USING RECENT DEVELOPMENTS IN RELATIONAL FRAME THEORY TO INCREASE ITS UTILITY IN APPLIED BEHAVIOUR ANALYSES OF HUMAN LANGUAGE AND COGNITION

DERMOT BARNES-HOLMES, COLIN HARTE, JOÃO H. DE ALMEIDA & CAROLINA SILVEIRA

THE PSYCHOLOGICAL SOCIETY OF IRELAND'S DIVISION OF BEHAVIOUR ANALYSIS,
16th SEPTEMBER 2021

Ulster University

ufsc

centro paradigma ciências do comportamento

Universidade Estadual de Londrina

abakids desenvolvimento infantil

Dermot Barnes-Holmes

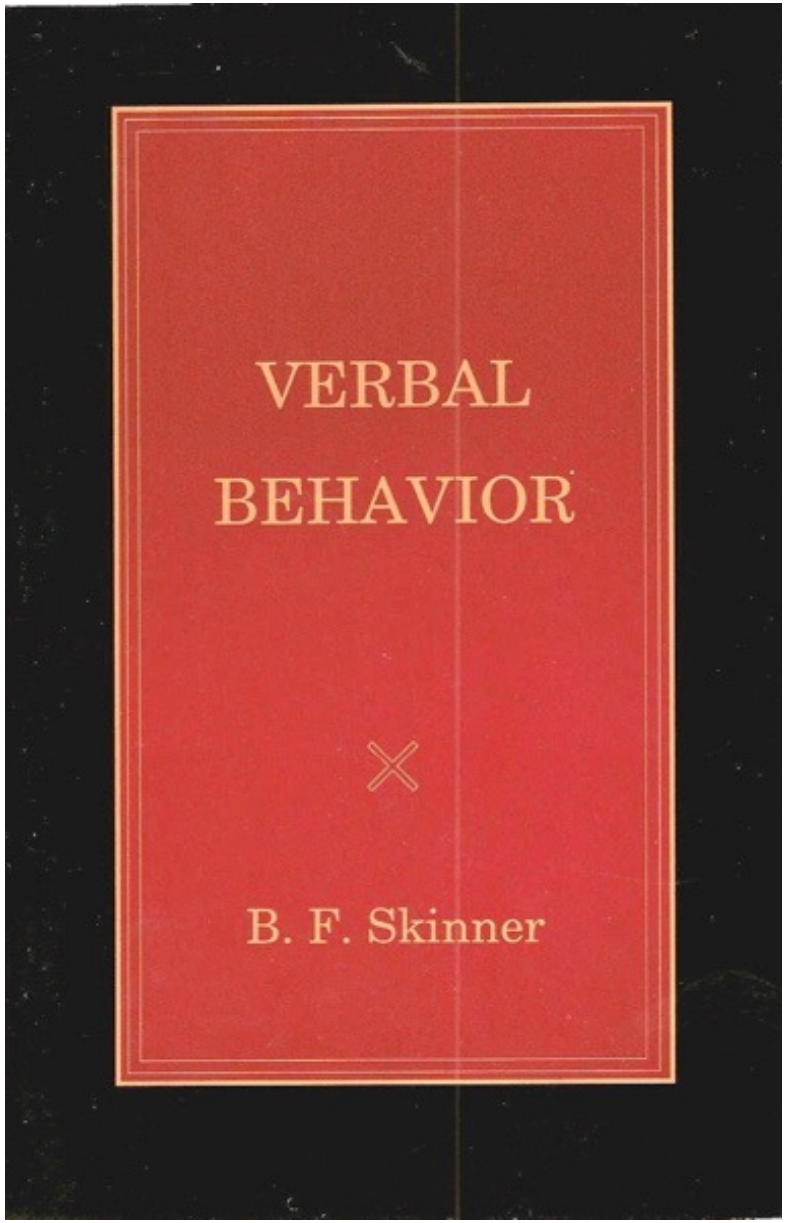
Colin Harte

Joao H. de Almeida

Carolina Silveira

WHAT IS RFT? A BRIEF HISTORY

- **First major behaviour analytic treatise on human language**
  - Largely a work of interpretation
  - Limited basic research but influential in remediating language deficits
  - Examples of derived relations appear but constrained by methodology and empirical work at that time



A DECADE LATER…

- **<u>Skinner proposes the concept of rule-governed behavior</u>**
  - Rule-governed behavior distinguished from direct control by contingencies
  - Rules specify contingencies, which circumvents the need to contact contingencies directly
  - Produces many basic research studies, particularly related to "schedule insensitivity effects" in verbal humans

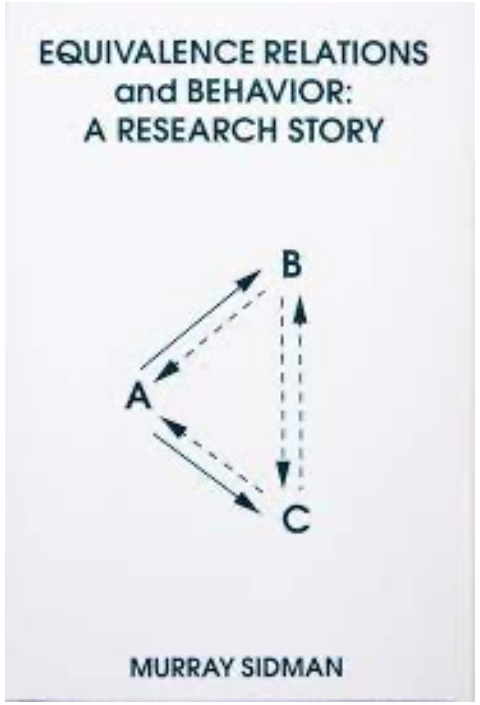
An operant analysis of problem solving

A DECADE LATER…

- **Skinner proposes the concept of rule-governed behavior**
  - Also many studies on the impact of rules per se (e.g., rules that specify the contingencies versus performance)
  - Recognized that rule-governed behavior may be beneficial in problem solving but may come at a cost
  - Also, some researchers asked how do rules specify contingencies?

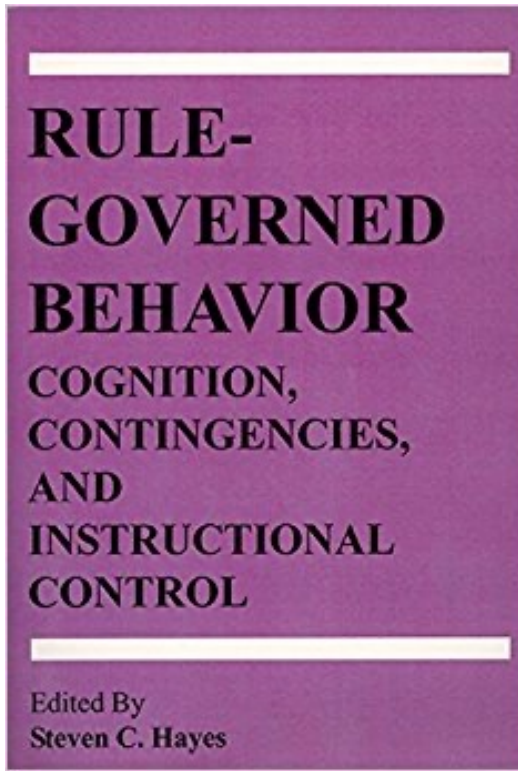
An operant analysis of problem solving

FIVE YEARS LATER…



- **Sidman offers an answer…**
  - Equivalence relations provide a functional-analytic definition of symbolic relations (i.e., specification)
  - The importance of Sidman's discovery is recognized immediately, but the conceptual implications emerge gradually through the 1970's, culminating in the 1982 "primates fail symmetry tests" JEAB article
  - A series of written exchanges between Sidman and Willard Day reveal that the idea of equivalence relations as symbolic relations was controversial…

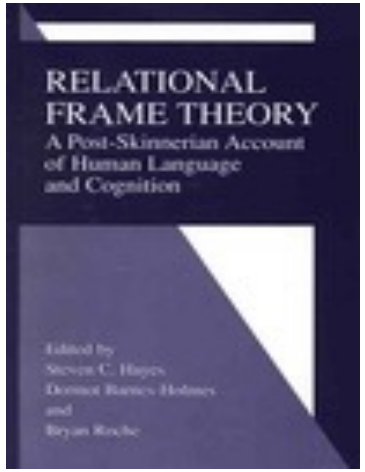
DURING THE MID 80S



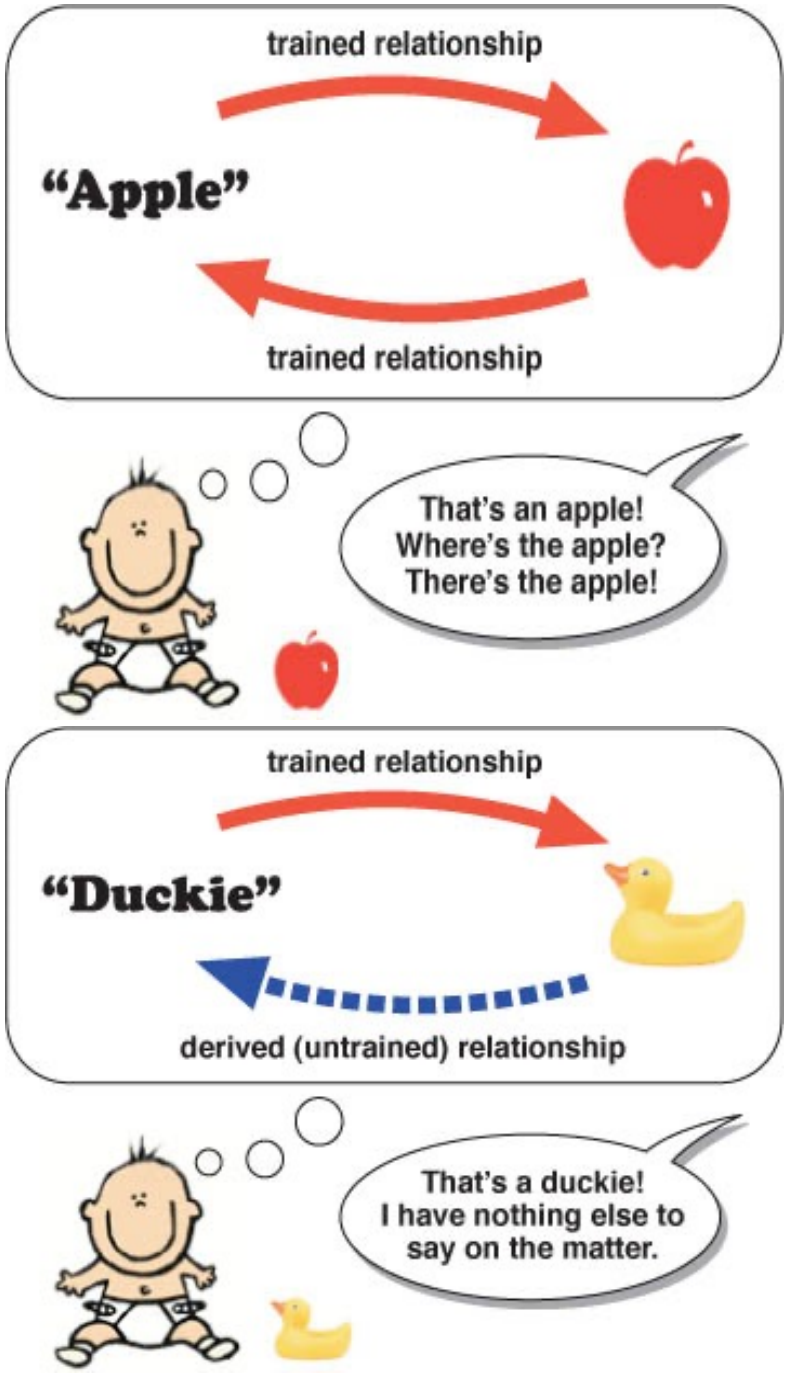
- **Hayes argued that equivalence is a generalized relational operant**
  - These operants are typically established through natural language interactions
  - Many such operants or "relational frames" are possible
  - Relational frames combine into networks of relations to form rules or instructions
  - Basic account presented across two chapters in 1989 book on Rule-Governed Behavior. . .

