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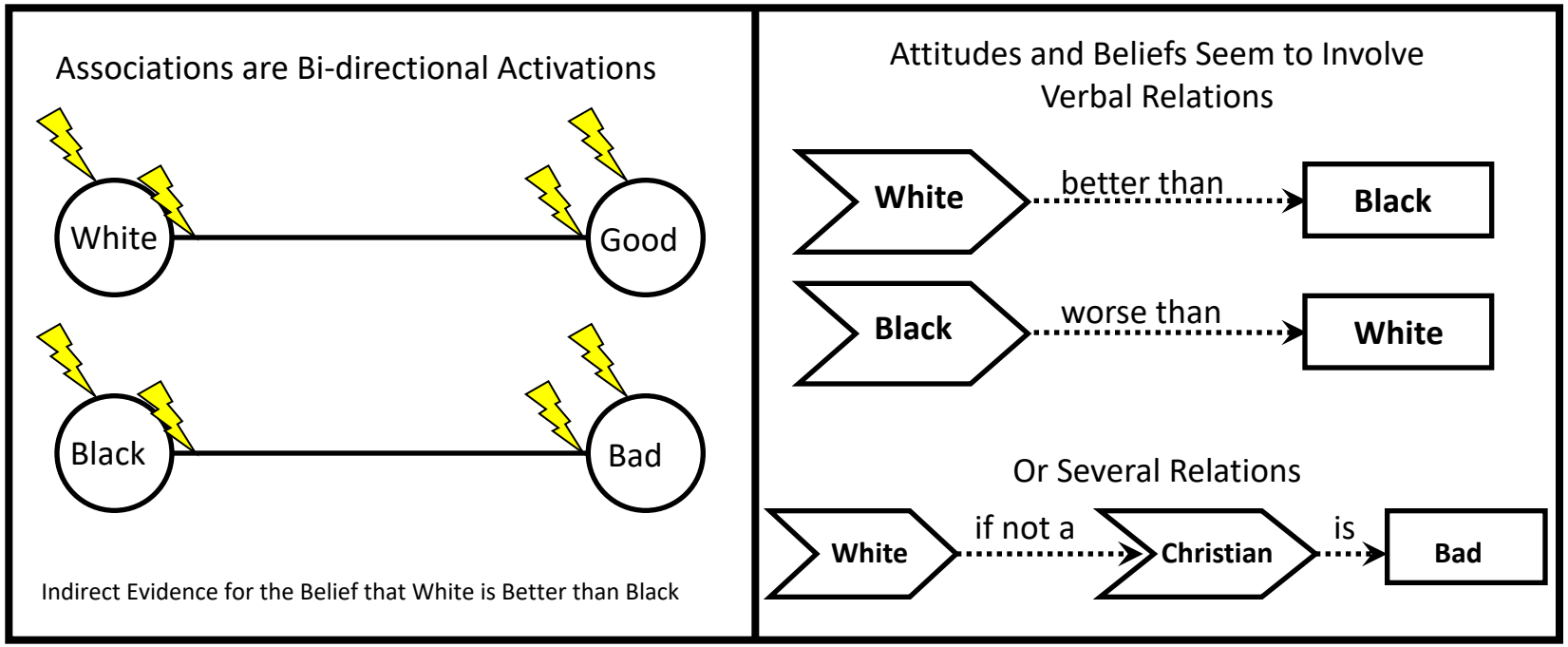
The IRAP as Frankenstein's Monster!

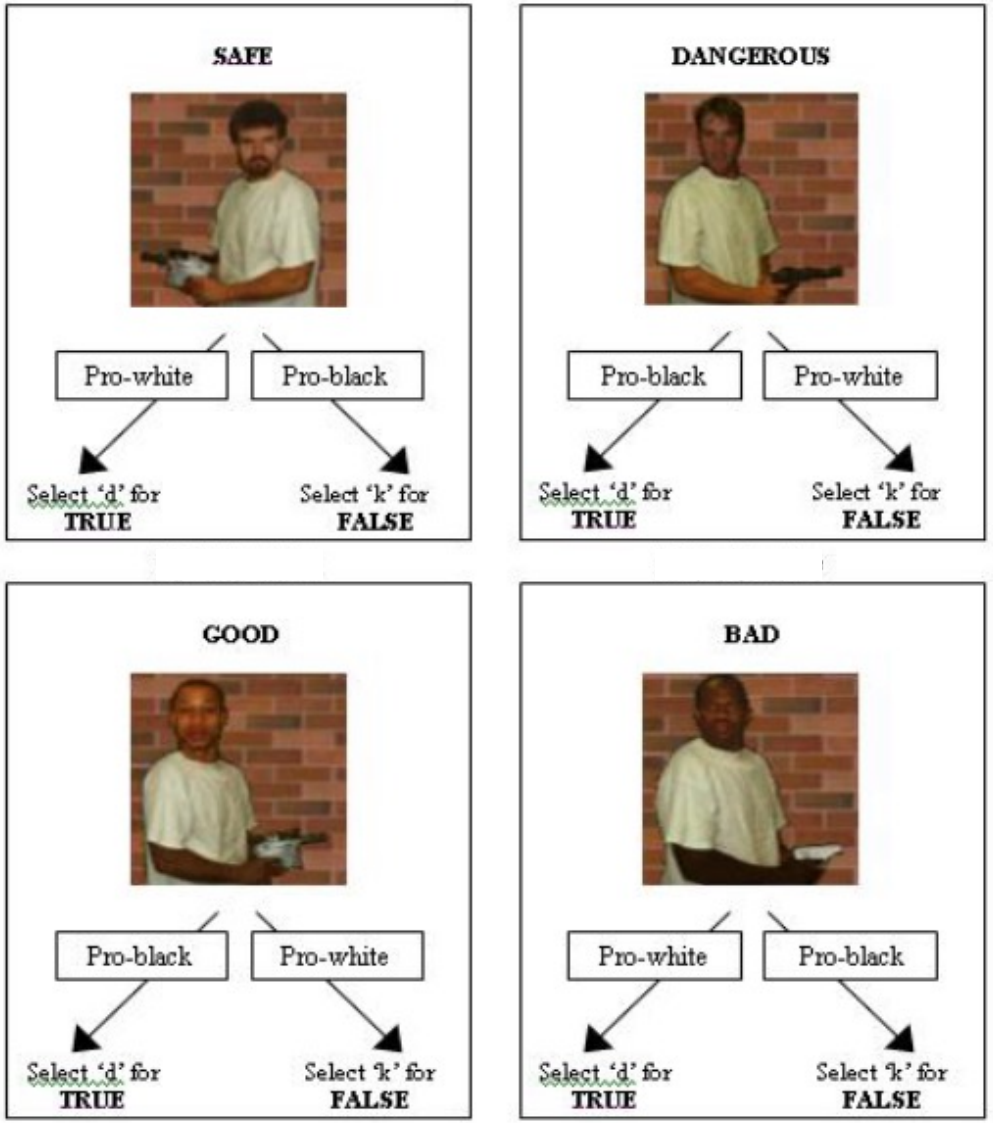
The IRAP

- **Numerous methods for assessing so called implicit cognition have been developed that aimed to assess implicit attitudes, such as the IAT, the Go/No-Go Association Task (GNAT), evaluative priming and the Extrinsic Affective Simon Task (EAST)**
- **Critically, however, each of these methods may be considered a relatively *indirect* measure because they target associations (in memory) rather than verbal relations**

