

*50 SHADES OF SOCIAL  
COGNITION*

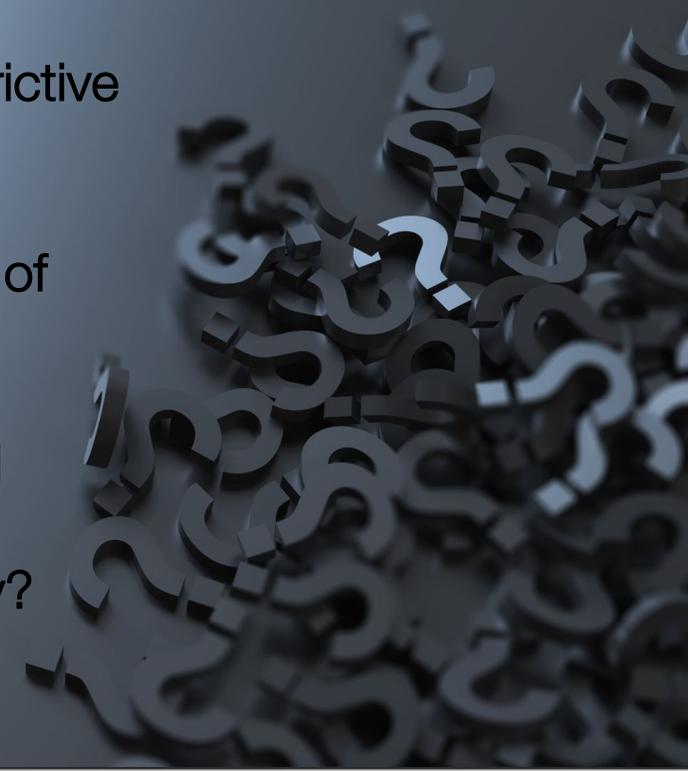


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*How to capture the  
diversity of socio-  
cognitive abilities?*

## OVERVIEW

- (1) Minimal notions expand restrictive standard notions
- (2) BUT there are shortcomings of minimal notions
- (3) Can a disjunctive conceptual schema allowing for varying degrees capture the diversity?



# Starting point



\* minimal mindreading, minimal joint actions, minimal sense of commitment, or shared intentions lite  
(Butterfill & Apperly 2013, Vesper et al. 2010, Michael et al. 2016, Pacherie 2013)

## How do minimal and standard notions relate to each other?

- investigate framework integrating minimal & standard notions

**CLAIM 1:** According to the wide-spread strategy to refer to a two-system approach also minimal notions neglect various instances.

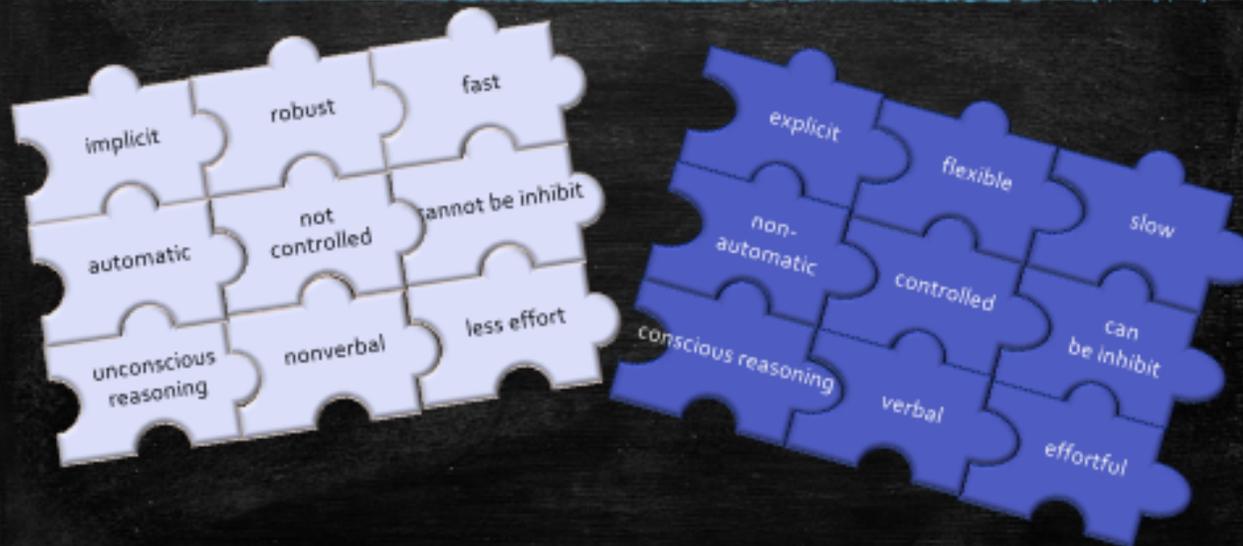
# *Two system approach = 2 different puzzle games*