RFT BOOK IN 2001

- **<u>RFT presented as a behaviour-analytic account of human language and cognition (not just rules)</u>**

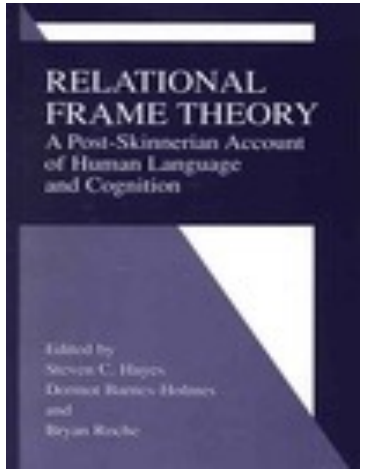


- Core operant process is named arbitrarily applicable relational responding (AARR)
- AARR as a generalized operant is learned and consists of **mutually entailed relations**…

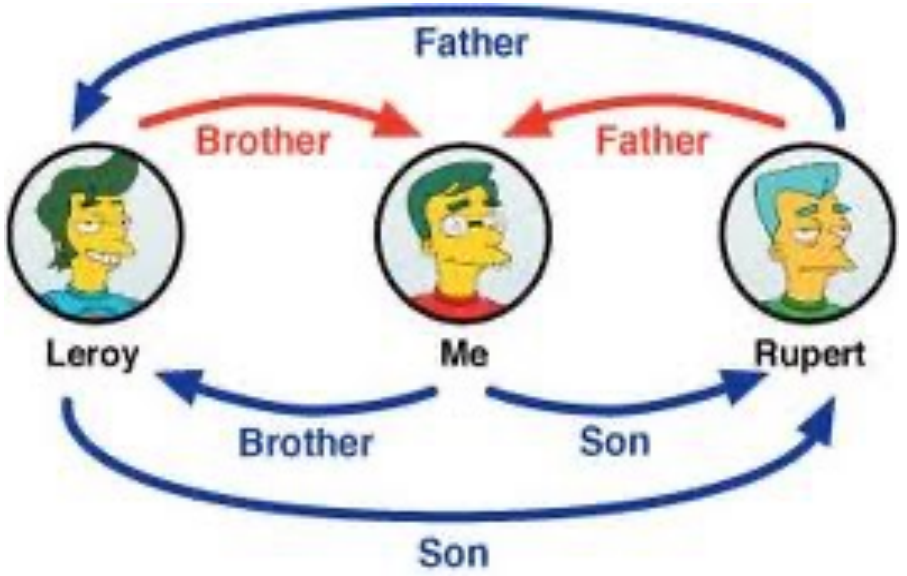


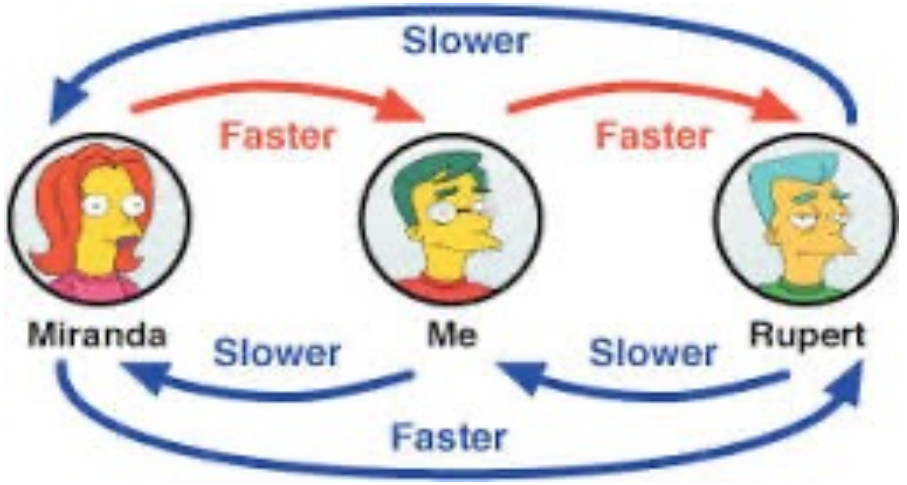
RFT BOOK IN 2001

- **<u>RFT presented as a behaviour-analytic account of human language and cognition (not just rules)</u>**



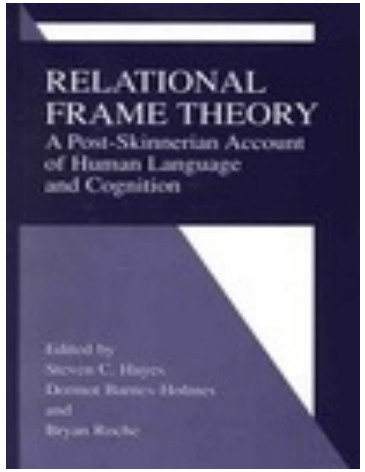
- Core operant process is named arbitrarily applicable relational responding (AARR)
- AARR as a generalized operant is learned and consists of **relational frames…**



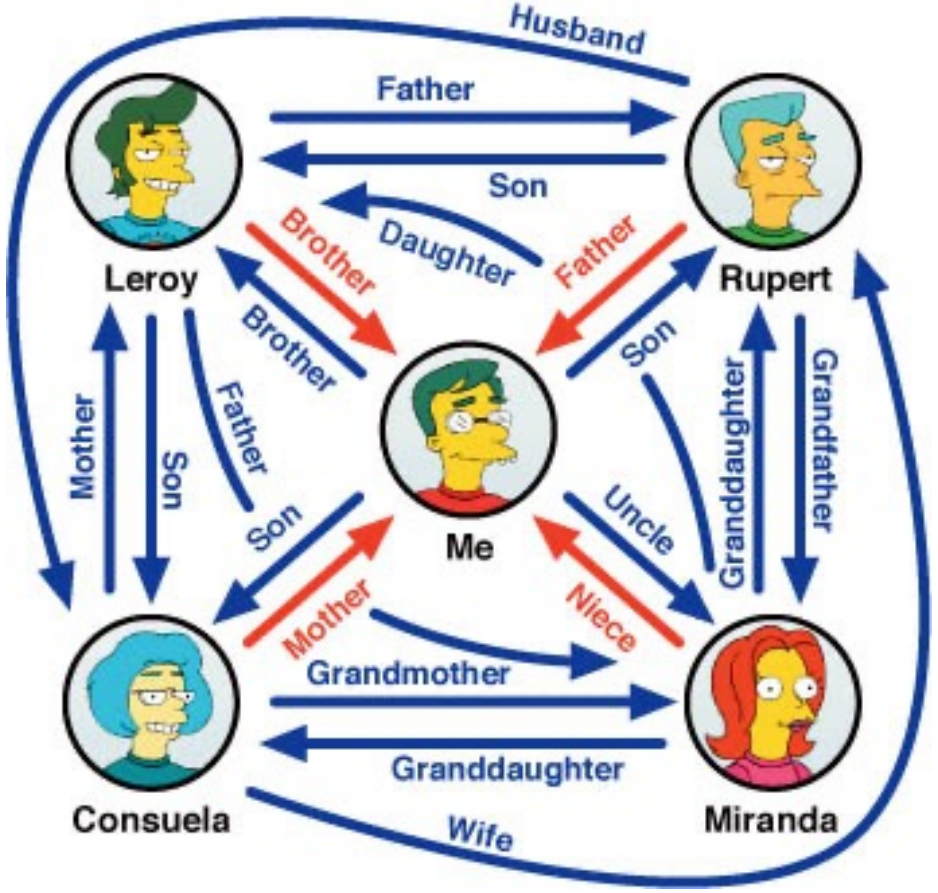


RFT BOOK IN 2001

- **<u>RFT presented as a behaviour-analytic account of human language and cognition (not just rules)</u>**

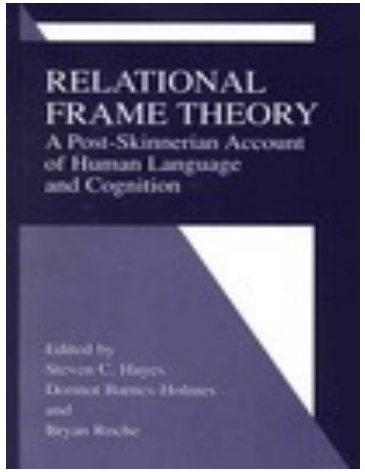


- Core operant process is named arbitrarily applicable relational responding (AARR)
- AARR as a generalized operant is learned and consists of (complex) **relational networks…**

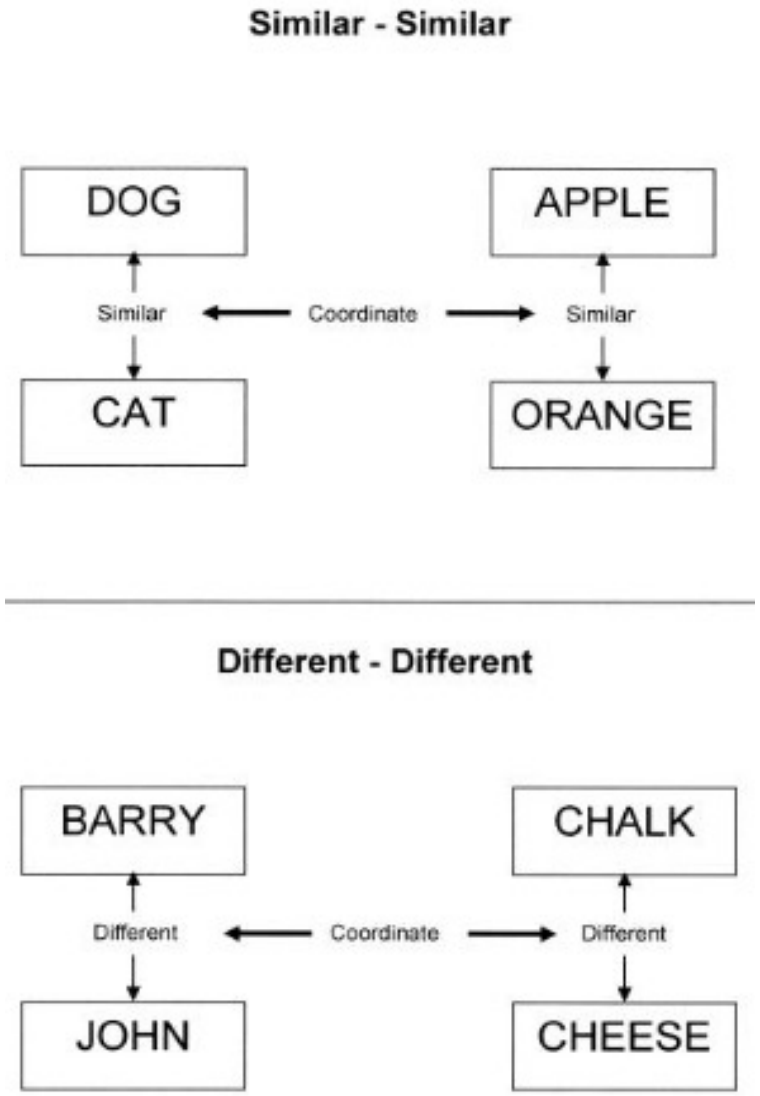


RFT BOOK IN 2001

- **<u>RFT presented as a behaviour-analytic account of human language and cognition (not just rules)</u>**