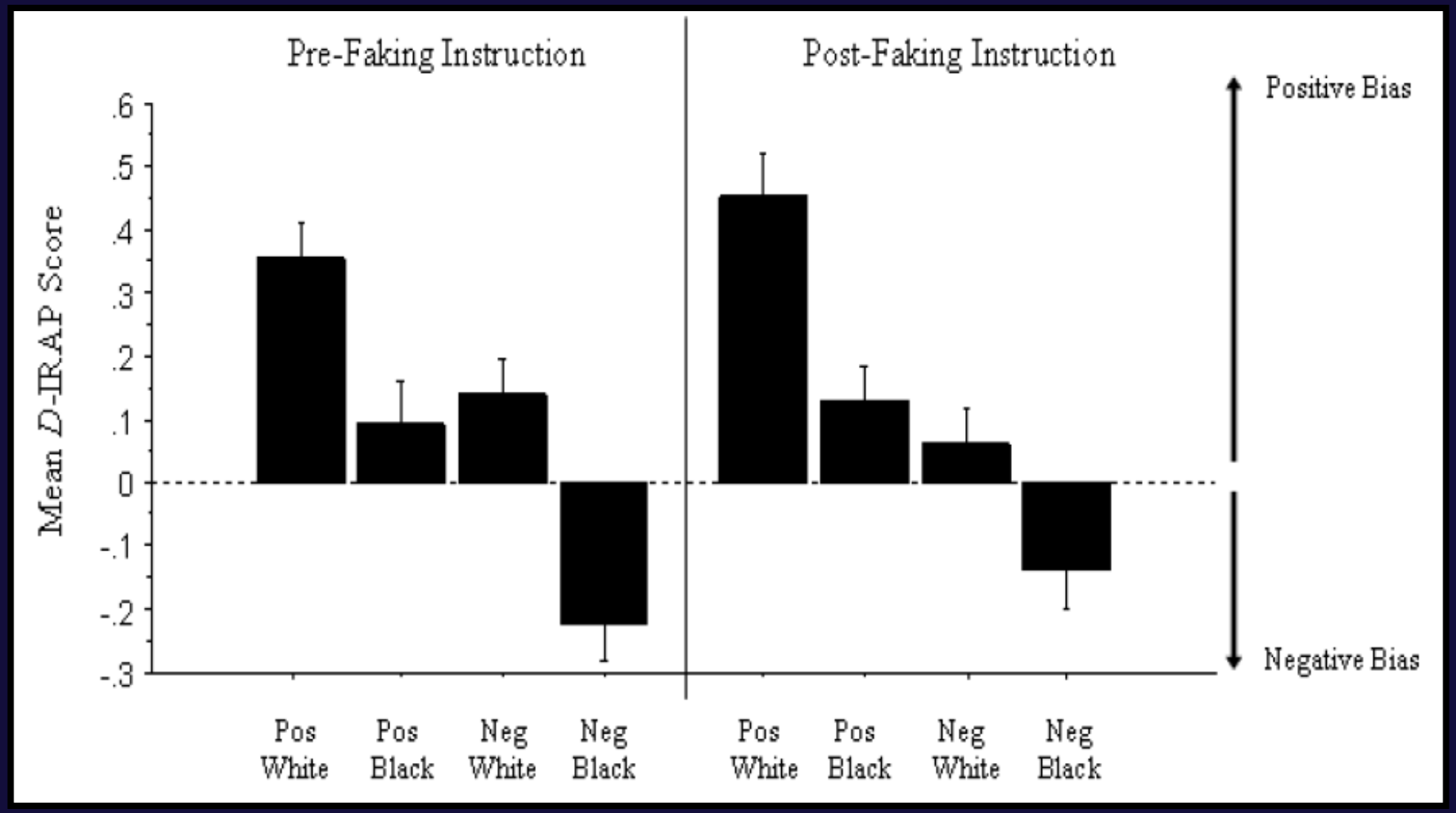


The IRAP

- In contrast to the IAT, and other associative measures, each trial of the IRAP typically asks participants to confirm or deny a specific verbal relation (or set of relations) between a label stimulus and a target item



The IRAP


Pre-Faking Instruction
Post-Faking Instruction
Positive Bias
Negative Bias
Mean D-IRAP Score
.6
.5
.4
.3
.2
.1
0
-.1
-.2
-.3
Pos White
Pos Black
Neg White
Neg Black
Pos White
Pos Black
Neg White
Neg Black

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So, the IRAP was developed as a method for assessing (the strength of) natural verbal relations rather than as a test of so called implicit cognition

However, the descriptor "implicit" was added because:

1. **The IAT was a source of inspiration for the IRAP**
2. **There appeared to be some potential for the IRAP to function as a test of so-called implicit cognition. . .**
3. **And the name "I-rap" was quite catchy and reflected what the test required -- rapid verbal responding. . .**

The Psychological Record, 2008, 58, 497–516

THE IMPLICIT RELATIONAL ASSESSMENT PROCEDURE (IRAP) AS A RESPONSE-TIME AND EVENT-RELATED-POTENTIALS METHODOLOGY FOR TESTING NATURAL VERBAL RELATIONS: A PRELIMINARY STUDY

Dermot Barnes-Holmes, Eilish Hayden, Yvonne Barnes-Holmes
National University of Ireland, Maynooth

Ian Stewart
National University of Ireland, Galway

The current article reports the first attempt to test the Implicit Relational Assessment Procedure (IRAP), as a group-based measure of natural verbal relations, using both response-latency and event-related potentials as dependent variables. On each trial of the IRAP, participants were presented with 1 of 2 attribute stimuli ("Pleasant" or "Unpleasant"), a positive (e.g., "Love") or negative (e.g., "Murder") target stimulus, and 2 relational terms, "Similar" and "Opposite," as response options. Participants were required to respond as quickly and accurately as possible across blocks of trials, with half of the blocks requiring responses that were deemed consistent (e.g., Pleasant–Love–Similar), and the other half inconsistent (e.g., Pleasant–Love–Opposite), with natural verbal relations. Shorter mean latencies were predicted for consistent than for inconsistent blocks. Two separate experiments supported this prediction. Event-related potentials, gathered during the second experiment, also proved to be sensitive to the IRAP, yielding more negative waveforms for inconsistent relative to consistent blocks of trials. A theoretical interpretation of the IRAP effect is offered, and important directions for future research are highlighted.