## MINIMAL NOTIONS

- meet properties of system-one
  - e.g. automatic, unconscious, uncontrolled
- realize cognitively less demanding and less effortful processes

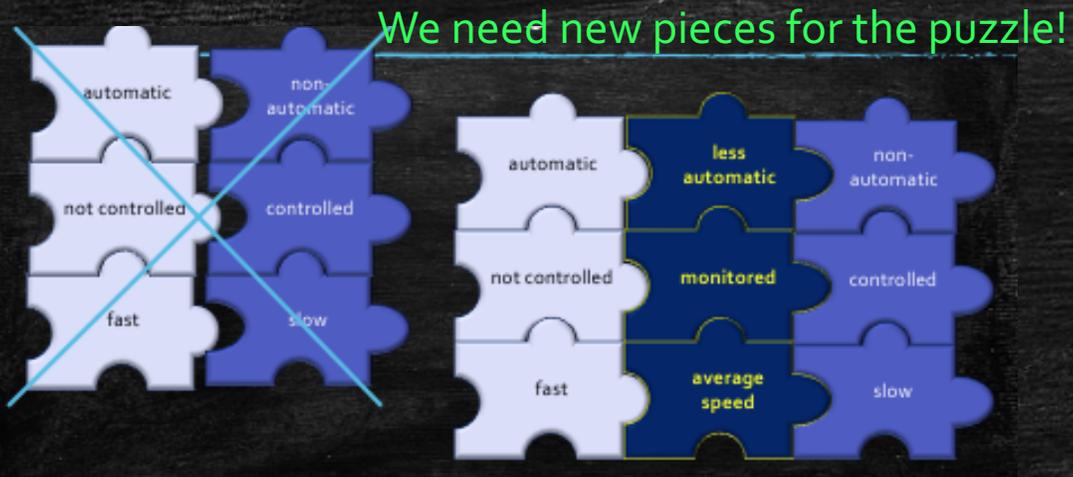
## STANDARD NOTIONS

- reflect properties of system-two
  - e.g. non-automatic, conscious, controlled
- reserved for cognitively demanding processes



# 1. Gradual appearances of the properties

- empirical findings speak for a continuum with respect to many properties characterizing socio-cognitive processes



system one	in-between	system two
completely automatic	more-or-less automatic	non-automatic
no control	partial control	control
no central accessibility	limited central accessibility	central accessibility
informationally encapsulated	limited accessibility	accessibility

CLAIM 1a: A dichotomous interpretation of a two-system approach cannot capture in-between cases.

## 2. Combinations of properties exhibit a greater diversity

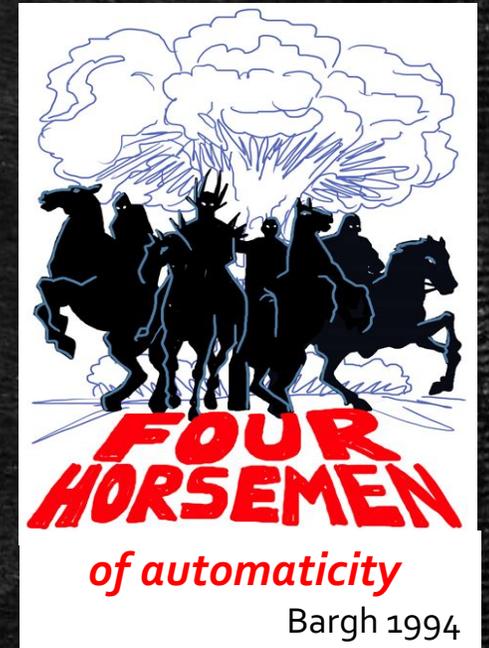
questioning an all-or none relation of properties characterizing one system

e.g.: automaticity

- necessarily co-occurs with four other properties  
(*unconscious, unintentional, efficient, uncontrollable*)