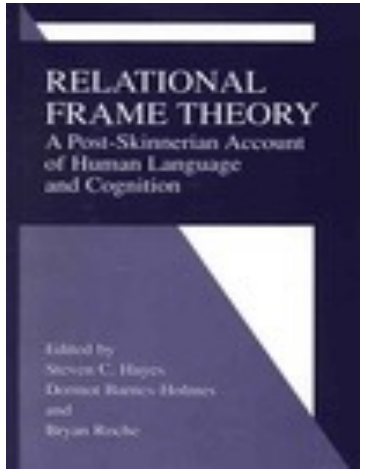


- Core operant process is named arbitrarily applicable relational responding (AARR)
- AARR as a generalized operant is learned and consists of **relating relations…**

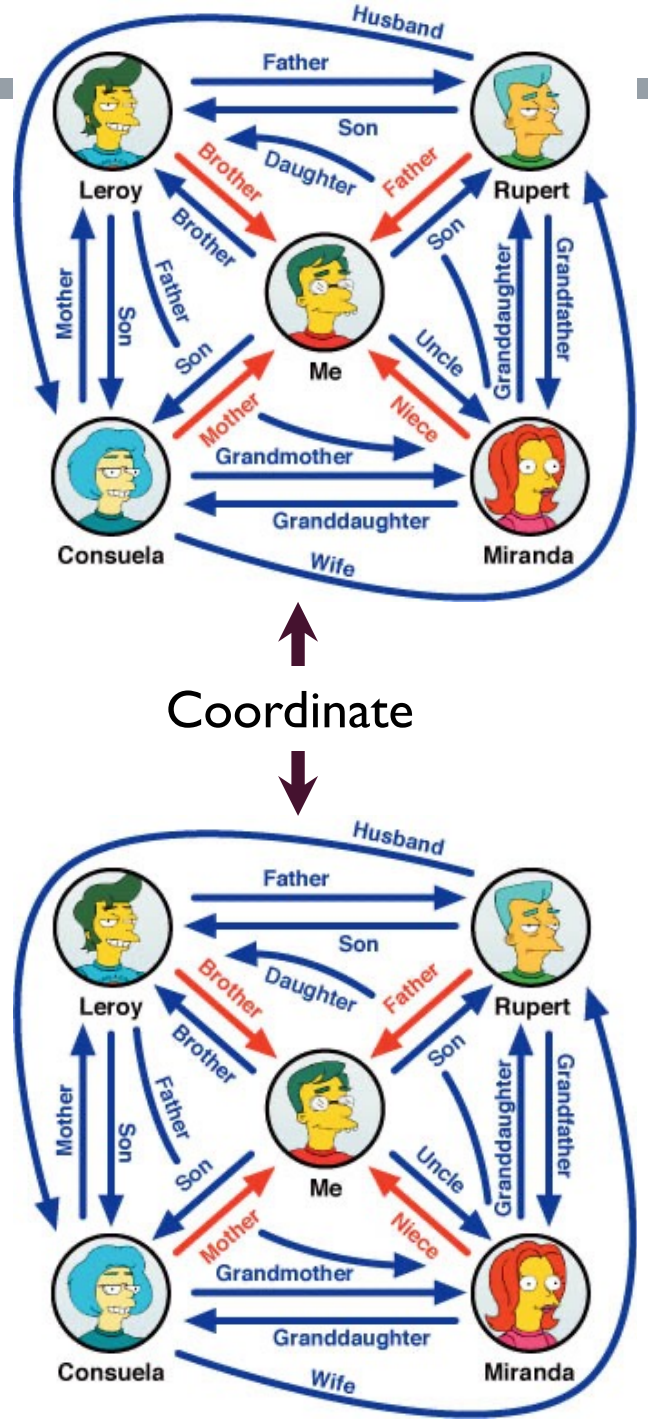


RFT BOOK IN 2001

- **<u>RFT presented as a behaviour-analytic account of human language and cognition (not just rules)</u>**

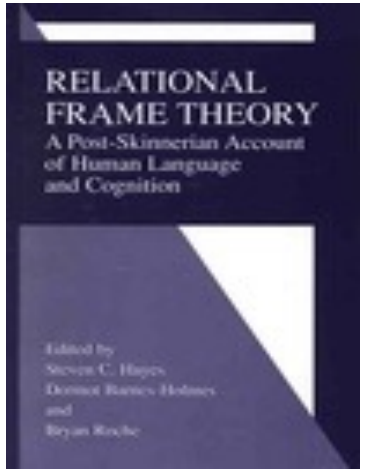


- Core operant process is named arbitrarily applicable relational responding (AARR)
- AARR as a generalized operant is learned and consists of **relating relational networks…**



RFT BOOK IN 2001…

- **RFT presented as a behaviour-analytic account of human language and cognition (not just rules)**

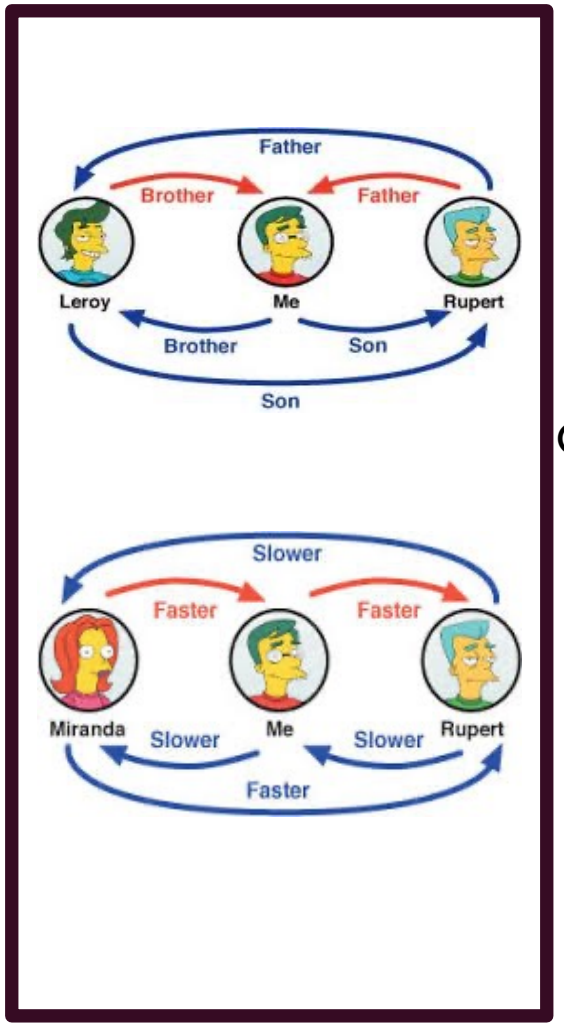


- Core operant process is named arbitrarily applicable relational responding (AARR)
- AARR as a generalized operant is learned and consists of **relating relational networks of increasing complexity…**

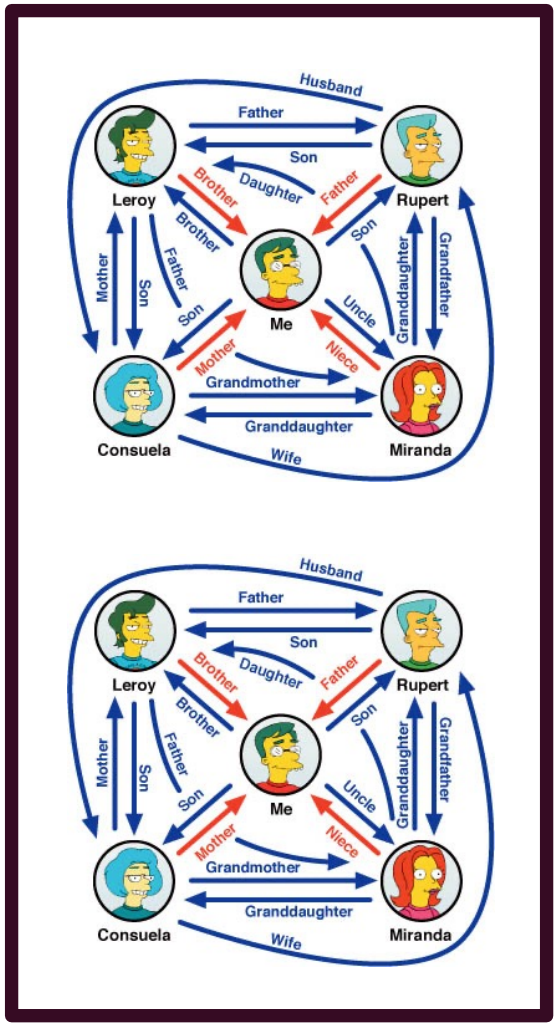
A Hierarchical Network of Relational Networks

Small Networks

Large Networks



Comparative



Journal of Contextual Behavioral Science 6 (2017) 434–445

Contents lists available at ScienceDirect

Journal of Contextual Behavioral Science

journal homepage: www.elsevier.com/locate/jcbs

Empirical Research

From the IRAP and REC model to a multi-dimensional multi-level framework for analyzing the dynamics of arbitrarily applicable relational responding*

Dermot Barnes-Holmes[a,*], Yvonne Barnes-Holmes[a], Carmen Luciano[b], Ciara McEnteggart[a]

[a] Ghent University, Ghent, Belgium
[b] University of Almería, Almería, Spain

ARTICLE INFO

Keywords:
Relational frame theory
Multi-dimensional
Multi-level
Dynamics
Arbitrarily applicable relational responding

ABSTRACT

The article presents the beginnings of a conceptual framework for analyzing the dynamics of arbitrarily applicable relational responding (AARRing). The framework focuses on the dimensions and levels of AARRing that have been the focus of empirical and conceptual analyses in the literature on relational frame theory over the past 30 years. The name of the framework is abbreviated the MDML, and the conceptual and empirical context from which it emerged is presented. The framework currently consists of four dimensions, (i) coherence, (ii) complexity, (iii) derivation, and (iv) flexibility; and five levels of relational development, (i) mutual entailing, (ii) relational framing, (iii) relational networking, (iv) relating relations, and (v) relating relational networks. Within the MDML, each of the dimensions intersect with each of the levels, yielding 20 potential units of behavioral analysis, defined as functional-analytic abstractive relational quanta (abbreviated as FAARQs). Some of the conceptual and empirical implications of the MDML are considered, focusing in particular on how it highlights the dynamic properties of AARRing. Specific examples of how the MDML is (and may) impact upon research in relational frame theory are also presented.

