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\*Relational Frame Theory:

*Description, Evidence, and Clinical Applications*

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From the perspective of contextual behavioral science (CBS), psychological therapists face the overarching conundrum of trying to alleviate the psychological problems *inherent in* human language, by using assessments and interventions *based on* language (Zettle, 2015). Whilst offering a useful description of the core related challenges of psychological assessment and intervention, this dilemma requires further clarification if we are to try to solve it. We list below some basic CBS assumptions in this regard that are entirely consistent with Relational Frame Theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001), and which point to some of the key links between RFT and Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999).

- First, we are not arguing that language *causes a separate set of events* which we refer to as psychological problems or abnormalities (i.e., no additional or “new” processes need to be defined).
- Rather, we believe that these problems *occur as part of the natural processes of language* (i.e., they arise through the emergence of language skills).
- Given the first two points above, we must be clear that we adhere to the pragmatic assumption (it is not a scientific fact and is not readily testable) that when you become language-able, you will *inevitably* experience psychological distress at some point(s) in your life *and* that you will react or struggle in an “unhealthy” manner (i.e., narrow and inflexible responding that limits access to reinforcers) toward some aspect of this distress.
- Our working assumption that psychological problems emerge out of language requires both elements listed in the point above (i.e., distress *and* psychological struggle) because animals experience distress although they do not have language. Hence, distress in and of itself is not behaviorally problematic. In contrast,

struggling in an unhealthy way with distress *is* problematic and it is this latter element that language in particular facilitates.

- Of course, as contextual scientists, we would also argue strenuously that our historical and current environments play a strong role in enhancing or reducing our contact with psychological struggle. *The influence of history can rarely be overstated.*

So, what are the implications of these assumptions for our original clinical conundrum? Broadly speaking, our assumptions dictate that psychological assessment and intervention should be targeting natural language processes (which RFT refers to as “verbal behavior”, see below) and that other aspects of a client’s behavior will only change when these processes have been manipulated appropriately. In simple terms, what RFT does for the contextual behavioral scientist and clinician is to provide a detailed, and empirically supported, account of these processes. In recent years, some individuals have used the theory to highlight specific ways in which therapy can be crafted so as to alter these processes in a manner that helps to return an individual toward psychological health (Tornöke, 2010; Villatte, Villatte, & Hayes, 2015). *This, in essence, is why we believe that it is important for the future of ACT, and indeed all therapies embedded within a CBS framework, that clinicians understand RFT and its implications for psychological assessment and intervention.* Put another way, if we use the concepts of RFT, our clinical hands are not tied as much by the language conundrum as you might first assume.

In the next section, we introduce you briefly, and in simple yet technically precise ways, to the core concepts of RFT (Barnes-Holmes, Hayes, Barnes-Holmes, & Roche, 2001). In doing so, we will describe how arbitrarily applicable relational responding (AARRing) is the foundational unit of language in its ability to relate non-physical properties of stimuli. We will then work upwards in complexity to the various patterns of AARRing, referred to as relational frames (e.g., coordination, distinction etc.), and groups of relations referred to as relational

networks, with the aim of providing an account of how RFT can offer a rich understanding of human language and how AARRing can be used to explain increasingly complex examples of the ways in which humans may suffer psychologically. Lastly, we will highlight the importance of focusing on the role of AARRing during the process of therapy in order to explore the functional properties of therapeutic targets.

- Psychological problems are part of the natural processes of language.
- Language inevitably brings psychological distress and the ability to struggle with this in an “unhealthy” manner.
- Psychological assessment and intervention should target verbal behavior.
- We believe that CBS clinicians need to understand RFT and its implications for psychological assessment and intervention.

## **Language as Verbal Behavior: Introducing RFT**

Writings on RFT are numerous and widespread, with several hundred published empirical studies. The theory is over 30 years old, and it is fair to say that its concepts have stood the test of time, debate, and experimental scrutiny extremely well (Hughes & Barnes-Holmes, 2016a, 2016b; but see Kissi, Hughes, Mertens, Barnes-Holmes, De Houwer, & Crombez, 2017). In summary, we are now confident in saying that the theory offers a precise, succinct, functional-analytic account of verbal behavior, although of course it remains very much a work in progress (see Barnes-Holmes, Barnes-Holmes, Hussey, & Luciano, 2016).

