

RUNNING HEAD: ACCEPTANCE AND COMMITMENT THERAPY

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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 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 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 seem promising.

Key words: Acceptance and Commitment Therapy; mindfulness; acceptance; mediational analysis

Acceptance and Commitment Therapy: Model, Processes and Outcomes

The behavior therapy movement began with two key commitments: 1. empirical validation of well-specified interventions for well-specified problems, and 2. an analysis of problems and treatment in terms of basic psychological processes. Franks and Wilson's 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" (1974, p. 7). Over the 40 years of development of behavior therapy, however, only the first of these two commitments has been firmly kept.

Behavior therapy can be divided into three generations: traditional behavior therapy, cognitive behavior therapy, and the more recent "third wave" of relatively contextualistic approaches (Hayes, 2004). In the first generation of behavior therapy it was possible to keep both 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 this base needed to expand beyond operant and classical principles to include those focused on human cognitive processes (Bandura, 1968). Clinicians realized that as well, and this realization was at the core of the second generation of traditional cognitive therapy and cognitive behavior therapy (e.g., Beck, Rush, Shaw, & Emery, 1979).

Unfortunately, none of the basic cognitive models available at the time were as easy to link to clinical interventions as were learning theory principles. The reasons for this are complex, but they go beyond merely the stage of development of basic analyses at the time. 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 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 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 but it does not itself specify the contextual variables that alter these variables and their impact on other forms of activity. Neither explanations of behavior that locate causality in the material of the brain, nor those that explain behavior as the unfolding of developmental patterns, lead directly or efficiently to the practical causes emphasized by the needs by clinicians. After all, clinicians always reside in the context surrounding clients and thus can only have an impact on client behavior by manipulating its context.

Unable to rely fully on basic cognitive accounts, clinicians created their own cognitive models and interventions as CBT was born. For example, specific patterns of irrational cognitions characteristic of specific forms of psychopathology were defined and measured (e.g., Beck, Brown, Steer, & Weissman, 1991). 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 – that is, 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 thirty years old, and the result of this approach can be examined. The results are decidedly mixed. CBT techniques are fairly well validated, but the link between cognitive therapy and cognitive science continues to be weak. Looking at the array of popular techniques developed in cognitive-behavior therapy, none are known to have emerged directly from the basic cognitive science laboratories. The underlying model has also received mixed support. Component analysis studies have generally failed to find support for the importance of direct cognitive change strategies (Gortner, Gollan, Dobson, & Jacobson, 1998; Jacobson, Dobson, Truax, Addis, Koerner, Gollan, Gortner, & Prince, 1996; Zettle & Hayes, 1987). Well-known cognitive therapists have been forced to conclude that in some important areas “there was 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. On the one hand, most modern psychologists agree that traditional behavior therapy was not adequate and that better methods of dealing with thoughts and feelings were needed. On the other, the core conception of traditional cognitive and cognitive behavior therapy – that direct cognitive change is necessary for clinical improvement – is still not well supported.

There is some indication that the new “third wave” interventions in CBT may have found a way around this conundrum. 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 Acceptance and Commitment Therapy (ACT, said as a single word, not as initials; Hayes, Strosahl, & Wilson, 1999), Dialectical Behavior Therapy (DBT; Linehan, 1993), Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2001), and meta-cognitive approaches (Wells, 2000). Rather than focusing on changing psychological events directly through first-order change strategies, these interventions seek to change the function of those events and the individual’s relationship to them through second-order change strategies such as mindfulness, acceptance, or cognitive defusion (Teasdale, 2003). We will describe these procedures later in the paper.

Taking Another Road: ACT, RFT, and Contextual Behavior Analysis

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 the present article, however, 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. As the above definition emphasizes, third generation CBT in general is more principles focused. ACT is

unique in its attempt to develop the basic laboratory itself so as to generate more adequate basic behavioral principles.

The second generation broke away from the first because operant and classical learning principles were not adequate to account for human cognition. ACT is the applied extension of a twenty year long attempt to create a modern form of behavior analysis more adequate to the challenge of human language and cognition – one that will allow behavioral and cognitive therapy to return more fully to its original vision. ACT is based on the development of a philosophy of science, and a theory of human language and cognition specifically designed with a functional unity of applied and basic psychology in mind.

ACT Description and Background

ACT Philosophical Roots

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 that have other goals.

