

MODELLING VS REALITY

EINAR W. HØST

CATEGORIZATION

ME



CATEGORY THEORY

THE FOLK THEORY OF CATEGORIES

1

THINGS COME IN
WELL-DEFINED CATEGORIES

2

CATEGORIES ARE CHARACTERIZED
BY SHARED PROPERTIES

3

THERE IS ONE RIGHT TAXONOMY
OF THE CATEGORIES

THESE ARE ALL WRONG

CATEGORY PRACTICE

HELLO

HELLO FELLOW

HELLO FELLOW APES

HELLO FELLOW HUMANS

HELLO FELLOW SENTIENT BEINGS

HELLO FELLOW OBJECTS

HELLO FELLOW APES

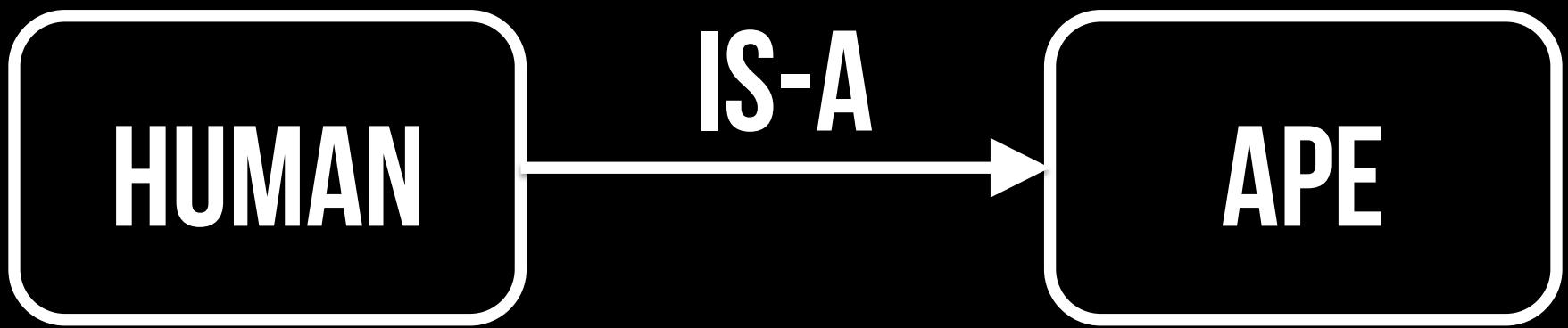
WHY IS IT PROBLEMATIC?

IS IT WRONG?

DO WE AGREE THAT WE ARE APES?

WHAT IS AN APE?

APE (TECHNICAL)





Gibbon

Human

Chimpanzee

Gorilla

Orangutan

WE ARE THE MOST COMMON APE

1 : 26000

**A HUMAN IS JUST A HOMINID
IN THE CATEGORY OF SIMIANS,
WHAT'S THE PROBLEM?**

TYPICALITY

YES WE ARE TECHNICALLY APES BUT

**WE DON'T USUALLY THINK
OF OURSELVES AS APES**

WE ARE PRIMARILY HUMAN

REASONS! EVIDENCE!

NOT HAIRY ENOUGH

TOO UPRIGHT

NOT LONG ENOUGH ARMS

WEAK FOOTGRIP / POOR CLIMBER

TOO INTELLIGENT

NOT QUITE FOND ENOUGH OF BANANAS

BANANAS?



~~NOT QUITE FOND ENOUGH OF BANANAS~~

WE ARE DIFFERENT

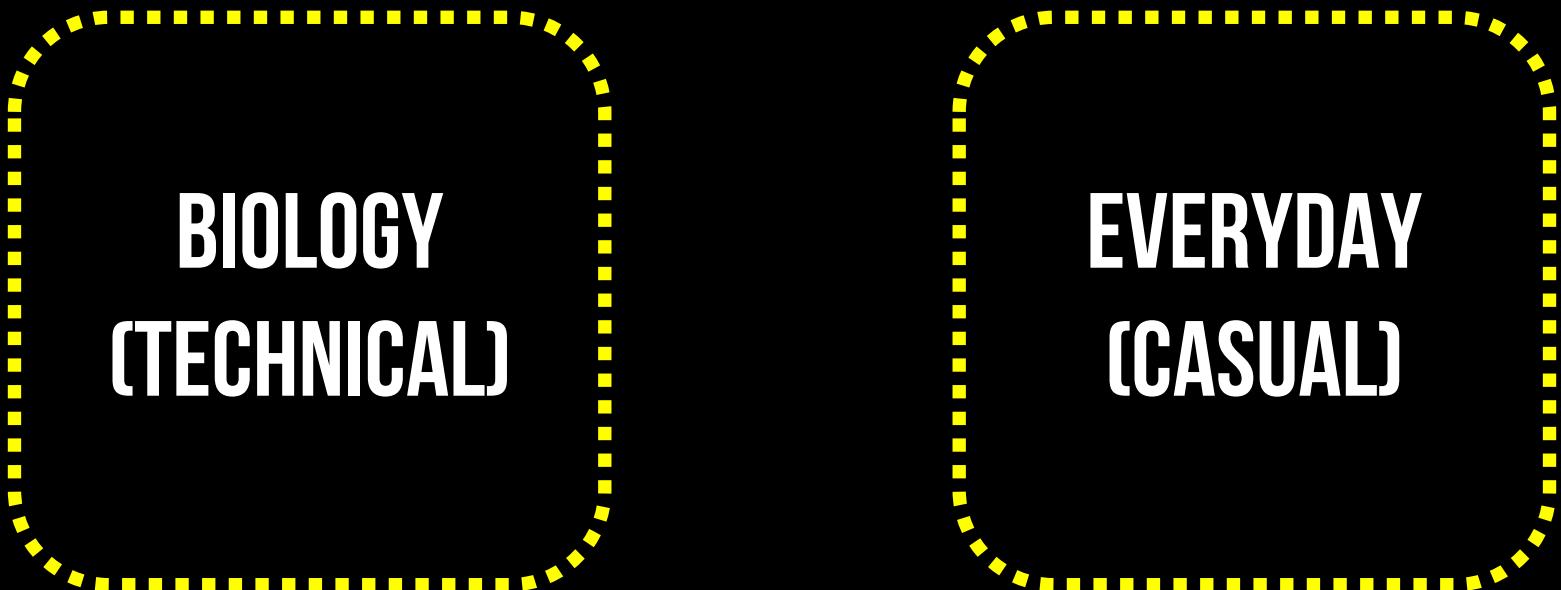


WITTGENSTEIN AGREES

APE (CASUAL)

SO ARE WE APES OR NOT?

