

### 3. Multimorbidity Day

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## Complexity and the Decision Maker

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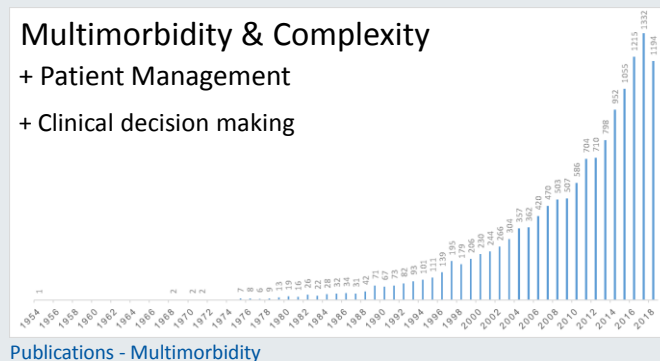


### Complexity & Multimorbidity



130'000 Complexity & health care  
3'000 Multimorbidity

200 Multimorbidity & Complexity  
100 + Patient Management  
20 + Clinical decision making



Publications - Multimorbidity



## Clinical decision making & complexity

What are the characteristics  
of a complex task?

Why task complexity?

## Objective task complexity

Task structure      - *component complexity*  
                             - *interactive complexity*

- conditions
- treatments
- interdependencies

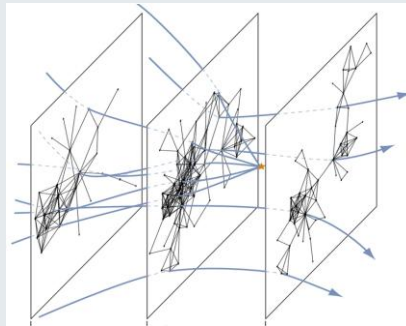


Static complexity

Gassmann et al. 2017

## Objective task complexity

- Task structure
- *component complexity*
  - *interactive complexity*
  - *dynamic complexity*



Dynamic complexity

### Example

## Static vs. dynamic complexity

Low component & interactive complexity  
High dynamic complexity

A.M., m, 86y

Heart disease  
with arterial fibrillation  
Bowel disease with anemia  
Low back pain  
Mental status: excellent

dynamic  
complexity

Heart disease  
with arterial fibrillation  
Bowel disease with anemia  
Low back pain  
Mental status: degraded

Medication adherence ↓  
Accidental drug overdosing ↑  
Accidental drug underdosing ↑  
Drug-drug interactions ↑  
Drug-disease interactions ↑

## Person-Task Interaction

### *Dynamic decision-making*

- set of different goals
- change in state of tasks due to previous decisions
- decisions/actions influence future decisions/actions
- delayed feedback about actions
- actions are interlinked with other actions
- effects of actions manifest over time
- time-dependence of actions

### *Overall complexity:*

Product of objective task characteristics x person

## Person-Task Interaction

### *Individual differences*

#### Task of low structure

- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>- multiple poss. paths</li><li>- multiple end states</li><li>- multiple interdependencies</li><li>- high uncertainty</li></ul> | } <i>Knowledge / Expertise</i> <ul style="list-style-type: none"><li>- identify critical cues</li><li>- navigate possible paths</li><li>- interpret interdependencies</li><li>- link actions to goals</li><li>- anticipate possible outcomes</li><li>- prioritise &amp; sequence actions</li></ul> |
|--|--|

*Performer dependence!*

## Psychological complexity

### *Impact of task on performer*

- perceived difficulty/mental effort
- human information processing capacity
  - time to manage information load
  - amount of attention dedicated to task
    - availability and clarity of information
    - quick changes in information availability
    - diversity of information
- cognitive load

## Implications

### General task complexity framework

- complexity - a multifaceted concept
- large number of potential measures
- diverse measures – diverse aspects of task
- measures insufficient in isolation – need context
- relative complexity
- threshold of minimal complexity?

## Behavioral studies

### *Dynamically complex tasks*

- practice, extended practice
- full, immediate feedback

### *Certain characteristics of task complexity:*

- decisions or actions at different speeds
- different delays until decisions or actions
- longer delays in receiving feedback
- act directly on current feedback

### *Environmental constraints:*

- high workload and time pressure

(Gonzalez, 2004, 2005; Kerstholt & Raaijmakers, 1997; Brunstein et al, 2010, Serman, 1989; Brehmer, 1980; Serman, 1994; Diehl & Serman, 1995)

## Conclusions

- Complexity: a multifaceted concept
- Decision making: diverse factors influence task complexity
- Task complexity framework to:
  - Identify complexity-related challenges in managing multimorbid patients
  - Develop basis to identify potential ways and methods to reduce these challenges