### **RFT’s Core Processes**

The current section contains a summary of the basic concepts on which RFT is built (for the original book-length account, see Hayes et al., 2001).

**Nonarbitrary versus arbitrarily applicable relational responding.** In essence, RFT proposes that language comprises the ability to relate stimuli and events (e.g., words and objects) in ways that do *not* depend upon the physical properties of the stimuli/events being

related. In Europe, for example, a one euro coin is physically smaller than a 50 cent coin, yet the social culture has established that the euro coin is *worth twice the value of* the 50 cent coin. If you were visiting Europe for the first time, you might assume that the opposite applied (i.e., the 50 cent coin was more valuable than the one euro coin). That is, when you compare one coin with the other, you might conclude that the larger one should be the more valuable. RFT refers to this as a *response based on the nonarbitrary or formal properties* of the stimuli being related. In contrast, the socially determined value of the two coins is independent of the difference in physical size between the coins. RFT refers to this as an *arbitrarily applicable relational response* (AARR) because the relating of the two coins in this way (i.e., not based on physical properties) has been arbitrarily established by the verbal community. Of course, your relating behavior in the latter case is not *arbitrary* because it does not change randomly; rather it is *applied arbitrarily* but consistently so by the wider social culture.

The key thing to note is that nonhumans are excellent at nonarbitrary relating (e.g., birds can differentiate fragments of different green grasses at great distances), but only humans appear to be highly proficient at AARRing, and only once language has developed (see Barnes-Holmes, Barnes-Holmes, & McEnteggart, in press). Consider naming, relating words to their referent objects (e.g., “dog” to an actual dog), as the most basic illustration of AARRing. Indeed, words rarely resemble the objects to which they refer (e.g., the word “dog” is not in any way like an actual dog). The verbal community coordinates, or relates together as equal, specific words and specific objects or events. In time, in that language community, those words always “mean” (refer to or are equal to) those objects. In simple terms, for RFT, language is about relating things together that do not actually go together in any physical way. While there is much more to RFT, it is important to emphasize that AARRing is its most basic process, around which all additional concepts revolve. In what follows, we walk briefly through these other concepts to explain how AARRing works.

**Mutual entailment.** We start with the simplest concept of all, *mutual entailment*, which appears to signal the very beginning of language development and is the most basic analytic unit of AARRing (Lipkens, Hayes, & Hayes, 1993). Mutual entailment simply means that when two stimuli are related in some way, this relationship links one stimulus to the other in a very specific way. For example, if I tell you that ‘A is less than B’, this relation mutually entails the relation that ‘B is more than A’. That is, a less-than relation between two stimuli allows you to derive a more-than relation between the same two stimuli, but going in the other direction.

**Combinatorial entailment.** But of course, language allows us to connect multiple things together, not just pairs of stimuli, and RFT employs the concept of *combinatorial entailment* to describe how relating three or more stimuli together affects all of the relations *among* the stimuli (Leonhard & Hayes, 1991). Imagine if I told you that ‘A is the opposite of B (B opposite A is mutually entailed) and B is the opposite of C (C opposite B is mutually entailed)’, then you could derive the combinatorially entailed relation of coordination between A and C. That is, two opposite relations among three related stimuli facilitate the derivation of a same (coordination) relation among two of the stimuli. In general, two sets of mutually entailed relations facilitate a combinatorially entailed relation. For RFT, mutual and combinatorial entailment are two of the defining properties of a relational frame.

**Relational frames.** As you can already see from the examples above, AARRing allows us to describe very precisely, the different ways in which stimuli and events can be related, and how doing so facilitates additional relations among those stimuli. RFT organizes these different patterns of relational behavior into what are known as *relational frames*, where a frame simply describes a type of pattern (Hayes et al., 2001). The frames that have been given at least some empirical attention in RFT are as follows: coordination (sameness), distinction (difference), comparison, opposition, hierarchy, temporal, and perspective-taking/deictic. Each of these is briefly summarized below.