DIFFERENT CONTEXTS



BIOLOGY
(TECHNICAL)

EVERYDAY
(CASUAL)

APE AS HOMONYM

WE ARE CONFUSED

HOW APE ARE WE?



WHAT IS A CATEGORY?

WHAT DOES THAT EVEN MEAN?

WHAT IS A CATEGORY **REALLY?**

WHAT IS THE TRUE NATURE OF CATEGORIES?

AN IMPRACTICAL PERSPECTIVE

PRACTICAL PERSPECTIVES

HOW IS A CATEGORY REPRESENTED IN THE HUMAN BRAIN?

WE DON'T KNOW

BUT WE HAVE SOME MODELS

ESSENSIAL PROPERTIES [CLASSICAL VIEW]

PROTOTYPICAL

WHAT ARE CATEGORIES USED FOR?

WHY ARE CATEGORIES USEFUL?

SENSE-MAKING

HOW WE ORGANIZE AND STRUCTURE INFORMATION ABOUT THE WORLD

THIS IS LIKE THAT

THIS IS IDENTICAL TO THAT

THIS IS ROUGHLY THE SAME AS THAT

THIS IS DIFFERENT FROM THAT

COMPARISON, SORTING, CLASSIFICATION, DISTINGUISHING

ENABLES LANGUAGE

ECONOMY OF THOUGHT

EFFICIENT COMMUNICATION

ENABLES INDUCTION

ENABLES LEARNING

**NAVIGATION, CHOICE,
PLANNING, ACTION**

**ENABLES US TO BE EFFECTIVE
AGENTS IN THE WORLD**

CATEGORIZATION IN PRACTICE

CATEGORIZATION IS HILARIOUS

EVERYDAY CASUAL MODELLING

COARSE, IMPRECISE, PARTIAL

MOSTLY ADEQUATE

INCREDIBLY USEFUL

TO ACHIEVE GOALS



Tweet



Mathias Verraes
@mathiasverraes

...

"The longer you investigate something, the less coherent it becomes" — [@rebeccawb](#)

7:39 PM · Jun 3, 2022 · Twitter Web App

CATEGORY MEMBERSHIP

MEMBERSHIP EVALUATION

BOOLEAN VS RATING

EXAMPLES

SOMETIMES IT'S EASY

HORSE?



HORSE?



HORSENESS VERY HIGH

HORSE?



HORSE?



HORSENESS QUITE LOW

HORSE?



HORSE?



HORSENESS EVEN LOWER

HORSE?



HORSE?



HORSENESS PRACTICALLY ZERO

SOMETIMES IT'S A LITTLE HARDER

HORSE?



HORSE?



HORSENESS MEDIUM+

HORSENESS DEPENDS
ON THE EXISTENCE OR ABSENCE
OF OTHER CATEGORIES

**DONKEYNESS SABOTAGES THE
HORSENESS OF THE DONKEY**



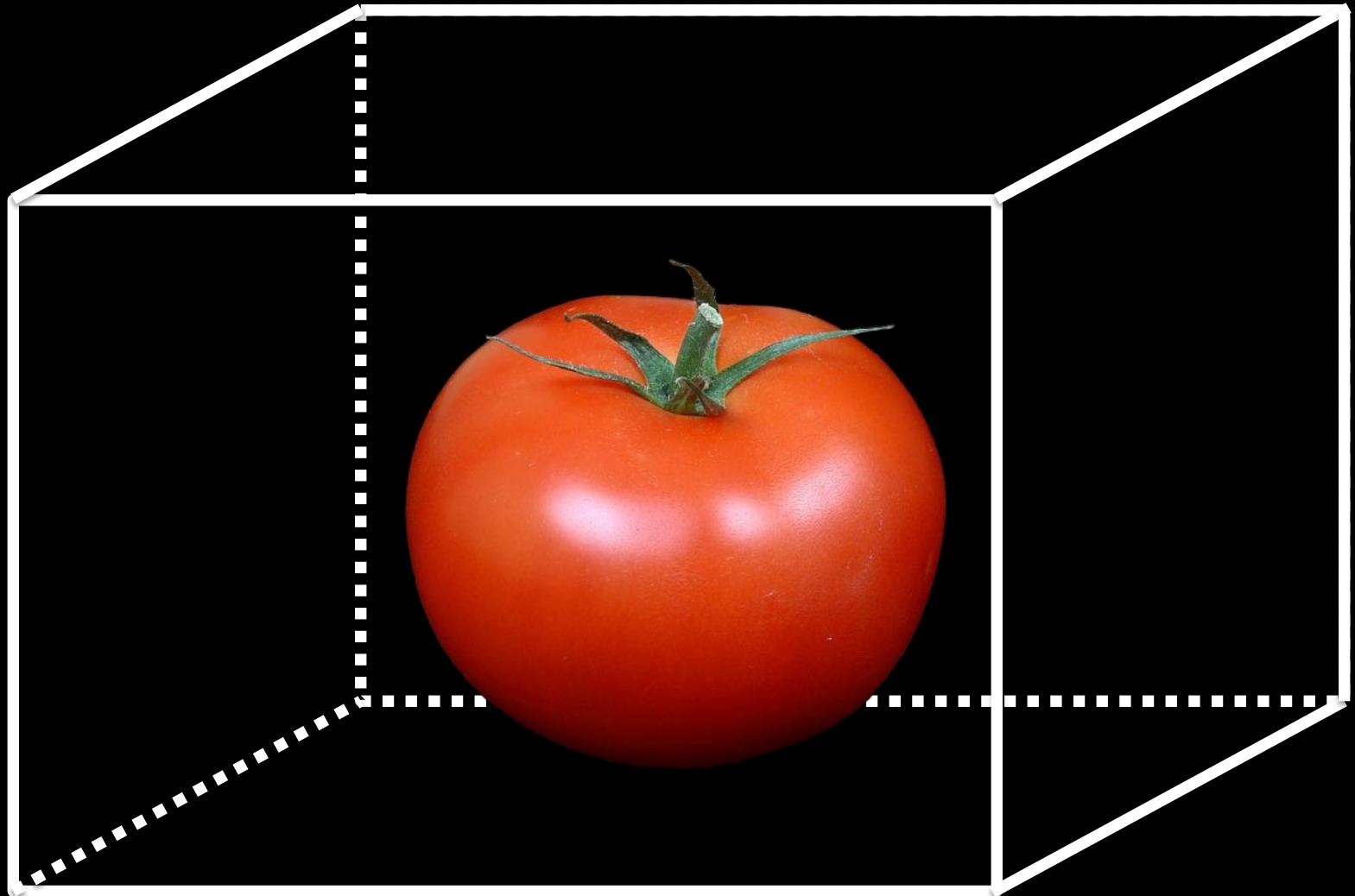




70% VEGETABLE



30% FRUIT





Romeu Moura
@malk_zameth

...