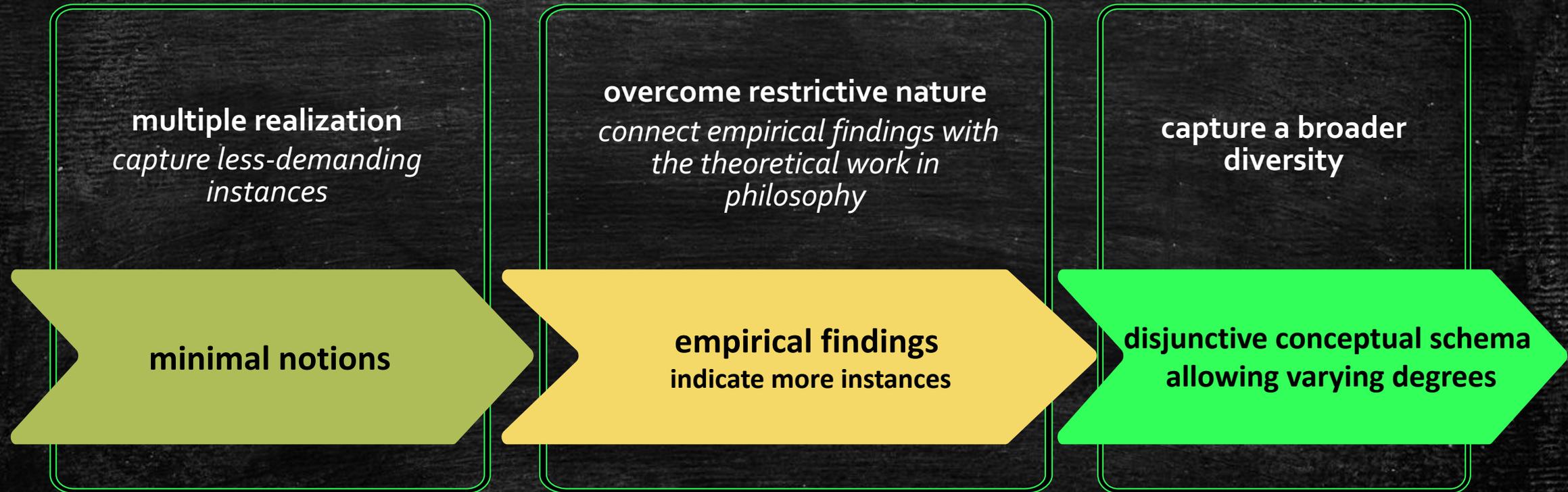
**BUT** not all automatic processes have necessarily all four properties

- processes can be
  - conscious but uncontrollable,
  - unintentional but still controllable, or
  - efficient and intentional (Gawronski & Bodenhausen 2006)



**CLAIM 1b:** Assuming a necessary co-occurrence of properties  
minimal notions neglect various instances.

# What can we do now?



Anna Strasser (2020). In-between implicit and explicit. *Philosophical Psychology*. doi: 10.1080/09515089.2020.1778163

# Challenges of the diversity

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Gradual appearances of the properties

1. **How can we capture continua?**

→ CONCEPTUAL FRAMEWORK FOR CONTINUA

Combinations of properties exhibits a greater diversity

2. **How can we capture family resemblance?**

→ DISJUNCTIVE CONCEPTUAL SCHEMA

3. **What concepts should we use for in-betweens?**

How do we call something what is neither triadic joint attention nor can be reduced to a dyadic co-orientation?