**Coordination relations.** Coordination relations involve relating stimuli as similar or same, and appears to be the first type of AARRing we learn well (Hayes et al., 2001). For example, I could show you a picture of a dog, and then point to the picture saying “this is a dog”. In this case, I have established a picture-word relation, and if you have had this type of training before, you will be able to generate the mutually entailed word-picture coordination relation, such that if I said “dog”, you could select the correct picture. As you can see from this example, coordinate relational responses are typically controlled by the cue “is”, such that when you hear the word “is”, it comes to mean that the two things specified by the “is” cue can be related together in a coordinate way. In natural language, there are numerous words and phrases that would likely have the same function in specifying a coordination relation (“same as”, “equals to”, etc.). Indeed, empirical evidence has demonstrated that mutual entailment has been shown to be readily established within a coordination relation using multiple exemplars (Luciano, Gomez-Becerra, & Rodriguez-Valverde, 2007), and that coordination relations can be established in individuals who showed deficits in these repertoires, in typically-developing children, and in children with autism (Carr, Wilkinson, Blackman, & McIlvane, 2000; Dunne, Foody, Barnes-Holmes, Barnes-Holmes, & Murphy, 2014; O’Connor, Rafferty, Barnes-Holmes, & Barnes-Holmes, 2009).

Indeed, it is worth noting that the concept of the *contextual cue* is pivotal in RFT. At one level, a contextual cue is similar to a discriminative stimulus because the AARRing controlled by the cue will have been reinforced previously. Imagine I showed you a five-euro note, a bundle of five one-euro coins, and a ten-euro note, and said “match”. You would likely point to the five-euro note and the five coins because “match” functions here as a contextual cue that specifies a coordination relation, which in this case can only be derived between the five-euro note and the five coins. In simple terms, you have learned across time that “match” means (is a contextual cue for) pairing things together that are equal (i.e., coordinated) along

some dimension (in this case monetary value). Indeed, evidence has suggested that relating in the absence of contextual cues involves less relational complexity until other cues are introduced that specify the relation (Dougher, Hamilton, Fink, & Harrington, 2007; Hughes, Barnes-Holmes, & Vahey, 2012; Hughes, De Houwer, & Barnes-Holmes, 2014).

***Opposition relations.*** Opposition relations can be thought of as a type of distinction relation, but they place the related stimuli at either end of a continuum, in terms of *extreme difference* from one another (Barnes-Holmes, Barnes-Holmes, Smeets, Strand, & Friman, 2004). Once again, the nature of the difference is not always specified, although the degree of difference now is (e.g., black is opposite to white). Because of this somewhat greater degree of specification, combinatorially entailed relations based on two mutually entailed opposite relations can often be specified. Imagine for example, if I tell you that ‘A is opposite to B and B is opposite to C’, you can derive that A and C are probably the same. That is, combining opposite relations often entails a coordination relation. This example illustrates that the phrase "is opposite to" in natural language may function as a cue for the frame of opposition. Empirical evidence has demonstrated that opposition relations can readily be established in children using multiple exemplars (Barnes-Holmes et al., 2004), even those with autism who show deficits in this regard (Dunne et al., 2014).

***Distinction relations.*** Learning to differentiate stimuli from one another is almost as important in language as learning to coordinate stimuli (Dixon & Zlomke, 2005). Indeed, if some stimuli are similar, they are by definition different from all other stimuli (or else everything would be the same). In many cases, distinction relations simply specify that two stimuli are not coordinated, but additional information is often necessary for you to know exactly where the difference lies. Imagine, for example, I told you that ‘I am very different from one of my sisters’. Given only this level of information, there are potentially many ways in which my sister and I differ, but if I add that we have very different personalities, then that

narrows down the possible array of differences being referred to. Because of the largely unspecified nature of distinction relations, two mutually entailed relations do not specify what the combinatorially entailed relation will be. For example, if I tell you that ‘A and B are different’ and that ‘B and C are different’, you cannot know whether A and C are the same, because you do not know the basis of the distinctions between A and B and between B and C. Note, however, that responding that you ‘cannot know what the relation is’ between A and C is itself an accurate relational response for the frame of distinction. As you can see from this example, distinction relational responses may be controlled by the cue "is different from". Empirical evidence has demonstrated that distinction relations can readily be established in children with autism using multiple exemplars (Dunne et al., 2014), and Roche and Barnes (1996), as well as Steele and Hayes (1991), established responding in accordance with distinction relations in teenagers and adults.