In the culinary bounded context: 🍅 is a vegetable

In the botanic bounded context: 🍅 is a fruit

In 💚💔 bounded context: 🍅 is feedback

2:17 PM · Nov 10, 2017 · Twitter Web App

CATEGORIES ARE CONTEXTUAL

CATEGORIES CAN BE FUZZY

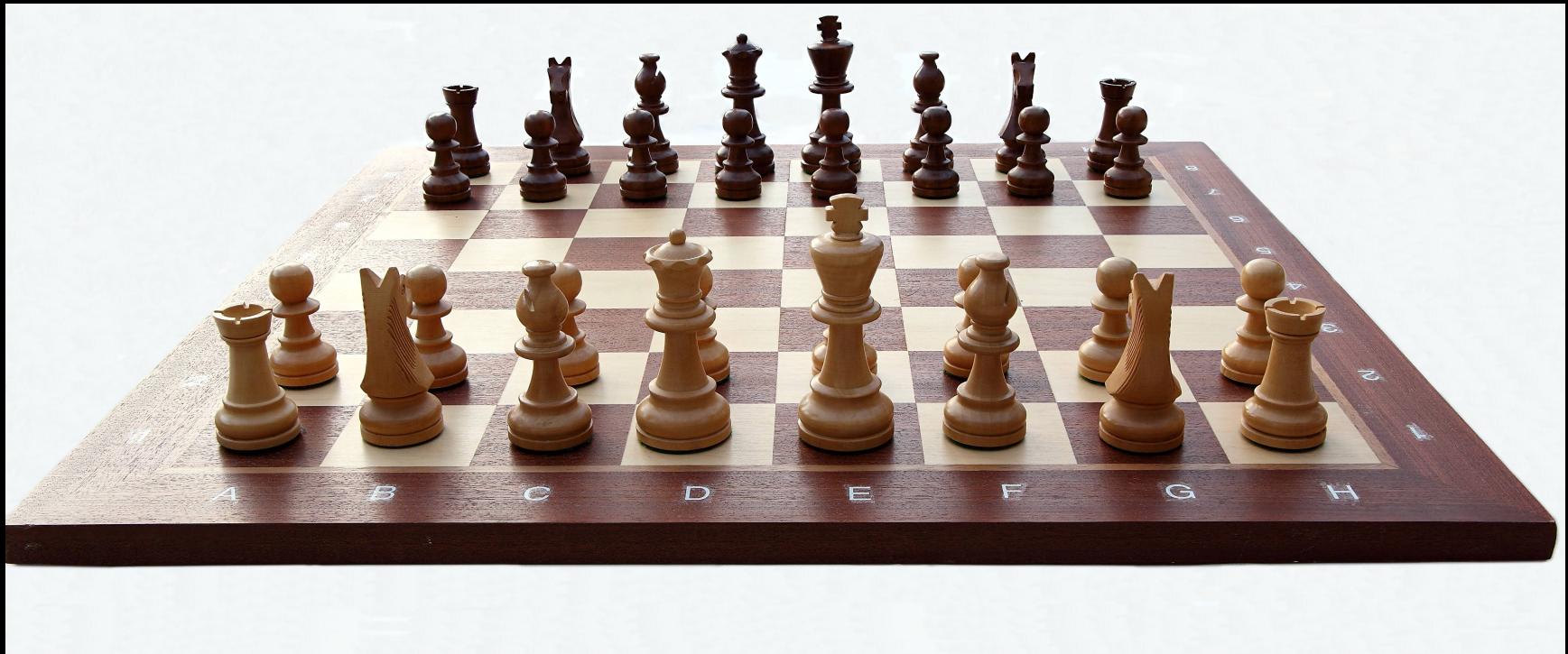
DEGREES OF MEMBERSHIP



SPORT?



SPORT?



SPORT THAT IS ALSO A GAME

SPORT?



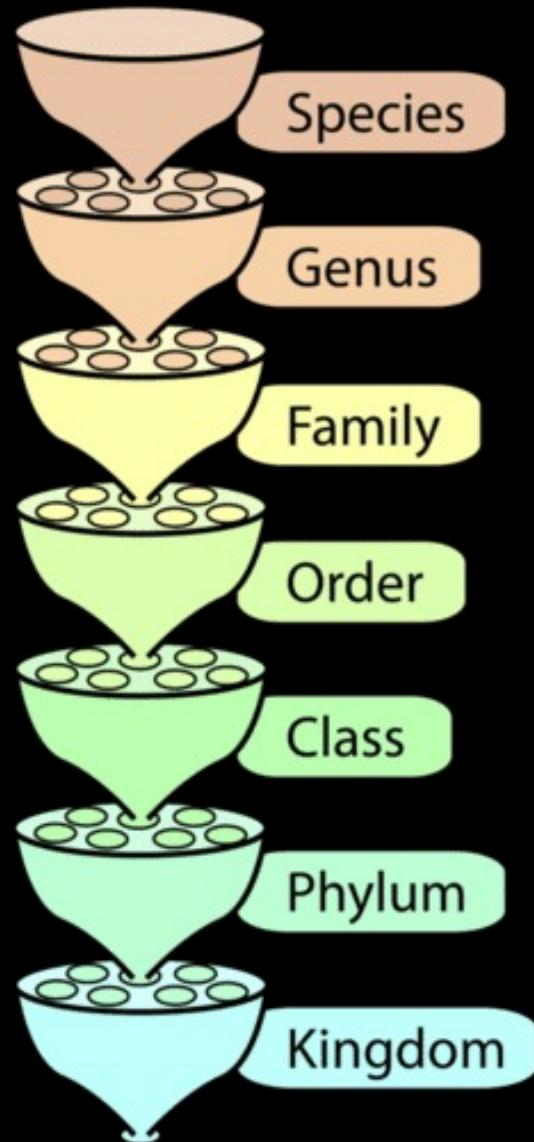
NOT A SPORT

RELATIONS BETWEEN CATEGORIES

TAXONOMIES

HIERARCHIES

GENERALISATIONS & SPECIALISATIONS



People also ask :

What are the 7 classifications of animals?