# *A short excursion into the realm of combinatoric*

IMAGINE a hypothetical socio-cognitive ability  $C^*$

that can be ascribed if

- at least one of four criteria ( $C_1, C_2, C_3, C_4$ ) is met
- allows three degrees (weak, middle, strong)

ESTIMATE

how many neglected instances are captured

INVESTIGATE

how neglected instances can be structured

# First approximation

- only diversity of combination of criteria (no gradual appearances)

## DISJUNCTIVE CONCEPTUAL SCHEMATA 'at least 1 of 4'

- family resemblance
  - each instance is described by a tuple of 4 variables
  - each variable represents one of the four criteria and can have either the value 1 or 0
- Let  $P_{\text{disjunct}}$  be the set of all tuples captured by schema 'at least 1 of 4'

ESTIMATE how many instances are captured  
→ 15 instance

INVESTIGATE how instances can be structured  
strategy 1: group them along the number of criteria met → 4 subsets

'at least 1 of 4'	described as tuples
$P_{\text{max}}$ 4 of 4 criteria	(1,1,1,1)
$P_{\text{in-between 3}}$ 3 of 4 criteria	(1,1,1,0)
	(1,1,0,1)
	(1,0,1,1)
	(0,1,1,1)
$P_{\text{in-between 2}}$ 2 of 4 criteria	(1,1,0,0)
	(1,0,0,1)
	(1,0,1,0)
	(0,1,1,0)
	(0,0,1,1)
	(0,1,0,1)
$P_{\text{min}}$ 1 of 4 criteria	(1,0,0,0)
	(0,1,0,0)
	(0,0,1,0)
	(0,0,0,1)
no-criteria	(0,0,0,0)

# Diversity of combination of criteria + gradual appearances

## DISJUNCTIVE CONCEPTUAL SCHEMATA 'at least 1 of 4+ varying degrees of the criteria'

\*limit variations to three manifestations: weak, middle, strong

→ each variable representing a criterion can have the value of 1, 2, 3 or 0

- Let  $P_{\text{disjunct + vary}}$  be the set of all permuted tuples

ESTIMATE how many instances are captured  
→ 255 instances ( $4^4 - 1 = 255$ )

INVESTIGATE how instances can be structured  
strategy 1: group them along the number of criteria met  
→ 4 subsets

$P_{\text{max}}$  : 81 instances with 4 of 4

$P_{\text{In-between}_3}$  : 108 instances with 3 of 4

$P_{\text{In-between}_2}$  : 54 instances with 2 of 4

$P_{\text{min}}$  : 12 instances with 1 of 4

How can we structure the many instances in each subset?

# Second strategy

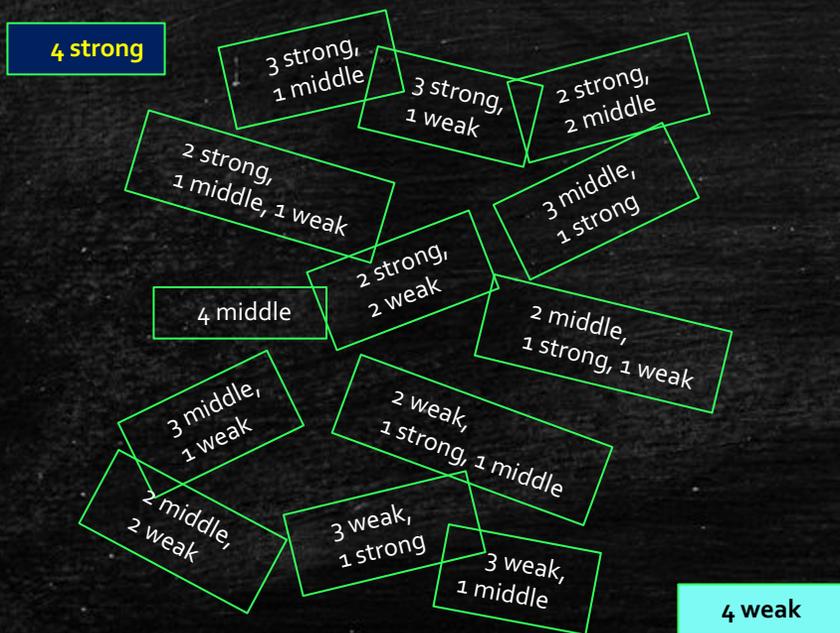
$P_{\max}$  : subset of 81 instances (all four criteria are met and variations in degree are allowed)