ACT reflects these philosophical connections in several ways. It 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 the most actively researched basic behavior analytic theory of human behavior, with over 70 empirical studies focused on its tenets. According to RFT, the core of human language and cognition is the learned ability to arbitrarily relate events, mutually and in combination, and to change the functions of events based on these relations. 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. RFT researchers have shown that such relations as knowing that one event is “larger” than another arbitrarily a) can be trained as an operant (Barnes-Holmes, Barnes-Holmes, Smeets, Strand, & Friman, 2004, 2004; Berens & Hayes, in press), and b) will alter the impact of other behavioral processes (e.g., Dymond & Barnes, 1995).

RFT has proven itself successful so far in modeling higher cognition at the behavioral and neurobiological level (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., Bissett & Hayes, 1998). Neurobiological measures tell the same story. For example, 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).

The details of RFT go beyond the scope of this paper, but virtually every component of ACT is connected conceptually to RFT, and several of these connections have been studied empirically. Among other applied implications of RFT, its primary implications in the area of psychopathology and psychotherapy can be summarized as follows (Hayes et al., 2001): 1. normal cognitive processes necessary for verbal problem solving and reasoning underlie psychopathology, thus these processes cannot be eliminated; 2. the content and impact of cognitive networks are controlled by distinct contextual features; 3. cognitive networks are historical and thus are elaborated over time. Much as extinction inhibits but does not eliminate learned responding, the logical idea that cognitive networks can be logically restricted or even eliminated is generally not psychologically sound; and, 4. direct change attempts focused on key nodes in cognitive networks, tend to elaborate the network in that area and increase its functional importance. ACT is based on these ideas.

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), the primary source of psychopathology is the way that language and cognition interacts with direct contingencies to produce an inability to persist or change 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.

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 Figure 1. Cognitive fusion refers to excessive or improper regulation of behavior by verbal processes, such as rules and derived relational networks (see Hayes et al., 1999 for further details). In contexts that foster such fusion, people's behavior is guided more by their inflexible verbal networks than by the contingencies of reinforcement in their environment. As a result, they are less able to act in a way that is consistent with what the environment affords for behavior that would foster the persons values and goals. Thus,

from an ACT / RFT point of view, it is not the form, or content, of cognition that is most troublesome, but the contexts that lead this cognitive content to inappropriately, or excessively, regulate human action.

The functional contexts that tend to have such deleterious effects include: contexts of literalism [treating symbols (e.g., the thought, “life is hopeless”) as one would their referents (i.e., a truly hopeless life)], reason-giving (i.e., basing action or inaction excessively on the constructed “causes” of one’s own behavior, especially when these processes point to non-manipulable “causes” such as conditioned private events) (Addis & Jacobson, 1996), and emotional control (i.e., focusing on proper manipulation of emotional states as a primary goal and metric of successful living).

Cognitive fusion supports experiential avoidance, which is 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 thus due to the natural effects of human language – 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 verbally 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 or even unhelpful (Hayes, 2002). Contact with the present moment decreases as the person begins to live “in their head.” 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 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 that are detached from long term desired qualities and gradually dominate in the person's repertoire. 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 Figure 2.

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 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, the thought could be watched dispassionately, repeated several times out loud until only its sound remains, or treated as an external observation 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 events and events in the environment 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 contact with what works to exert more control over behavior; and by using language 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 deictic frames such as I-You, Now-Then, and Here-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 deictic relations, but since this sense of self is a context for verbal knowing, not the content of that knowing, it’s limits cannot be consciously known. Self as context is important in part because from this standpoint, one can be aware of ones own flow of experiences without attachment to them or an investment in what 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 values x”). 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 that in turn occasion identifying and working through psychological barriers that show up along the way 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 Relational Frame Theory, that applies mindfulness and acceptance processes, and commitment and behavior change processes, to the creation of psychological flexibility.

Research on ACT

In this review we will focus primarily on the underlying ACT / RFT model, considering 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. This outcome review is brief since a fairly recent review is available (Hayes, Masuda, Bissett, Luoma, & Guerrero, 2004) but it is necessary since the literature has increased a great deal just 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 sets (e.g., dissertations) provided they are randomized trials. Case studies were not covered. We believe that this review references nearly all of the existent literature as of Spring 2005 that directly examines ACT or ACT components. Studies which 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 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 (hereafter referred to as just acceptance) and the other that assesses values-based action, both of which load onto a second-order factor, which might 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 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. 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 down is good) or acceptance and flexibility (so that up is good); outcome measures are that way as well and their labels are sometimes not enough to disambiguate the direction. This is made worst by the use 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 scores go with better scores.