What are the 5 classification of animal?



What are the 10 classifications of animals?



What are the 6 major classifications of animals?



What are the 11 groups of animals?



What are the 7 characteristics of animals?



Feedback

(THERE ARE NO SPECIES)

BASIC LEVEL CATEGORIES

BASIC LEVEL PREFERENCE

DIFFERENCE & INFORMATION

THIS IS AUTOMATIC

BASED ON UTILITY AND EXPERIENCE

DEPENDS ON EXPERTISE

CULTURE-SPECIFIC



8/31/23

130

BUT IT'S ALWAYS MORE COMPLICATED

EXPERIMENT

TEST

1

2

3



31.08.2023

137

LET'S RUN THE EXPERIMENT!

PICTURE #1

1

2

3



PICTURE #2

1

2

3

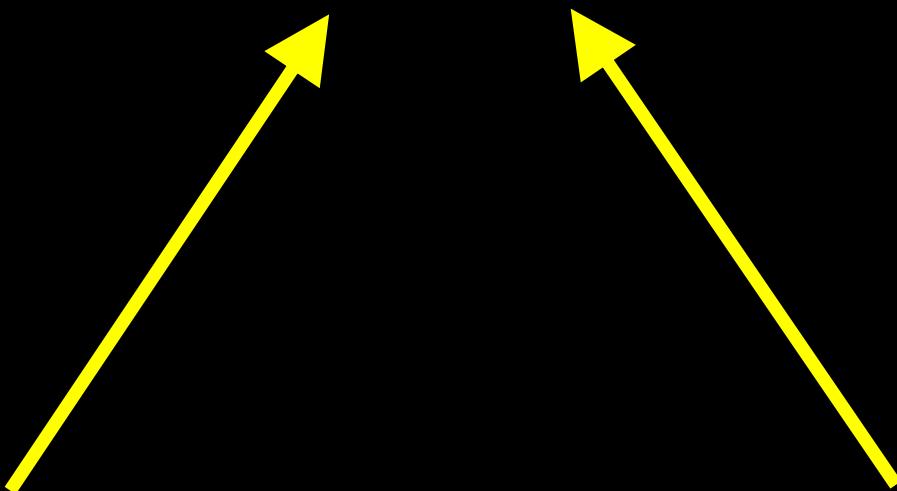


WHAT HAPPENED HERE?

BIRD

ROBIN

PENGUIN



**A ROBIN IS A BIRD
THAT HAPPENS TO BE A ROBIN**

**A PENGUIN IS A PENGUIN
THAT HAPPENS TO BE A BIRD**

ROBINS ARE TYPICAL BIRDS

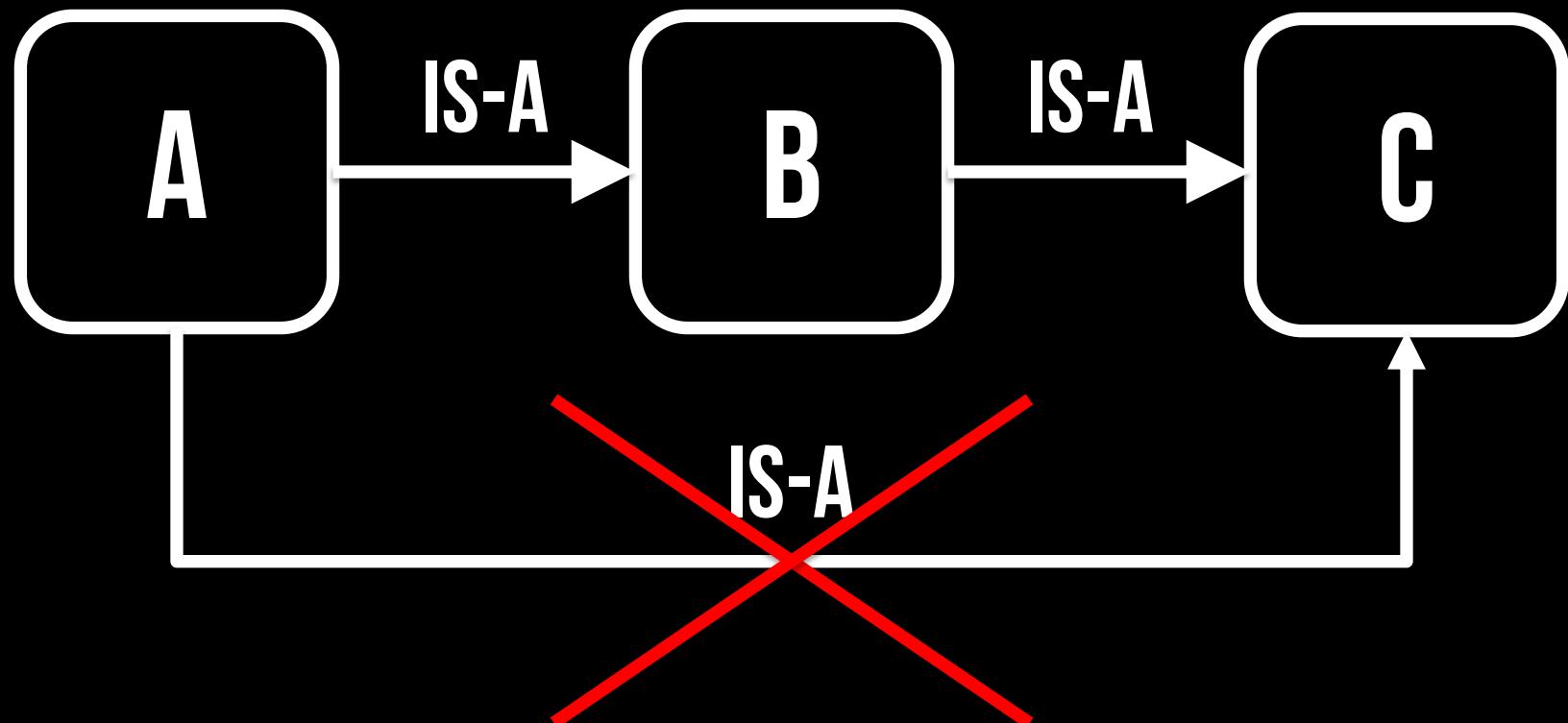
PENGUINS ARE **ATYPICAL** BIRDS

**TYPICAL CASES
ARE CATEGORIZED AT
THE BASIC LEVEL**

**ATYPICAL CASES
ARE CATEGORIZED AT
THE SUBORDINATE LEVEL**

TROUBLE IN TAXONOMY TOWN

NON-TRANSITIVITY





CHAIR IS FURNITURE?