- 15 in principle distinct realizations
  - uncontroversial (3,3,3,3) and (1,1,1,1) mark start respectively end point

## strategy 2: cross sum of variables

- categorize the 15 realizations in 9 groups (cross sums of (3,3,3,1) and (3,3,2,2) are equal)
- group them into triples

➤ three types of subcategories



15 distinct realizations of $P_{\max}$		example	cross sum
<b>MAX</b>	4 strong	3,3,3,3	12
	3 strong / 1 middle	3,3,3,2	11
	3 strong / 1 weak	3,3,3,1	10
	2 strong / 2 middle	3,3,2,2	10
<b>IN-BETWEEN</b>	2 strong / 1 middle / 1 weak	3,3,2,1	9
	3 middle / 1 strong	2,2,2,3	9
	2 middle / 1 strong / 1 weak	2,2,3,1	8
	4 middle	2,2,2,2	8
	2 strong / 2 weak	3,3,1,1	8
	2 weak / 1 strong / 1 middle	1,1,3,2	7
	3 middle / 1 weak	2,2,2,1	7
	2 middle / 2 weak	2,2,1,1	6
<b>MIN</b>	3 weak / 1 strong	1,1,1,3	6
	3 weak / 1 middle	1,1,1,2	5
	4 weak	1,1,1,1	4