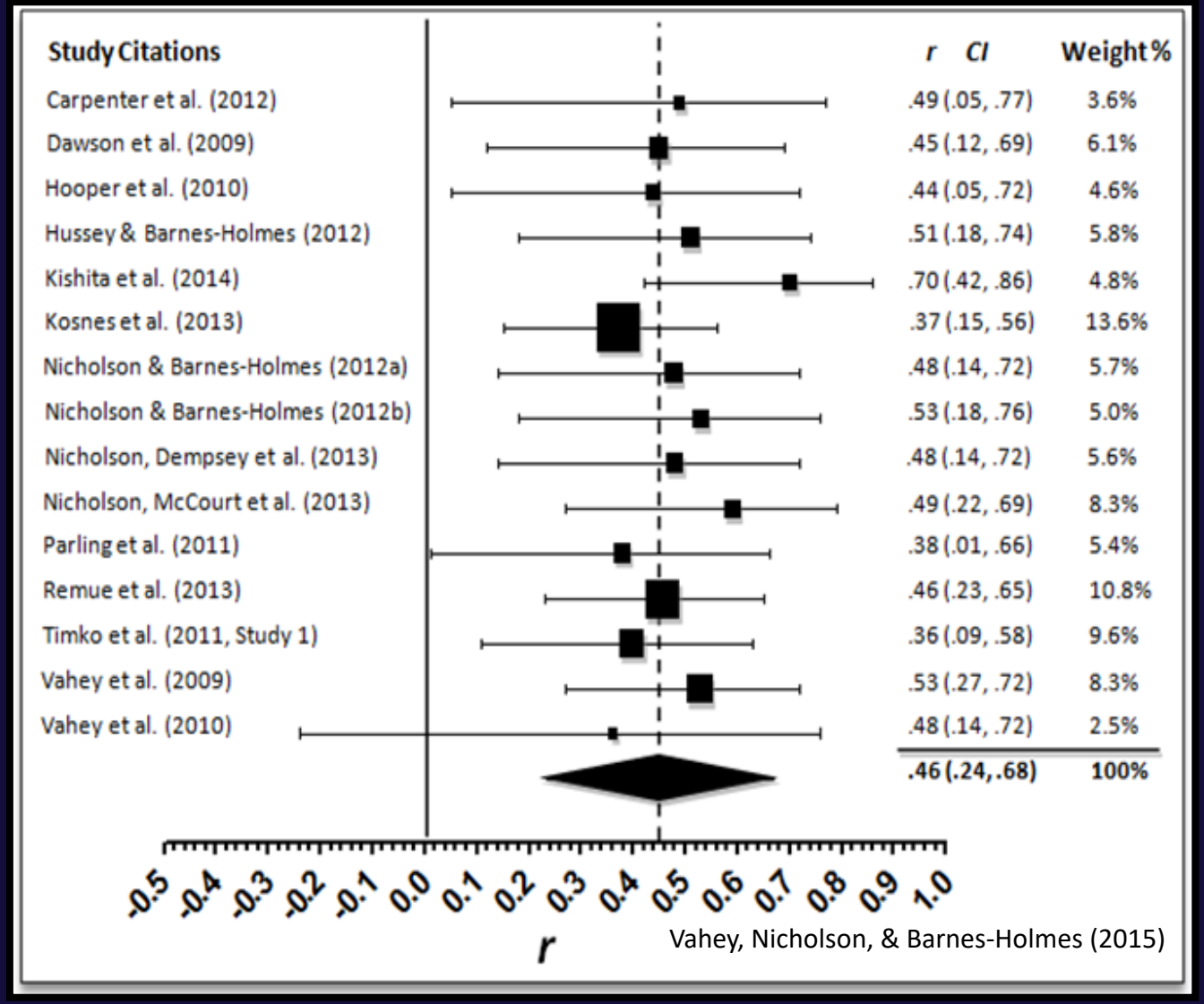
The study of human language and cognition has attracted increasing attention among behavior-analytic researchers, with a particular focus on stimulus equivalence and derived stimulus relations (e.g., Hayes, Barnes-Holmes, & Roche, 2001; Sidman, 1994). In a typical study of stimulus equivalence, a series of interrelated conditional discriminations are first reinforced, and then a number of untaught but predictable stimulus relations are seen to emerge in the absence of explicit feedback or verbal instruction. During the training, for example, A-B and B-C matching-to-sample (MTS) responses might be taught. A series of test or probe MTS trials are then presented in which symmetry (B-A, C-B), transitivity (A-C), and combined

Correspondence may be addressed to Dermot Barnes-Holmes, Department of Psychology, National University of Ireland, Maynooth, Co. Kildare, Ireland. E-mail: Dermot.Barnes-Holmes@nuim.ie

The IRAP

The IRAP did not start out as a measure of implicit cognition but it seems to have been relatively successful in becoming one. . .

A Meta-Analysis of Clinically-Relevant IRAP Effects

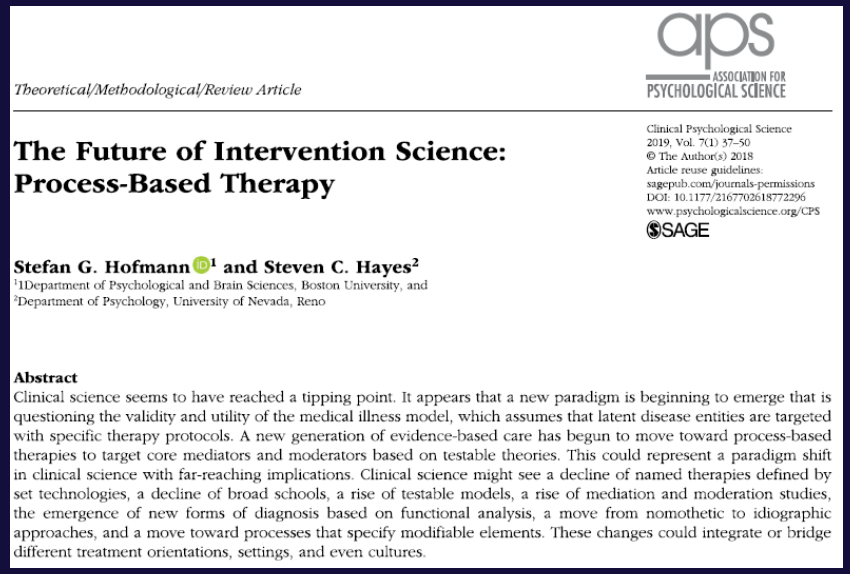


Vahey, Nicholson, & Barnes-Holmes (2015)

- So, what's the problem?
- If you combine an ill-defined domain (i.e., implicit cognition) with a "measure" that is not understood reasonably well, in a functional-analytic abstractive manner, you are heading down an intellectual blind alley!
- Well, that's how I now feel.

- So, forgive me, for I have sinned. . .
- In my defense (and here is where I share the blame), I was not the only one on this path.
- The newly formed ACBS was very quickly awash in ill-defined concepts. . .
- The hexaflex, with terms such acceptance, values, defusion, self-as-context, etc. were offered as middle-level terms and are typically measured using psychometric instruments (e.g., the AAQ)

- Traditional psychometric instruments are constructed based on individual differences.
- Many problems with such tools, which even ACBS leaders now recognize – e.g., see recent articles and chapters by Hayes, Hoffman et al. . .
- The new mantra – CBS needs to be more process-focused, more ideographic and oriented towards functional analysis



Theoretical/Methodological/Review Article

aps ASSOCIATION FOR PSYCHOLOGICAL SCIENCE

The Future of Intervention Science: Process-Based Therapy

Clinical Psychological Science
2019, Vol. 7(1) 37–50

DOI: 10.1177/2167702618772296
www.psychologicalscience.org/CPS
SAGE

Stefan G. Hofmann[1] and Steven C. Hayes[2]
[1]Department of Psychological and Brain Sciences, Boston University, and
[2]Department of Psychology, University of Nevada, Reno

Abstract
Clinical science seems to have reached a tipping point. It appears that a new paradigm is beginning to emerge that is questioning the validity and utility of the medical illness model, which assumes that latent disease entities are targeted with specific therapy protocols. A new generation of evidence-based care has begun to move toward process-based therapies to target core mediators and moderators based on testable theories. This could represent a paradigm shift in clinical science with far-reaching implications. Clinical science might see a decline of named therapies defined by set technologies, a decline of broad schools, a rise of testable models, a rise of mediation and moderation studies, the emergence of new forms of diagnosis based on functional analysis, a move from nomothetic to idiographic approaches, and a move toward processes that specify modifiable elements. These changes could integrate or bridge different treatment orientations, settings, and even cultures.

Clinical Psychology Review 76 (2020) 101824

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

Review

Beyond linear mediation: Toward a dynamic network approach to study treatment processes

Stefan G. Hofmann[a,*], Joshua E. Curtiss[a], Steven C. Hayes[b]

[a] Boston University, United States
[b] University of Nevada, Reno, United States

HIGHLIGHTS

- Linear Mediation is inadequate to study treatment processes.
- Treatment processes are dynamic.
- Dynamic network processes are more appropriate to study mediation.