CHAIR IS FURNITURE?



YES



CAR SEAT IS CHAIR?



CAR SEAT IS CHAIR?



YES



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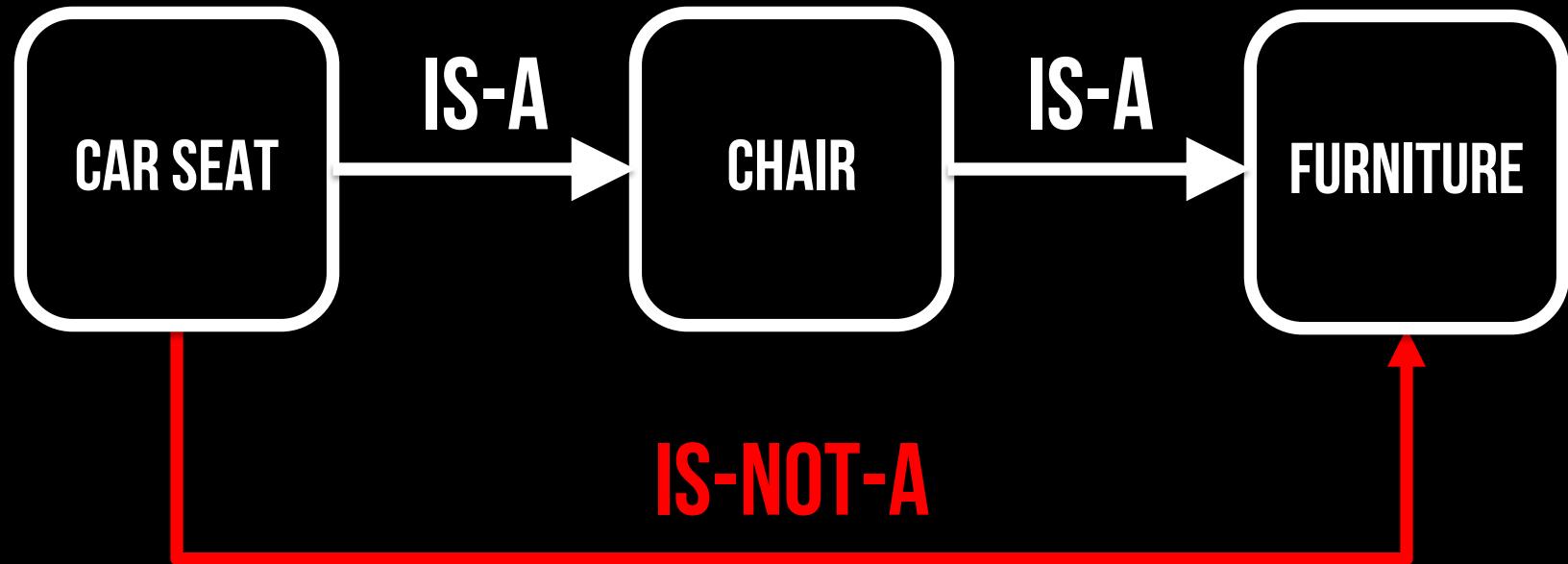
CAR SEAT IS FURNITURE?



CAR SEAT IS FURNITURE?



NO



CATEGORIES ARE FUZZY

DEGREES OF MEMBERSHIP

EDGE CASES

NEGOTIATING CATEGORIES



IS HTML A PROGRAMMING LANGUAGE?

**DO WE WANT HTML TO BE A
PROGRAMMING LANGUAGE?**

DESCRIPTIVE VS NORMATIVE

**THE PROBLEM IS NOT THE OBJECT
BUT THE CATEGORY**

PLATYPUS AGREES



CATEGORY DISCUSSION AS PROXY DISCUSSION

**CATEGORY DEFINITION IS
POWER OVER THE DOMAIN**

IS X A MEMBER OF Y?

WHAT ARE THE IMPLICATIONS?

PROS AND CONS

TRADEOFFS

MODELLING

MODELLING AS TECHNIFICATION OF CATEGORIES

ELIMINATING AMBIGUITY

HANDLING EDGE CASES

**TECHNIFICATION OF CATEGORIES
HAVE SURPRISING CONSEQUENCES**

NUTS ARE FRUITS?!?

ALMONDS ARE NOT NUTS?!?

WE'RE WRONG ABOUT EVERYTHING!!!

BUT WE'RE NOT WRONG

CONTEXT

EVERYDAY VS TECHNICAL CATEGORIES

TECHNICAL CATEGORIES FOR PRECISION

PRECISION COMES AT A COST



VARIATIONS ON A THEME

UNMARRIED PEOPLE LIVING TOGETHER

**TWO PEOPLE ABOVE 18 YEARS OF AGE
WHO ARE NOT MARRIED, REGISTERED
PARTNER OR LIVING WITH ANYONE ELSE**

**TWO PEOPLE WHO USUALLY LIVE
TOGETHER EVEN IF THEY ARE
TEMPORARILY SEPARATED**

**TWO PEOPLE LIVING IN THE SAME
HOUSE, EVEN IF THEY LIVE IN SEPARATE
PARTS OF THE HOUSE**

[...] UNLESS THEY EACH LIVE IN
SEPARATE UNITS IN A HOUSE WITH
FOUR OR MORE INDEPENDENT AND
CLEARLY SEPARATED UNITS

HAVE PREVIOUSLY BEEN MARRIED

LIVING TOGETHER IN A MARRIAGE-LIKE RELATIONSHIP

**COULD LEGALLY GET MARRIED OR
ENTER PARTNERSHIP**

**HAVE OR ARE EXPECTING
CHILDREN TOGETHER**

**HAVE OR HAVE HAD
CHILDREN TOGETHER**

JOINT RESIDENCE

COMMON HOUSEHOLD

**HAVE LIVED TOGETHER
FOR AT LEAST 12 MONTHS**

**HAVE LIVED TOGETHER
FOR 12 OF THE LAST 18 MONTHS**

INTEND TO KEEP LIVING TOGETHER

PRECISION COMES AT A COST

EXPLOSION OF SIMILAR CATEGORIES

SIMPLIFICATION?