A brief outline of the multi-dimensional multi-level framework for analyzing the dynamics of arbitrarily applicable relational responding (AARRing) was provided in a recent chapter, which functioned as an introduction to a section on relational frame theory (RFT) in the *Wiley Handbook of Contextual Behavioral Science* (Barnes-Holmes, Barnes-Holmes, Hussey, & Luciano, 2016). In that chapter, we argued that the proposed framework would provide a context for analyzing the dynamics of AARRing by conceptualizing such behavior in terms of multiple dimensions and multiple levels, and abbreviated the name of the framework, the MDML.[1] The key purpose of the current article is to present a more detailed or elaborate view of the MDML than was presented in the chapter of the recent handbook. In so doing, it should be clear that we are not seeking to replace RFT with something fundamentally new or different. Rather, we hope to focus on and extend those features of the original theory that appear to us to be the most important at the current time, but perhaps have remained somewhat understated in much of the early work on RFT. What we present here, therefore, is not an alternative to RFT as presented in the seminal volume (Hayes, Barnes-Holmes, & Roche, 2001), but an exercise in focusing on those features of the theory that seem to us to be most in need of emphasis as we move forward with the reinvigorating model of basic and applied science that serves to characterize contextual behavioral science itself (see Hayes, Barnes-Holmes et al., 2012).

1. What is the MDML and what does it offer?

At this point in an earlier version of the current paper we first presented the historical background to the MDML before describing the framework itself and explaining why we think it may be a useful tool within contextual behavioral science and perhaps beyond. During the review process, however, it became clear that it was important to begin with a basic outline of the MDML and to provide at least one or two examples of the motivation behind its development. Adopting this strategy requires that the reader who is unfamiliar with the MDML

* Authors' Note: This article was prepared with the support of an Odysseus Group 1 grant awarded to the first author by the Flanders Science Foundation (FWO) and partly funded by PSI2014-56610 (Ministerio Economía y Competitividad, Spain) to the third author. * Correspondence to Department of Experimental, Clinical, and Health Psychology, Ghent University, Henri Dunantlaan 2, B-9000 Ghent, Belgium.
Email address: Dermot.BarnesHolmes@ugent.be (D. Barnes-Holmes).

[1] As explained in greater detail later in the paper, the term "dynamics" refers to the ways in which the units of analysis, created by the intersection between the levels and dimensions specified within the MDML, interact with each other.

http://dx.doi.org/10.1016/j.jcbs.2017.08.001
Received 4 May 2017; Accepted 4 August 2017

A FRAMEWORK FOR RFT

- **2017 and beyond: A multi-dimensional, multi-level (MDML) framework for analysing the dynamics of AARR**
  - On balance, the domain of human language and cognition is far from simple and behavior analysts have been grappling with it since the 1950s
  - A single overarching framework that summarizes how RFT is approaching the experimental analysis of human language and cognition reveals the challenge we face…

THE MULTI-DIMENSIONAL, MULTI-LEVEL (MDML) FRAMEWORK

Levels	Dimensions			
	Coherence	*Complexity*	*Derivation*	*Flexibility*
Mutual Entailing	Coh/Mut-Ent	Cpx/Mut-Ent	Dev/Mut-Ent	Flx/Mut-Ent
Relational Framing	Coh/Frame	Cpx/Frame	Dev/Frame	Flx/Frame
Relational Networking	Coh/Net	Cpx/Net	Dev/Net	Flx/Net
Relating Relations	Coh/Rel-Rel	Cpx/Rel-Rel	Dev/Rel-Rel	Flx/Rel-Rel
Relating Relational Networks	Coh/Rel-Net	Cpx/Rel-Net	Dev/Rel-Net	Flx/Rel-Net

COHERENCE

- **Coherence** refers to the extent to which a pattern of derived relational responding coheres with previously established patterns of such responding.
  - For example, if an individual is told that stimulus A is larger than B, and is subsequently told that stimulus B is smaller than A, the latter statement would likely be deemed coherent with the former.
  - In this instance, coherence would be relatively high because the overall pattern (A>B = B<A) coheres so consistently with the way in which such verbal relations have been established by the wider verbal community
  - I.e., there are few instances in which the statement, "if A is bigger than B, then B is bigger than A" would be reinforced, or not punished/corrected, by an English-speaking listener).

COMPLEXITY

- **Complexity** refers to the intricacy or density of a pattern of derived relational responding including differing levels of complexity in contextual control

- For example, all things being equal;

  - if A = B then B = A involves only one relation,
  - A > B then B < A involves two relations,
  - If A = B and B = A on the basis of color involves only one contextual dimension,
  - If A = B and B = A on the basis of color and shape involves two contextual dimensions,
  - If A = B and B = A on the basis of an arbitrary cue (e.g., "is a") likely involves a more extensive (complex) history than (simple) non-arbitrary contextual control; note also that arbitrary cues require low levels of (simple) orienting responses.

DERIVATION

- **Derivation** refers to the extent to which a particular pattern of derived relational responding has previously been emitted or "practiced."

- Within the new framework, each time a relation is derived its level of derivation reduces because it acquires its own history that extends beyond the derivation that is made from the "baseline" relation;

  - If an individual learns that A is bigger than B, and thus derives that B is smaller than A, the first time that the B<A relation is derived it is derived "directly" from the A>B "baseline" relation.

  - However, if the individual subsequently continues to respond to B as smaller than A, that relational response gradually acquires its own history that renders it less and less derived from the original baseline relation (i.e., A bigger than B).

FLEXIBILITY

- **Flexibility** refers to the extent to which a particular pattern of derived relational responding may be modified by a contextual variable.

  - E.g., when playing a game of **"give me the wrong answer"** tell me what 2 x 2 equals. . . (4) as quickly as you can?

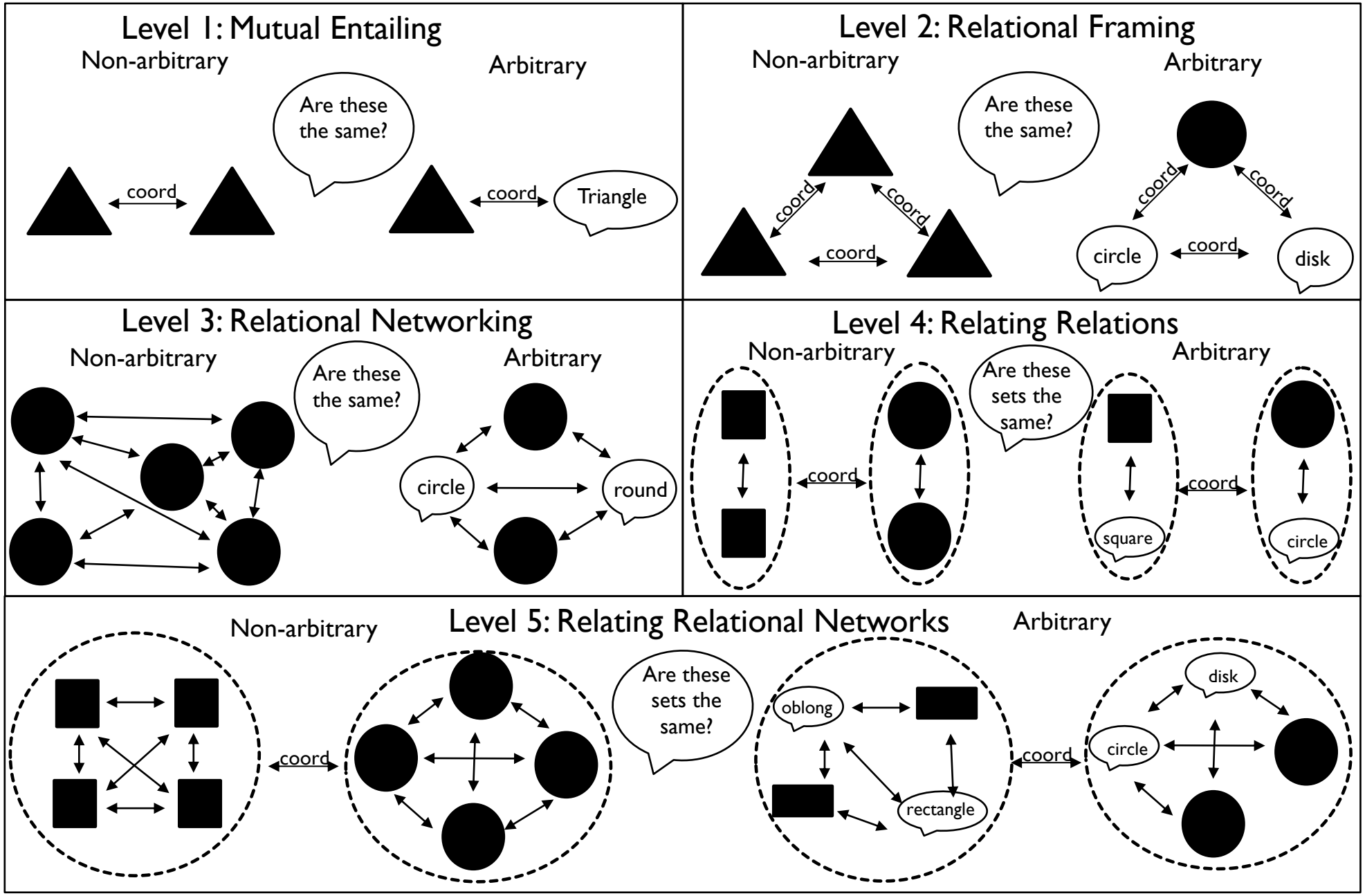
THE MDML FRAMEWORK

Levels	Dimensions			
	Coherence	*Complexity*	*Derivation*	*Flexibility*
Mutual Entailing	Coh/Mut-Ent	Cpx/Mut-Ent	Dev/Mut-Ent	Flx/Mut-Ent
Relational Framing	Coh/Frame	Cpx/Frame	Dev/Frame	Flx/Frame
Relational Networking	Coh/Net	Cpx/Net	Dev/Net	Flx/Net
Relating Relations	Coh/Rel-Rel	Cpx/Rel-Rel	Dev/Rel-Rel	Flx/Rel-Rel
Relating Relational Networks	Coh/Rel-Net	Cpx/Rel-Net	Dev/Rel-Net	Flx/Rel-Net

MAKING THE ABSTRACT MORE CONCRETE

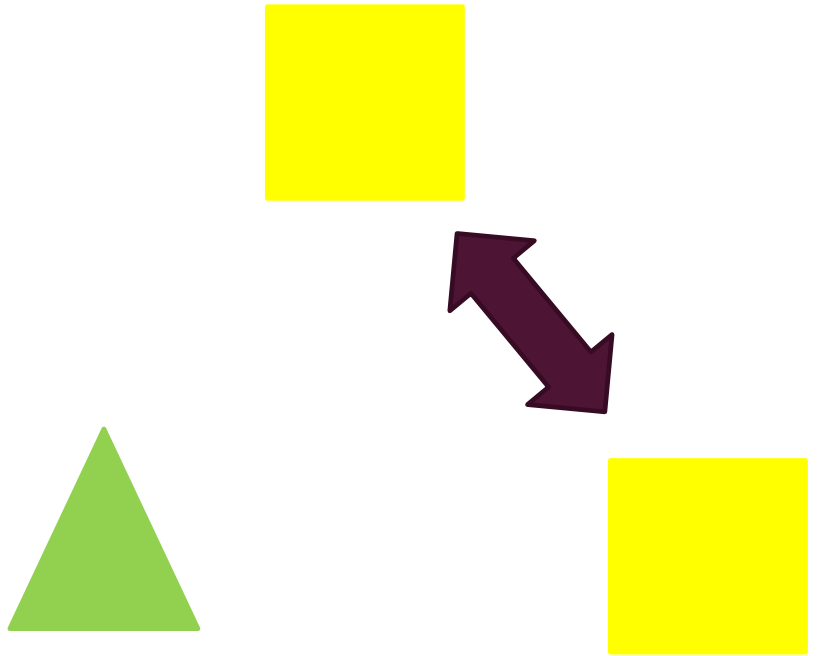
PRACTICAL IMPLICATIONS FOR ABA

COORDINATION


Level 1: Mutual Entailing
Non-arbitrary
Arbitrary
Are these the same?
coord
coord
Triangle
Level 2: Relational Framing
Non-arbitrary
Arbitrary
Are these the same?
coord
coord
coord
coord
coord
circle
disk
Level 3: Relational Networking
Non-arbitrary
Arbitrary
Are these the same?
circle
round
Level 4: Relating Relations
Non-arbitrary
Arbitrary
Are these sets the same?
coord
coord
square
circle
Level 5: Relating Relational Networks
Non-arbitrary
Arbitrary
coord
Are these sets the same?
oblong
rectangle
coord
disk
circle

