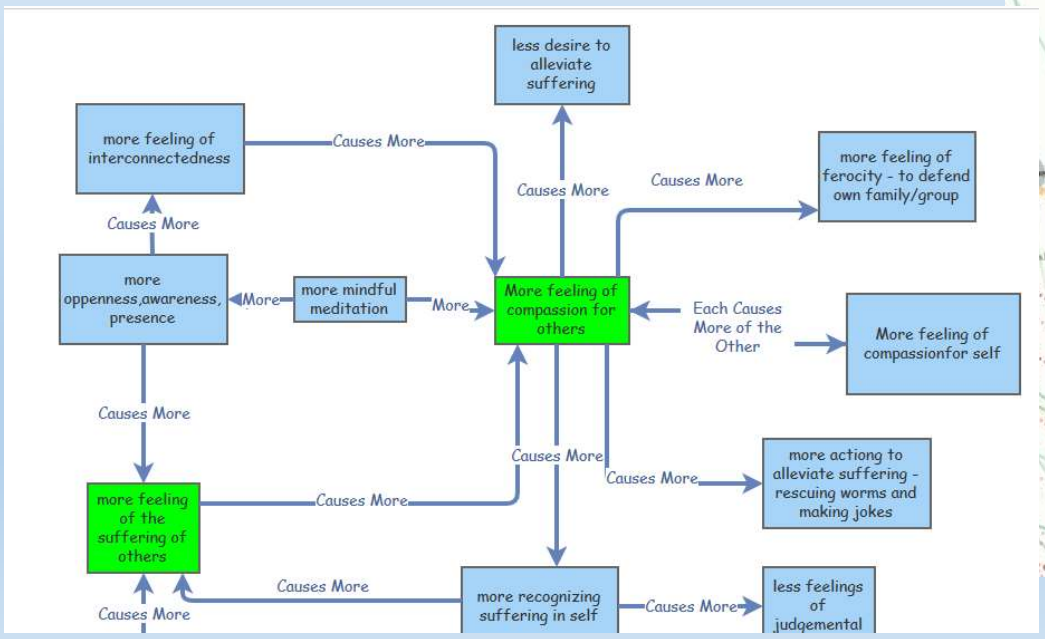
Most theories of the social sciences are down here

Platforms

Paper and pen – tabletop ASK MATT Solutions

https://kumu.io/ - great for presentations

https://insightmaker.com/ - easier to use



Resources

- More detailed webinar: https://www.youtube.com/watch?v=-15wyiyaiZQ
- Basics of IPA analysis: http://meaningfulevidence.com/wp-content/uploads/Basics-of-IPA.pdf
- Good overview of the field: Wallis, S. (2015). The Science of Conceptual Systems: A Progress Report. *Foundations of Science* https://www.researchgate.net/publication/282247735_The_Science_of_Conceptual_Systems_A_Progress_Report
- Range of related publications: http://meaningfulevidence.com/publications