*Comparison relations.* Comparison relations are somewhat more complex than coordination and distinction relations because they specify the relativity between stimuli along a specific dimension (Barnes-Holmes et al., 2004; Berens & Hayes, 2007). For example, if I tell you that ‘A is bigger than B’, this specifies the relative difference between the stimuli in terms of hypothetical size. But, there are many such dimensions for comparison, including height, weight, color, depth, and so on. Remember, that although physical or formal properties are being specified here, we are talking about AARRing and language, hence this is not nonarbitrary responding. For example, if you are told that ‘A is bigger than B and B is bigger than C’, you can derive that C is smaller than A, even though the stimuli A, B, and C remain completely unknown. Natural language phrases such as “bigger than”, “smaller than”, “more than”, and “less than” often serve as contextual cues for the frame of comparison. Empirical evidence has demonstrated that comparison relations can readily be established in typically-

developing children and children with autism using multiple exemplars (Barnes-Holmes, Barnes-Holmes, Smeets, Strand, & Friman, 2004; Berens & Hayes, 2007; Dunne et al., 2014).

**Temporal relations.** Temporal relations likely overlap functionally with comparison relations, but are restricted to stimuli or events that occur in specific sequences in the natural environment. Thus, if I tell you that ‘A occurred before B and B occurred before C’, you could derive that C occurred after A. In natural language, words and phrases such as “before”, “after”, “followed by”, and “was preceded by” function as cues for temporal relations. Empirical evidence has thus far focused on establishing this class of relations in adult populations, and their implications for intelligence and rule-following (e.g., O’Hora, Barnes-Holmes, Roche, & Smeets, 2004; O’Hora, Peláez, & Barnes-Holmes, 2005; O’Hora et al., 2008; O’Toole & Barnes-Holmes, 2009).

**Hierarchical relations.** Hierarchical relational responding appears to be highly complex and is undoubtedly better described in terms of relational networks rather than basic relational frames (see below). For example, hierarchical relations comprise coordination and distinction frames. Family trees provide a classic example of hierarchical relational networks. Imagine if I told you that ‘Ciara is my niece’ (mutually entails that I am Ciara’s aunt) and ‘Margaret is her mother’ (mutually entails that Ciara is her daughter). This establishes the combinatorially entailed relation of Margaret and I being sisters. In simple terms, the family tree starts in this case with two sisters and the generation below contains a daughter of one of the sisters. Hierarchical relations are like classes that contain members on different levels. Basic hierarchical relational responding may be controlled in natural language by combinations of contextual cues, such as “is part of”, “is similar to”, and “is distinct from.” For example, a steering wheel, a gear stick, a wing mirror, and a bumper could all be defined as *parts of* a car. But, the steering wheel and the gear stick could be defined as similar because they are typically inside the car, but different from the wing mirror and the bumper because they are typically

found outside the car. Empirical evidence for hierarchical relations has emerged largely from studies analoging their potential role in therapeutic interventions, especially ACT (Foody, Barnes-Holmes, Barnes-Holmes, & Luciano, 2013; Foody, Barnes-Holmes, Barnes-Holmes, Rai, & Luciano, 2015; Gil, Luciano, & Ruíz, 2008; Gil, Luciano, Ruiz, & Valdivia-Salas, 2012; Gil-Luciano, Ruiz, Valdivia, & Suárez, 2016; Griffee & Dougher, 2002; Luciano et al., 2011; Ruiz, Hernández, Falcón, & Luciano, 2016; Slattery, & Stewart, 2014; Slattery, Stewart, & O'Hora, 2011).