WE MUST CHOOSE

CHOICES ARE NOT RIGHT OR WRONG

CHOICES HAVE CONSEQUENCES

DECISIONS

IMPLICIT MODEL OF THE WORLD

IMPLICIT OPINIONS ABOUT WHAT MATTERS AND WHAT DOES NOT

TACIT ASSUMPTIONS

BETS AGAINST THE FUTURE

**ASSUMPTIONS AND DECISIONS
ACCUMULATE OVER TIME**

ACCUMULATED ASSUMPTION LOAD



« TECHNICAL DEBT »

**THE INEVITABLE BYPRODUCT
OF CHANGE AND INERTIA**

CHANGE IMPACT

**HOW LONG DOES THIS
FEATURE TAKE TO IMPLEMENT?**

**HOW DOES THIS FEATURE
CHANGE OUR MENTAL MODEL?**

**HOW MANY ASSUMPTIONS
ARE INVALIDATED?**

**HOW MANY DECISIONS MUST BE
UNDONE AND REMADE?**

HOW MUCH STRUCTURE RELIES ON INVALIDATED ASSUMPTIONS?

HOW MUCH STRUCTURE RELIES ON OBSOLETE DECISIONS?

TECHNICAL STRUCTURE

ORGANIZATIONAL STRUCTURE

ECONOMIC STRUCTURE

