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Acceptance and Commitment Therapy: Model, processes and outcomes

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Abstract

The present article presents and reviews the model of psychopathology and treatment underlying Acceptance and Commitment Therapy (ACT). ACT is unusual in that it is linked to a comprehensive active basic research program on the nature of human language and cognition (Relational Frame Theory), echoing back to an earlier era of behavior therapy in which clinical treatments were consciously based on basic behavioral principles. The evidence from correlational, component, process of change, and outcome comparisons relevant to the model are broadly supportive, but the literature is not mature and many questions have not yet been examined. What evidence is available suggests that ACT works through different processes than active treatment comparisons, including traditional Cognitive-Behavior Therapy (CBT). There are not enough well-controlled studies to conclude that ACT is generally more effective than other active treatments across the range of problems examined, but so far the data are promising.

Keywords: Acceptance and Commitment Therapy; Relational Frame Theory; Mindfulness; Acceptance; Mediational analysis; Third generation CBT; Clinical behavior analysis; Contextualism

Introduction

The behavior therapy movement began with two key commitments. Behavior therapy was to be a field designed to (1) produce a scientifically based analysis of behavioral health problems and their treatment cast in terms of basic psychological processes, and (2) develop well-specified and empirically validated interventions for such problems. Franks and Wilson's (1974) well-known early definition of behavior therapy shows that dual commitment clearly, asserting that behavior therapy was based on "operationally defined learning theory and conformity to well established experimental paradigms" (p. 7). Over the 40 years of development of behavior therapy, however, only the latter of these two commitments has been firmly kept.

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Many methods of change in the contemporary cognitive and behavioral therapies are linked to relatively narrow clinical theories, not to basic principles derived from "operationally defined learning theory" or indeed any other basic science. The failure to provide an adequate basic account has reduced the scientific progressivity of the behavioral and cognitive therapies, and the overall coherence of the resulting science.

Focusing merely on validation of an ever-expanding list of multi-component manuals designed to treat a dizzying array of topographically defined syndromes and sub-syndromes creates a factorial research problem that is scientifically impossible to mount. Such a "brute force" empirical approach makes it increasingly difficult to teach what is known or to focus on what is essential. Linkage to basic principles helps solve this problem because it allows the diversity of methods that result from clinical creativity to be distilled down to a manageable number of common core processes (cf. Harvey, Watkins, Mansell, & Shafran, 2004). It also fosters the practical value and coherence of psychology itself by allowing empirical clinical psychology to contribute the development of the discipline.

The present article briefly considers why the linkage to basic principles was weakened, and examines evidence regarding the model of psychopathology and change that underlies Acceptance and Commitment Therapy (ACT, said as a single word, not as initials; Hayes, Strosahl, & Wilson, 1999). ACT has followed a very different developmental approach by consciously developing a basic research program to meet the needs of modern behavioral and cognitive therapies such as ACT, in the hopes that the models that result will be more fruitful.

How behavior therapy weakened its link to basic principles

Behavior therapy can be divided into three generations: traditional behavior therapy, cognitive-behavior therapy (CBT), and the more recent "third generation" of relatively contextualistic approaches (Hayes, 2004). In the first generation of behavior therapy it was possible to keep both of its founding commitments because traditional behavior therapists drew on a large set of basic principles drawn from the basic behavioral laboratories. Even in the earliest days, however, authors of behavioral principles texts realized that these principles needed to expand beyond operant and classical conditioning principles to include those focused on human cognitive processes (Bandura, 1968). Clinicians realized that as well, and this insight was at the core of the second generation of traditional cognitive therapy and CBT (e.g., Beck, Rush, Shaw, & Emery, 1979).

Unfortunately, behavior analysis was unable to supply an empirically adequate account of cognition, despite taking private events seriously. This left basic cognitive models as the only alternative, but none were as easily linked to clinical interventions as were learning theory principles. The reasons for this are complex, but time has shown that they go well beyond merely the stage of development of basic cognitive analyses at the time. After decades of relatively unsuccessful effort, this difficulty in linking behavior therapy to basic cognitive models appears more likely to be the result of a philosophical mismatch.

When CBT emerged, the dominant cognitive models largely were (and remain) either mechanistic information processing approaches or organismic cognitive developmental approaches. For philosophical reasons, both are more focused on the nature and evolution of cognitive acts and their impact on other forms of action than they are on the specific contextual events that regulate these psychological events and relate them one to the other. This feature tends to limit the direct applied relevance of the basic concepts that result (Hayes & Brownstein, 1986). Let us explain.

A principle like reinforcement is focused on the interface between action and its manipulable context, in effect, unifying both dependent and independent variables into a single unit. When the clinician applies such a concept to change behavior (we will we use the term "behavior" in this paper as it is used in behavior analysis, that is, as a term for all forms of psychological activity, both public and private, including cognition), the independent variables specified by the term can be manipulated and the effect noted.

This is not, in the main, true of the cognitive concepts generated by information processing and developmental cognitive perspectives. A concept like cognitive schemas (Piaget, 1964) is focused on the organization of a specific kind of dependent variable (cognition) but it does not itself specify the contextual events that alter this variable or regulate its impact on other forms of activity. Similarly, explanations of cognition that focus on the material causality of the brain in essence shift a dependent variable from one level of analysis to another level of analysis but without providing concrete and manipulable independent variables

that can be directly changed. Explaining cognition in terms of unfolding developmental patterns has this same "independent variable free" quality. As a result, principles drawn from basic theories of this kind have hard time leading directly or efficiently to the practical causes emphasized by clinicians and their pragmatic purposes.

Unable to rely fully on basic cognitive accounts, as CBT was born clinicians created their own cognitive models to guide treatment development. This step allowed greater specificity about clinically relevant cognitive targets and it allowed the field to move ahead without having to wait for a basic account that could be usefully applied, but it also meant that the behavior therapy tradition was implicitly adopting a new and very different model of scientific development in which basic principles would be far less important to behavior therapy than its originators imagined. For example, CBT researchers defined and measured specific patterns of cognitions characteristic of specific forms of psychopathology (e.g., Hollon & Kendall, 1980). The terms used to describe these patterns sometimes were loosely linked to basic cognitive psychology (e.g., schemas), but often they were not (e.g., Ellis, 1962) and in either case the actual content of these cognitive processes (e.g., over-generalization; Black and White thinking; emotional reasoning; irrational cognitions, and so on) were of little importance to basic cognitive science. These concepts were "cognitive" in the sense that they were about thinking as understood in common sense terms—they focused on "thoughts." In the area of treatment, the relationship to basic processes was even more tenuous: cognitive disputation, empirical tests, collaborative empiricism, and so on were not methods of fundamental importance to the basic cognitive science laboratory—they were common-sense practical procedures generated clinically.

The second generation of behavior therapy is now 30 years old, and the long-term impact of this second model of scientific development can be examined. The results are mixed. CBT techniques have produced impressive outcomes in many areas but it is not clear how much of this is due to what was added to traditional behavior therapy. When we look specifically at the original goal of an analysis linked to basic principles, the picture is not positive. The link between cognitive therapy and basic cognitive science continues to be weak. Looking at the array of popular techniques developed in CBT, none are known to have emerged directly from the basic cognitive science laboratories. Component analysis studies have generally failed to find support for the importance of direct cognitive change strategies, which was the common sense lynch pin of CBT (Gortner, Gollan, Dobson, & Jacobson, 1998; Jacobson et al., 1996; Zettle & Hayes, 1987). Well-known cognitive therapists have been forced to conclude that in some important areas there is "no additive benefit to providing cognitive interventions in cognitive therapy" (Dobson & Khatri, 2000, p. 913). The response to traditional cognitive therapy often occurs before cognitive change techniques have been implemented (Ilardi & Craighead, 1994), a finding that has still not been adequately explained. Support for the hypothesized mediators of change in CBT is weak (e.g., Burns & Spangler, 2001; Morgenstern & Longabaugh, 2000), particularly in areas that are causal and explanatory rather than descriptive (Beck & Perkins, 2001; Bieling & Kuyken, 2003).

This overall picture presents an anomaly. One the one hand, most empirical clinicians agree that traditional behavior therapy was simply not adequate and that better methods of dealing with thoughts and feelings were needed. CBT is widely understood to have been a step forward in freeing up the behavior therapy tradition to work directly with cognition, and the outcomes for CBT protocols are generally quite good compared to work outside of behavior therapy writ large. On the other hand, the core conception of traditional cognitive and CBT—that direct cognitive change is necessary for clinical improvement—is still not well supported, and there is scant evidence that traditional CBT is bringing together basic and applied analyses into a more scientifically coherent and useful discipline.

Taking another road: ACT, RFT, and contextual behavior analysis

This is a time of upheaval in behavioral and cognitive therapy, particularly due to the rapid rise of acceptance and mindfulness-based interventions. These third generation approaches have been defined as follows (Hayes, 2004):

> Grounded in an empirical, principle-focused approach, the third wave of behavioral and cognitive therapy is particularly sensitive to the context and functions of psychological phenomena, not just their form, and

thus tends to emphasize contextual and experiential change strategies in addition to more direct and didactic ones. These treatments tend to seek the construction of broad, flexible and effective repertoires over an eliminative approach to narrowly defined problems, and to emphasize the relevance of the issues they examine for clinicians as well as clients (p. 658).

Examples of third wave CBT interventions include ACT, dialectical behavior therapy (DBT; Linehan, 1993), mindfulness-based cognitive therapy (MBCT; Segal, Williams, & Teasdale, 2001), and meta-cognitive approaches (Wells, 2000), among several others. Rather than focusing on changing psychological events directly these interventions seek to change the function of those events and the individual's relationship to them through strategies such as mindfulness, acceptance, or cognitive defusion (Teasdale, 2003).