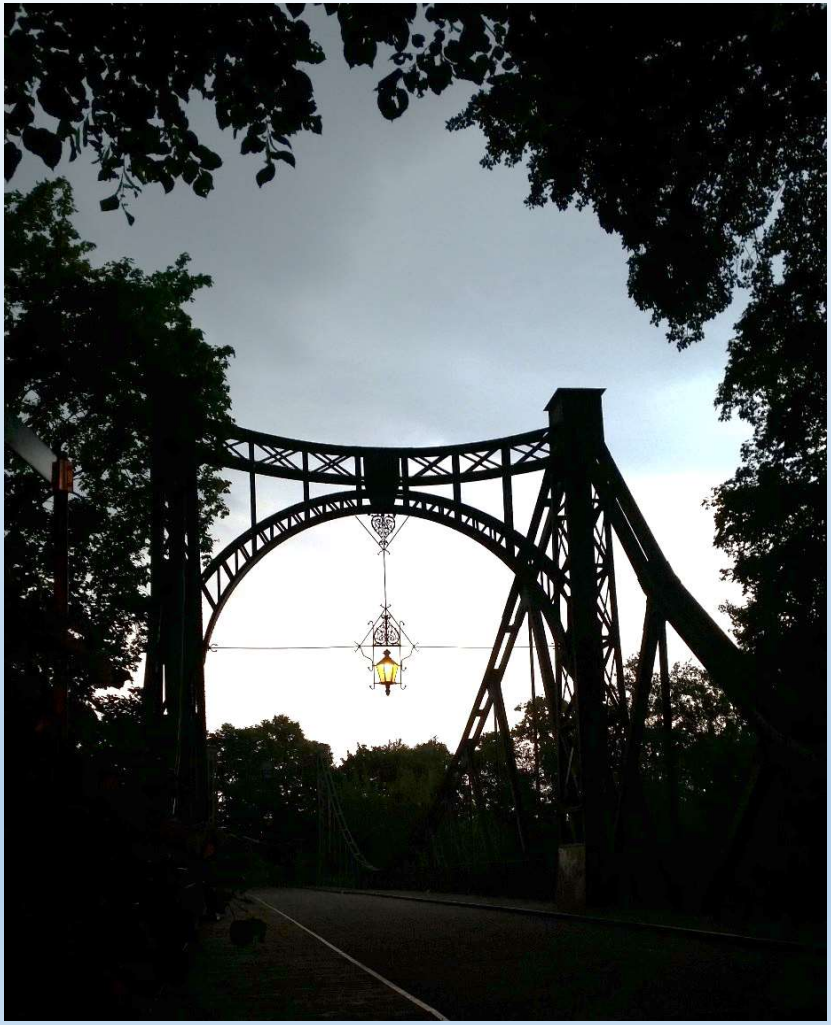
Steve@ASKMATT.Solutions

Thank You !

Questions & Conversations

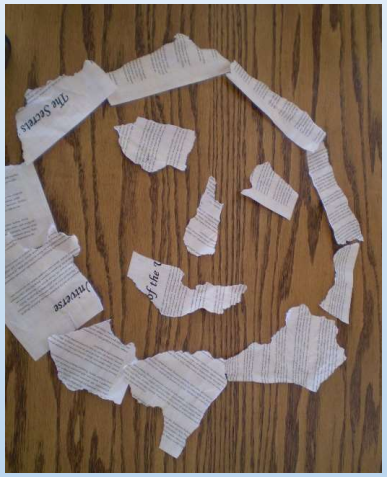
Steven E. Wallis, PhD

Steve@ASKMATT.Solutions



Bonus Content

False Focus on “data”



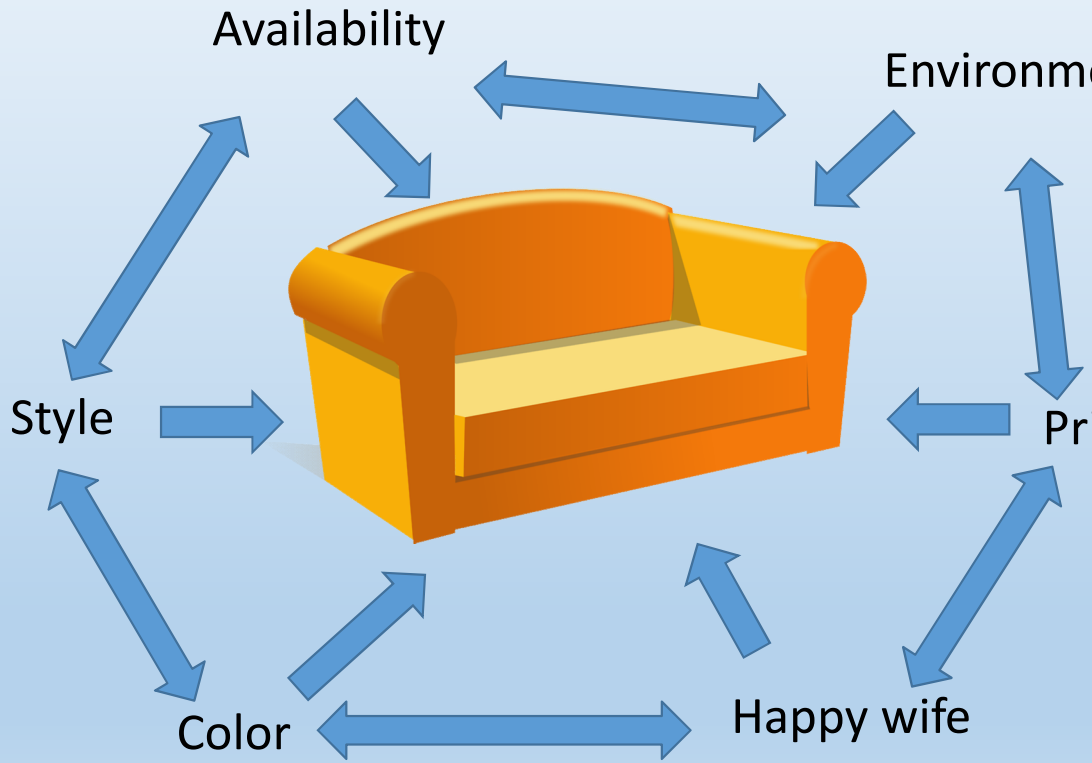
KEY: Data is not enough.