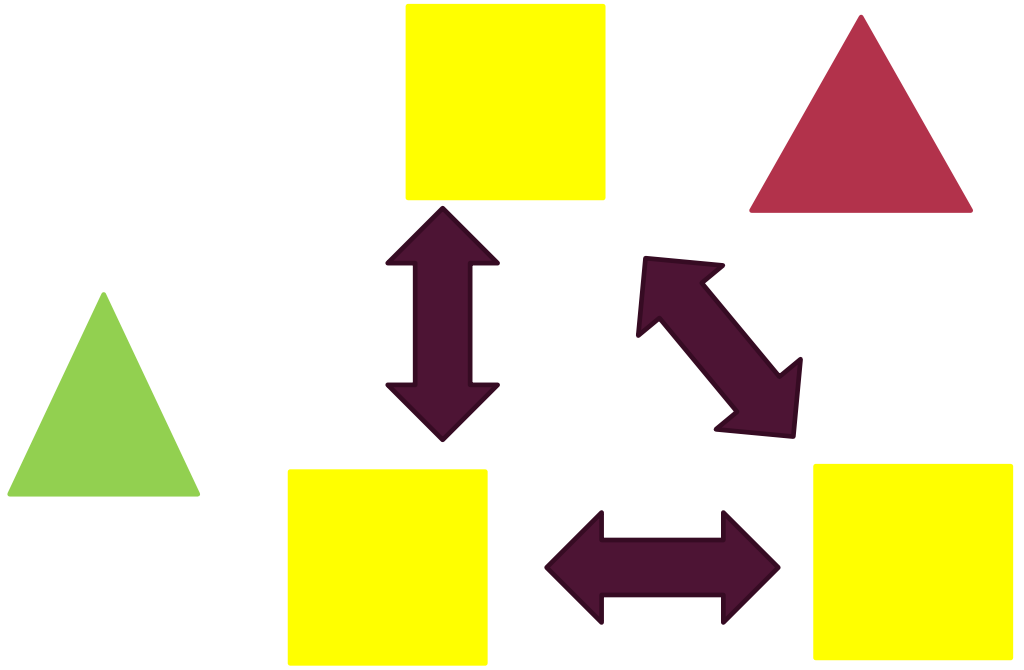
LEVEL 1 – COORDINATION (NON ARBITRARY RELATIONS)

- The video presented here was removed for this pdf to protect the anonymity of the participant involved.



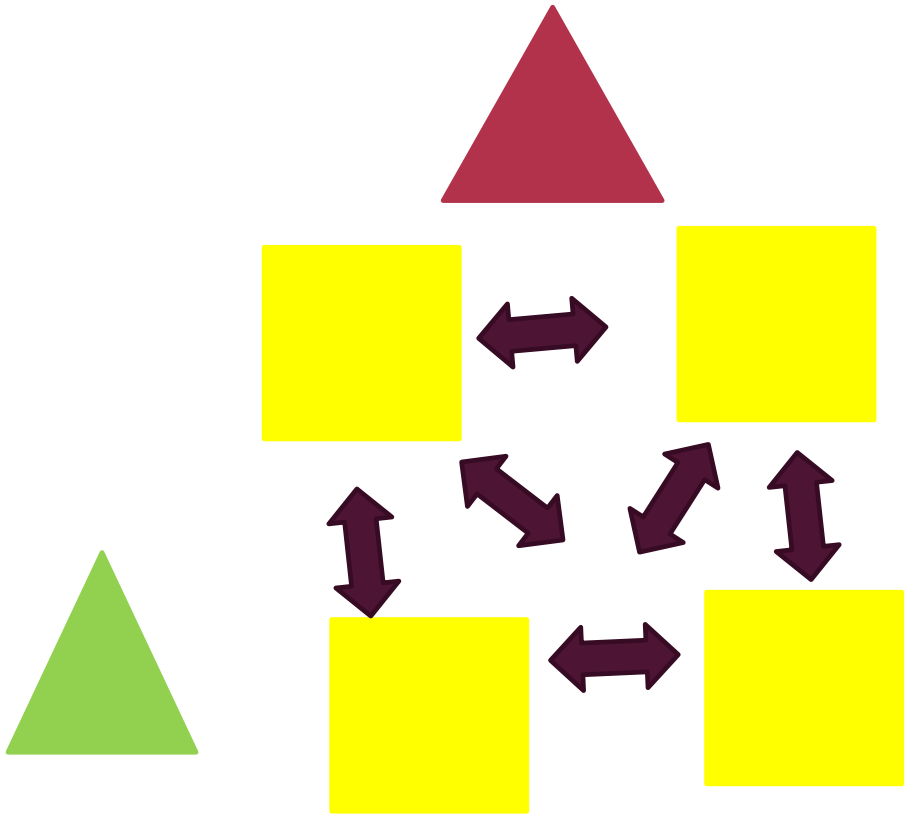
LEVEL 2 – COORDINATION (NON ARBITRARY RELATIONS)

- The video presented here was removed for this pdf to protect the anonymity of the participant involved.



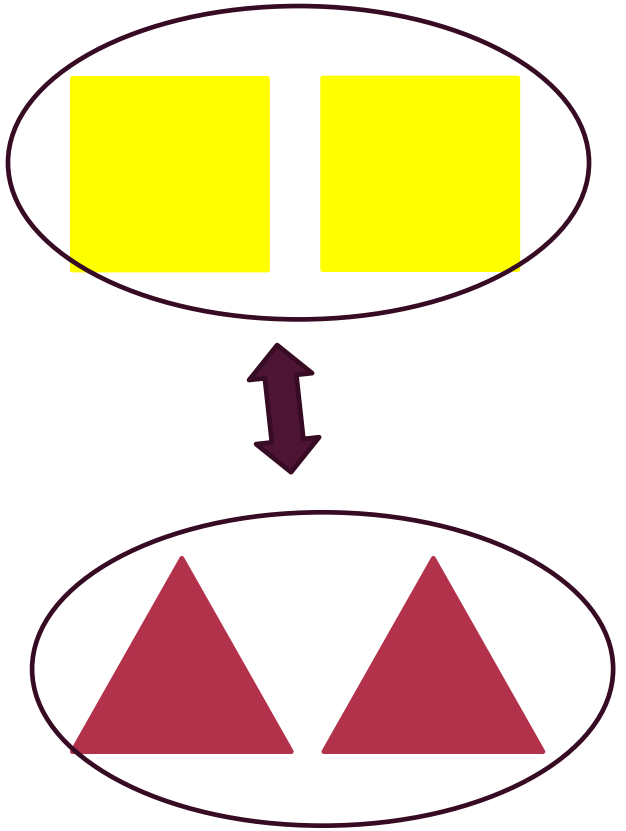
LEVEL 3 – COORDINATION (NON ARBITRARY RELATIONS)

- The video presented here was removed for this pdf to protect the anonymity of the participant involved.



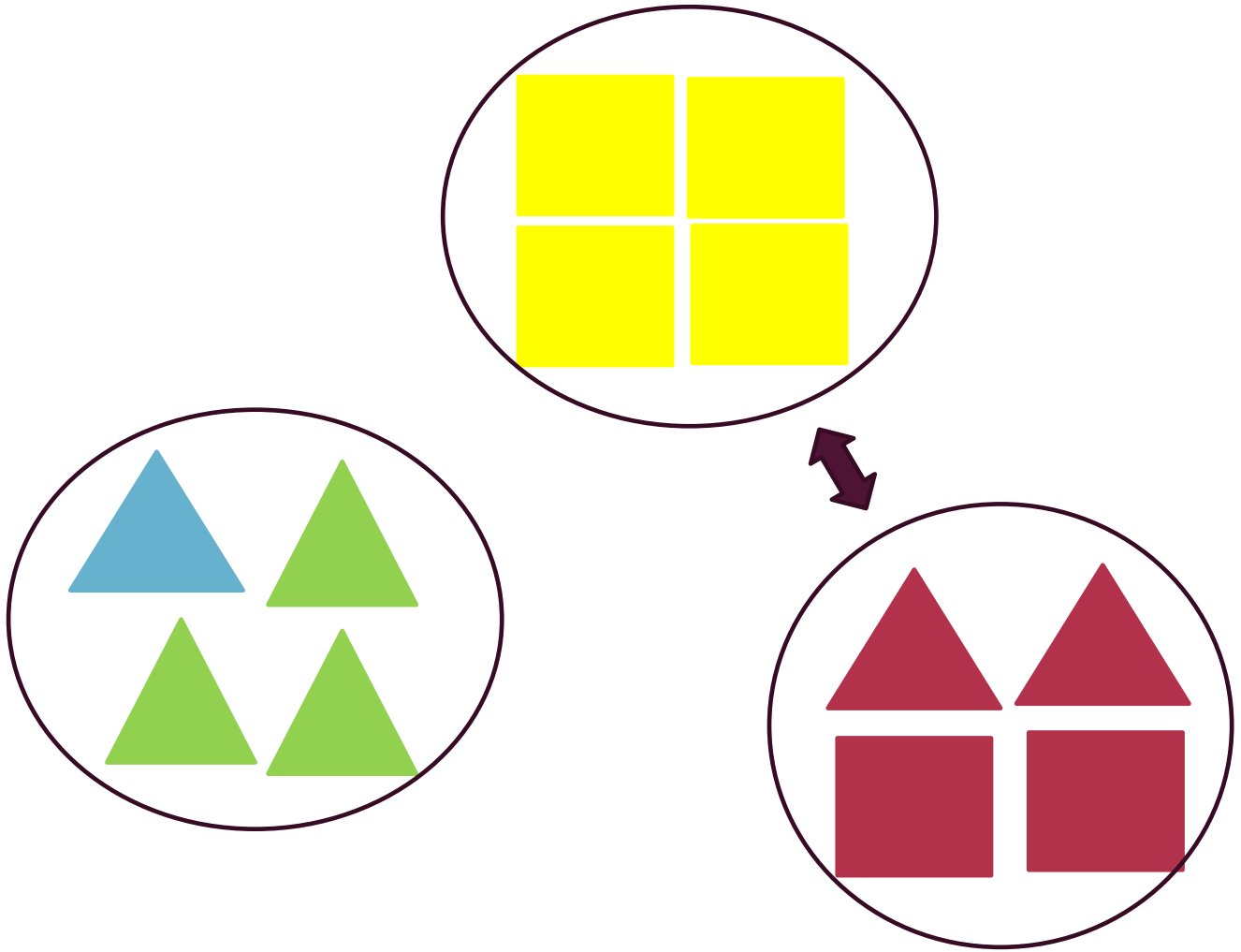
LEVEL 4 – COORDINATION (NON ARBITRARY RELATIONS)

- The video presented here was removed for this pdf to protect the anonymity of the participant involved.