Third generation approaches are emerging both within more behavioral and more cognitive wings of CBT, which is part of what justifies thinking of these changes in generational terms. In times of transition, basic assumptions and strategies can be more easily considered.

In the present article, it is our purpose to characterize ACT and its underlying theory, to summarize the data available, and to begin to contrast ACT with traditional CBT. While ACT is part of current developments, it is also distinct in the particular development path it has followed, particularly in its attempt to develop the basic behavioral laboratory itself so as to generate more clinically adequate basic principles.

The second generation broke away from the first because operant and classical learning principles were not alone adequate to account for human cognition. ACT is the applied extension of a 20 year long attempt to create a modern form of behavior analysis that could overcome this challenge by adding the principles needed to account for cognition from a functional contextual or behavior analytic point of view. The core conviction of this effort is that behavior therapy indeed needs to deal more effectively with cognition but that a contextualistic theory of cognition would be more likely to lead to accomplishment of its practical goals while retaining the original basic science commitments of the behavior therapy tradition. Clinicians always reside in the context surrounding the actions of clients and thus can only have an impact on these actions by manipulating contextual variables. These variables are specified in the case of traditional behavioral principles, but they are not in traditional mechanistic, organicist, or clinical theories of cognition.

ACT embraces a contextualistic philosophy of science, a basic theory of language and cognition, and an applied theory of psychopathology and psychological change. We will very briefly describe each of these before proceeding to the empirical results of this approach.

ACT philosophical roots

Expanding behavior analysis to create a contextual theory of cognition required considerable philosophical clarity about the kind of contextualistic approach that might be adequate to that task. ACT is rooted in the pragmatic philosophy of functional contextualism (Biglan & Hayes, 1996; Hayes, 1993; Hayes & Brownstein, 1986; Hayes, Hayes, & Reese, 1988), a specific variety of contextualism that has as its goal the prediction and influence of events, with precision, scope and depth (Hayes, 1993). Contextualism views psychological events as ongoing actions of the whole organism interacting in and with historically and situationally defined contexts. These actions are whole events that can only be broken up for pragmatic purposes, not ontologically. Because goals specify how to apply the pragmatic truth criterion of contextualism (Hayes, Hayes, Reese, & Sarbin, 1993), functional contextualism differs from other varieties of contextualism that have other goals. ACT thus shares common philosophical roots with constructivism, narrative psychology, dramaturgy, social constructionism, feminist psychology, Marxist psychology, and other contextualistic approaches, but its unique goals leads to different qualities and different empirical results than these more descriptive forms of contextualism, seeking as they do a personal appreciation of the complexity of the whole (Hayes, 1993) rather than prediction and influence per se.

ACT itself reflects its philosophical roots in several ways. ACT emphasizes workability as a truth criterion, and chosen values as the necessary precursor to the assessment of workability because values specify the criteria for the application of workability. Its causal analyses are limited to events that are directly manipulable, and thus it has a consciously contextualistic focus. From such a perspective, thoughts and feelings do not cause other actions, except as regulated by context (Biglan & Hayes, 1996; Hayes &

Brownstein, 1986). Therefore, it is possible to go beyond attempting to change thoughts or feelings so as to change overt behavior, to changing the context that causally links these psychological domains.

ACT theoretical roots

Nearly a decade and a half passed between the earliest randomized trials on Comprehensive Distancing (the early form of ACT, Zettle & Hayes, 1986) and those in the modern era (e.g., Bond & Bunce, 2000). In that interval, the basic theory of human language and cognition underlying ACT, Relational Frame Theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001) was developed into a comprehensive basic experimental research program used to guide the development of ACT itself.

RFT has become one of the most actively researched basic behavior analytic theories of human behavior, with over 70 empirical studies focused on it tenets. RFT is initially technically difficult, and it requires mastery of several new terms, but fortunately only a broad overview is necessary in the present context.

According to RFT, the core of human language and cognition is the learned and contextually controlled ability to arbitrarily relate events mutually and in combination, and to change the functions of specific events based on their relations to others. For example, very young children will know that a nickel is larger than a dime by physical size, but not until later will the child understand that a nickel is smaller than a dime by social attribution. In addition to being arbitrarily applicable (a nickel is "smaller" than a dime merely by social convention), this more psychologically complex relation is mutual (e.g., if a nickel is smaller than a dime, a dime is bigger than a nickel), combinatorial (e.g., if a penny is smaller than a nickel and a nickel is smaller than a dime then a penny is smaller than a dime), and alters the function of related events (if a nickel has been used to buy candy a dime will now be preferred even if it has never actually been used before). The applied implications of RFT derive from several sources, but three critical features are that: (1) human cognition is a specific kind of learned behavior. For example, RFT researchers have recently shown that arbitrarily applicable comparative relations (the nickel and dime situation just mentioned) can be trained as an overarching operant in young children (Barnes-Holmes, Barnes-Holmes, Smeets, Strand, & Friman, 2004; Berens & Hayes, under submission); (2) cognition alters the effects of other behavioral processes (e.g., Dymond & Barnes, 1995). For example, a person who has been shocked in the presence of B and who learns that B is smaller than C, will show a greater emotional response to C than to B, even though B was directly paired with shock (Dougher, Hamilton, Fink, & Harrington, under submission), and; (3) cognitive relations and cognitive functions are regulated by different contextual features of a situation (e.g., Wulfert & Hayes, 1988).

The primary implications of RFT in the area of psychopathology and psychotherapy extend from the three important features just described (Hayes et al., 2001): (1) verbal problem solving and reasoning is based on some of the same cognitive processes that can lead to psychopathology, and thus it is not practically viable to eliminate these processes, (2) much as extinction inhibits but does not eliminate learned responding, the common sense idea that cognitive networks can be logically restricted or eliminated is generally not psychologically sound because these networks are the reflection of historical learning processes; (3) direct change attempts focused on key nodes in cognitive networks creates a context that tends to elaborate the network in that area and increase the functional importance of these nodes, and (4) since the content and the impact of cognitive networks are controlled by distinct contextual features, it is possible to reduce the impact of negative cognitions whether or not they continue to occur in a particular form. Taken together, these four implications mean that it is often neither wise nor necessary to focus primarily on the content of cognitive networks in clinical intervention. Fortunately, the theory suggests that it is quite possible instead to focus on their functions.

RFT has proven itself successful so far in modeling higher cognition in a number of areas (Hayes et al., 2001). For example, RFT researchers have successfully modeled analogy and metaphor (Stewart, Barnes-Holmes, & Roche, 2004), and shown that relational frames produce semantic priming (e.g., Hayes & Bissett, 1998). Neurobiological measures tell the same story. Complex RFT tasks generate pre-frontal activation (Barnes-Holmes, Regan, et al., in press) as would be expected based on cognitive research on relational reasoning (Waltz et al., 1999). Similarly, brain activation patterns show that priming within arbitrary stimulus relations in RFT tasks is relational, not merely associative (Barnes-Holmes et al., 2005).

RFT is meant to be a comprehensive contextualistic account of human language and cognition and thus its goals extend far beyond ACT or even the behavioral and cognitive therapies in general. Because all of the key features of the theory are cast in terms of manipulable contextual variables, it has readily lead to applied interventions in such areas as education, for example (e.g., Berens & Hayes, under submission; Barnes-Holmes et al., 2004). In ACT, virtually every component of the technology is connected conceptually to RFT, and several of these connections have been studied empirically.

ACT/RFT theory of psychopathology: psychological inflexibility

From an ACT/RFT point of view, while psychological problems can emerge from the general absence of relational abilities (e.g., in the case of mental retardation), a primary source of psychopathology (as well as a process exacerbating the impact of other sources of psychopathology) is the way that language and cognition interact with direct contingencies to produce an inability to persist or change behavior in the service of long-term valued ends. This kind of psychological inflexibility is argued in ACT and RFT to emerge from weak or unhelpful contextual control over language processes themselves, and the model of psychopathology is thus linked point to point to the basic analysis provided by RFT. This yields an accessible and clinically useful middle level theory bound tightly to more abstract basic principles.

The literature on an ACT/RFT model of psychopathology is large and growing, so only a thumbnail account can be given here. An overall model is shown in Fig. 1. In general terms cognitive fusion refers to excessive or improper regulation of behavior by verbal processes, such as rules and derived relational networks (see Hayes, Strosahl et al., 1999 for further details). In contexts that foster such fusion, human behavior is guided more by relatively inflexible verbal networks than by contacted environmental contingencies. As a result, people may act in a way that is inconsistent with what the environment affords relevant to chosen

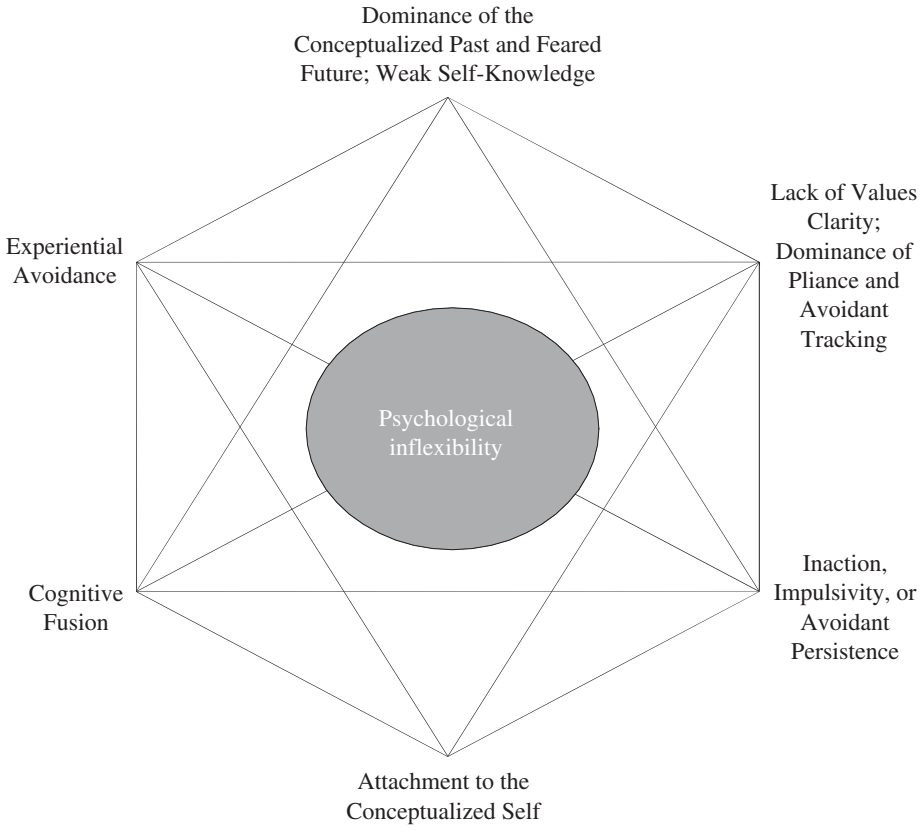

Fig. 1. An ACT/RFT model of psychopathology.

values and goals. From an ACT/RFT point of view, the form or content of cognition is not directly troublesome, unless contextual features lead this cognitive content to regulate human action in unhelpful ways.