***Deictic relations.*** The deictic relations have attracted a great deal of attention in the field of CBS, most likely because of the pivotal role they play in so-called perspective-taking (Barnes-Holmes, 2001; Barnes-Holmes, Foody, Barnes-Holmes, & McHugh, 2013; McHugh, Barnes-Holmes, & Barnes-Holmes, 2004). The primary function of deictic relations in natural language is to allow you to locate yourself verbally in space and time, and in relation to others. RFT describes the three core deictic relations that go to make up the frame: I versus YOU/OTHER, HERE versus THERE, and NOW-THEN. RFT suggests that deictic relations develop through a history of learning to talk about what you are doing where and when, relative to others. For example, a young child would have to learn to say “I am eating pasta, but my brother is eating bread”. That is, the deictic relations involve learning to respond verbally from the perspective of self or I in relation to others about events that occur in specific times and places.

According to RFT, sophisticated deictic framing requires the prior establishment of more basic framing abilities, so that the cues involved in those more basic frames can then be applied to the deictic relata. For example, the cue “not” (a cue for distinction) would play an important role in establishing a child’s ability to report “I am eating pasta at the table, but my brother is not”. There have been many studies of deictic relations that have focused on developmental assessments (Rehfeldt, Dillen, Ziomek, & Kowalchuk, 2010), and even some

examining the impact of training these relations for educational (Heagle & Rehfeldt, 2006; Weil, Hayes, & Capurro, 2011) and clinical purposes (Villatte, Monestes, McHugh, Baque, & Loas, 2008; Villatte, Monestes, McHugh, Freixa i Baque, & Loas, 2010).

**Relational responses versus relational networks.** As noted earlier, some frames appear to be relatively simple or basic, such as coordination, opposition, and distinction, whereas, others are better considered to involve networks, such as hierarchy and deictics. Indeed, in one sense, all frames are networks because they involve more than two stimuli. But in RFT, the term network is typically reserved for instances in which multiple relational frames become interrelated in the production of relatively complex patterns of behavior, such as rule-following and problem-solving (see Hughes & Barnes-Holmes, 2016a, 2016b).

**Transformation of stimulus functions.** There is one remaining core process of AARRing which we have not yet described and that is referred to as the *transformation of stimulus functions* (see Dymond & Barnes, 1995 for the first empirical demonstration). Thus far, what we have said about AARRing is largely descriptive in the sense that it has focused on the many relational features of AARRing, such as how stimuli are related to others by mutual or combinatorial entailment or by a specific relational pattern (e.g., coordination versus opposition). However, RFT is not a theory of abstract logic or reasoning, but a theory of how language operates ‘in the real world’. According to RFT, verbally-able humans engage in AARRing almost constantly about their feelings, thoughts, and reactions to events and stimuli in the environment, and this involves what is referred to as the *transformation of stimulus functions*. Imagine, for example, that a friend tells you that there is a new soft drink that tastes even *better than* your favorite. As a result, the evaluative functions of the new drink have been transformed based on your friend’s advice (i.e., the new drink is better than your favorite drink). Consequently, the next time you’re asked “What do you want to drink?”, you may order the

new soft drink, even though you have never actually tasted this drink before. In this case, your behavior in the real world has been changed based purely on the process of AARRing.

- RFT concepts have stood the test of time, debate, and experimental scrutiny extremely well.
- For RFT, language is about relating things together that do not actually go together in any physical way.
- RFT distinguishes between nonarbitrary relational responding and arbitrarily applicable relational responding (AARRing).
- AARRing is RFT's its most basic process.
- Mutual entailment is the most basic analytic unit of AARRing with two stimuli.
- RFT uses *combinatorial entailment* to describe how relating three or more stimuli together affects all of the relations *among* them.
- RFT organizes these patterns of AARRing into relational frames, that include coordination (sameness), distinction (difference), comparison, opposition, hierarchy, temporal, and deictic relation.
- The concept of the *contextual cue* is pivotal in RFT in specifying which relations are to be derived in a given context.
- Whilst all relational frames are networks because they involve more than two stimuli, the term network is typically reserved for instances in which multiple relational frames become interrelated.
- Feelings, thoughts, reactions etc. become part of these relational repertoires through the transformation of stimulus functions.