# First and second strategy combined

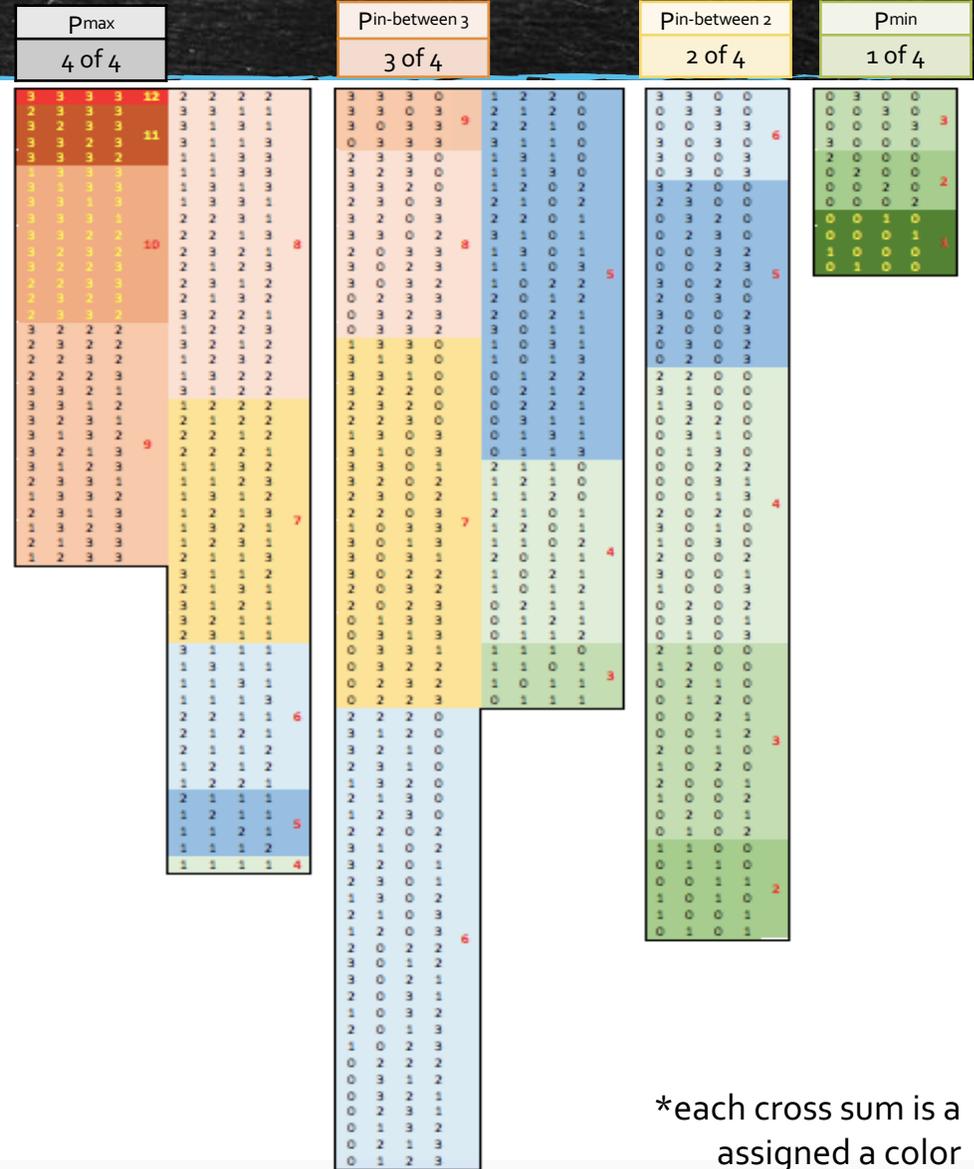
## DISJUNCTIVE CONCEPTUAL SCHEMATA

'at least 1 of 4+ varying degrees of the criteria'

- $p_{\text{disunct + vary}}$ : set of all permuted tuples with 255 instances

INVESTIGATE how instances can be structured

- strategy 1: group along the number of criteria met  $\rightarrow$  4 subsets
- strategy 2: structure tuples in each subset by their cross sums



\*each cross sum is assigned a color

# *A somehow unsatisfying solution*

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assuming the cross-sum strategy provides a measure regarding graduality