The functional contexts that tend to have such deleterious effects are largely sustained by the social/verbal community. There are several. A context of literality treats symbols (e.g., the thought, "life is hopeless") as one would referents (i.e., a truly hopeless life). A context of reason-giving bases action or inaction excessively on the constructed "causes" of owns own behavior, especially when these processes point to non-manipulable "causes" such as conditioned private events (cf., Addis & Jacobson, 1996; Zettle & Hayes, 1986). A context of experiential control focuses on the manipulation of emotional and cognitive states as a primary goal and metric of successful living.

These contexts are interrelated, which helps explain why cognitive fusion supports experiential avoidance—the attempt to alter the form, frequency, or situational sensitivity of private events even when doing so causes behavioral harm (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Due to the temporal and comparative relations present in human language, so-called "negative" emotions are verbally predicted, evaluated, and avoided. Experiential avoidance is based on this natural language process—a pattern that is then amplified by the culture into a general focus on "feeling good" and avoiding pain. Unfortunately, attempts to avoid uncomfortable private events tend to increase their functional importance—both because they become more salient and because these control efforts are themselves verbal linked to conceptualized negative outcomes—and thus tend to narrow the range of behaviors that are possible since many behaviors might evoke these feared private events.

The social demand for reason giving and the practical utility of human symbolic behavior draws the person into attempts to understand and explain psychological events even when this is unnecessary (Hayes, 2002). Contact with the present moment decreases as people begin to live "in their heads." The conceptualized past and future, and the conceptualized self, gain more regulatory power over behavior, further contributing to inflexibility. For example, it can become more important to be right about who is responsible for personal pain, than it is to live more effectively with the history one has; it can be more important to defend a verbal view of oneself (e.g., being a victim, never being angry, being broken, etc.) than to engage in more workable forms of behavior that do not fit that that verbalization. Furthermore, since emotions and thoughts are commonly used as reasons for other actions, reason-giving tends to draw the person into even more focus on the world within as the proper source of behavioral regulation, further exacerbating experiential avoidance patterns. Again psychological inflexibility is the result.

In the world of overt behavior, this means that long-term desired qualities of life (i.e., values) take a backseat to more immediate goals of being right, looking good, feeling good, defending a conceptualized self, and so on. People lose contact with what they want in life, beyond relief from psychological pain. Patterns of action emerge and gradually dominate in the person's repertoire that are detached from long-term desired qualities of living. Behavioral repertoires narrow and become less sensitive to the current context as it affords valued actions. Persistence and change in the service of effectiveness is less likely.

Six core processes of ACT

ACT targets each of these core problems with the general goal of increasing psychological flexibility—the ability to contact the present moment more fully as a conscious human being, and to change or persist in behavior when doing so serves valued ends. Psychological flexibility is established through six core ACT processes as is show in Fig. 2. Each of these areas are conceptualized as a positive psychological skill, not merely a method of avoiding psychopathology.

Acceptance

Acceptance is taught as an alternative to experiential avoidance. Acceptance involves the active and aware embrace of those private events occasioned by one's history without unnecessary attempts to change their frequency or form, especially when doing so would cause psychological harm. For example, anxiety patients are taught to feel anxiety, as a feeling, fully and without defense; pain patients are given methods that

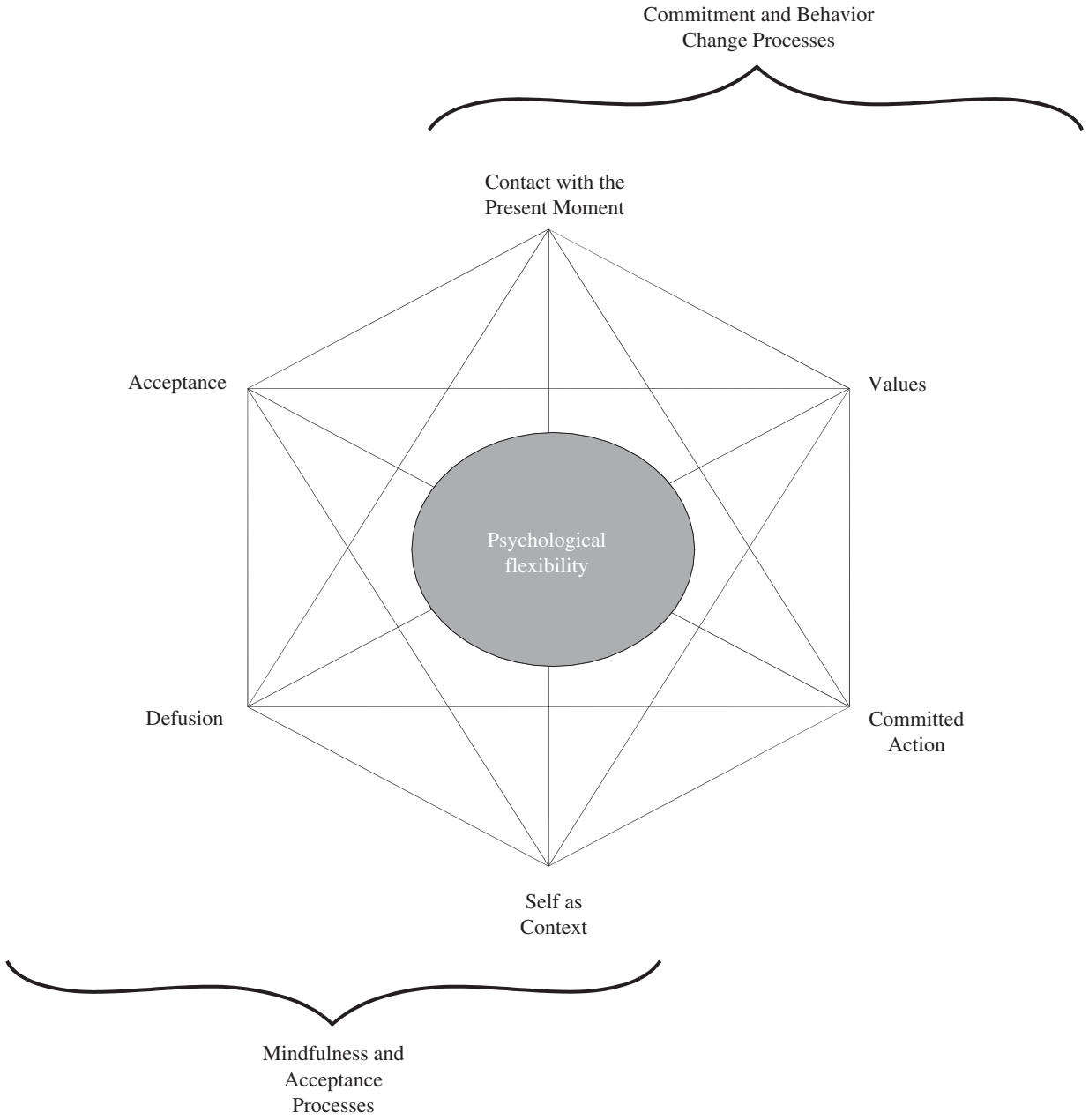

Fig. 2. A model of the positive psychological processes ACT seeks to strengthen.

encourage them to let go of a struggle with pain, and so on. Acceptance (and defusion) in ACT is not an end in itself. Rather acceptance is fostered as a method of increasing values-based action.

Cognitive defusion

Cognitive defusion techniques attempt to alter the undesirable functions of thoughts and other private events, rather than trying to alter their form, frequency or situational sensitivity. Said another way, ACT attempts to change the way one *interacts with* or *relates to* thoughts by creating contexts in which their unhelpful functions are diminished. There are scores of such techniques that have been developed for a wide variety of clinical presentations (Hayes & Strosahl, 2005). For example, a negative thought could be watched

dispassionately, repeated out loud until only its sound remains, or treated as an externally observed event by giving it a shape, size, color, speed, or form. A person could thank their mind for such an interesting thought, label the process of thinking (''I am having the thought that I am no good''), or examine the historical thoughts, feelings, and memories that occur while they experience that thought. Such procedures attempt to reduce the literal quality of the thought, weakening the tendency to treat the thought as what it refers to (''I am no good'') rather than what it is directly experienced to be (e.g., the thought ''I am no good''). The result of defusion is usually a decrease in believability of, or attachment to, private events rather than an immediate change in their frequency.