Twenty-seven studies, involving 5,616 participants, 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, examining the overall data set and sub-sets, defined by specific problems or common measures.

The overall dataset produced 67 correlations between these two sets of variables. The weighted effect size of these relations was 0.42 (95% confidence interval: 0.40– 0.44) 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. 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: 0.40 (95% confidence interval: 0.34 – 0.45). 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, one 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, 2001; Dykstra & Follette, 1998; Forsyth, Parker, & Finlay, 2003; Gold et al., submitted; Pistorello, 1998; Plumb, Orsillo, & Luterek, 2004; Polusny, Rosenthal, Aban, & Follette, 2004; Strosahl, Hayes, Bergan & Romano, 1998) compared the AAQ with either edition one or two of the Beck Depression Inventory (BDI; Edition I: Beck, Ward, Mendelson, Mock & Erbaugh, 1961; Edition II: Beck, Steer, & Brown, 1996), and when we aggregated these correlations in a meta-analysis, we obtained an effect size of 0.50 (95% confidence interval: 0.46 – 0.54). Similarly, 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 correlations between these variables also produced a large effect: 0.53 (95% confidence interval: 0.47 – 0.58). Our final meta-analysis, based upon data from four studies (Karekla, Forsyth, & Kelly, 2004; Stewart, Zvolensky & Eifert, 2002; Strosahl et al., 1998; Toarmino et al., 1997), showed that the AAQ was, overall, significantly related to three well-known measures of anxiety, to a fairly large extent: 0.49 (95% confidence interval: 0.44 – 0.54). (These three measures were: State-Trait Anxiety Inventory, Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983; Beck Anxiety Inventory, Beck & Steer, 1993; and the Anxiety Sensitivity Index, Reiss, Peterson, Gursky, & McNally, 1986.) Cohen (1977) notes that finding large effect sizes 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. Specifically, Bond and Bunce (2003) found that psychological flexibility predicted, to a medium extent, the number of computer input errors that call centre workers made over the following year. This measure of job performance did not predict AAQ scores one 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.

Overall, the correlational evidence is fairly supportive of the ACT model as assessed by self-report instruments specifically designed by ACT therapists to measure the range of processes targeted by ACT. It is particularly strong using more traditional measures of psychopathology, but also applies to a wide range of measures, from work performance to pain behaviors. 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 outside of 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 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, 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 et al., 1999, p. 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-minute ACT protocol focused on acceptance and defusion on pain tolerance utilizing a cold pressor task (Hayes, Bissett, Korn, Zettle, Rosenfarb, Cooper, & Grundt, 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 the acceptance and defusion exercises were important or whether it was the rationale itself that made a difference even if more traditional CBT exercises were used (Takahashi, Muto, Tada, & Sugiyama, 2002). An acceptance and defusion rationale was used in each of two active treatment conditions, but one also used the Leaves on the Stream mindfulness exercise (Hayes et al., 1999, p. 158-161) and the Physicalizing defusion exercise (Hayes et al., 1999; p. 170-171), both of which are designed to undermine the literal impact of difficult private events. The other condition used exercises designed to control pain. Participants (N=28) were randomly assigned to these conditions or to an attention-placebo control. Participants in the acceptance-based condition that included acceptance and defusion exercises but not those in the other two conditions showed positive changes

in pain tolerance suggesting that acceptance and defusion exercises were necessary to produce the effect.

Another pain tolerance study (Gutierrez, Luciano, & Fink, 2004) examined the impact of a 20-minute long ACT acceptance, defusion and values intervention using the Card Exercise (Hayes et al., 1999, p. 162) and Swamp Metaphor (Hayes et al., 1999, p. 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 (CO₂)-enriched air (Felder, 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 CO₂-enriched air or a similar condition that instructed participants to suppress their feelings during the CO₂ 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 CO₂.

In a similar study 60 highly anxious females were randomly assigned to a 10-minute acceptance condition (i.e., accepting and mindfully observing feelings; use of a physical version of the Chinese Finger Trap metaphor; Hayes et al., 1999, p. 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 CO₂-inhalation study than those in comparison groups.

The impact of a brief acceptance method on the exposure to CO₂-enriched air has also been examined using individuals with panic disorder (Levitt, Brown, Orsillo, & Barlow, 2004). Sixty patients were randomly assigned one of three 10-minute audiotaped interventions: acceptance, suppression and distraction. The acceptance-based condition drawn directly from the ACT manual (Hayes 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 in 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, 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 the primary outcome variable targetted (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 .74 at post ($N = 629$) and 1.17 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 .58 at post ($N = 381$) and 1.41 at follow-up ($N = 343$); for comparisons with wait list, treatment as usual, or placebo treatments the effect sizes were .99 at post ($N = 248$) and .72 at follow-up ($N = 176$). Across the dataset, follow-ups, when they occurred, ranged from 8 to 52 weeks with a weighted average of 19.6 weeks.