POWER STRUCTURE

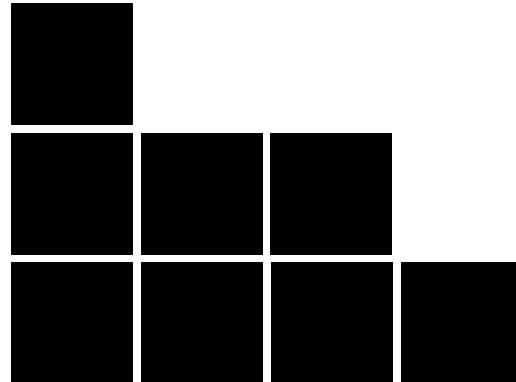
INTERTWINED MUTUALLY REINFORCING STRUCTURES

ENTRENCHMENT

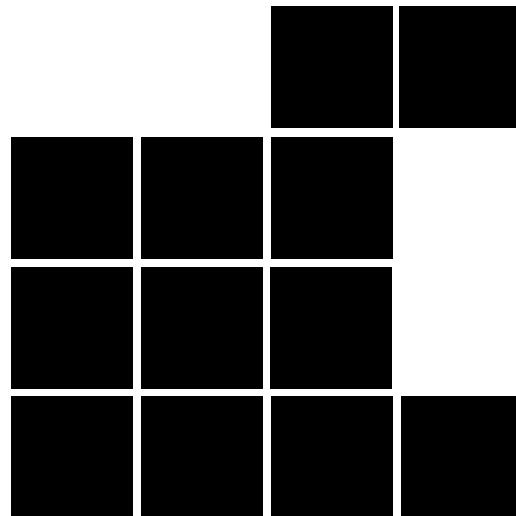
OSSIFICATION



ASSUMPTION

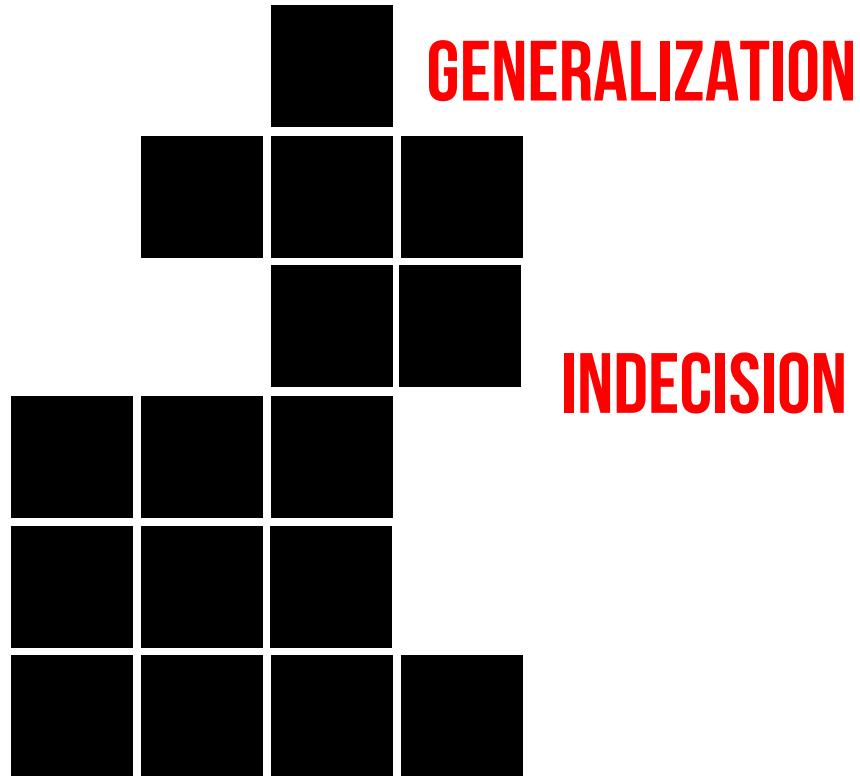


ASSUMPTION

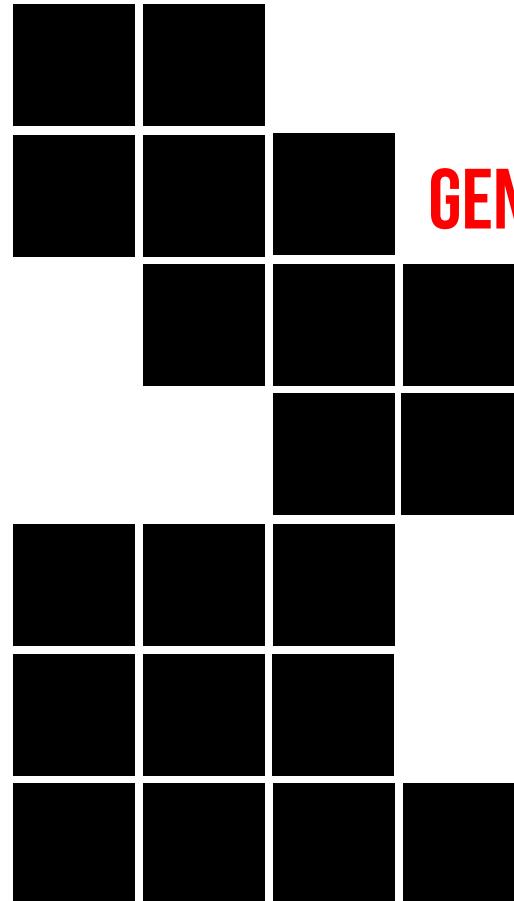


INDECISION

ASSUMPTION



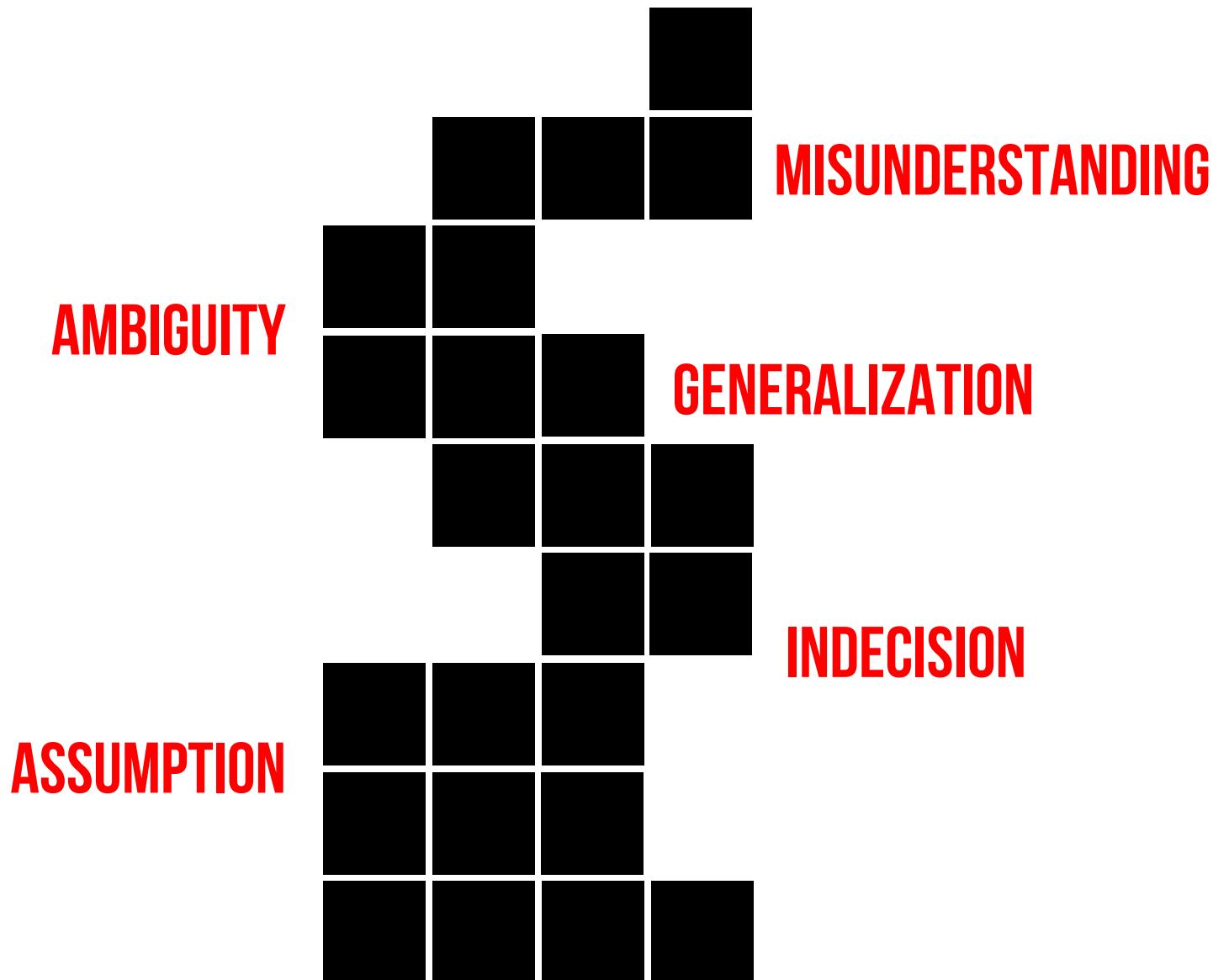
AMBIGUITY

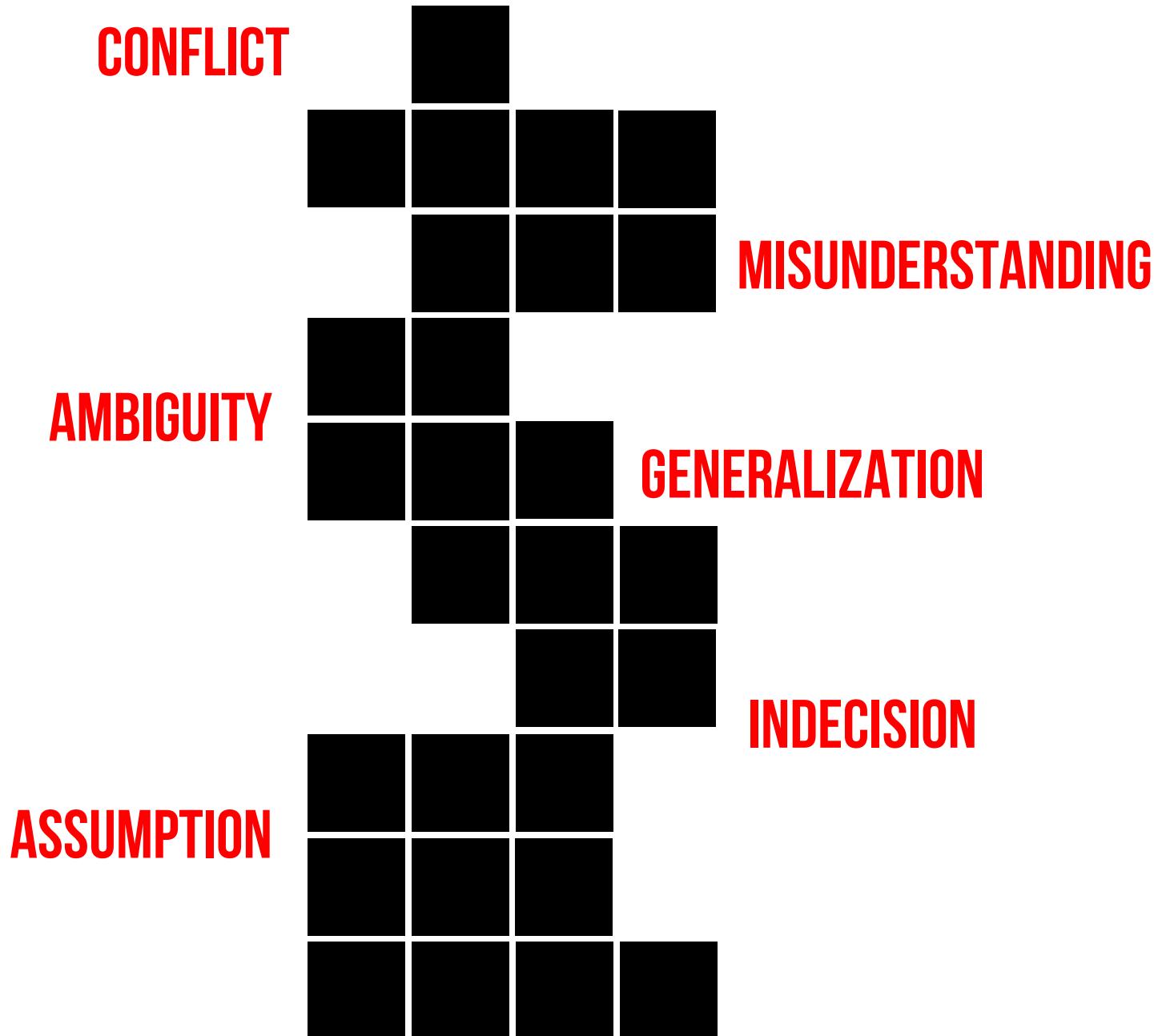


GENERALIZATION

ASSUMPTION

INDECISION





CONFFLICT

MISUNDERSTANDING

AMBIGUITY

GENERALIZATION
GAME OVER

INDECISION

ASSUMPTION

HOW TO PLAY WELL?

MODELLING IS OUR BEST BET

MODELLING AS DELIBERATE DESIGN OF TECHNICAL CATEGORIES

MODELLING IS DIFFICULT

MODELLING IS META-PROGRAMMING

DISCOMFORT

RELUCTANCE