Being present

ACT promotes ongoing non-judgmental contact with psychological and environmental events as they occur. The goal is to have clients experience the world more directly so that their behavior is more flexible and thus their actions more consistent with the values that they hold. This is accomplished by allowing workability to exert more control over behavior; and by using language more as a tool to note and describe events, not simply to predict and judge them. A sense of self called ''self as process'' is actively encouraged: the defused, non-judgmental ongoing description of thoughts, feelings, and other private events.

Self as context

As a result of relational frames such as I versus You, Now versus Then, and Here versus There, human language leads to a sense of self as a locus or perspective, and provides a transcendent, spiritual side to normal verbal humans. This idea was one of the seeds from which both ACT and RFT grew (Hayes, 1984), and there is now growing evidence of its importance to language functions such as empathy, theory of mind, sense of self, and the like (e.g., see McHugh, Barnes-Holmes, & Barnes-Holmes, 2004). In brief the idea is that ''I'' emerges over large sets of exemplars of perspective-taking relations (what are termed in RFT ''deictic relations''), but since this sense of self is a context for verbal knowing, not the content of that knowing, its limits cannot be consciously known. Self as context is important in part because from this standpoint, one can be aware of one's own flow of experiences without attachment to them or an investment in which particular experiences occur: thus defusion and acceptance is fostered. Self as context is fostered in ACT by mindfulness exercises, metaphors, and experiential processes.

Values

Values are chosen qualities of purposive action that can never be obtained as an object but can be instantiated moment by moment. ACT uses a variety of exercises to help a client choose life directions in various domains (e.g., family, career, spirituality) while undermining verbal processes that might lead to choices based on avoidance, social compliance, or fusion (e.g., ''I should value *X*'' or ''A good person would value *Y*'' or ''My mother wants me to value *Z*''). In ACT, acceptance, defusion, being present, and so on are not ends in themselves; rather they clear the path for a more vital, values consistent life.

Committed action

Finally, ACT encourages the development of larger and larger patterns of effective action linked to chosen values. In this regard, ACT looks very much like traditional behavior therapy, and almost any behaviorally coherent behavior change method can be fitted into an ACT protocol, including exposure, skills acquisition, shaping methods, goal setting, and the like. Unlike values, which are constantly instantiated but never achieved as an object, concrete goals that are values consistent can be achieved and ACT protocols almost always involve therapy work and homework linked to short, medium, and long-term behavior change goals. Behavior change efforts in turn lead to contact with psychological barriers that are addressed through other ACT processes (acceptance, defusion, and so on).

The core ACT processes are both overlapping and interrelated. Taken as a whole, each supports the other and all target psychological flexibility: the process of contacting the present moment fully as a conscious human being and persisting or changing behavior in the service of chosen values. The six processes can be chunked into two groupings. Mindfulness and acceptance processes involve acceptance, defusion, contact with the present moment, and self as context. Indeed, these four processes provide a workable behavioral definition

of mindfulness (Fletcher & Hayes, in press). Commitment and behavior change processes involve contact with the present moment, self as context, values, and committed action. Contact with the present moment and self as context occur in both groupings because all psychological activity of conscious human beings involves the now as known.

ACT is an approach to psychological intervention defined in terms of certain theoretical processes, not a specific technology. In theoretical and process terms we can define ACT as a psychological intervention based on modern behavioral psychology, including RFT, that applies mindfulness and acceptance processes, and commitment and behavior change processes, to the creation of psychological flexibility.

Research on ACT

To assess whether this ACT/RFT model seems to be working, and is distinct from other approaches, we will consider correlational studies, studies of the impact of ACT components, and processes of change studies. We will summarize quantitatively the strength of ACT outcomes as compared to alternative approaches, since processes of change hardly matter if change itself does not occur. The outcome review will be brief since a fairly recent review is available (Hayes, Masuda, Bissett, Luoma, & Guerrero, 2004) but has increased considerably since that time and the earlier review was purely descriptive, not quantitative. We will cover all published articles using any controlled methodology, and any other available data set (e.g., dissertations) provided they are randomized trials. Case studies are not covered. We believe that this review references nearly all of the extant literature as of Spring 2005 that directly examines ACT or ACT components. Studies that might have relevance to ACT processes of change (e.g., mindfulness studies outside of ACT per se) but which did not directly attempt to examine ACT or ACT derived components were deliberately excluded from this review since it is hard to know where to draw the line in such a review.

Studies of the ACT model: correlational studies

The correlational studies of the ACT model to date have generally not focused on a single ACT processes. The largest body of evidence has used various forms of the Acceptance and Action Questionnaire (AAQ; Hayes, Strosahl et al., 2004). The AAQ was constructed by having ACT therapists generate an item pool of the kinds of clinical processes targeted by ACT. The resulting instrument measures the degree to which an individual fuses with thoughts, avoids feelings, and is unable to act in the presence of difficult private events. Thus the AAQ, although it is often referred to generically as a measure of experiential avoidance, is actually a more general measure of several ACT processes that bear on psychological flexibility. The AAQ is particularly designed for use in population-based studies.

There are two general validated versions of the AAQ. One 16-item version consists of two factors: one that measures acceptance and mindfulness and the other that assesses values-based action. Both of these load onto a second-order factor, which can justifiably be called psychological flexibility (Bond & Bunce, 2003). The second 9-item version measures only this general factor (Hayes, Bissett et al., 2004). Both versions have adequate criterion-related, predictive, and convergent validities (Bond & Bunce, 2003; Hayes, Bissett et al., 2004). A specific pain-related version of the AAQ has also been widely used that is based on a rewriting of the AAQ items to focus on pain content: the Chronic Pain Acceptance Questionnaire (CPAQ; McCracken, 1998; McCracken, Vowles, & Eccleston, 2004). Several other specific versions are becoming available, some of which will be mentioned later in this review.

The individual studies reviewed here are listed in Table 1 (note that the several studies reported as part of Hayes, Strosahl et al. (2004) are listed here from their original sources; see Table 1 for details). In order to determine the extent to which the AAQ and psychological outcomes are related, these studies were integrated into a meta-analysis in which correlations established with a greater number of people were given more weight in calculating the average "effect size" using the Pearson product–moment correlation coefficient (r) as the metric (Durlak, 1995; Rosenthal & DiMatteo, 2001). The AAQ has been keyed both positively and negatively in the literature, depending on whether people are speaking in terms of experiential avoidance (so that lower scores are good) or acceptance and flexibility (so that higher scores are good); outcome measures are that way as well and their labels are sometimes not enough to disambiguate the direction. This is made worse by the use

Table 1
Studies included in the meta-analysis that examines the average relationship between the Acceptance and Action Questionnaire (AAQ) or its specific variants (e.g., the CPAQ) and measures of psychopathology and quality of life. Direction is set in all cases so that positive correlations mean *positive for the model* (better scores go with better scores) not literally positive

Study	Psychopathology and quality of life measures	*N*	*r*
Batten, Follette, and Aban (2001)*	Brief Symptom Inventory (BSI)-Global Severity Index (GSI)	257	.57
	Trauma Symptom Inventory	257	.55
Begotka et al. (2004)	Trichotillomania severity	436	.24
Bond and Bunce (2000)	Perceived physical health	97	.41
	Affective well-being at work	97	.38
	Job Induced Tension Scale	97	.37
	General Health Questionnaire	97	.32
	Beck Depression Inventory (BDI)	97	.66
Bond and Bunce (2003)	General Health Questionnaire	412	.44
	Performance	412	.34
	Negative affectivity	412	.36
	Job satisfaction	412	.26
Cook (2004)*	Symptom checklist-90-R	154	.56
Donaldson-Feilder and Bond (2004)	General Health Questionnaire	290	.36
	Physical health	290	.32
Dykstra and Follette (1998)*	BSI GSI	41	.70
	BDI	41	.72
	Fear Questionnaire (FQ)—social phobia	41	.55
	FQ—blood injury phobia	41	.49
	FQ—agoraphobia	41	.44
Forsyth et al. (2003)	Anxiety Sensitivity Index	94	.71
	Body Sensations Questionnaire—fear of autonomic arousal	94	.24
	BDI	94	.57
Gold, Marx, and Heidt (submitted for publication)	PTSD severity (Posttraumatic Stress Diagnostic Scale)	145	.46
	BDI II	145	.65
	Lesbian Internalised Homophobia Scale	72	.37
	Nungesser Homosexuality Attitudes Inventory	73	.50
Gratz and Roemer (2004)	Deliberate Self-harm Inventory	357	.20
Greco et al. (in press)	Posttraumatic stress checklist	66	.48
	Parenting Stress Inventory	66	.55
	Parental Stressor Scale	66	.30
Hayes, Strosahl et al. (2004)	BDI GSI	460	.56
Kashdan, Barrios, Forsyth, and Steger (in press); Study 1	Trait anxiety	382	.65
	Suffocation fears	382	.33
	Body sensation fears	382	.19
	Anxiety sensitivity	382	.37
Study 2	Daily emotional experiences	97	.38
Karekla et al. (2000)*	Quality of Life Inventory	381	.40
Karekla et al. (2004)	State–Trait Anxiety Inventory	54	.16
	Subjective Units of Discomfort Scale	54	.17
Marx and Sloan (2005)	PTSD severity	185	.31
	Peritraumatic Dissociative Experiences Questionnaire	185	.24
McCracken (1998)	Depression about pain*	160	.58
	Anxiety about pain*	160	.66
McCracken and Eccleston (2003)	Daily functioning hampered by pain*	230	.47
McCracken et al. (2004)	Medication taken for pain*	235	.24
Pistorello, (1998)*	BDI-II	51	.60
Plumb et al. (2004); Study 1 and 2	BSI GSI	298	.55
	Post-Traumatic Diagnostic Scale	298	.37
Study 3	Traumatic stress symptom severity	37	.32
	BDI	37	.50
Polusny et al. (2004)*	BDI	304	.51
	SCL-90-R	304	.53
	Alcohol Dependence Scale	304	.15

