

**The Ties between a Basic Science of Language and Cognition
and Clinical Applications**

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TIES BETWEEN BASIC SCIENCE AND PRACTICE

The Ties between a Basic Science of Language and Cognition and Clinical Applications

Introduction

There is general consensus that the scientist-practitioner model embodies a working relationship between basic scientific concepts in psychology and interventions designed to alleviate the problems often interpreted with these concepts. The advantages of this integrative model have been articulated frequently and may be summarized as follows: 1. clinicians are kept up to speed with the latest scientific developments (i.e., assessment and treatment); 2. clinicians can systematically evaluate treatment procedures; and 3. clinical observations and knowledge of specific populations are pivotal to refining research questions [1]. While the potential disadvantages of the scientist-practitioner model are rarely discussed, they center on obstructions to operating the model, rather than problems inherent in the approach itself. Indeed, numerous authors have lamented upon the range of difficulties that clinicians encounter when trying to organize their clinical lives as scientist-practitioners. These typically include: 1. existing research methodologies do not permit the study of clinically relevant phenomena; 2. little research is conducted by practitioners; and 3. Basic research often does not influence practice [2].

In the current paper, we try to scrutinize, at a scientific level, the basic research concepts we currently have at our clinical disposal. This is based on our belief that limitations in the concepts we currently use have contributed to the difficulties that clinicians face in trying to apply these concepts and that researchers face when trying to generate concepts that will have clinical utility. We illustrate this problem through the lens of functional psychology, which we believe has lost a great deal by not grappling with these conceptual dilemmas. Specifically, we look at the relationship between Relational Frame Theory (RFT) [3] and Acceptance and Commitment Therapy (ACT), a third-wave behavior therapy [4]. We

TIES BETWEEN BASIC SCIENCE AND PRACTICE

believe that our issues with the scientific utility of clinical concepts have been compounded over the past decade, since the development of the ACT hexaflex model.

Middle-level Concepts are Problematic

The science on which clinical psychology is purportedly based is dominated by middle-level terms [5]. In a recent book chapter, Barnes-Holmes and colleagues defined these terms as follows [6*]:

A middle-level term is a theoretically-specific, non-technical term that has not been generated within basic scientific research. In other words, middle-level terms are not “high-level” (e.g., attention) because they cohere directly with a specific theoretical account. However, they are not “low-level” or “basic” terms (e.g., reinforcement) because they have not been generated directly from experimental data. In other words, describing something as a middle-level term is a way of placing it on a continuum between the analytic units of the basic science (of psychology) and folk psychological terms (e.g., emotion, memory, stress, etc.) within a given domain.

Indeed, it is perhaps surprising when one stops to think of how very few of our existing clinical concepts are “basic” (i.e., laboratory generated) in origin. Consider “sensitivity”, “vulnerability”, and “irrational” as high-level, widely used descriptions, compared to “acceptance” as a middle-level term. However, all of these have little or no proof of concept evidence to support them. While they have undisputed clinical utility or at least convenience [5], these terms add little or nothing to our understanding of the processes of psychological suffering and offer no direction towards its alleviation. This issue *in and of itself* may not be a problem for *all* clinical traditions, but it is hugely problematic for scientists and practitioners aligned with functional-analytic psychology [6*-9].

Why middle-level terms are problematic for functional-analytic science and practice. Let’s begin at the philosophical level. Functional-analytic psychology is governed by the philosophical truth criterion of prediction and influence with precision, scope, and

TIES BETWEEN BASIC SCIENCE AND PRACTICE

depth [10]. Yet, many of the clinical middle-level concepts used by this field do not meet this criterion. Consider, for example, ACT's hexaflex concepts of "fusion/defusion", "self as context" and the especially problematic "contact with the present moment". A concept cannot be defined as a functional-analytic term (i.e., it is non-*technical*) unless the requirements of prediction and influence with precision, scope, and depth are met [6*, 10]. And, only a small, long-established, number of terms within behavioral psychology meet this criterion and may thus be defined as functional-analytic (e.g., reinforcement) [11]. In short, many middle-level terms used in functional psychology do not accurately reflect functionally distinct processes.

And the lack of functionality is further reflected in the field's common conflation of procedures, processes, and outcomes. Consider the term "defusion" (that describes separating an individual from his/her psychological content). A defusion technique is said to be a procedure that harnesses the process of defusing a client from her psychological content and thereby generating the outcome of reduced levels of fusion. That is, defusion-the-procedure reduces fusion through defusion-the-process, and the circularity is immediately obvious. Of course, we are neither denying that defusion techniques exist, nor that fusion can be reduced, nor that any of this can't happen through a process of defusion, instead we are simply saying that the *same* concept can't be all three types of phenomena. In any case, there is no good evidence to say that this is a functional concept.