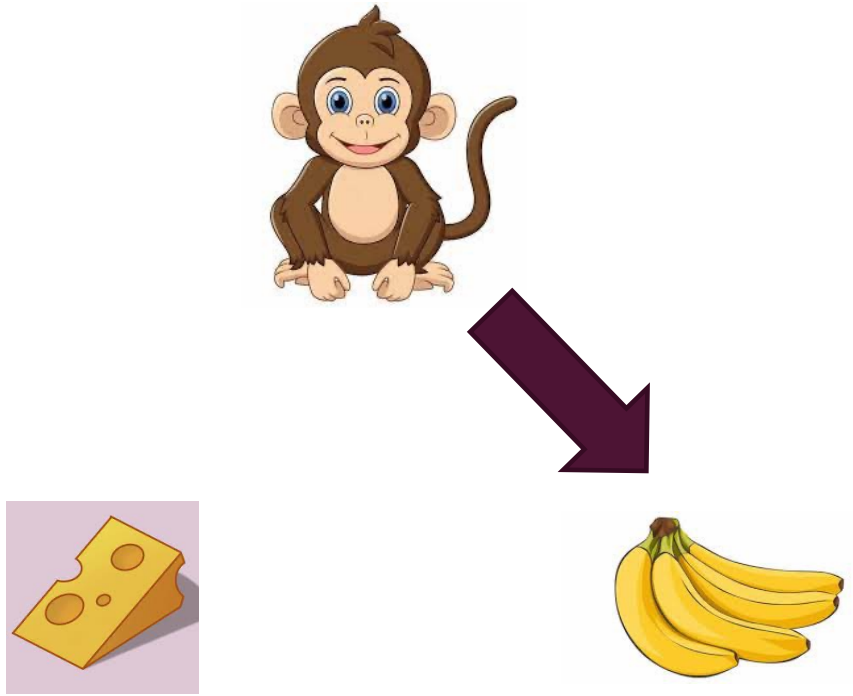
LEVEL 5 – COORDINATION (NON ARBITRARY RELATIONS)

- The video presented here was removed for this pdf to protect the anonymity of the participant involved.



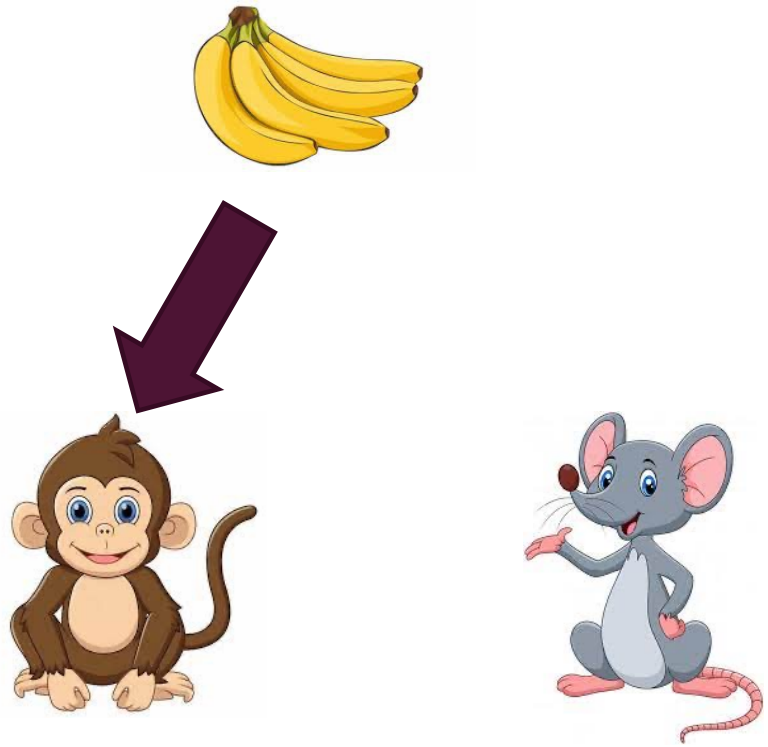
LEVEL 1 – COORDINATION (ARBITRARY RELATION) TRAINING AB

- The video presented here was removed for this pdf to protect the anonymity of the participant involved.



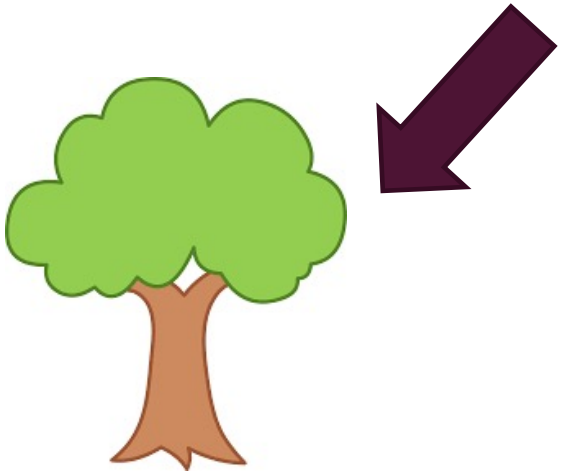
LEVEL 1 – COORDINATION (ARBITRARY RELATION) TESTING BA

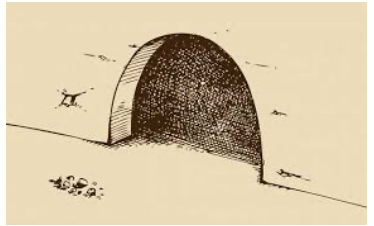
- The video presented here was removed for this pdf to protect the anonymity of the participant involved.



LEVEL 1 – COORDINATION (ARBITRARY RELATION) TRAINING AC

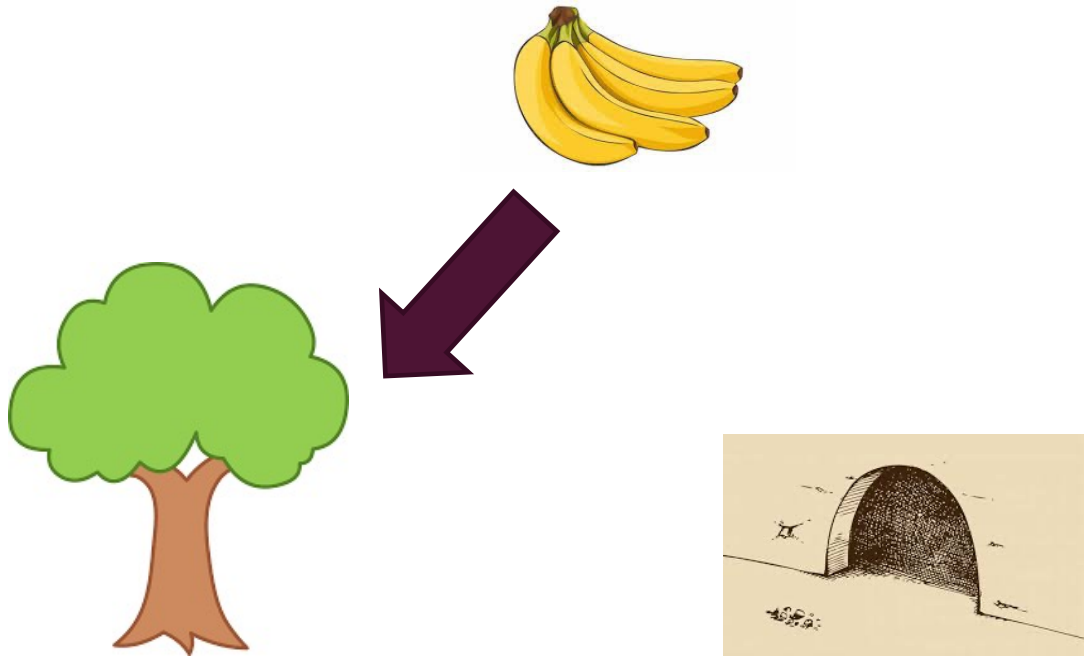
- The video presented here was removed for this pdf to protect the anonymity of the participant involved.



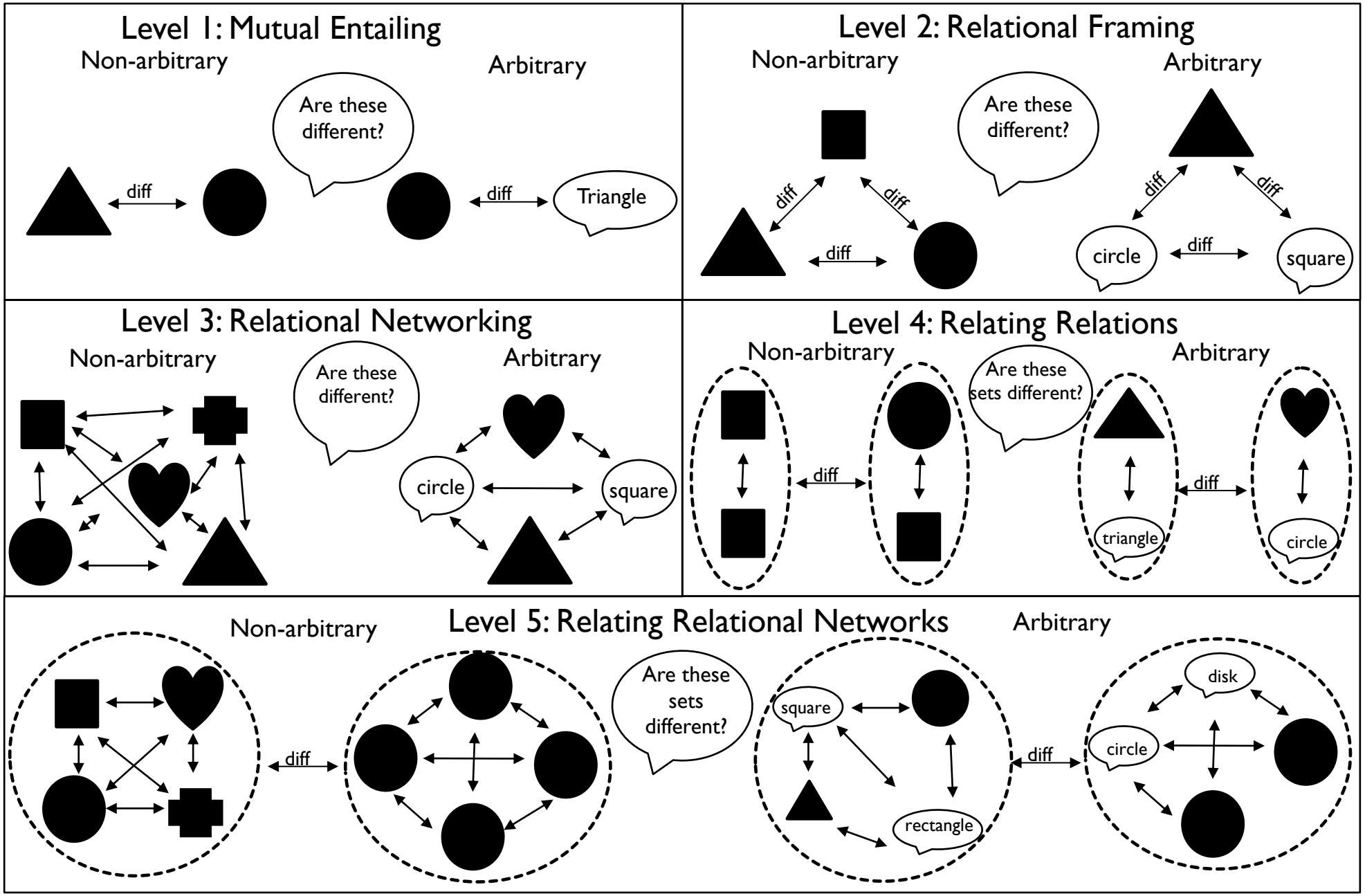


LEVEL 2 – COORDINATION (ARBITRARY RELATIONS) TESTING BC

- The video presented here was removed for this pdf to protect the anonymity of the participant involved.