Without *structure*, we loose reasoning ability

Data or Structure ?

Addresses

Coherence or Correspondence?

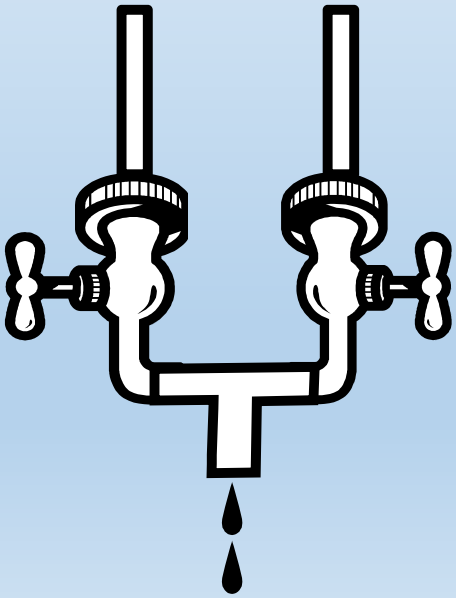


(Concetto, Variabile)

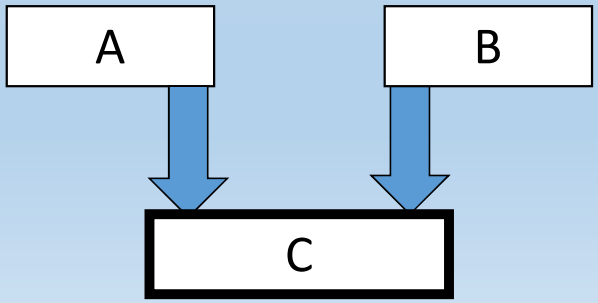
Importance of Concatenation

Empirical Base

Concatenated structures support good empirical research (results are more reliable with more independent variables).