Table 1 (*continued*)

Study	Psychopathology and quality of life measures	*N*	*r*
Roemer et al. (2005); Study 1	Generalized Anxiety Disorder Questionnaire-IV	240	.43
	Penn State Worry Questionnaire	240	.57
Study 2	Depression Anxiety Stress Scales (DASS)—depression	19	.40
	DASS—anxiety	19	.47
	DASS—stress	19	.48
	Penn State Worry Questionnaire	19	.35
Sloan (2004)	Emotional reactivity	62	.24
Stewart et al. (2002)*	Anxiety Sensitivity Index	205	.52
Strosahl et al (1998)*	BDI	419	.36
	Beck Anxiety Inventory	419	.58
Toarmino et al. (1997)*	Symptom checklist-90-R	202	.49
	Beck Anxiety Inventory	202	.35
	Fear of intimacy	202	.33
Tull et al. (2004)	PTSD checklist	160	.49
	BSI GSI	160	.55
	BSI depression	160	.55
	BSI anxiety	160	.53
	BSI somatization	160	.49
Woods et al. (in press)	MGH-Hairpulling Scale	25	.59

Note. r = Pearson product–moment correlation coefficient representing the relationship between the AAQ and the listed measure. The AAQ has been keyed both positively and negatively in the literature, depending on whether people are speaking in terms of experiential avoidance (so that down is good) or acceptance and flexibility (so that up is good). Outcome measures also are sometimes similarly keyed in different directions. In this summary, the directions are set so that positive correlations comport with the ACT model (e.g., if higher flexibility or acceptance is associated with lower depression the correlation is set to be positive rather than negative. Thus better flexibility/acceptance predicts better depression scores, better quality of life scores, and so on). Studies indicated by an asterisk were also reported in Hayes, Strosahl et al. (2004), in some cases more extensively than in the original study.

of terms that amount to double negatives (e.g., "lower levels of inflexibility") which, when they enter into negative correlations, become very confusing. In the table and in this summary, directions were set so that in every case positive correlations mean that the result is positive for the ACT model we have described. That way, regardless of how you cast these various processes—and regardless of whether the focus is depression or quality of life—verbally it is easy to interpret the overall results shown in Table 1: positive correlations means that better ACT process scores go with better psychological and quality of life scores.

Thirty-two studies, involving 6628 participants, have investigated the relationship between the AAQ and various quality of life outcomes, including psychopathology (e.g., depression, anxiety, post-traumatic stress, trichotillomania), stress, pain, job performance, and negative affectivity. Several separate meta-analyses were performed on these data, examining the overall data set and sub-sets defined by specific problems or common measures.

The overall data set produced 74 correlations between the AAQ and various outcomes. The weighted effect size of these relations was .42 (95% confidence interval: .41–.43) showing that this measure of ACT processes had a moderate relationship with psychological outcomes generally. None of the correlations were negative (in the sense just noted) meaning that all obtained correlations fit with the model: higher levels of psychological flexibility are associated with better quality of life and outcomes.

Three studies (Bond & Bunce, 2000, 2003; Donaldson-Feilder & Bond, 2004) showed that higher levels of psychological flexibility (i.e., acceptance and values-based action processes) were associated with a lower probability of having a psychiatric disorder, as measured by the General Health Questionnaire (GHQ; Goldberg, 1978). The relationship between the AAQ and GHQ was of a medium size: .40 (95% confidence interval: .34–.45). Similarly, one two-wave, full-panel study by Bond and Bunce (2003) showed that higher levels of flexibility predicted better mental health also to a medium extent. Moreover, the AAQ demonstrated these predictive effects, after controlling the longitudinal impacts of negative affectivity, locus of control, and the amount of control people have over how they do their job. Finally, results indicated that the GHQ did not

predict AAQ scores, 1 year later. Taken together, these longitudinal findings suggest that levels of psychological flexibility are impacting subsequent mental health, and not the reverse.

Eight studies (Bond & Bunce, 2000; Dykstra & Follette, 1998; Forsyth, Parker, & Finlay, 2003; Gold, Marx, & Heidt, submitted for publication; Hayes, Strosahl et al., 2004, reporting a data set originally collected as part of Pistorello, 1998; Plumb, Orsillo, & Luterek, 2004; Polusny, Rosenthal, Aban, & Follette, 2004; Strosahl, Hayes, Bergan, & Romano, 1998) compared the AAQ with the Beck Depression Inventory (either the version from Beck, Steer, & Brown, 1996 or Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). The aggregated effect size was .50 (95% confidence interval: .46–.54). Three studies (Cook, 2004; Polusny et al., 2004; Toarmino, Pistorello, & Hayes, 1997) investigated the association between the AAQ and the Symptom Checklist-90-R (SCL-90-R; Derogatis, 1994), which assesses various indicators of mental ill-health. The aggregated correlation was .53 (95% confidence interval: .47–.58). Five studies (Karekla, Forsyth, & Kelly, 2004; Kashdan Barrios, Forsyth, & Steger, in press; Stewart, Zvolensky, & Eifert, 2002; Strosahl et al., 1998; Toarmino et al., 1997), related the AAQ three well-known measures of anxiety (the State-Trait Anxiety Inventory, Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983; Beck Anxiety Inventory, Beck, Epstein, Brown, & Steer, 1988; and the Anxiety Sensitivity Index, Reiss, Peterson, Gursky, & McNally, 1986), yielding an effect size of .54 (95% confidence interval: .50–.58). Cohen (1977) notes that finding large effect sizes of this kind is unusual in the behavioral sciences.

The AAQ is not just correlated with important measures of psychopathology, however. Research indicates that it is also associated with behavioral effectiveness, in the form of job performance and chronic pain management. Bond and Bunce (2003) found that psychological flexibility predicted, to a medium extent, the number of computer input errors that call center workers made over the following year. This measure of job performance did not predict AAQ scores 1 year later, thus suggesting that it is the AAQ that is determining job performance and not the reverse.

McCracken (1998) found that higher levels of psychological flexibility as measured by a pain-specific variant of the AAQ predicted, to a medium extent, less disability, better work status, and more daily "up-time", among people experiencing chronic pain and did so to a greater degree than actual pain ratings. McCracken et al. (2004) also found that higher levels of this measure amongst chronic pain patients were related, to a medium extent, to fewer pain-related health care visits and fewer classes of prescribed analgesic medications.

One study (Kashdan et al., in press) has attempted to distinguish psychological flexibility and experiential avoidance as measured by the AAQ from a variety of other coping strategies including cognitive reappraisal, maladaptive coping, emotional response styles, and controllability. They found that the impact of all of these others strategies on anxiety or daily mood outcomes were fully or partially mediated by the AAQ.

Overall, the correlational evidence is fairly supportive of the ACT model as assessed by self-report instruments designed by ACT therapists to measure some of the processes targeted by ACT. The range of measures of ACT processes is still limited, however. A wide range of concepts and measures seem to overlap with the ACT model, and researchers are beginning to explore connections with such concepts as distress tolerance (Brown, Lejuez, Kahler, & Strong, 2002), learned industriousness (Eisenberger, 1992), thought suppression (Wenzlaff & Wegner, 2000), delay discounting (Myerson & Green, 1995), strivings (Sheldon, Ryan, Deci, & Kasser, 2004), mindfulness (Baer, Smith, & Allen, 2004), metacognition (Wells, 2000), decentering (Watkins, Teasdale, & Williams, 2000) and the like. As the ACT/RFT research program expands, a wider variety of theoretically coherent measures, including some that go beyond self-report, seem likely to be available to refine the tests of an ACT model.

Experimental psychopathology and ACT component studies

Many current empirically supported treatment protocols are large packages composed of diverse elements. Unless each element is linked to a basic principle and integrated into a larger theory, it is difficult to know how to dismantle these packages because the natural lines of fracture are drawn more from common sense than a refined scientific theory. Small-scale dismantling studies tend to be ignored, but large-scale studies are expensive and are only conducted with the most widely adopted treatments, and then only many years after scores of clinicians have been trained in and have adopted the model. By that time, dismantling studies may have little immediate impact if they show that favored components are unhelpful, and their results may just be

explained away. Cognitive therapy for depression may provide an example. Small scale early dismantling studies (e.g., Zettle & Hayes, 1987), and subsequent larger scale studies (Gortner et al., 1998; Jacobson et al., 1996) have apparently not lead so far to notable changes in the protocols or their underlying model.

ACT researchers are following a different course that is afforded by an inductive, technique-building, principles-focused treatment development approach: conduct micro-studies on each of the key ACT processes (e.g., acceptance, defusion, values, self as context, contact with the moment, values, and commitment) to see if each is psychologically active and works in a fashion that accords with the theory. In the handful of years since publication of the ACT book (Hayes, Strosahl et al., 1999), several such micro-studies have appeared. The early published studies have focused largely on acceptance, defusion, and values, but targeted studies are underway or completed on all of the other elements. These studies are important for the overall model and we will examine them in some detail.

The impact of a cognitive defusion technique on negative self-referential thoughts has been examined (Masuda, Hayes, Sackett, & Twohig, 2004) using the Milk–Milk Exercise (Hayes, Strosahl et al., 1999, pp. 154–155) in which a thought is rapidly repeated aloud until it loses all meaning. In this study the impact of word repetition on the discomfort and believability of self-relevant negative thoughts was investigated as compared to a distraction task (reading about Japan) or to a thought control task involving abdominal breathing training and instructions to shift attention to more pleasant thoughts. In a series of alternating treatments designs ($N = 8$) the cognitive defusion technique was found to reduce both discomfort and believability more so than the comparison approaches. Group control studies suggested that the effect was not due to demand characteristics.