### **Clinical Applications of RFT**

The foregoing example of the way in which you can positively evaluate a novel drink without any direct experience of that drink may be seen as relevant to how AARRing provides a behavioral explanation for a wide range of clinical phenomena. As a very simple example, consider how someone might develop an irrational fear or phobia, based on the transformation

of stimulus functions. Imagine a young child who is told the story of the three pigs and the big bad wolf, and is then told at the end of the story that a wolf is a type of dog. Although the child may have previously had no fear of domestic dogs, they may begin to show some fear or anxiety around dogs, based purely on the coordinating of dogs with wolves. In this case, the negative evaluative functions established by the fairytale for wolves transform the evaluative functions of dogs generally in a manner that we would describe as an irrational fear.

The ability to AARR can be used to explain increasingly complex examples of the ways in which humans may suffer psychologically. For instance, the ability to relate entire relational networks to other relational networks may be involved in highly abstract transformations of functions. Imagine, for example, a woman who has recently begun to feel trapped in two or three areas of her life (e.g., work, relationships, and family responsibilities). The extent to which the word “trapped” is used to describe her struggle in these domains may give rise to bouts of claustrophobia and panic, when she is required to enter enclosed spaces, including elevators, subways, and crowded shopping areas. The emergence of so-called claustrophobia and panic disorder may have little to do with aversive experiences in any of these contexts, but is based on the transformation of functions of those contexts, because they are related via the term ‘trapped’ to the relational networks that describe work, relationships, and family responsibilities.

Another example of how AARRing may explain the unique emergence of human psychological suffering might focus on the development of the verbal self in the context of early family relationships. Imagine a young boy who is subject to physical and emotional abuse by a parent over a period of years. The parent may literally abuse the child one moment and then say, for example, “You know that I love you” the next moment. The fact that the parent employs language in a manner that is entirely incoherent with the way in which the wider verbal community employs that language may undermine the child’s ability in later life to connect in

a healthy way with other adults who did not experience this verbal fracturing between normative and unhealthy languaging by his parent (i.e., being told he is loved by an abusive parent). In simple terms, a frame of coordination has been established for the child between feeling abused and feeling loved. Not surprisingly, the child may find it challenging in later life to form a close and intimate relationship with someone who is not abusive towards him in some way.

When human psychological suffering and struggle is interpreted or explained in terms of AARRing, it highlights the importance of focusing on the role of language during the process of therapy. In the case of the woman who developed claustrophobia and panic disorder above, in the context of feeling trapped in several domains in her life, it may be useful in therapy to focus on the word ‘trapped’ itself. For example, in exploring the functional properties of ‘trapped’, the therapist might literally hold the client’s wrists gently and ask her to describe how it feels to be trapped by someone else. During the process of therapy, engaging in this physical metaphor may help the client to see the connections between the claustrophobia/panic and the wider unhappy features of her life, and to then explore her reactions to these in ways that are values-driven, rather than values-disabling (e.g., consider changing jobs, sharing her fears with her partner, etc.).

- AARRing provides a behavioral explanation for a wide range of clinical phenomena.
- For example, an individual might develop an irrational fear or phobia, based on the transformation of stimulus functions.
- Highly abstract transformations of functions may involve the ability to relate entire relational networks to other relational networks.
- This ability may explain patterns of suffering such as claustrophobia and panic, even when there have been few directly relevant aversive experiences.
- Another example of how AARRing may explain psychological suffering might focus on the development of the verbal self in the context of early family relationships.
- When human psychological suffering and struggle is interpreted or explained in terms of AARRing, it highlights the importance of focusing on the role of language during the process of therapy.

## **Conclusions**

In the Introduction, we noted that RFT was linked closely to ACT and indeed it is true that the theory and the application certainly co-evolved closely in the early years. More recently, however, ACT has developed the hexaflex as its own scientific model, which specifies six psychological ‘processes’ couched largely in middle-level terms (e.g., defusion, acceptance, etc.). While those individuals who are highly familiar with the early history of ACT and RFT may readily see how such terms connect to the functional analysis of verbal behavior that RFT provides, others who are less familiar may not. Thus, it seems important to continue to explore exactly how the technical terms and concepts of RFT might be used to understand human psychological suffering and to treat it in the context of psychotherapy. The current chapter constitutes one such attempt.

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