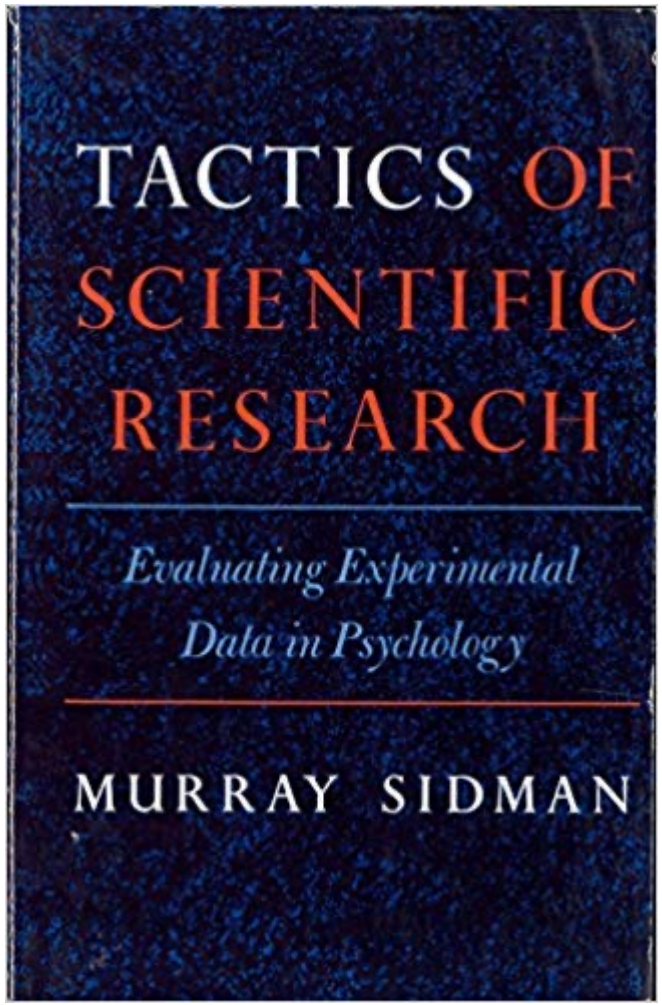
ARTICLE INFO

Keywords:
Therapy
Process
Treatment
Mediation
Complex Network
Dynamic System

ABSTRACT

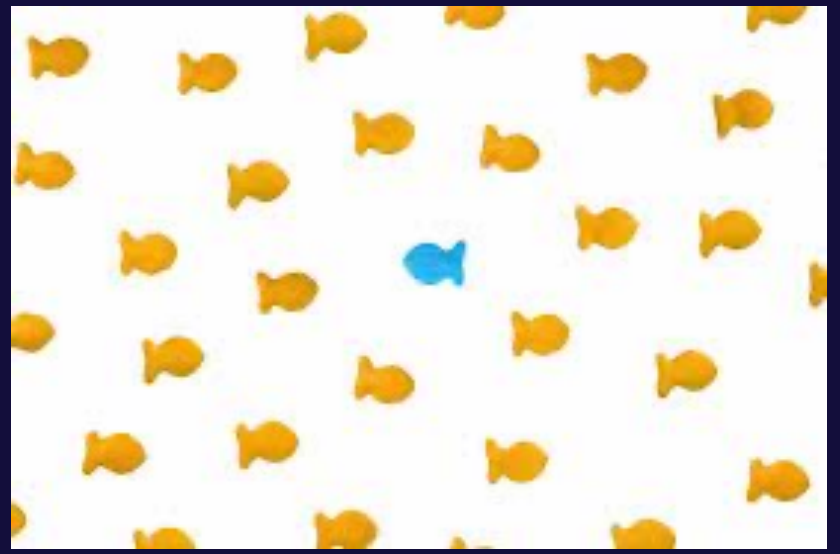
Few clinical scientists would disagree that more research is needed on the underlying mechanisms and processes of change in psychological therapies. In the dominant current approach, processes of change are studied through mediation. The study of mediation has been largely structured around a distinction between moderation and mediation first popularized by Baron and Kenny's (1986) seminal article, which is based on a nomothetic and cross-sectional framework. In this article, we argue that this approach is unable to adequately address change processes in psychological therapies, because it falsely assumes that treatment change is a linear, unidirectional, pauci-variate process and that the statistical assumptions are met to study processes of change in an individual using a nomothetic approach. In contrast, we propose that treatment is a dynamic process involving numerous variables that may form bi-directional and complex relationships that differ between individuals. Such relationships can best be studied using an individual dynamic network approach connected to nomothetic generalization methods that are based on a firm idiographic foundation. We argue that our proposal is available, viable, and can readily be integrated into existing research strategies. We further argue that adopting an individual dynamic network approach combined with experimental analyses will accelerate the study of treatment change processes, which is necessary as the field of evidence-based care moves toward a process-based model. We encourage future research to gather empirical evidence to examine this approach.

- Okay, but we had that 20-30 years ago – it was called (clinical) behavior analysis (and we had Sidman 60 years ago!)
- So, what went wrong?
- Increasing sense of intellectual stagnation within ABAI
- Clinical behavior analysis only tiny part of ABAI



Academic/professional contingencies:

- Adopt mainstream codes of conduct
  - Publish in high-impact journals
  - Group designs
  - RCTs
  - Big data
  - Obsession with statistical replication over psychological/societal relevance
  - Little interest in behavioural principles over cognitive/mental processes



- IRAP ***as a measure of implicit cognition*** very much part of this "mainstream" focus
- Danger was recognized many years ago when the sensitivity of the IRAP to ***verbal relations*** was highlighted (Barnes-Holmes, et al., 2010)

The Psychological Record, 2010, 60, 57–66

THE IMPLICIT RELATIONAL ASSESSMENT PROCEDURE: EXPLORING THE IMPACT OF PRIVATE VERSUS PUBLIC CONTEXTS AND THE RESPONSE LATENCY CRITERION ON PRO-WHITE AND ANTI-BLACK STEREOTYPING AMONG WHITE IRISH INDIVIDUALS

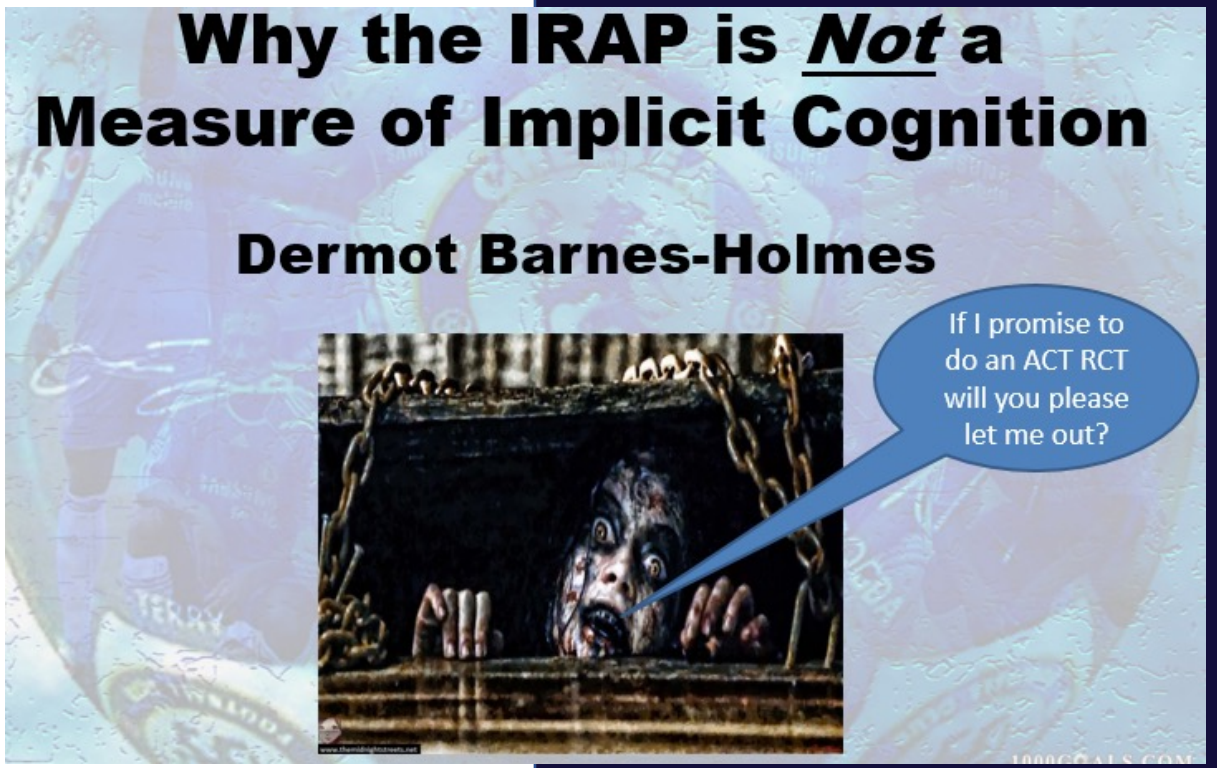
Dermot Barnes-Holmes, Aisling Murphy, and Yvonne Barnes-Holmes
National University of Ireland, Maynooth