So, what putative evidence is offered to support ACT's middle-level concepts? Supporting evidence for ACT's "processes" relies heavily on mediation analyses and analogue studies that attempt to isolate the "functional processes" at play in therapeutic interventions. However, neither of these methodologies can provide empirical evidence of functional processes, nor can it be argued that they constitute what a clinician targets in the broad therapeutic context. For example, mediation analyses refer to whether change on one measure explains change on another measure (e.g., effects on a defusion measure explain a

TIES BETWEEN BASIC SCIENCE AND PRACTICE

change on an anxiety measure). Furthermore, from a functional analytic perspective, psychometric “processes” do not capture *functional* processes, at best they capture proxies of processes that remain unspecified. Put simply, scores on a questionnaire (even one with sound psychometric properties) are not direct observations of target behavior, hence they are only *proxies* of that behavior [6*].

Analogue studies do explicitly attempt to isolate “processes”, only to rarify them. For example, a researcher might investigate the outcomes of an intervention component (usually selected from a larger treatment package) on a proxy measure of defusion following a stress induction procedure [12]. But, even when a gold-standard experimental methodology is used [13], analogue studies cannot ensure that functional processes (especially those putatively targeted) produced the effects [6*, 14]. Some authors have argued that this incorrect assumption is based on a number of simple errors [6*]. 1. Arbitrarily selecting components from larger treatment packages as the target “functional” process conflates procedure, process, and outcome. For example, a researcher might choose a word repetition task as a defusion procedure to target defusion-the-process. 2. Assuming the existence of a functional process, such as defusion, is also highly problematic. 3. Assuming the chosen procedure provides *evidence* for the functional process rather than a proxy of the process. 4. Assuming the relationship between the chosen procedure and the measured outcome demonstrates the *targeted process* (and not another). 5. Using another procedure as convergent evidence for the targeted functional process (i.e., this would be a repetition of the first error).

It is undisputed, however, that middle-level terms have broad clinical utility. For example, they orient therapists without basic scientific training towards effective therapy and how it can be disseminated. And these terms may *indeed* reflect functional processes that are essential for behavior change in therapy. However, there is no sound evidence that this is the case, at least in ACT (although we suspect that this is the case for most other therapeutic

TIES BETWEEN BASIC SCIENCE AND PRACTICE

traditions as well). In truth, faith in a middle-level term approach to clinical science is rapidly diminishing because it does not provide sufficient evidence for the core functional processes required for change [6*, 15, 16].

Is a reticulating model the answer? Within a contextual behavioral science approach (CBS), the debate around middle-level terms often raises questions about the relative benefits of operating scientific models that are “top-down” versus “bottom-up” [8]. In general, arguments against a top-down approach comprise much of what we have said above about middle-level terms (e.g., these concepts cannot yield to functional analytic scrutiny under lab conditions). In contrast, arguments against a bottom-up approach look much like typical obstructions to operating the scientist-practitioner model (e.g., basic research concepts often don’t have clinical applicability). In response, CBS has offered something of a compromise [17**] in terms of “*a reticulated (that is, web-like) model of scientific and practical development, in which theoretical and technological progress occurs at multiple levels but in an interconnected way*” (p. 6). Specifically, the reticulated model proposes that the flow of information between bottom-up and top-down approaches is bidirectional and mutually beneficial. According to this view, for example, ACT informs RFT about the human condition through middle-level terms, and RFT informs ACT by providing evidence for these middle-level terms [17**]. However, while the idea of such a productive relationship between science and clinical practice is indeed appealing, this is not borne out in practice. For example, an RFT researcher may not be interested in alleviating human suffering and “acceptance” may simply not yield to functional analysis. As such, we cannot see how mutual reticulation between basic science (RFT) and application (ACT) can be anything other than *asymmetrical*, where information only flows from basic to applied science [6*]. To put it bluntly, there is little evidence to date that ACT’s middle level terms

TIES BETWEEN BASIC SCIENCE AND PRACTICE

can be subjected to appropriate functional analytic scrutiny. Hence, basic researchers don't have sufficient analytic units with which to do science.

Is bottom-up the answer? Again, answering this is not straight-forward because there are problems inherent in a purely bottom-up approach: 1. scientific progress is slow; 2. basic researchers may not be interested in clinical concepts; and 3. the complexity of the basic analysis may not translate into clinical concepts [17**]. As such, some authors have argued that these limitations are more practical than theoretical in nature [17**]. In contrast, we would argue that the limitations of a basic science reticulating with non-functional middle-level terms are more theoretical than practical. That is, basic science concepts are basic science concepts, and don't have to yield to a conceptual clinical agenda. Although there may be overlap, it should not become the job of basic researchers to find these, especially if it involves any compromise to the basic units of analysis. Critically, we would argue that the progression of psychological science is driven by an expansion of the basic account. While this is not *conducted* entirely through a bottom-up account (as clinical knowledge and heuristics serve to address scientific questions), it is *accomplished* through it.