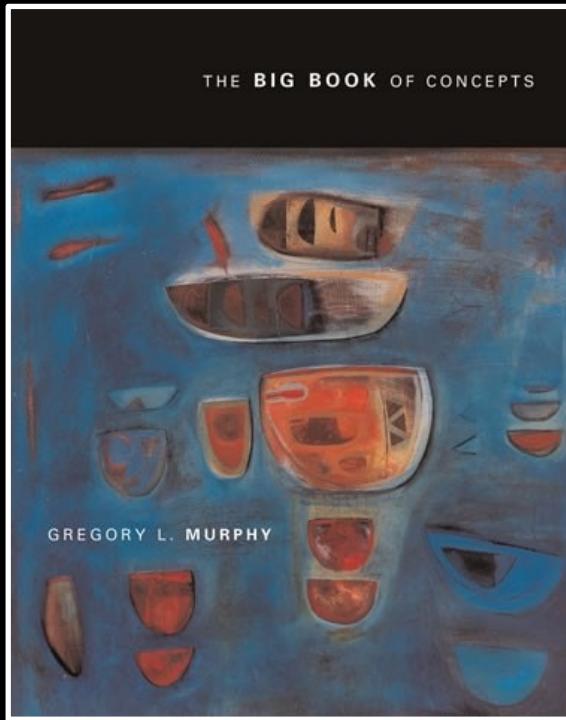
**« WHY ARE YOU MAKING IT
SO COMPLICATED? »**

**TO AVOID MAKING IT UNNECESSARILY
COMPLICATED OVER TIME**

MODELLING IS TEACHABLE

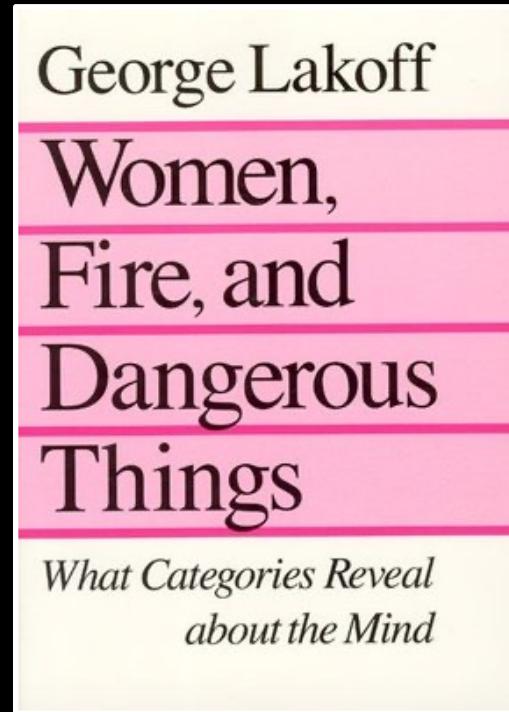
LEARN ABOUT CATEGORIES

THE BIG BOOK OF CONCEPTS



GREGORY L. MURPHY

WOMEN, FIRE, AND DANGEROUS THINGS



GEORGE LAKOFF

SORTING THINGS OUT



BOWKER AND STAR



charlesazorn
@charlesazorn

...

Bees Are Officially a Type of Fish, California Judges Say



insider.com

California court rules that bees are a type of fish in order to protect them under...

In a move that thrilled bee enthusiasts, California judges decided that endangered invertebrates were legally protected — under the category of "fish"

1:20 PM · Jun 17, 2022 · Twitter for Android