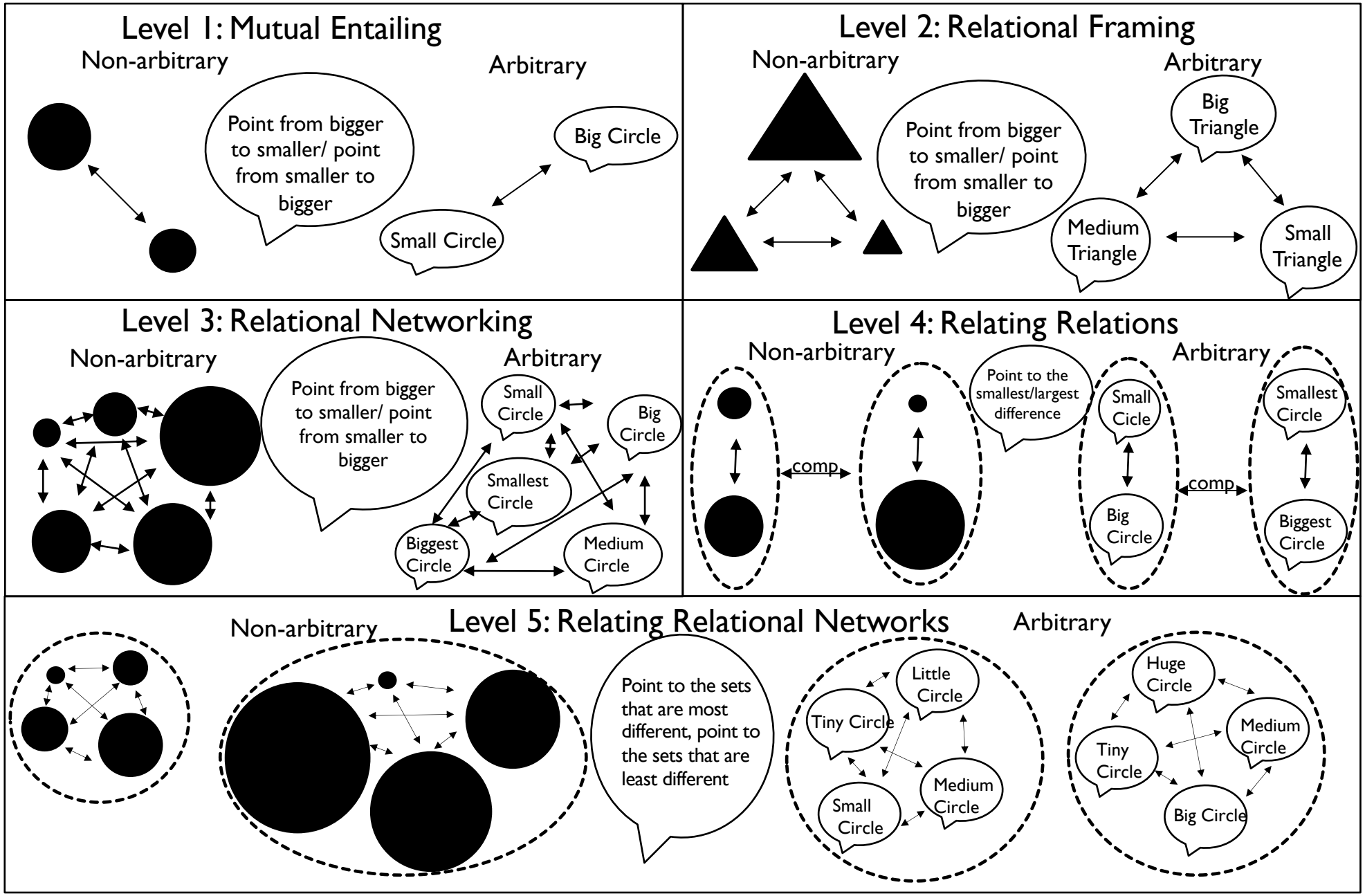
DIFFERENCE


Level 1: Mutual Entailing
Non-arbitrary
Arbitrary
Are these different?
diff
diff
Triangle
Level 2: Relational Framing
Non-arbitrary
Arbitrary
Are these different?
diff
diff
diff
diff
diff
circle
square
Level 3: Relational Networking
Non-arbitrary
Arbitrary
Are these different?
circle
square
Level 4: Relating Relations
Non-arbitrary
Arbitrary
Are these sets different?
diff
diff
triangle
circle
Level 5: Relating Relational Networks
Non-arbitrary
Arbitrary
diff
Are these sets different?
square
rectangle
diff
disk
circle

LEVEL 1 – DIFFERENCE (ARBITRARY RELATIONS)

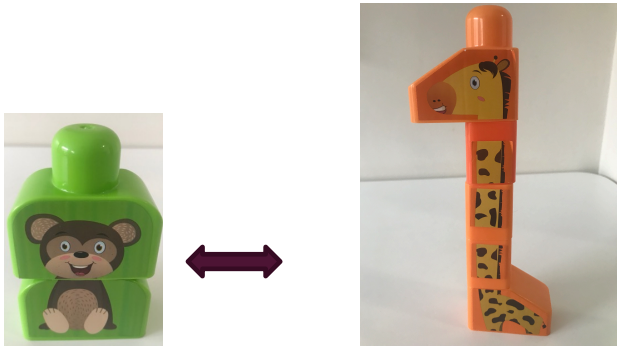
- The video presented here was removed for this pdf to protect the anonymity of the participant involved.

COMPARISON


Level 1: Mutual Entailing
Non-arbitrary
Arbitrary
Point from bigger to smaller/ point from smaller to bigger
Big Circle
Small Circle
Level 2: Relational Framing
Non-arbitrary
Arbitrary
Point from bigger to smaller/ point from smaller to bigger
Big Triangle
Medium Triangle
Small Triangle
Level 3: Relational Networking
Non-arbitrary
Arbitrary
Point from bigger to smaller/ point from smaller to bigger
Small Circle
Big Circle
Smallest Circle
Biggest Circle
Medium Circle
Level 4: Relating Relations
Non-arbitrary
Arbitrary
comp
Point to the smallest/largest difference
Small Cicle
Big Circle
comp
Smallest Circle
Biggest Circle
Level 5: Relating Relational Networks
Non-arbitrary
Point to the sets that are most different, point to the sets that are least different
Arbitrary
Little Circle
Tiny Circle
Medium Circle
Small Circle
Huge Circle
Medium Circle
Tiny Circle
Big Circle

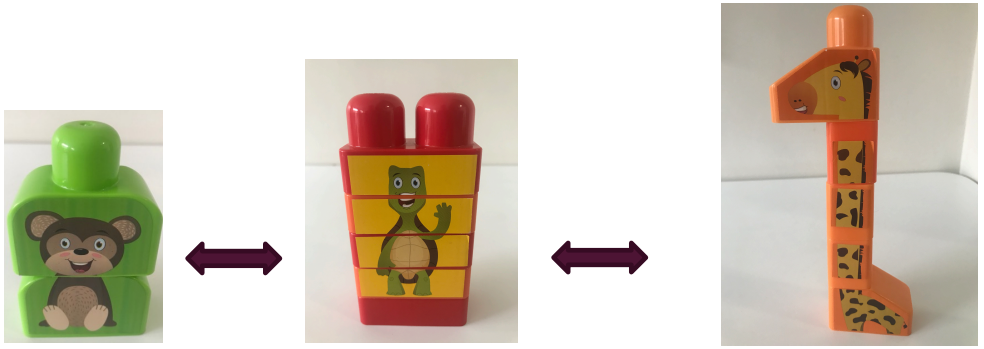
LEVEL 1 – COMPARISON (NON ARBITRARY RELATIONS)

- The video presented here was removed for this pdf to protect the anonymity of the participant involved.



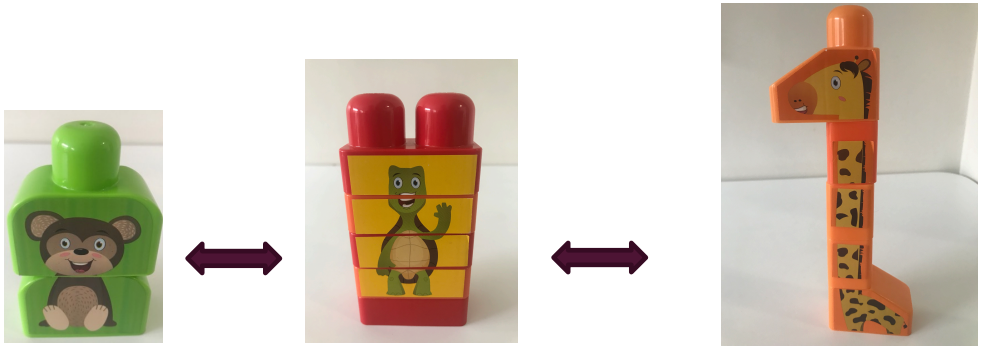
LEVEL 2 – COMPARISON (NON ARBITRARY RELATIONS)

- The video presented here was removed for this pdf to protect the anonymity of the participant involved.



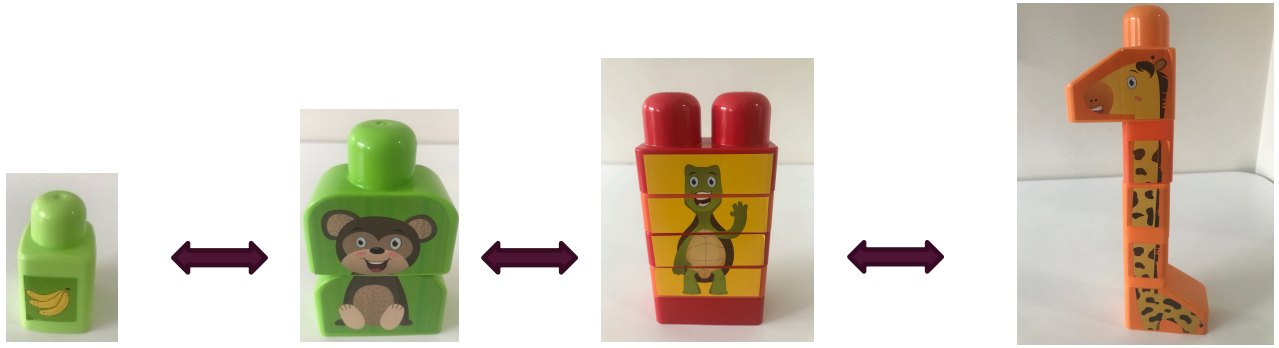
LEVEL 2 – COMPARISON (NON ARBITRARY RELATIONS)

- The video presented here was removed for this pdf to protect the anonymity of the participant involved.