- cross-sum strategy can be used to structure the instances in each subset

BUT this leaves me somehow unsatisfied

**BECAUSE** in each subset we find a colorful variation of how criteria are pronounced

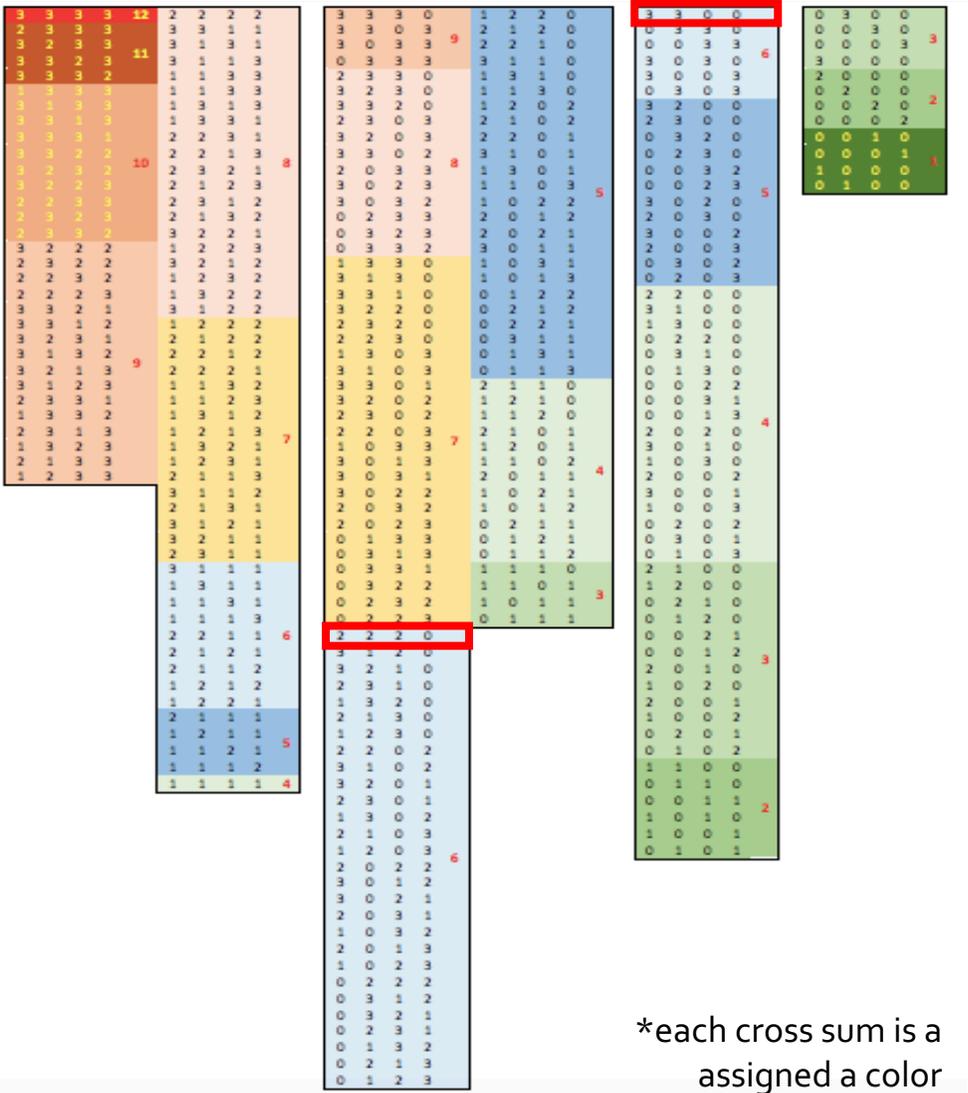
- it is somehow striking that in each subset instances with similar cross sums are present
  - instances are treated as unequal even though they have the same cross sum
    - e.g., instances with the cross sum 4 can be found in all four subsets
- Do we have a reason to apply strategy 1 first?
- What happens if we first order all 255 instances along the cross-sum strategy?

