

**IIQM-ATLAS.ti Qualitative
Methods Master Class Webinar
Series**

Complexity theory:
What is it and how can I use it?

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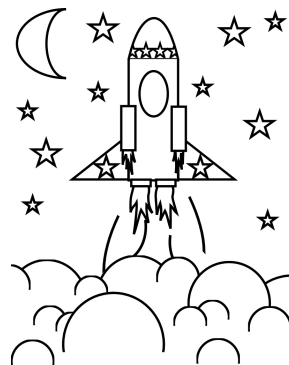
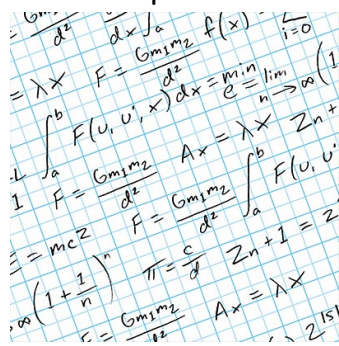
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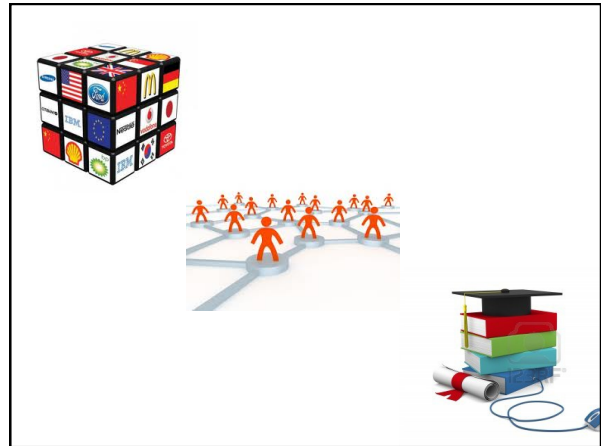
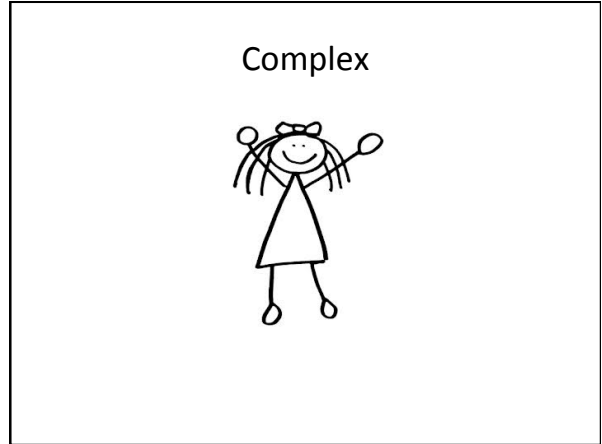


Aims

- 1. Understand the complex versus the complicated
- 2. Outlines main principles of complexity theory
- 3. Applying to real research

Complicated



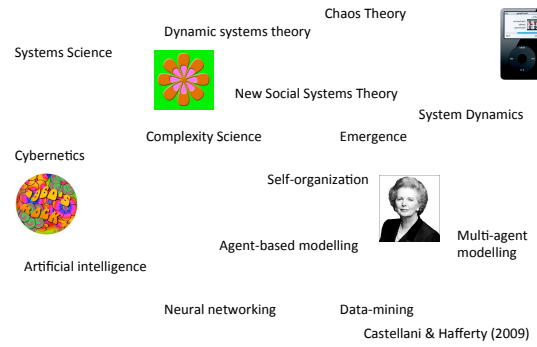


Key principles of complexity theory

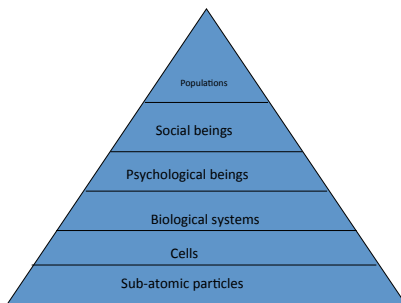


Clark et al (2008) *Advances in Nursing Science* 31(4):E67-E79.
 Clark et al (2007) *Health* 11(4):513-39.