Ian Stewart
National University of Ireland, Galway

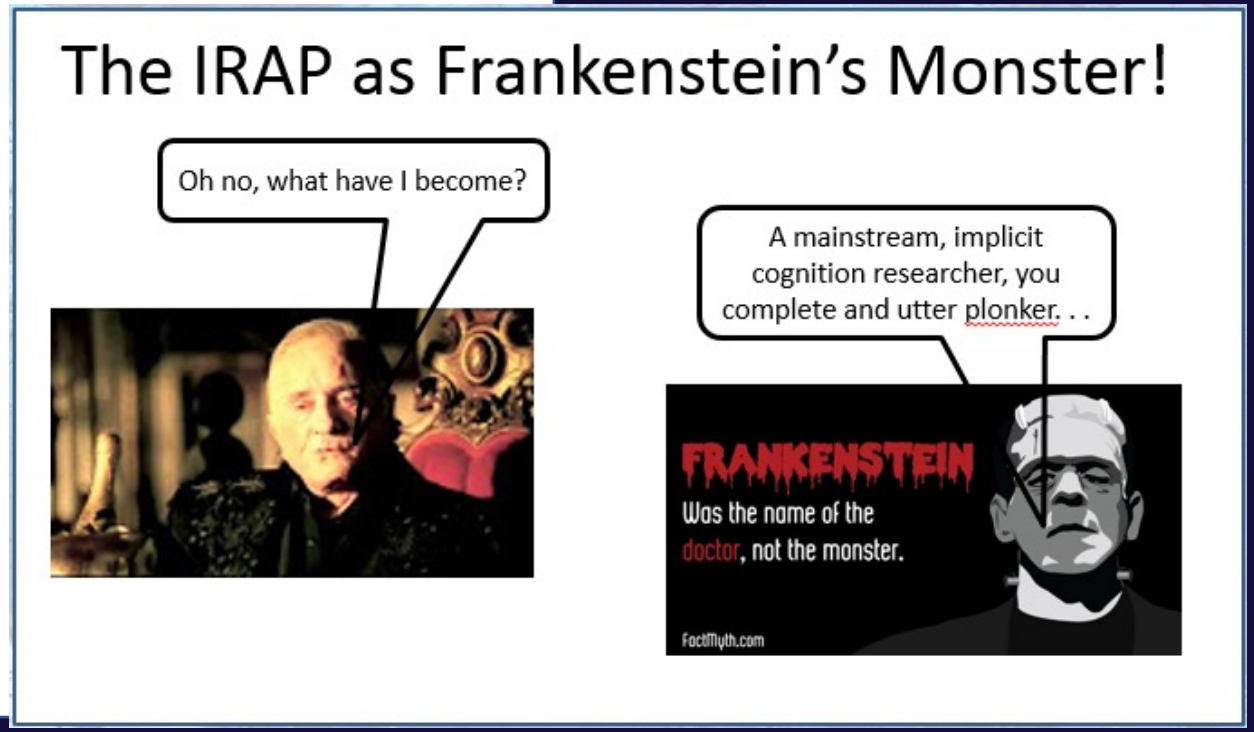
The current research comprised two experiments that employed the Implicit Relational Assessment Procedure (IRAP) as a measure of implicit racial attitudes. White Irish participants were exposed to blocks of trials that involved responding in a manner consistent with either a pro-white stereotype or a pro-black stereotype. In Experiment 1, participants completed the IRAP in either a public or private assessment situation. It was hypothesized that implicit pro-white stereotyping would decrease in the public context relative to the private context. The results, however, were not in accordance with this prediction. A second experiment was conducted to determine if requiring participants to respond in a public context but within a shorter timeframe would impact significantly upon implicit stereotyping. The results showed that a reduction in response latency significantly increased ingroup stereotyping. The findings appear to be consistent with the relational elaboration and coherence model.
Key words: Implicit, racism, adults, assessment context, response latency

are presented. On balance, procedural variables specific to the IRAP may be involved here. For example, the stereotyping effect for the Dangerous–Black trial type required responding "True" more quickly than "False," but the opposite was required for the Safe–Black trial type. It is possible, therefore, that a bias toward responding "True" over "False," per se, interacted with the socially loaded stimulus relations presented in the IRAP. If such a response bias does play a role, however, the source of that bias needs to be explained. As suggested previously, the impact of common verbal practices, which tend to confirm negative rather than deny positive stereotypes, is a possibly important variable.

- IRAP ***<u>as a measure of implicit cognition</u>*** very much part of this mainstream focus
- In my defense, I continued to launch warning flares!
  - ACBS (2014):



- IRAP ***as a measure of implicit cognition*** very much part of this mainstream focus
- In my defence, I continued to launch warning flares!
  - ACBS (2017) multiple papers with similar message. . .



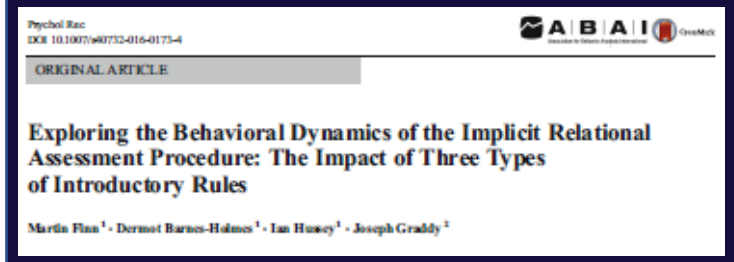
- And we began publishing empirical papers that warned of a “melt-down” in the IRAP ***<u>as a measure of implicit cognition:</u>***
  - Maloney & Barnes-Holmes (2015) – the impact of Crel versus RCI response options
  - Finn, et al. (2016) – the impact of instructions and order effects
  - Finn, et al. (2018) – the impact of experimental experience with latency-based measures and the talk-aloud procedure
  - Kavanagh et al. (2018) – the impact of the talk-aloud procedure on a deictic IRAP


Psychol Rec (2016) 66:395–403
DOI 10.1007/s40732-016-0180-5

ORIGINAL ARTICLE

Exploring the Behavioral Dynamics of the Implicit Relational Assessment Procedure: The Role of Relational Contextual Cues Versus Relational Coherence Indicators as Response Options

Emma Maloney[1] · Dermot Barnes-Holmes[2]


Psychol Rec
DOI 10.1007/s40732-016-0173-4

ORIGINAL ARTICLE

Exploring the Behavioral Dynamics of the Implicit Relational Assessment Procedure: The Impact of Three Types of Introductory Rules

Martin Finn[1] · Dermot Barnes-Holmes[1] · Ian Hussey[1] · Joseph Graddy[2]


The Psychological Record (2018) 68:11–25
https://doi.org/10.1007/s40732-017-0262-z

ORIGINAL ARTICLE

Exploring the Single-Trial-Type-Dominance-Effect in the IRAP: Developing a Differential Arbitrarily Applicable Relational Responding Effects (DAARRE) Model

Martin Finn[1] · Dermot Barnes-Holmes[1] · Ciara McEnteggart[1]

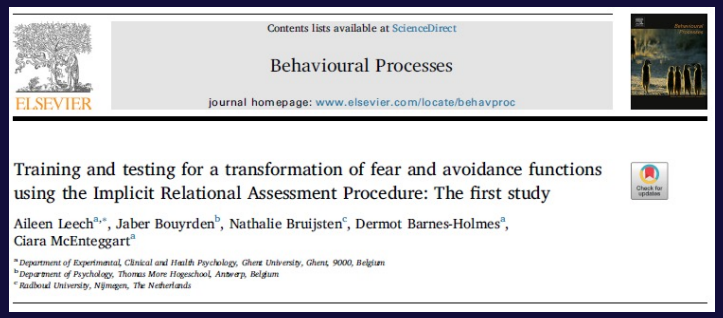

The Psychological Record
June 2018, Volume 68, Issue 2, pp 163–176 | Cite as

Exploring Differential Trial-Type Effects and the Impact of a Read-Aloud Procedure on Deictic Relational Responding on the IRAP

Authors | Authors and affiliations

Deirdre Kavanagh, Yvonne Barnes-Holmes, Dermot Barnes-Holmes, Ciara McEnteggart, Martin Finn

- And we began publishing empirical papers that warned of a “melt-down” in the IRAP ***<u>as a measure of implicit cognition:</u>***
  - Leech et al. (2018, 2020) – using the IRAP as training and testing context for AARRing reveals potentially important boundary conditions and thus the need for thoroughgoing experimental functional analyses.