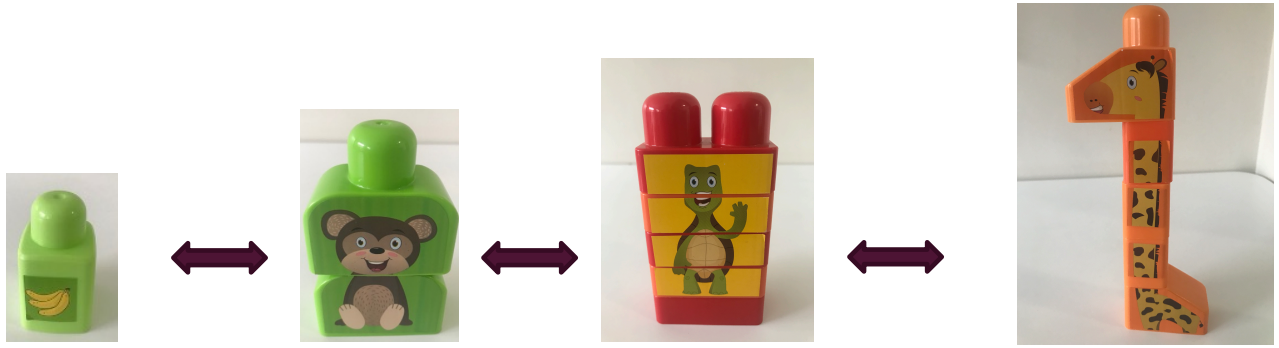
LEVEL 3 – COMPARISON (NON ARBITRARY RELATIONS)

- The video presented here was removed for this pdf to protect the anonymity of the participant involved.



LEVEL 3 – COMPARISON (NON ARBITRARY RELATIONS)

- The video presented here was removed for this pdf to protect the anonymity of the participant involved.



LEVEL 4 – COMPARISON (NON ARBITRARY RELATIONS)

- The video presented here was removed for this pdf to protect the anonymity of the participant involved.

SET 1

SET 2

CASE CONCEPTUALIZATION USING THE MDML

SUMMARY

- Luca, age eight years, has a diagnosis of autism and intellectual disability. He lives with his mother. He has been receiving in-clinic ABA services since Feb-2021, as well as speech and occupational therapy.

- The evaluations used were: VB-MAPP, some of AFLLS, specifics for Reading, and non-arbitrary relational repertoire.

SUMMARY

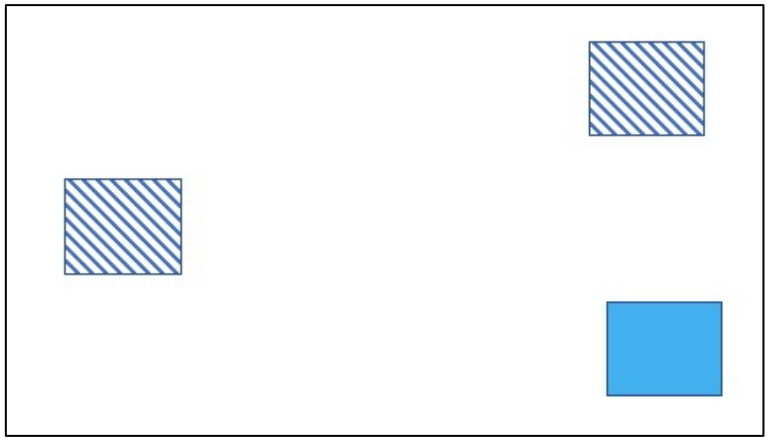
- Luca loves a superhero series and some Ipad games. He also participates well in board games (but it's not his first choice).

- Barriers: shows rigidity with changes in his routine but often complains when he is asked to repeat the trials in a teaching session.

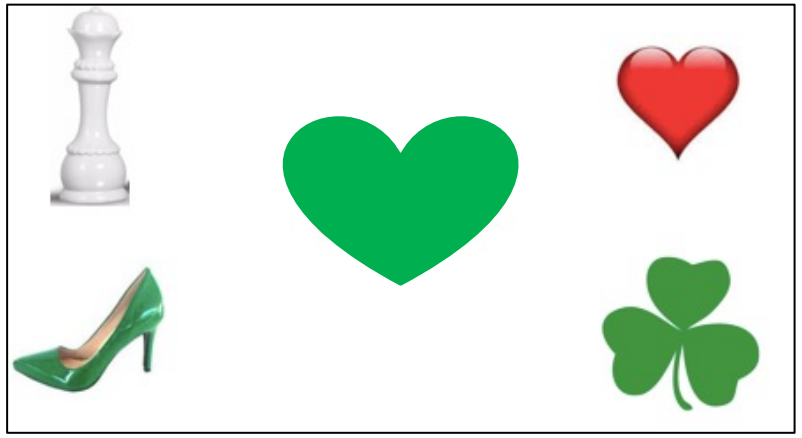
ASSESSMENT INFORMATION

VB MAPP Level 3 - showed a few gaps.

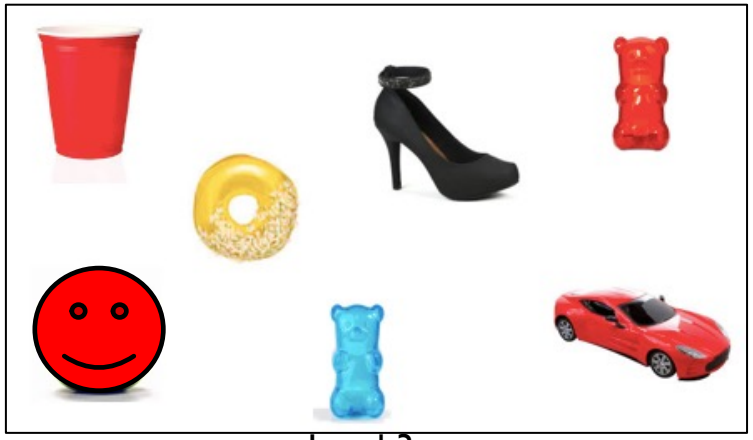
MDML EVALUATION – COORDINATION LEVELS 1-5.



Level 1

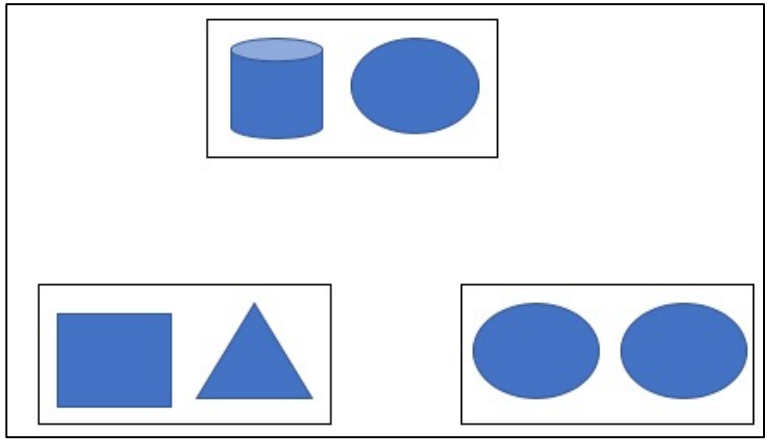


Level 2



Level 3

Level 4



Level 5

ASSESSMENT INFORMATION

MDML – Levels 1-4 non arbitrary

	Non arbitrary			
Level	Coordination	Difference	Comparison	Opposition
1	10/10	9/10	10/10	1/10
2	7/10	4/10	10/10	_
3	5/10	_	_	_
4	0/5	_	_	_
5	_	_	_	_

CLINICAL INTERVENTION PROGRAM - OBJECTIVES

- LEVEL 2 - COORDINATION **NON ARBITRARY** RELATIONS

- Match in the same/different relations, 2D stimuli, in terms of shape/color in a set involving four pictures, presenting contextual cues of same/different.
  - Correction Critereon: if the learner make two consecutive mistakes the relation can be directly trained and one **new set of non-familiar** added to the procedure.

  - Ending Critereon: being able to respond to five **new stimuli** without presentation of reinforcement.

CLINICAL INTERVENTION PROGRAM - OBJECTIVES

- LEVEL 1 – COORDINATION **ARBITRARY** RELATIONS

- Match pictures of animals with written English names (These training trials **will be reinforced**).
  - When the learner is consistently relating two pairs of names and pictures of animals he can proceed to the test.

  - **Test - Level 1** – Present the written English names and the learner have to select the respective animal.
    - Ending Critereon: two correct answers out of of two opportunites in two simultaneous blocks.

CLINICAL INTERVENTION PROGRAM - OBJECTIVES

- LEVEL 2 – COORDINATION **ARBITRARY** RELATIONS
  - Present the "sound that an animal makes" and the learner will select pictures of animal (These training trials **will be reinforced**).
    - When the learner is consistently relating two pairs of pictures and sounds of animals he can proceed to the test.
  - **Test - Level 2** – Present the written English name and the learner have to emit the respective sound.
    - Ending Critereon: two correct answers out of of two opportunites in two simultaneous blocks.

DIMENSIONS

- Coherence:
  - Non-arbitrary procedures: using visual-visual elements in the training will make the coherence higher than employing stimuli with different sensory properties (tactile, olfative).
- Complexity
  - For early learners complexity should be always kept as low as possible, in other words isolated relation-types and only the necessary number of elements for one specific level should be used. On the other hand, for more advanced learners. mixing different relation-types and adding more elements than the necessary in some given level could be desirable for refining their relational repertoire.
- Derivation
  - Employing familiar elements might likely lower the derivation level and non-familiar elements would likely have the opposite effect. (e.g., animal context vs teach a new language).
  - Sometimes it is useful to lower the derivation level to increase fluency at the same level across future opportunities
- Flexibility:
  - Try to employ different set ups for the stimuli presentation (other than traditional Matching to sample).
  - Use the same stimuli from one relation to other relations.

THE MDML FRAMEWORK

Levels	Dimensions			
	Coherence	*Complexity*	*Derivation*	*Flexibility*
Mutual Entailing	Coh/Mut-Ent	Cpx/Mut-Ent	Dev/Mut-Ent	Flx/Mut-Ent
Relational Framing	Coh/Frame	Cpx/Frame	Dev/Frame	Flx/Frame
Relational Networking	Coh/Net	Cpx/Net	Dev/Net	Flx/Net
Relating Relations	Coh/Rel-Rel	Cpx/Rel-Rel	Dev/Rel-Rel	Flx/Rel-Rel
Relating Relational Networks	Coh/Rel-Net	Cpx/Rel-Net	Dev/Rel-Net	Flx/Rel-Net

CONCLUSION

- The roots of RFT can be traced back to an early conference paper on rule-governed behaviour in 1984
- A full book-length treatment of RFT is now itself 20 years old
- Curiously, the potential impact of the RFT approach to human language and cognition in applied behaviour analysis is only now beginning to emerge
- One of the main reasons that RFT failed to make a significant impact earlier was its apparent complexity and the introduction of many new terms and concepts (some might say jargon!) unfamiliar to traditional behaviour analysis
- Furthermore, RFT lacked an overarching framework that attempted to organise and summarise its key assumptions and concepts

CONCLUSION

- Many ABA researchers and practitioners understandably did not see any potential value in engaging with the theory in the absence of such a framework
- Hopefully with the introduction of the MDML in the general updating of RFT the much needed framework is emerging.
- This, we hope, will help ABA folks begin to utilise RFT in ways that hitherto could not readily be seen or appreciated
- Of course, this will take time and effort – but we hope that todays workshop will play some small part in that journey

THANK YOU! ANY QUESTIONS?

YOU CAN FIND THE SLIDES FROM THIS WORKSHOP, AS WELL AS OTHER RESOURCES AND MATERIALS, FREE TO DOWNLOAD AT:

WWW.BALC-I.NET