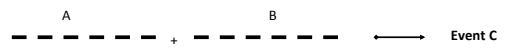
Complexity in the applied Social Sciences



Stratification



Linear Causation



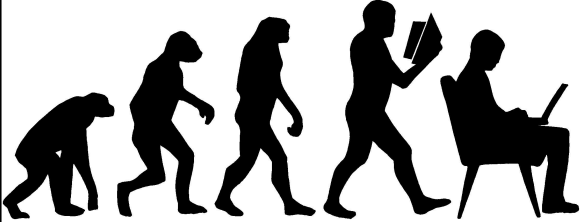
Sedentary person + exercise program = Regular exercise

Generative Causation

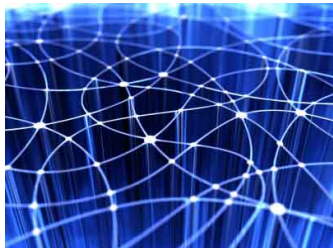
- Generative

→ Event C


Change and evolution Learning and adaptation



Distributed control



Emergence



Demi-regularities



Applying complexity theory to research

Clark et al (2012) What football teaches us about researching complex interventions. *BMJ* ;345:e8316

CHRISTMAS 2012: SPORT

What football teaches us about researching complex health interventions

Football and healthcare are both complex adaptive systems: Alex Clark and colleagues wonder how and why football scores more highly when it comes to introducing interventions

Alexander M Clark professor¹, Thomas G Birtles research associate professor², Lorraine Thrift assistant professor³, Lisa Houlden senior research fellow⁴, Julie Peake senior research fellow⁵

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Who would you rather have as a player on your football team: Messi or Messi's 100 clones? Messi scores more frequently, consistently, and as he has been there for longer, he has the same size team, and the football is 11 v 11. But his clones would never play, playing in the number 10 jersey.

However, because an elite team's characteristics, such as a good team, are the result of a complex system, it is not possible to predict the characteristics of a team by simply adding up the characteristics of its individual parts. This is because the system is a complex adaptive system, and the characteristics of the system are the result of the interactions of its parts. In football, this is the interaction of players, the referee, the stadium, the weather, the crowd, and the rules of the game. In healthcare, this is the interaction of patients, the doctor, the hospital, the government, and the public.

Complex versus complicated

Interventions in football and healthcare systems are "complex" rather than "complicated." Complicated systems are those whose behavior can be reliably predicted from their parts, whereas complex systems are those whose behavior can only be understood in terms of the interactions of their parts. In football, this is the interaction of players, the referee, the stadium, the weather, the crowd, and the rules of the game. In healthcare, this is the interaction of patients, the doctor, the hospital, the government, and the public.

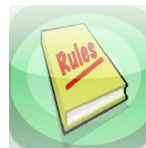
Lesson 1: Ontology—being complex in

Because football and healthcare are complex, describing

Outcomes are important....



Formal rules and Structures



• ...theorize



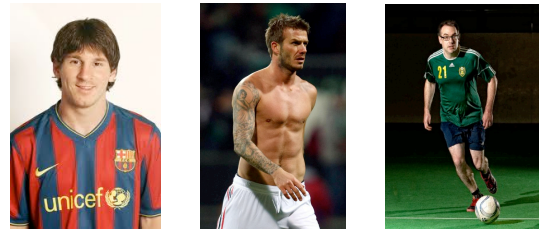
What are the components?

- Wholes
- Parts



What are the sub-components?

- Some things matter
- Other things don't



Spot the difference .



Clark A M et al. BMJ 2012;345:bmj.e8316



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What else affects outcomes?

- The variations that exist within laws and structures
 - Exceptions
 - Variations







What else can affect outcomes?

- The context
 - How context interacts with parts

What else can affect the game?