Contents lists available at ScienceDirect

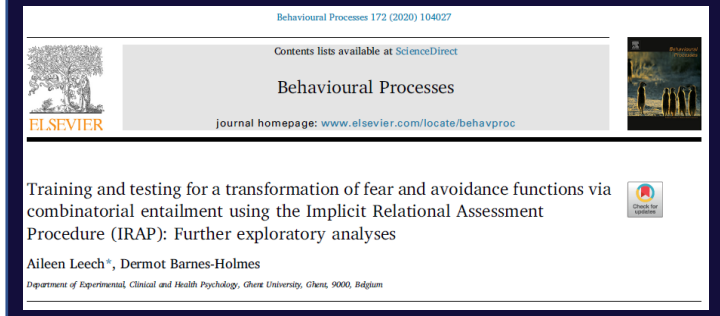
Behavioural Processes

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

Training and testing for a transformation of fear and avoidance functions using the Implicit Relational Assessment Procedure: The first study

Aileen Leech[a,*], Jaber Bouyrden[b], Nathalie Bruijsten[c], Dermot Barnes-Holmes[a], Ciara McEnteggart[a]

[a] Department of Experimental, Clinical and Health Psychology, Ghent University, Ghent, 9000, Belgium
[b] Department of Psychology, Thomas More Hogeschool, Antwerp, Belgium
[c] Radboud University, Nijmegen, The Netherlands



Behavioural Processes 172 (2020) 104027

Contents lists available at ScienceDirect

Behavioural Processes

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

Training and testing for a transformation of fear and avoidance functions via combinatorial entailment using the Implicit Relational Assessment Procedure (IRAP): Further exploratory analyses

Aileen Leech*, Dermot Barnes-Holmes

Department of Experimental, Clinical and Health Psychology, Ghent University, Ghent, 9000, Belgium

- We also began publishing empirical and conceptual papers that highlighted how IRAP research could contribute towards the on-going development of RFT:
  - The MDML

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 intersects 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.

Table 1
A Multi-dimensional multi-level framework consisting of 20 functional-analytic abstractive relational quanta or FAARQs; broken lines are used to separate the FAARQs to highlight that the boundaries between them may be considered relatively "fuzzy" (see text for details).

LEVELS	DIMENSIONS			
	Coherence	Complexity	Derivation	Flexibility
Mutually 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

- We also began publishing empirical and conceptual papers that highlighted how IRAP research could contribute towards the on-going development of RFT:
  - The MDML
  - The DAARRE Model

The Psychological Record (2018) 68:11–25
https://doi.org/10.1007/s40732-017-0262-z

ORIGINAL ARTICLE

Exploring the Single-Trial-Type-Dominance-Effect in the IRAP: Developing a Differential Arbitrarily Applicable Relational Responding Effects (DAARRE) Model

Martin Finn[1] · Dermot Barnes-Holmes[1] · Ciara McEnteggart[1]

Published online: 21 December 2017

Abstract
The Implicit Relational Assessment Procedure (IRAP) has been used as a measure of implicit cognition and has been used to analyze the dynamics of arbitrarily applicable relational responding. The current study uses the IRAP for the latter purpose. Specifically, the current research focuses on a pattern of responding observed in a previously published IRAP study that was difficult to explain using existing conceptual analyses. The pattern is referred to as the single-trial-type dominance effect because one of the IRAP trial types produces an effect that is significantly larger than that of the other three. Based on a post hoc explanation provided in a previously published article, the first experiment in the current series explored the impact of prior experimental experience on the single-trial-type dominance effect. The results indicated that the effect was larger for participants who reported high levels of experimental experience ($M = 32.3$ previous experiments) versus those who did not ($M = 2.5$ previous experiments). In the second experiment, participants were required to read out loud the stimuli presented on each trial and the response option they chose. The effect of experimental experience was absent, but the single-trial-type dominance effect remained. In the third experiment, a different set of stimuli than those used in the first two experiments was used in the IRAP, and a significant single-trial-type dominance effect was no longer observed. The results obtained from the three experiments led inductively to the development of a new model of the variables involved in producing IRAP effects—the differential arbitrarily applicable relational responding effects (DAARRE) model—which is presented in the General Discussion.

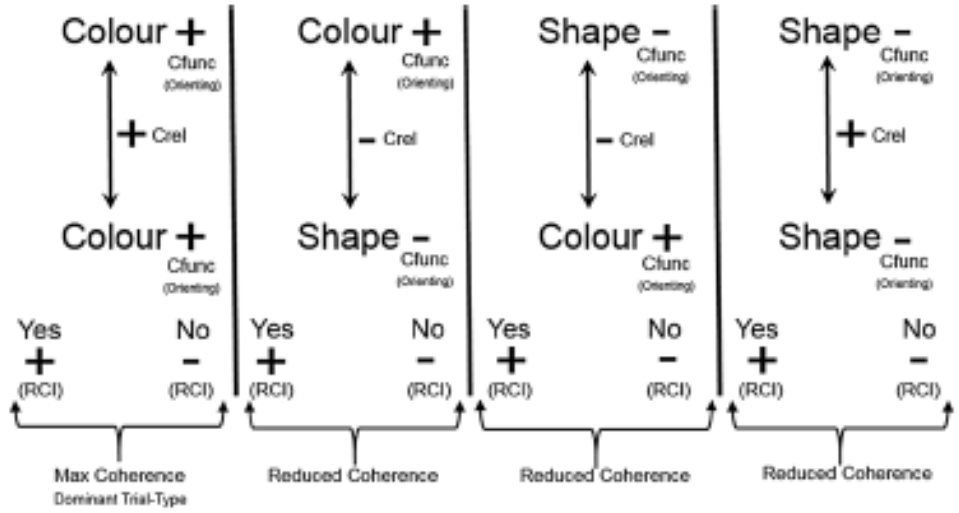


Fig. 5 The DAARRE model as it applies to the shapes and colors stimulus set (upper panel) and the forks and spoons stimulus set (lower panel). The positive and negative labels refer to the relative positivity of the Cfuncs for each label and target; the relative positivity of the Crels; and the relative positivity of the RCIs in the context of the other Cfuncs, Crels, and RCIs in that stimulus set. DAARRE = differential arbitrarily applicable relational responding effects; RCI = relational coherence indicator

- We also began publishing empirical and conceptual papers that highlighted how IRAP research could contribute towards the on-going development of RFT:
  - The MDML
  - The DAARRE Model
  - The HDML

The Psychological Record
https://doi.org/10.1007/s40732-019-00372-3

THEORETICAL ARTICLE

Updating RFT (More Field than Frame) and its Implications for Process-based Therapy

Dermot Barnes-Holmes[1] · Yvonne Barnes-Holmes[1] · Ciara McEnteggart[1]

Abstract
The current article presents a response to the recent call for a focus on psychological processes of change in psychotherapy. In addressing the need for a more process-based focus, the need for clarity in defining psychological processes per se becomes apparent, before it is possible to develop process-based therapy. In grappling with this challenge, the current article is divided into two parts. In Part I, we present a modern view of behavioral processes as they apply specifically to verbally sophisticated humans. The view we offer is based on one of the main approaches to human language and cognition within behavioral science, relational frame theory (RFT), which has been updated in recent years. In Part 2, the view of behavioral processes, as seen through the lens of an updated RFT, is used to begin to develop a process-based approach to the assessment and treatment of human psychological suffering. The article ends with two case summaries and a series of brief take-home messages that aim to capture the core elements of the RFT-driven process-based therapy we are currently developing.