Another study examined the impact of a 90-min ACT protocol focused on acceptance and defusion on pain tolerance utilizing a cold pressor task (Hayes, Bissett et al., 1999) as compared to a traditional CBT pain-management condition (training in applying the gate theory of pain) and to an attention placebo condition consisting of discussion of a behavioral approach to pain. The acceptance and defusion protocol addressed the paradoxical effects of emotional control, an attempt to undermine feelings and thoughts as reasons for actions, the workability of emotional control, and defusion of thoughts and feelings from the self. Thirty-two college students were randomly assigned to one of the three conditions. No differences were found in the intensity of pain at post-intervention, but participants in the acceptance and defusion condition were able to keep their hand in the cold water significantly longer than the other conditions at post-test. Participants in the acceptance condition also showed lower levels of belief in pain-oriented reasons for action than the other groups.

This cold pressor study was extended by a subsequent study that attempted to determine whether an acceptance and defusion rationale would make a similar difference even if combined with more traditional CBT exercises, rather than ACT acceptance and defusion exercises (Takahashi, Muto, Tada, & Sugiyama, 2002). An ACT-based acceptance and defusion rationale was combined with ACT exercises designed to undermine the literal impact of difficult private events (the Leaves on the Stream mindfulness exercise, Hayes, Strosahl et al., 1999, pp. 158–161, and the Physicalizing defusion exercise, Hayes, Strosahl et al., 1999, pp. 170–171), or with exercises designed to control pain. Participants ($N = 28$) were randomly assigned to either of these two conditions or to an attention-placebo control. Participants in the condition that included acceptance and defusion exercises but not those in the other two conditions showed positive changes in pain tolerance suggesting that ACT exercises, and not merely the rationale, were necessary to produce the effect.

Another pain tolerance study (Gutierrez, Luciano, & Fink, 2004) examined the impact of a 20-min long ACT acceptance, defusion and values intervention using the Card Exercise (Hayes, Strosahl et al., 1999, p. 162) and Swamp Metaphor (Hayes, Strosahl et al., 1999, pp. 247–248) as compared to a cognitive and emotional change intervention. Pain levels were systematically raised throughout the study, and the randomly assigned participants ($N = 40$) were paid to persist as long as they could in each condition. ACT participants showed significantly higher tolerance of pain, and significantly greater willingness to persist even after they said the pain levels had reached very high levels.

The effects of ACT acceptance techniques on tolerance of exposure to carbon dioxide (CO_2)-enriched air (Feldner, Zvolensky, Eifert, & Spira, 2003) was examined with 48 college students who scored high or low on the AAQ. Participants were randomly assigned either to a computerized acceptance-based condition that taught participants to observe and let go of a struggle with feelings during the exposure to CO_2-enriched air or

a similar condition that instructed participants to suppress their feelings during the CO_2 inhalation. In the suppression condition but not the acceptance condition, individuals with high experiential avoidance reported greater levels of anxiety relative to those with low experiential avoidance. Participants with high experiential avoidance in comparison to those with low experiential avoidance reported greater levels of anxiety and affective distress, but not physiological arousal, in the exposure to the CO_2.

In a similar study, 60 highly anxious females were randomly assigned to a 10-min acceptance condition (i.e., accepting and mindfully observing feelings; use of a physical version of the Chinese Finger Trap metaphor; Hayes, Strosahl et al., 1999, pp. 104–105), a emotional-control condition (controlling psychological experiences by abdominal breathing), or a no-instruction condition (Eifert & Heffner, 2003). Compared to the control and non-instruction participants, those in the acceptance condition were less avoidant behaviorally and also reported less intense fear and cognitive symptoms. Participants in the acceptance group also reported greater willingness to return to the CO_2-inhalation study than those in comparison groups.

The impact of a brief acceptance method on the exposure of individuals with panic disorder to CO_2-enriched air has also been examined (Levitt, Brown, Orsillo, & Barlow, 2004). Sixty patients were randomly assigned one of three 10-min audiotaped interventions: acceptance, suppression and distraction. The acceptance-based condition was drawn directly from the ACT manual (Hayes, Strosahl et al., 1999) and focused on the futile and paradoxical nature of experiential control, and the importance of focusing on behavior change in alignment with own values. The acceptance group showed significantly greater levels of willingness to participate in the biological challenge again and lower level of anxiety than those is comparison groups.

Summary of component results

The existing evidence is supportive of acceptance and defusion procedures and their impact comports with the ACT model. Values-based procedures are just beginning to be tested. As of yet other aspects of the ACT model have not been specifically tested in ACT component studies.

Processes of change

A second method for studying processes of change is to attempt to measure their fluctuation during treatment outcome studies and to examine their relation to treatment condition and outcome. This section reviews several ACT intervention studies that have examined processes of change in ACT, generally focusing either on the AAQ, or similar instruments that target a specific domain of experience (e.g., the CPAQ), or on brief rating scales targeting acceptance or defusion. We will first briefly examine the overall comparative impact on outcome, followed by studies that have conducted formal mediational analyses, and finally those that have reported processes of change data in less stringent fashion.

Quantitative characterization of the relative strength of ACT outcomes

Understanding processes of change is of no importance unless there is change to begin with. The between condition effect sizes for the ACT outcome literature (including all studies with a direct applied purpose and excluding non-clinical analogue studies) are shown in Table 2. Summarizing across this early extant literature on what seemed to be the most clinically relevant outcome variable targeted (see Table 2 for our judgments in that regard), and weighting average effect sizes by the number of cases that produced the effect, ACT has produced between condition effect sizes (using Cohen's *d*) of .66 at post ($N = 704$) and .66 at follow-up ($N = 519$). Average effect sizes for comparisons between ACT and active, well-specified treatments that were deliberately provided to affect the targetted problem were at post ($N = 456$) and .63 at follow-up ($N = 404$); for comparisons with wait list, treatment as usual, or placebo treatments the effect sizes were .99 at post ($N = 248$) and .71 at follow-up ($N = 176$). Across the data set, follow-ups, when they occurred, ranged from 8 to 52 weeks with a weighted average of 19.2 weeks.

As these results apply to the ACT model per se it seems worth noting the handful of studies that have directly compared ACT and traditional CT or CBT (Block, 2002; Branstetter, Wilson, Hildebrandt, & Mutch, 2004; Zettle & Hayes, 1986; Zettle & Rains, 1989). Between condition effect sizes were .73 at post (range: .49–1.23) and .83 (range: .79–.92) at follow-up in favor of ACT on outcome. On primary processes of change

Table 2
ACT outcome literature

Study	Problem focus	Primary measure	Comparison condition	*d* (*N*) post	*d* (*N*) F-up	F-up weeks
ACT as compared to structured interventions designed to impact the problem						
Block (2002)	Social phobia	Speaking time	Group CBT	.49 (26)		
Bond and Bunce (2000)	Work stress	GHQ	Workplace innovation	.8 (60)	.72 (60)	12
Branstetter et al. (2004)	End stage cancer	Distress	CBT	.9 (31)		
Gifford et al. (2004)	Smoking	Not smoking	Nicotine patch	.06 (62)	.57 (55)	52
Gregg (2004)[a]	Type II diabetes	Diabetic control	Diabetes education		.57 (78)	12
Hayes, Bissett et al. (2004)	Stigma and burnout	Maslach Burnout Inventory	Biological education	.74 (59)	.61 (53)	12
Hayes, Bissett et al. (2004)	Stigma and burnout	Maslach Burnout Inventory	Multicultural training	.26 (64)	.57 (58)	12
Hayes, Wilson et al. (2004)	Polysubstance abuse	Objective UA	Methadone maintenance	.41 (51)	.95 (43)	24
Levitt et al. (2004)	Agoraphobia	Willingness to do exposure	Suppression	.67 (40)		
Zettle and Hayes (1986)[a]	Depression	BDI	Cognitive therapy	1.23 (18)	.92 (18)	12
Zettle and Rains (1989)	Depression	BDI	Cognitive therapy	.53 (21)	.75 (21)	8
Zettle (2003)	Math anxiety	MARS (Math anxiety)	Systematic desensitization	−.55 (24)	−.12 (18)	8
Weighted average effect size for ACT vs. structured interventions:				.48 (456)	.63 (404)	
ACT as compared to wait list, placebo, or general treatment as usual						
Bach and Hayes (2002)	Psychosis	Rehospitalization	Treatment as usual		.45 (70)	16
Block (2002)	Social phobia	Speaking time	Control	.52 (26)		
Bond and Bunce (2000)	Work stress	GHQ	Wait list control	.72 (60)	.7 (60)	12
Dahl et al. (2004)	Chronic pain	Sick leave (days)	Treatment as usual	1.17 (19)	1 (19)	24
Gaudiano & Herbert (in press a)	Psychosis	Clinically large BPRS improvement	Enhanced TAU	1.11 (29)[b]		
Gratz and Gunderson (in press)	BPD	Self harm	Treatment as usual	.98 (22)		
Levitt et al. (2004)	Agoraphobia	Willingness to do exposure	Distraction	.81 (40)		
Lundgren (2004) Lundgren and Dahl (2005)	Epilepsy	Seizure frequency × duration	Attention placebo	1.43 (27)	1.23 (27)	52
Woods et al. (in press)	Trichotillomania	MGH-HS (Hair pulling)	Wait list	1.72 (25)		
Weighted average effect size for ACT vs. wait list, placebo, or general TAU:				.99 (248)	.71 (176)	
Total weighted average effect size for ACT vs. all other conditions:				.66 (704)	.66 (580)	

[a]Reanalyzed for the present paper.
[b]The effect size on the raw BPRS scores was .52 and if used would reduce the section *d* by .06 and the overall by .02.

measures specified from an ACT model, the between condition effect sizes in these studies were 3.32 at post ($N = 96$) and .74 at follow-up ($N = 39$). These early data thus indicate that ACT and traditional CBT may impact change processes differently and that ACT may have superior outcomes. The total number of participants in these four studies is still very small however ($N = 96$ and 39 at post and follow-up, respectively). No firm conclusions should be reached given the extremely preliminary nature of the data. Furthermore, although these trials include well trained cognitive and cognitive-behavioral therapists (for example, Zettle & Hayes, 1986; Zettle & Rains, 1989, were conducted by a Beck-trained clinician), researchers interested in ACT organized these studies so bias is possible. Larger scale studies and broader effectiveness trials that those current conducted (Strosahl et al., 1998) will be needed to tease out these issues. Positive preliminary results have been found in two effectiveness studies that have randomly assigned patients in outpatient clinics to ACT or to traditional CBT (Forman, Herbert, Yeomans, & Geller, 2004; Lappalainen, Lehtonen, Skarp, & Taubert, 2005), so more evidence seems likely soon.