- Extraneous internal and external less predictable factors

Recap on complexity

- Outcomes and explaining them
- Parts and subcomponents
- Complex and dynamic interactions between parts and context
- Role of extraneous and unpredictable factors
- Need for understanding of outcomes

But how to apply?

Social Science & Medicine
 journal homepage: www.elsevier.com/locate/socscimed

Review
What are the components of complex interventions in healthcare? Theorizing approaches to parts, powers and the whole intervention
 Alexander M. Clark
Faculty of Nursing, University of Alberta, Edmonton Clinic Health Academy, Edmonton, Alberta, Canada T6G 1C9

ARTICLE INFO **ABSTRACT**

Article history:
 Available online xxx

Keywords:
 Complexity
 Complex interventions
 Trials
 Theory
 Emergence
 Realism

The components of complex interventions are frequently discussed, invoked and examined in theory and research but seldom defined. This leads to theoretical and ontological ambiguities, lack of methodological transparency, and potentially, resistance to the wider movement towards complex intervention. This paper is the first to compare and contrast the different approaches that can be taken to the components of complex interventions. Most basically, complex interventions are defined as being composed of parts that make the whole intervention and, in isolation or combination, can generate the power of the intervention. Examples from the field of cardiac rehabilitation are used to illustrate key points. In relation to complex interventions past approaches variously: downplay complexity, focus on the complicatedness of complex interventions, or emphasize the complexity of complex interventions. Thus, approaches can be categorized as viewing components variously as: (1) Non-existent parts and powers; (2) Irrelevant parts and powers; (3) Undifferentiated powerful parts; (4) Higher order parts and non-existent lower

Clark (2012) Soc Sci & Med
<http://dx.doi.org/10.1016/j.socscimed.2012.03.035>

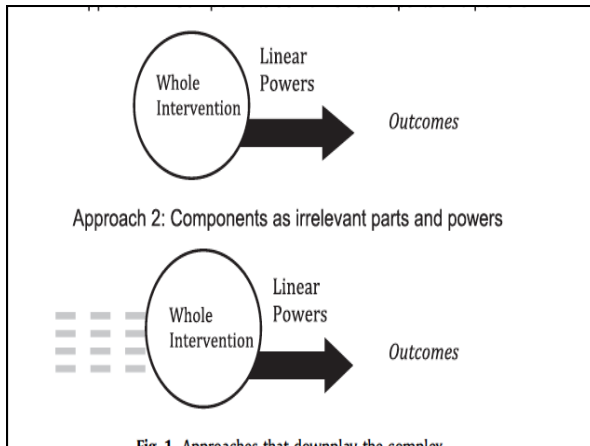


Fig. 1. Approaches that downplay the complex

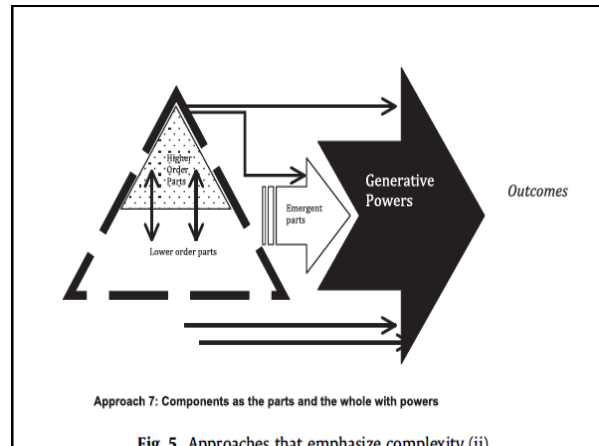


Fig. 5. Approaches that emphasize complexity (ii)

Conclusions

- Complex versus Complicated
- Games, sports, economy, organisations...
- Principles useful to health research
- Applications in intervention research

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Discussion

What ways have or can you apply concepts from complexity theory to your qualitative research?

The next IIQM Webinar

*Proposing a new method for computer-assisted
qualitative data analysis*

[Dr. Susanne Friese](#)

February 28 1:00 pm MST