# strategy 1 combined with strategy 2

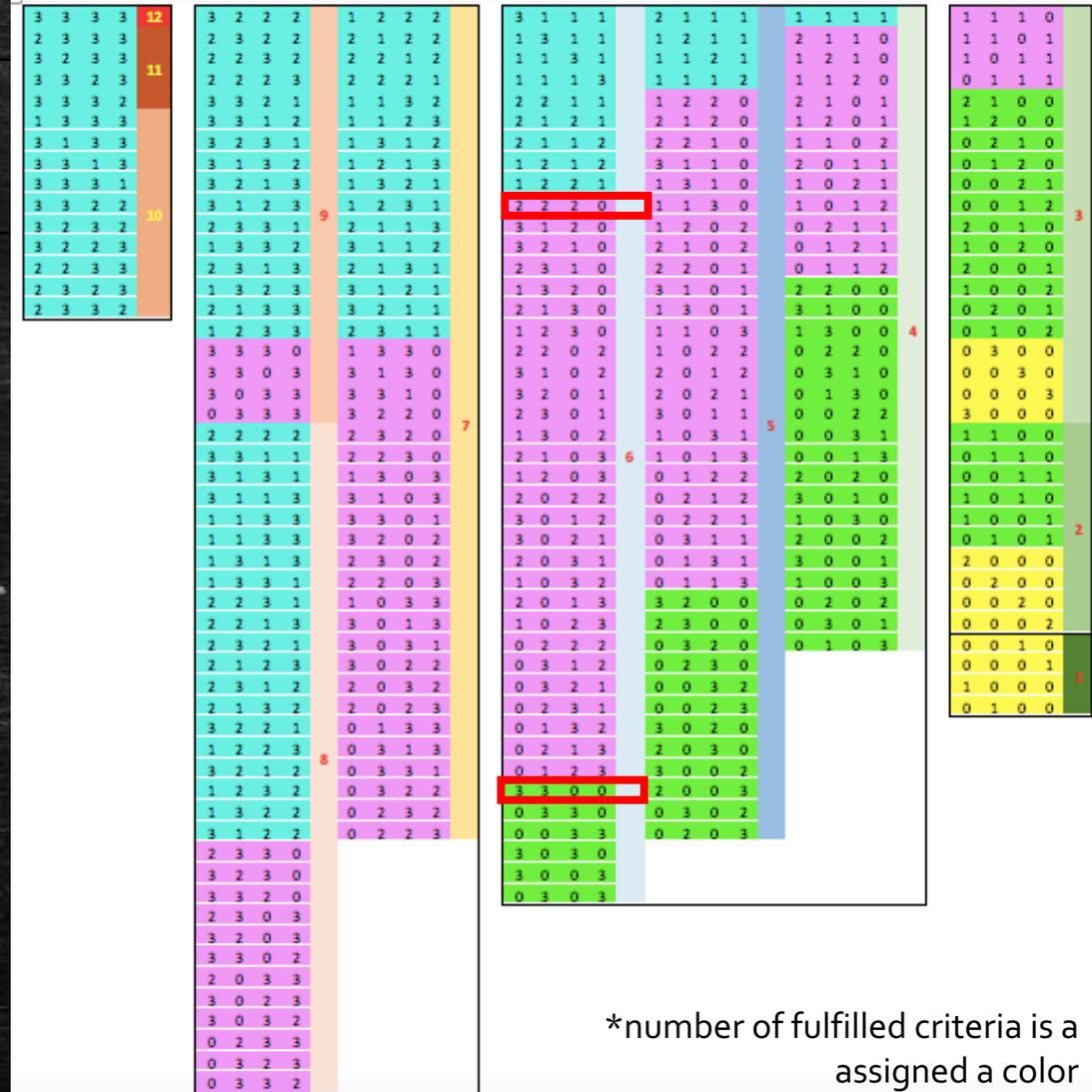
# strategy 2 combined with strategy 1

Pmax	Pin-between 3	Pin-between 2	Pmin
4 of 4	3 of 4	2 of 4	1 of 4

Pmax	Pin-between 3	Pin-between 2	Pmin
10-12	7-9	4-6	3-1



\*each cross sum is a assigned a color



\*number of fulfilled criteria is a assigned a color

*How would you structure the 255 instances?*

NOT ALL INSTANCES CAN BE REASONABLE COMPARED → MATHEMATICIANS: PARTIAL ORDER

- uncontroversial:
  - $(1,1,1,0)$  'smaller' than  $(3,3,3,0)$  /  $(3,3,3,0)$  is 'bigger' than  $(3,0,0,0)$

But how can we judge whether an instance being manifested by three criteria with a middle value  $(2,2,2,0)$  is 'bigger', 'equal' or 'smaller' than an instance realized by two strong criteria  $(3,3,0,0)$ ?

**What is worse: Having 3 symptoms in a middle appearance or having 2 symptoms with a strong appearance?**

## *This is the point where I nearly gave up*

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- I still believe that in order to capture the diversity of socio-cognitive abilities it is reasonable to point to neglected instances & expand the conceptual framework to capture neglected instances

BUT delivering a clear-cut way how to structure all instances seems to be a challenging project

- the quantitative mathematical perspective does not offer a clear-cut solution
- Future research should return to practical examples in order to find a way of how qualitative considerations may guide how to order all the neglected instances
  - For example, in psychiatric diagnostic manuals we have a case in which both family resemblance and gradual variations play a role. To be diagnosed with a mental disorder it is assumed that a person exhibits a certain number of symptoms, whereby it also plays a role how strong the symptoms are.

# Conclusion

sharp, clear-cut notions

indicate more instances

capture more instances

indicate more instances

capture a broader diversity

standard notions

empirical findings

minimal notions

empirical findings

disjunctive conceptual schema  
+ varying degrees

are too restrictive to capture the diversity of socio-cognitive abilities

expand restrictive standard terminology of philosophy

referring to a two-system approach results in critical shortcomings

challenge to structure the number of neglected instances is impressing high

- To deal with unresolvable cases, it seems appropriate to take into account qualitative considerations arising from concrete conceptual contexts.

**Let's return to real concepts**

# Bundles of properties

ASPECTS		SYSTEM-ONE UNCONSCIOUS REASONING		SYSTEM-TWO CONSCIOUS REASONING	
INPUT		domain-specificity		diverse input parameters	
INTER-MEDIATE OPERATIONS	CONTROL	no voluntary control, unintentional		voluntary control, intentional	
		automatic		non-automatic	
	SPEED	fast		slow	
	ACCESS	CENTRAL	not available to consciousness		available to consciousness
		OTHER INFORMATION	not accessible		accessible
		FOR OTHER PROCESSES	information is not accessible		information is accessible
	STRUCTURE	simple computational operations		effortful, cognitively demanding	
		hardwired, fixed neural architecture, robust		adaptive, flexible	
DEVELOPMENTAL FACTORS	innate or developed early		developed later		
OUTPUT		sense specific behavior		verbal reports 	

NO  
IN-BETWEEN