Mediational studies

This section examines the formal mediational analysis results. Zettle and Hayes (1986) compared an early version of ACT to two variants of cognitive therapy for depressed clients ($N = 18$) delivered in a 12 week individual protocol. Since the two variants were virtually identical in outcomes, the two groups were combined for the main comparison. ACT was superior to CT on depression outcomes at post and at a 2-month follow-up. ACT and CT did not differ significantly on the Automatic Thoughts Questionnaire (ATQ; Hollon & Kendall, 1980) which measures depressogenic thought frequency but did if clients were asked to rate the believability of these same thoughts were they to occur (the "ATQ-B")—a measure of cognitive defusion. The groups also differed on reason-giving (see Addis & Jacobson, 1996, for a later version of this measure).

This small study is important for present purposes because it is one of a handful of studies so far that have directly compared ACT and CT. A formal mediational analysis was not reported in the original study (it appeared before such analyses were well known), but the original data were reanalyzed for the present article. These results will be reported in more detail than most of the studies below since this analysis is original.

At the mid-point of treatment (week 6), ACT and CT did not differ significantly in their Beck Depression Inventory (BDI) scores ($F(1, 16) = 8.61$, $p = 01$, ACT $M = 12.05$, SD = 7.15, CT $M = 22.86$, SD = 13.48, $d = 1.00$), but they did differ significantly in their ATQ-B scores ($F(1, 16) = 8.61$, $p = .01$, ACT $M = 49.0$, SD = 10.95, CT $M = 92.25$, SD = 34.77, $d = 1.68$). The mid-point ATQ-B scores were then assessed for their role as a mediator of outcomes on the post-score BDI, which did reveal a significant difference in outcome ($F(1, 16) = 4.61$, $p < .05$, ACT $M = 4.83$, SD = 5.19, CT $M = 19.42$, SD = 16.01, $d = 1.23$). All four steps of the mediational model suggested by MacKinnon (2003) were satisfied: (1) a Spearman above .2 between treatment condition and outcome (actual result = .50, $p = .033$); (2) a significant Spearman between treatment condition and the mediator (actual result = .60, $p = .008$); (3) a significant Spearman between the mediator and the outcome (actual result = .85, $p < .001$); and (4) a significant regression between the mediator and the outcome after condition is included in the model (*Beta* = .97, $t = 7.35$, $p < .001$). A similar analysis was then conducted on the follow-up Hamilton scores (HRS-D F-up). The results were similar. Treatment condition correlated significantly with HRS-D F-up (.57, $p = .013$), and week 6 ATQ-B (reported above), which in turn correlated with HRS-D F-up (.88, $p < .001$). The regression between the week 6 ATQ-B and HRS-F F-up scores was significant after condition was included in the model (Beta = .87, $t = 5.35$, $p < .001$). Thus greater changes in the believability of depressogenic thoughts mediated the superior outcomes achieved by ACT in this study.

A worksite stress reduction study randomly assigned 90 participants to receive 9 h of ACT, 9 h of a behavioral program designed to teach workers to remove stressors in the workplace, or to be wait listed (Bond & Bunce, 2000). At a 3-month follow-up, ACT was significantly better than the other groups on the GHQ, while both active treatment groups were improved in initiating innovative working practices. The study reported that the AAQ mediated ACT versus wait list group GHQ outcomes and workplace innovation at follow-up using follow-up AAQ scores. In a re-analysis done for the present paper all four steps of MacKinnon's (2003) mediation steps were met using post-AAQ scores and follow-up outcome scores. The relation of treatment to the follow-up outcomes and treatment to the post-AAQ is reported in the original

article. The reanalysis showed a significant Spearman between the mediator and the outcome (GHQ: $r = .55$, $p < .001$; innovation: $r = .35$, $p = .005$); and a significant regression between the mediator and the outcome after condition is included in the model (GHQ: *Beta* = .53, $t = 4.76$, $p < .001$; Innovation: *Beta* = .41, $t = 3.12$ $p = .007$) thus satisfying all four steps in this type of mediational test. Changes in the AAQ did not mediate the significant effects of the behavior therapy program on initiating innovation, showing that this mediational effect was specific to ACT.

Type II diabetes requires emotionally challenging and consistent patterns of self-management, which is traditionally encouraged by detailed diabetes education. ACT plus diabetes education was compared to diabetes education alone in a trial that randomized 81 newly diagnosed poor and primarily minority diabetics to a one-day workshop for either approach (Gregg, 2004). At 3-month follow-up, ACT outperformed the control condition on changes in self-management behaviors and blood glucose (HbA_{1C}), particularly among those participants with a high HbA_{1C} value. A version of the AAQ that targeted diabetes-related content, the Acceptance and Action Diabetes Questionnaire (AADQ; Gregg, 2004) was used as the mediator. Mediational analyses were conducted using as the steps specified by MacKinnon (2003) and showed that diabetes-related acceptance and action was a mediator of self-management behaviors but not change in HbA_{1C} scores.

A study comparing ACT to Nicotine Replacement Therapy (NRT) for smoking cessation (Gifford et al., 2004) randomized 67 smokers either to NRT or seven individual and seven group sessions of ACT. ACT had significantly better outcomes at 1-year follow-up (35% versus 15%). The Avoidance and Inflexibility Scale (AIS), developed for this study, examined smokers endorsement of the need to avoid smoking related thoughts and feelings in order to maintain abstinence. Mediational analyses showed that the AIS passed all of Baron and Kenny's (1986) steps for mediation.

A study compared ACT, multicultural training (MT), and education about the biology of addiction in terms of their effectiveness in reducing stigma toward clients and burnout among substance abuse counselors (Hayes, Bissett et al., 2004). Ninety-three counselors were randomized to a day-long, 6-h workshop in each condition. At follow-up, ACT, but not MT, was superior to the education condition on the frequency of stigmatizing attitudes; ACT was also significantly better than MT on burnout. The Stigmatizing Attitudes Believability Scale (SAB), a measure designed for this study, measured defusion from stigmatizing thoughts towards substance abusing clients, as distinct from their form, frequency, or situational sensitivity. Mediational analyses were conducted using the steps specified by MacKinnon (2003) and found that the SAB mediated both counselor burnout and stigmatizing attitudes in the ACT group but not the MT group as compared to education.

Gaudiano and Herbert (in press a, b) replicated Bach and Hayes (2002) with a better controlled but smaller study focused on coping with hallucinations or delusions among inpatients hospitalized with a primary psychotic disorder or mood disorder with psychotic features ($N = 29$). In this study, enhanced treatment as usual (ETAU—enhanced so as to control for therapist contact) was compared to three sessions (on average) of ACT plus TAU. At discharge from the hospital, participants in the ACT condition showed significantly greater improvement in affective symptoms, overall improvement, social impairment, and distress associated with hallucinations. Fifty percent of the ACT group showed a two standard deviation improvement on the total score of the BPRS as compared to 7% in the ETAU group, a significant difference. Although 4-month rehospitalization rates were 38% lower in the ACT group, this difference did not reach statistical significance. A rating of the believability of delusions or hallucinations was used as the process measure in this study. Only the ACT condition was found to result in lower believability ratings at post-intervention. Mediational analyses conducted as specified by Baron and Kenny (1986) found that believability of hallucinations mediated the relationship between frequency of hallucinations and associated distress at post-intervention.

A study of the distress produced by end-stage cancer (Branstetter et al., 2004) randomly assigned cancer patients either to 12 sessions of ACT or traditional CBT focused on relaxation and cognitive restructuring. Treatment was delivered during chemotherapy or other medical visits. Patients were dying at too high a rate for meaningful follow-up. By session 12 ACT produced significantly greater reductions in distress, anxiety, and depression than traditional CBT. A mediation analysis using Sobel's method (1982) found that the Mental Disengagement subscale of the COPE (Carver, Scheier, & Weintraub, 1989), which includes items like "I go to movies or watch TV, to think about it less," mediated the reduction in distress. Only the ACT condition reduced mental disengagement: this measure actually increased in the CBT condition.

A small randomized trial ($N = 27$) done with poor institutionalized South African epileptics who had seizures that were not well controlled by medication (Lundgren, 2004; Lundgren & Dahl, 2005) tested the impact of an ACT intervention to reduce seizures and stress as compared to an attention placebo control condition. Both conditions were delivered in two 90 min individual sessions and two 3 h group sessions. Reductions of more than 95% of the average time spent per month seizing were found at post and at a 6-month and 1-year follow-up (between condition $d = 1.44$, 1.27 and 1.24, respectively). Improvement in overall quality of life using the World Health Organization Quality of Life scale was not found at post, began to improve at 6-month follow-up, and showed large and significant changes by the 1-year follow-up (between condition $d = .28$, .51, and 1.59 across post, 6-month follow-up, and 1 year follow-up, respectively). ACT produced very large improvements at post and both follow-ups (between condition $d = 3.23$, 3.76, and 2.82, respectively) in a specific epilepsy-focused version of the AAQ. Post-scores on the epilepsy focused AAQ fully mediated 1-year follow-up outcomes for both seizures and quality of life, using the steps recommended by Baron and Kenny (1986). The quality of life result is particularly important since the post-AAQ changes occurred several months before significant quality of life changes were observed.