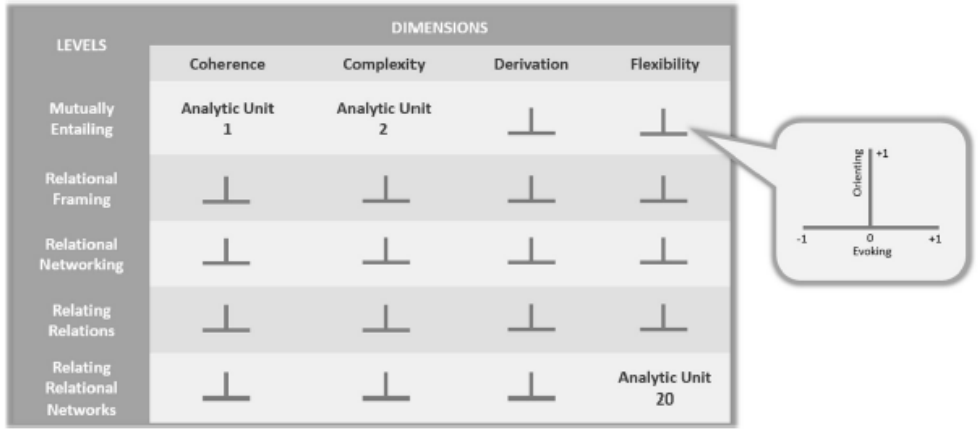


Fig. 3 A *hyper*-dimensional multilevel (HDML) framework consisting of 20 intersections between the dimensions and levels of arbitrarily applicable relational responding, combined with the dimensions of orienting and evoking from the DAARRE model

- We also began publishing empirical and conceptual papers that highlighted how IRAP research could contribute towards the on-going development of RFT:
  - The MDML
  - The DAARRE Model
  - The HDML
  - The ROE
  - The ROE-M

The Psychological Record
https://doi.org/10.1007/s40732-019-0372-3

THEORETICAL ARTICLE

Updating RFT (More Field than Frame) and its Implications for Process-based Therapy

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Abstract
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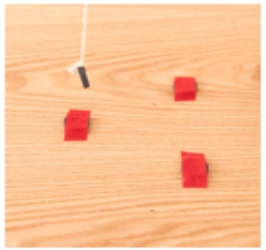
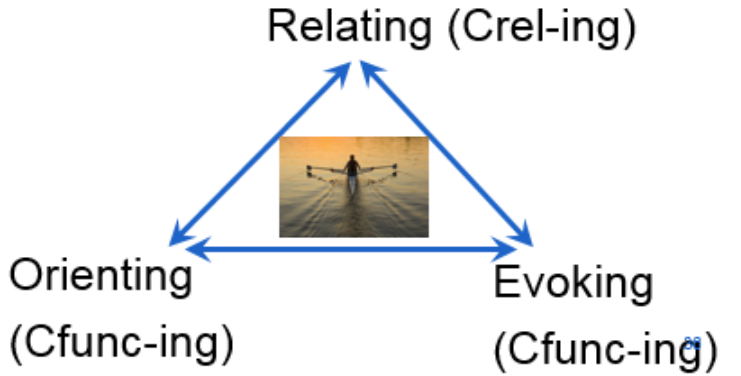
- Crel and Cfunc properties may be analysed independently (*experimentally)* but *conceptually* they are inseparable:



Psychological Events for Verbal Humans Involve a Constant Behavioral Stream of Relating, Orienting, and Evoking (ROE-ing)
The "Holy Trinity" of Human Psychological Events



- We also began publishing empirical and conceptual papers that highlighted how IRAP research could contribute towards the on-going development of RFT:
  - The MDML
  - The DAARRE Model
  - The HDML
  - The ROE-M
  - The STTDE and the DTTTE

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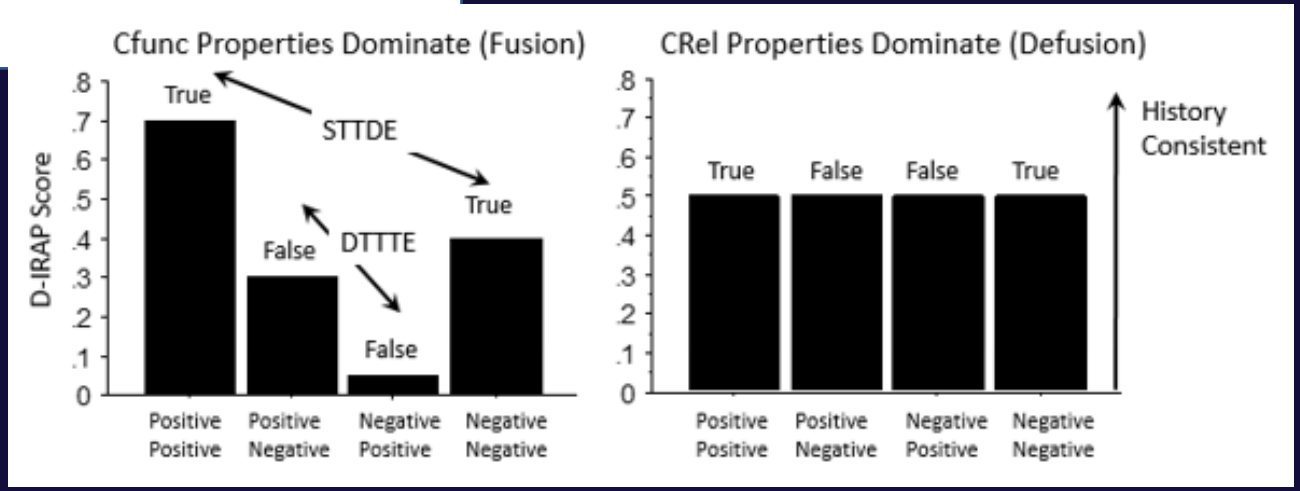
Exploring the Use of Pictures of Self and Other in the IRAP: Reflecting upon the Emergence of Differential Trial Type Effects