Conclusions

In summary, we are clearly biased towards the advancement of a basic science that has testable *functional* processes at its core [6*-9]. And we believe that Relational Frame Theory has provided a sound account of these processes (i.e., through arbitrarily applicable relational responding). But, we feel equally passionate about producing a functional approach to psychological suffering. But, we want this approach to be precisely that – functional. If this approach has clinical utility but offers little by way of explaining suffering and its treatment in functional analytic terms, this will not be enough for us. Our aspiration is to do what we believe has not been done thus far – to find a functional-analytic way of explaining suffering that identifies basic functional processes which can then be harnessed with precision and

TIES BETWEEN BASIC SCIENCE AND PRACTICE

depth in efforts towards lasting behavioral change. While this vision is grand, and we think not currently available, we are no less confident that it is feasible and worthwhile.

References

- [1] Barlow DH, Durand, VM: *Abnormal psychology: An integrated approach* (6th Ed.). Cengage Learning; 2012.
- [2] Barlow DH, Hayes SC, Nelson RO: *The Scientist Practitioner: Research and Accountability in Clinical and Educational Settings*. Pergamon Press; 1984.
- [3] Hayes SC, Barnes-Holmes D, Roche B: *Relational frame theory: A post-Skinnerian account of human language and cognition*. Plenum Press; 2001.
- [4] Hayes SC, Strosahl K, Wilson KG: *Acceptance and commitment therapy: An experiential approach to behavior change*. Guilford Press; 1999.
- [5] Vilardaga R, Hayes SC, Levin ME, Muto T: **Creating a strategy for progress: a contextual behavioral science approach**. *The Behav Anal* 2009, **32**:105-33.
- [6*] Barnes-Holmes Y, Hussey I, McEnteggart C, Barnes-Holmes D, Foody M: **Scientific Ambition: The Relationship Between Relational Frame Theory and Middle-level Terms in Acceptance and Commitment Therapy**. In *Handbook of Contextual Behavioral Science*. Edited by Hayes SC, Barnes-Holmes D, Zettle RD, Biglan A. Blackwell-Wiley; in press.
- This chapter builds upon the current article, further assessing the functionality and scientific utility of ‘middle-level terms’, the relationship between basic science and applied work, and argues for a refocusing on basic research.
- [7] Blackledge JT., Moran DJ, Ellis AE: **Bridging the divide: Linking basic science to applied psychotherapeutic interventions - A relational frame theory account of cognitive disputation in rational emotive behavior therapy**. *J of Rat-Emot & Cog-Behav Ther* 2009, **27**:232-248.

- [8] Hayes SC, Plumb JC: **Mindfulness from the bottom up: Providing an inductive framework for understanding mindfulness processes and their application to human suffering.** *Psychol Inq: Int J Adv of Psychol Theo* 2007, **18**:242-248.
- [9] Luciano C, Valdivia-Salas S, Ruiz F: **The self as the context for rule governed behavior.** In *The self and perspective taking: Research and applications*. Edited by McHugh L, Stewart I. New Harbinger; 2012.
- [10] Hayes SC, Barnes-Holmes D, Wilson KG: **Contextual behavioral science: Creating a science more adequate to the challenge of the human condition.** *J Context Behav Sci* 2012, **1**:1-16.
- [11] Barnes-Holmes D: **Behavioral pragmatism: No place for reality and truth.** *The Behavior Analyst* 2000, **23**:191–202.
- [12] Foody M, Barnes-Holmes Y, Barnes-Holmes D: Empirical investigation of the single-sentence paradigm as a method of stress induction. *Int J of Psychol and Psychol Ther* 2012, **12**:127-138.
- [13] Dymond S, Roche B, Bennett M: **Relational frame theory and experimental psychopathology.** In *Advances in relational frame theory and contextual behavioral science: Research and application*. Edited by Dymond S, Roche B. New Harbinger; 2013.
- [14] Gutiérrez-Martínez O, Luciano-Soriano C, Rodríguez-Valverde M, Fink BC: **Comparison between an acceptance-based and a cognitive-control-based protocol for coping with pain.** *Behav Ther* 2004, **35**:767-783.
- [15] Barlow DH, Sauer-Zavala S, Carl JR, Bullis JR, Ellard KK: **The nature, diagnosis, and treatment of neuroticism: Back to the future.** *Clin Psychol Sci* 2013. Advance online publication.

[16] Nock MK: **Conceptual and design essentials for evaluating mechanisms of clinical change.** *Alcoh: Clin and Exp Res* 2007, **31**:4S-12S.

[17**] Hayes SC, Long DM, Levin ME, Follette WC: **Treatment development: Can we find a better way?** *Clin Psych Rev* 2013, **33**:870-82.

This article outlines the reticulating model for treatment development, specifically for the community of Contextual Behavioral Science, drawing specifically on how Relational Frame Theory and Acceptance and Commitment Therapy can reticulate with one another in a coherent manner.

[18] Hussey I, Barnes-Holmes D: **From Relational Frame Theory to implicit attitudes and back again: Clarifying the link between RFT and IRAP research.** *Curr Opin Psychol* 2015.