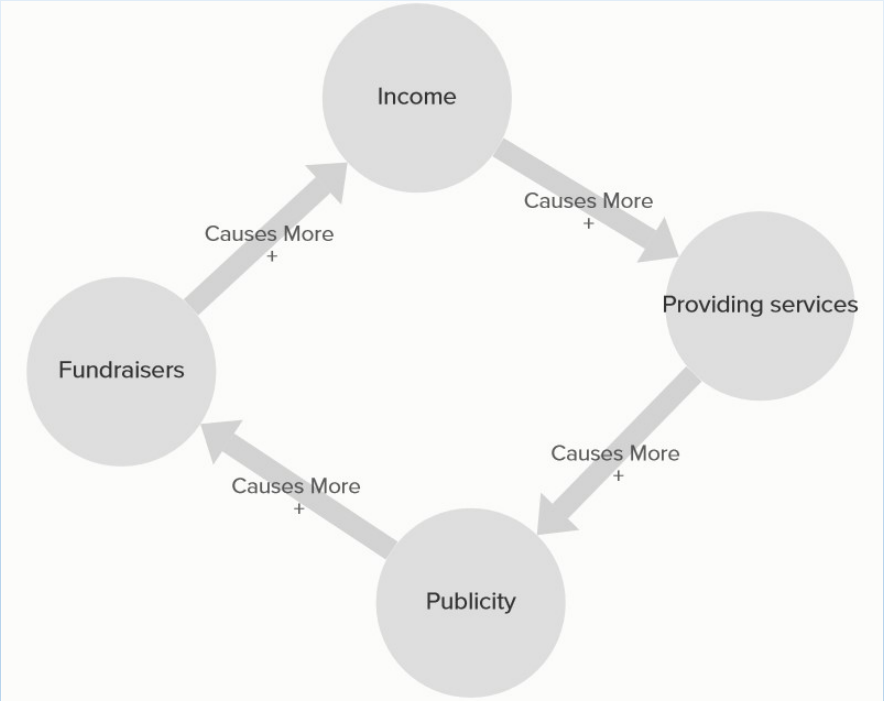
Philosophical Base



- Dual description
- Dialectic
- Multiple variables
- Partial Cause

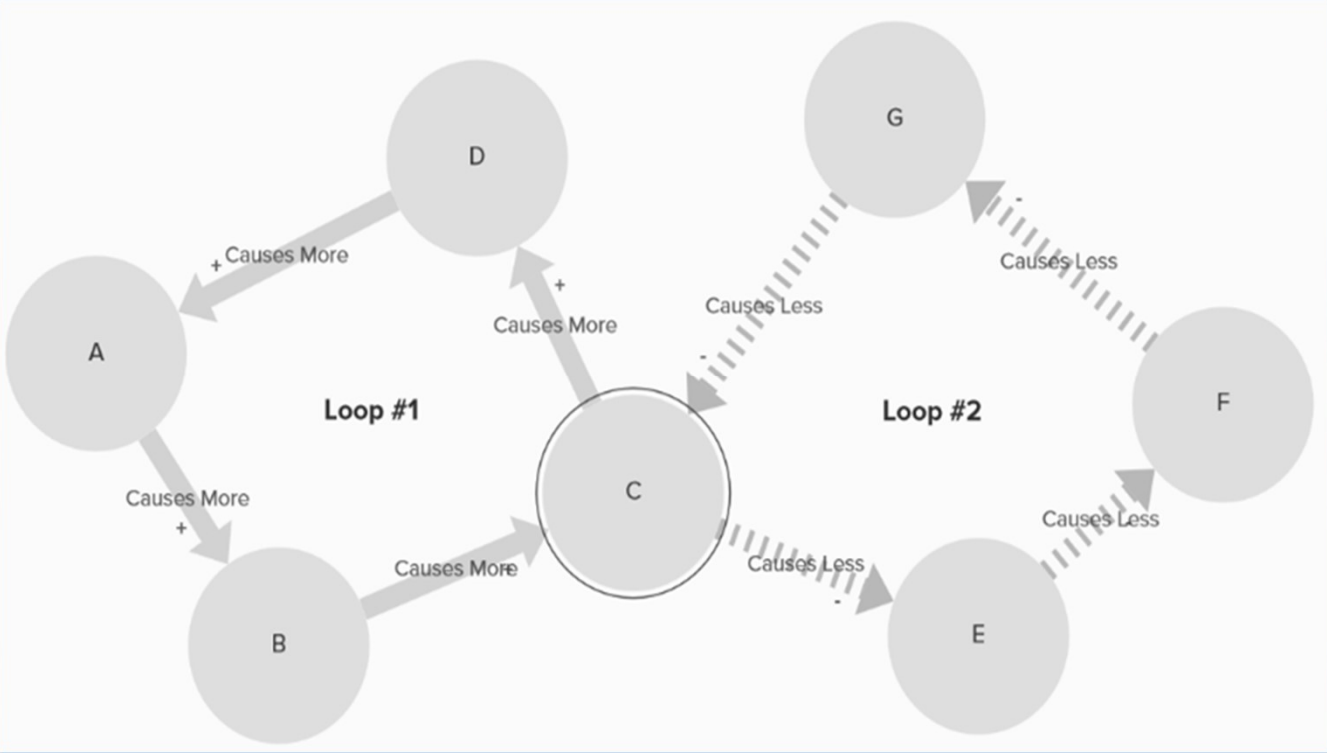
Loops:

Where can you find sustainable success?



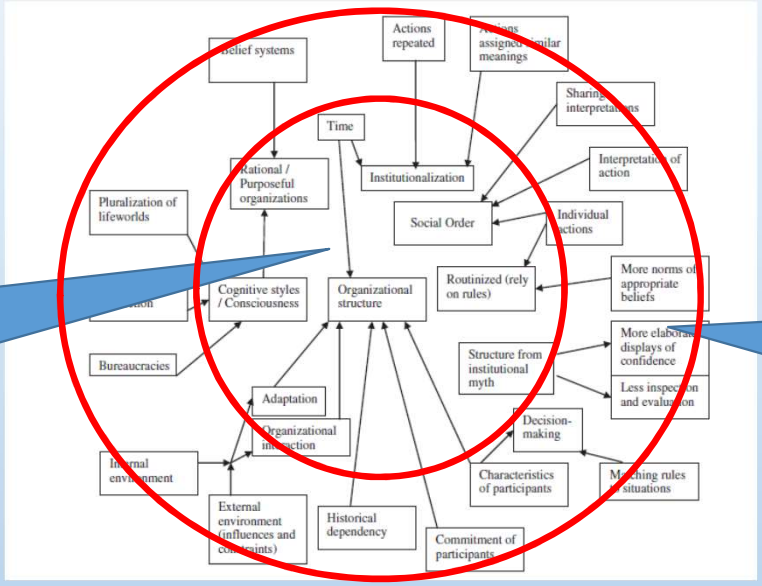
Leverage Points

Where your efforts can have the most impact



Util: Finding “core” & “belt” of a theory

“Core” concepts are those with MORE connections



“Belt” concepts are those with FEWER connections

Suggests which areas are better known (core) or need more research (belt)

Seek similar levels of abstraction (or categorization)

To create, improve, or repair an automobile or a knowledge map it is important to choose "parts" on the related steps

KEY: We make better knowledge maps if are concepts are *at a similar level of abstraction*