Other studies

Several others studies have reported changes in process variables. Bach and Hayes (2002) compared four 45-min sessions of ACT to TAU in a randomized trial helping inpatients cope with positive psychotic symptoms ($n = 80$). Patients in the ACT condition had half the rate of rehospitalization over a 4-month follow-up period. ACT was found to result in lower believability ratings of psychotic symptoms (e.g., rating whether the delusions/hallucinations were literally true) at the 4-month follow-up. Overall symptom reduction was *less* in the ACT group than the TAU group but in the ACT group, rehospitalization rates for patients who admitted psychotic symptoms were one-fourth that of those who did not. This pattern was interpreted as an indication that ACT undermined denial and thus symptom admission was an indication of greater acceptance in the ACT group. No one in the ACT condition was rehospitalized who both admitted symptoms and viewed them as less believable.

Zettle (2003) compared ACT and systematic desensitization for math anxiety ($N = 24$) and found equivalent reductions in math-related anxiety, but greater change in trait anxiety with systematic desensitization. This is the only study in the literature so far in which effect sizes between ACT and another condition were negative (see Table 2). It may be that this was in part due to the relatively healthy population being treated. The study showed some support for this idea since significantly greater reductions in math anxiety were found for ACT participants who had higher initial levels of experiential avoidance as measured by the AAQ, but this was not true with desensitization.

McCracken, Vowles, and Eccleston (in press) reported the effects of a 3–4 week residential/inpatient treatment for chronic pain conditions based on ACT ($n = 108$). Significant improvements in emotional, social, and physical functioning as well as lower health care utilization was found following treatment. The CPAQ improved significantly with acceptance-based treatment, and changes in this measure were significantly associated with change in five of nine outcome variables examined, including depression, pain-related anxiety, physical and psychosocial disability, and the ability to stand and sit rapidly in a timed test.

ACT plus habit reversal was compared to a wait list control for the treatment of trichotillomania in a small ($N = 25$) randomized trial reported by Woods, Wetterneck, and Flessner (in press). Wait list subjects then received the combination treatment. Self-reported and objectively verified hair pulling decreased significantly with treatment, was maintained at a 3-month follow-up and correlated .57 with changes in the AAQ.

Block (2002) conducted a small randomized trial ($N = 39$) comparing ACT, cognitive-behavioral group therapy (CBGT), and a wait list control in the treatment of social phobia. Both active groups were superior to the wait list on most measures. Participants in the ACT condition stayed longer in an arranged public speaking situation than those in the other groups post-treatment, and showed larger reductions in distress during the speech (Cohen's *d* within-condition effect-sizes for distress of 1.37 for ACT, versus .67 for CBGT and −.02 for the wait list). The primary process variable, rated willingness to experience anxiety during exposure, also increased more pre to post for ACT (Cohen's d within-condition pre-post effect-sizes for willingness of 1.03, .38, and −.42 for the ACT, CBGT, and wait list conditions, respectively). The pre-differences among groups approached significance, however (ACT participants were generally more severe) so

regression to the mean is a possible explanation for these results. Examining only the post-scores on the primary outcome variable (length of time in a public speaking situation), however, the effect sizes were $d = .49$ and .52 for ACT as compared to CBGT and the control, respectively, which is particularly supportive given the trends at pre-assessment.

Another study examined the treatment of polysubstance abusing individuals being maintained on methadone (Bissett, 2001; Hayes, Wilson et al., 2004). Participants ($N = 124$) were randomly assigned to either ACT, Intensive Twelve-Step Facilitation, or to methadone maintenance only. In the two active treatments, participants received 32 individual and 16 group sessions. At the 6-month follow-up participants in the ACT condition demonstrated a greater decrease in objectively measured (through monitored urinalysis) total drug use than did methadone maintenance alone; and greater decreases in self-reported total drug use than both of the other conditions. ITSF includes a significant acceptance component and there were few process differences between ACT and ITSF, but there were a number of process differences between ACT and the control condition. For example, the ratio of ATQ and ATQ-B (or a similar ratio focused on reasons for using drugs) differed between the ACT and control conditions. There are problems in this study at the level of processes of change, however. For example, the AAQ did not change in any condition. A large number of processes measures were used and the reader is referred to Bissett (2001) for more details.

In a small ($N = 22$) randomized trial on self-harm and emotional dysregulation among Borderline Personality Disordered patients, Gratz and Gunderson (in press) compared TAU to a short group consisting of ACT and DBT. About two-thirds of the sessions appeared to have been drawn from ACT. Large between group effects were found at post on measure of self harm ($d = .98$) and emotional dysregulation ($d = 1.84$). Unusually large effects were found on the AAQ ($d = 3.08$) but correlations between process and outcome were not reported.

The impact of an eight session ACT protocol on OCD has been assessed in a multiple baseline ($N = 4$) by Twohig, Hayes and Masuda (in press). Large reductions in were found in the frequency of obsession and the distress they produced at post ($d = 2.86$ and 3.08, respectively) and at a 3-month follow-up ($d = 3.24$ and 4.63, respectively). Relatively large changes occurred in ACT-relevant processes, including the AAQ (post $d = .92$; follow-up $= 2.86$).

Summary of mediational and processes of change results

There are weaknesses in these studies. Some of the measures used in these studies lack published data regarding their psychometric properties. The mediational analyses have often (but not always) used processes measures taken after outcomes began to improve significantly. These results rely almost exclusively on self-reported processes measures, often with measures of high face validity. Behavioral and observer measures of hypothesized process variables would considerably improve the strength of claims of mediation. The measures used also target a small number of putative processes, leaving other parts of the overall model untested. Also, this review includes data (e.g., dissertations) not yet published in journal form, so some of these analyses may change and these studies have not yet been subjected to peer review.

Despite their weaknesses, these results seem to be supportive and relatively consistent. This is particularly encouraging in light of the relatively low power of some of these trials, and in light of the well-known difficulties in obtaining consistent mediational results in CBT or indeed in empirical clinical psychology generally. So far, the ACT model seems to be holding up relatively well in these early tests, although a great deal more work remains to be done.

Discussion

ACT is part of a larger movement in the behavioral and cognitive therapies toward the use of mindfulness and acceptance (Hayes, Follette, et al., 2004). While this development seems important, in the long run it will not alone produce a more progressive discipline. The strategy of scientific development followed by ACT researchers is perhaps more unusual and potentially more important.

The long delay between the earliest studies on ACT (Zettle & Hayes, 1986) and its publication as a book length model and manual (Hayes, Strosahl et al., 1999) allowed time for the development of a basic account linked to a comprehensive experimental program in human language and cognition (Hayes et al, 2001) and

related philosophical development. The present article is the first to consider the available evidence regarding the progressivity of the resulting model of psychopathology and its treatment.

Reviewing the entire body of evidence suggests that the ACT model seems so far to be working across an unusually broad range of problems, and across a range of severity from psychosis to interventions for ordinary people (e.g., worksite stress interventions). Effect sizes generally seem somewhat larger with more severe problems, and are as large or larger at follow-up than immediately post-intervention, although the literature is too young to say for sure. The studies conducted so far cover different ethnic groups, classes, and geographic regions, from poor institutionalized native South Africans to behavioral health professionals in the United States, with no indication that outcomes or processes covary in accord with such factors. It appears that the processes targeted by ACT are at least in part responsible for the outcomes ACT produces and that these processes seem not targeted, or are not targeted as efficiently, by the other conditions examined so far, including empirically supported interventions such as traditional cognitive and CBT. It also appears that the processes being targeted seem to work in broadly similar ways across the tested range of settings and populations.

It is worth noting that many of these ACT interventions are extremely short and somewhat limited in scope. That seems in part due to the stage of the research program. Extensive treatment protocols are difficult and expensive to mount, and it is natural in the early stages of a research program to conduct constrained and typically unfunded studies (e.g., in the form of theses and dissertations). Equally important, however, the relatively inductive approach being followed leads toward small, targeted, and relatively short studies. Several studies have deliberately excluded components of known impact that normally would be included in ACT (e.g., treatment of OCD without exposure, Twohig et al., in press) precisely so that the processes responsible for the results could be better assessed. The data so far seem supportive despite these limitations, and the effect size data are more impressive in that light, but as the literature matures it will be import to learn how to build these methods out into more comprehensive programs targeting the range of clinical needs being addressed.

This research program is still very young, despite its breadth and nominal chronological age, in part because so much time has been devoted to developing the basic foundation of the approach. As a result, many aspects of the model have received little empirical attention as of yet. While beyond the scope of this article, RFT is developing rapidly and is beginning to model applied processes from the bottom up. In the ideal world these two research programs will merge. For example, if the overall theory is valid it should be possible to create cognitive fusion and then use a variety of techniques to dismantle it—all in the experimental laboratory. These procedures could then be able to be applied and tested directly in the clinic. In the earliest days of behavior therapy, translational research of that kind was both possible and common, but it is rarely seen today.

The ACT/RFT research program is focused on producing a new contextual behavioral psychology that is more adequate to the challenge of the human condition. The strategic goal of this work is identical to that of early behavior therapy: creating a field that both empirically tests its procedures and links them back to basic behavioral principles so as to create a more scientifically comprehensive and coherent account. What is different about this effort is that when needed basic behavioral principles were missing, they were developed in the basic laboratory. A new and empirically vigorous behavioral analysis of cognition has been produced as a result. Whether this now allows mindfulness and acceptance-based behavioral and cognitive therapies to link their procedures to a basic behavioral account can still be argued, but this article shows that there is growing base of empirical support for the ACT model and the processes and components it specifies.

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