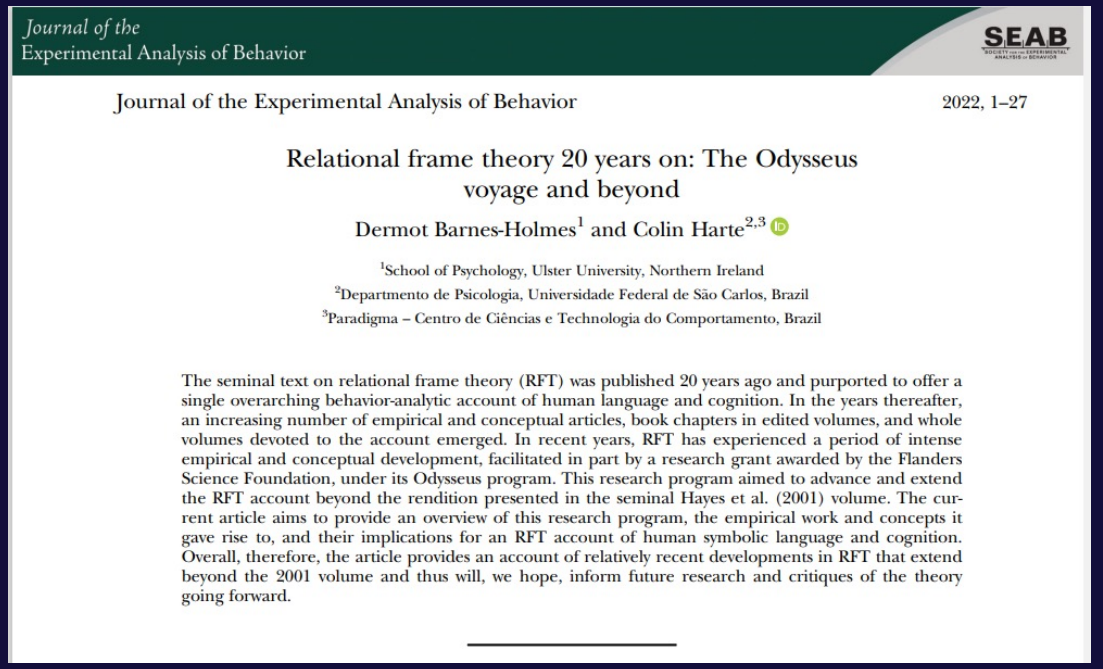
Deirdre Kavanagh
Ghent University, Belgium
Nele Matthyssen
Thomas More Hogeschool, Antwerp, Belgium
Yvonne Barnes-Holmes, Dermot Barnes-Holmes, Ciara McEnteggart
Ghent University, Belgium
Roberta Vastano
University of Miami, USA

Abstract

The Implicit Relational Assessment Procedure (IRAP) assesses the relative strength of derived relational responding. A growing body of IRAP research has focused on assessing verbal relations pertaining to the self and others. This preliminary study sought to determine the feasibility of using matched pictures of self and of others across two IRAPs (N= 32). Both the self- and other-IRAPs also presented pictures of pens as the contrast category. The results of the IRAPs were broadly consistent with common-sense expectations. That is, participants confirmed more readily than they denied that a picture of a face was a face and that a picture of a pen was a pen. They also denied more readily than confirmed that a picture of a pen was a face and that a picture of a face was a pen. No significant differences in the sizes of the individual trial type effects, or differences among those effects, emerged between the two (self and other) IRAPs. However, two key differential trial type effects did emerge for both IRAPs, which relate directly to recent and on-going conceptual developments surrounding the IRAP and the analysis of the dynamics of arbitrarily applicable relational responding in general. These developments are considered and discussed in detail toward the end of the article.
Key words: Relational Frame Theory, IRAP, differential trial type effects, self.



- We also began publishing empirical and conceptual papers that highlighted how IRAP research could contribute towards the on-going development of RFT:
  - The MDML
  - The DAARRE Model
  - The HDML
  - The ROE-M
  - The STTDE and the DTTTE
  - Ongoing development of RFT:
    - Relational **Field** Theory,
    - Entailed Orienting
    - Mutually Entailed Orienting
    - Building bridges between RFT VBDT, and Naming Theories. . .



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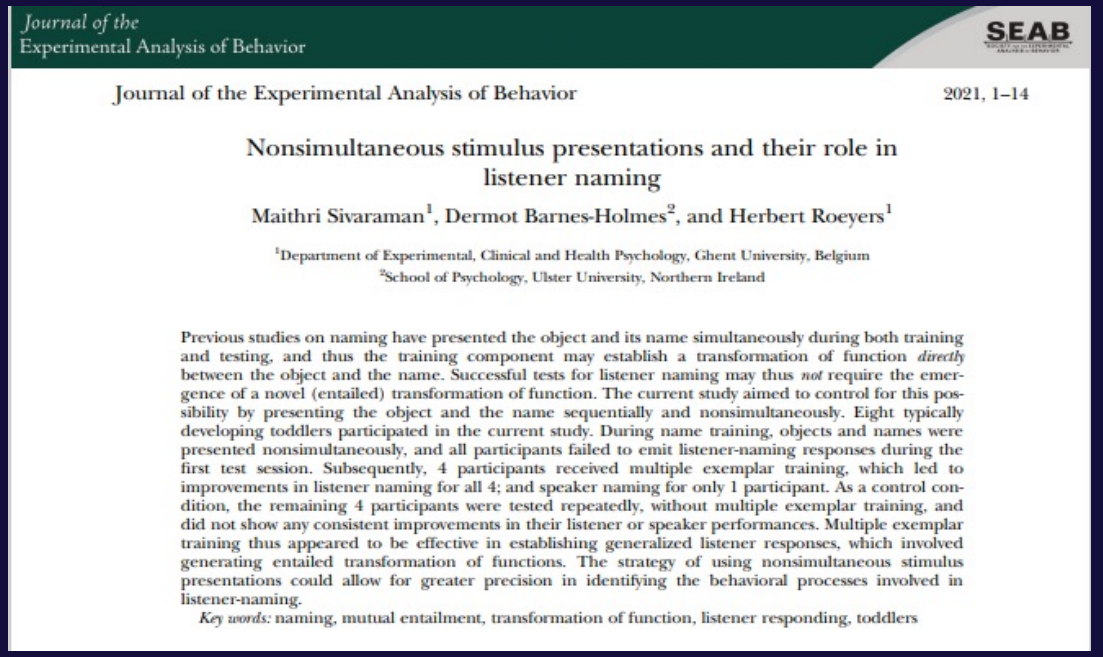
Relational frame theory 20 years on: The Odysseus voyage and beyond

Dermot Barnes-Holmes[1] and Colin Harte[2,3]

[1]School of Psychology, Ulster University, Northern Ireland
[2]Departmento de Psicologia, Universidade Federal de São Carlos, Brazil
[3]Paradigma – Centro de Ciências e Technologia do Comportamento, Brazil

The seminal text on relational frame theory (RFT) was published 20 years ago and purported to offer a single overarching behavior-analytic account of human language and cognition. In the years thereafter, an increasing number of empirical and conceptual articles, book chapters in edited volumes, and whole volumes devoted to the account emerged. In recent years, RFT has experienced a period of intense empirical and conceptual development, facilitated in part by a research grant awarded by the Flanders Science Foundation, under its Odysseus program. This research program aimed to advance and extend the RFT account beyond the rendition presented in the seminal Hayes et al. (2001) volume. The current article aims to provide an overview of this research program, the empirical work and concepts it gave rise to, and their implications for an RFT account of human symbolic language and cognition. Overall, therefore, the article provides an account of relatively recent developments in RFT that extend beyond the 2001 volume and thus will, we hope, inform future research and critiques of the theory going forward.



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Nonsimultaneous stimulus presentations and their role in listener naming

Maithri Sivaraman[1], Dermot Barnes-Holmes[2], and Herbert Roeyers[1]

[1]Department of Experimental, Clinical and Health Psychology, Ghent University, Belgium
[2]School of Psychology, Ulster University, Northern Ireland

Previous studies on naming have presented the object and its name simultaneously during both training and testing, and thus the training component may establish a transformation of function *directly* between the object and the name. Successful tests for listener naming may thus *not* require the emergence of a novel (entailed) transformation of function. The current study aimed to control for this possibility by presenting the object and the name sequentially and nonsimultaneously. Eight typically developing toddlers participated in the current study. During name training, objects and names were presented nonsimultaneously, and all participants failed to emit listener-naming responses during the first test session. Subsequently, 4 participants received multiple exemplar training, which led to improvements in listener naming for all 4; and speaker naming for only 1 participant. As a control condition, the remaining 4 participants were tested repeatedly, without multiple exemplar training, and did not show any consistent improvements in their listener or speaker performances. Multiple exemplar training thus appeared to be effective in establishing generalized listener responses, which involved generating entailed transformation of functions. The strategy of using nonsimultaneous stimulus presentations could allow for greater precision in identifying the behavioral processes involved in listener-naming.

Key words: naming, mutual entailment, transformation of function, listener responding, toddlers

Conclusion

The IRAP as Measure of Implicit Cognition

The IRAP as a Tool for Analyzing Relational Fields