As these results apply to the ACT model per se it seems worth noting the few studies that have directly compared ACT and traditional CT or CBT (Block, 2002; Branstetter et al., 2004; Zettle & Hayes, 1986; Zettle & Rains, 1987). Between condition effect sizes were .73 at post (range: .49 to 1.23) and .83 (range: .79 to .92) at follow-up in favor of the ACT approach on primary outcome measures. The total number of participants in these four studies is still very small however ($N = 96$ and 39 at post and follow-up, respectively). On primary processes of change 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 provide a possible indication that ACT and traditional CBT impact change processes differently and that ACT make contribute to clinical outcome, although no conclusions should be reached given the extremely preliminary nature of the data. Furthermore, although some of these trials have been conducted by Beck trained clinicians (Zettle & Hayes, 1986; Zettle & Rains, 1987), these studies are also being conducted by researchers interested in ACT, so bias is possible. Larger scale studies and broader effectiveness trials than those current conducted (Strosahl et al., 1998) will be needed to tease out these issues. Positive preliminary results from

effectiveness studies that have randomly assigned patients in an outpatient clinic to ACT or to traditional CBT have recently been presented (e.g., Foreman & Herbert, 2004), 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 two-month follow up. ACT and CT did not differ significantly on the Automatic Thoughts Questionnaire (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 and 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 know), 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 six), ACT and CT did not differ significantly in their BDI scores ($F(1, 16) = 2.81, p = .12$, 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 ($F(1, 16) = 2.81, p = .12$, 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 six 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 received 9 hours of ACT, 9 hours of a behavioral program designed to teach workers to remove stressors in the workplace, or to be waitlisted (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 three-month follow-up, ACT outperformed the control condition on changes in self-management behaviors and blood glucose (HbA_{1c}) 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. Mediation analyses were conducted using 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. Self-management changes also did not mediate blood glucose.

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 one-year follow-up (35% vs. 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. Mediation 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 et al., 2004). 93 counselors were randomized to a day-long, six-hour 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. Mediation 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; in press 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. 50% 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 four 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, Wilson, Hildebrandt, & Mutch, 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, & Wientraub, 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 minute individual sessions and two 3 hour group sessions. Large and significant reductions in a seizure index (frequency times the duration of seizures) were found at post and at a six month and one-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 one-year follow-up (between condition $d = .28, .51,$ and 1.59 across post, six-month follow-up, and one 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 one-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 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-minute sessions of ACT to treatment as usual (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 four month follow-up period. ACT was found to result in significantly lower believability ratings of psychotic symptoms (e.g., rating whether the delusions/hallucinations were literally true) at the four month follow up. Overall symptom reduction was less in the ACT group than the TAU group. An interesting pattern was found

only in the ACT group, where rehospitalization rates for patients who admitted psychotic symptoms were only one-fourth of that than for 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, & Eccleston (in press) reported the effects of a three to four 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 three 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 waitlist control. 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 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 six-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 treatment as usual 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 three 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.

Despite these weaknesses, in broad terms 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 known difficulties in obtaining consistent mediational results across several

studies in CBT or 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, & Linehan, 2004). The long delay between the earliest studies on ACT (Zettle & Hayes, 1986) and its publication as a book length model and manual (Hayes et al., 1999) allowed time for the development of a theoretical account for these processes based on a comprehensive experimental program in human language and cognition (Hayes et al., 2001). The present article is the first to consider the available evidence regarding the progressivity of the model of psychopathology and its treatment that has resulted.

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 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 seen not targeted, or are not targeted as efficiently, by the other conditions examined so far, including empirically supported interventions such as traditional cognitive and cognitive-behavioral therapy. 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., 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 seem somewhat more impressive in that light, but as the literature matures it will be important 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 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 attention as yet. While beyond the scope of this article, RFT is also 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 program is focused on producing a new contextual behavioral psychology that is more adequate to the challenge of the human condition that is coherent from the most basic study to the most applied. Whether that “back to the future” vision will come to pass only tomorrow will tell. This article shows, however, that there is preliminary empirical support for the ACT model and the processes and components it specifies.

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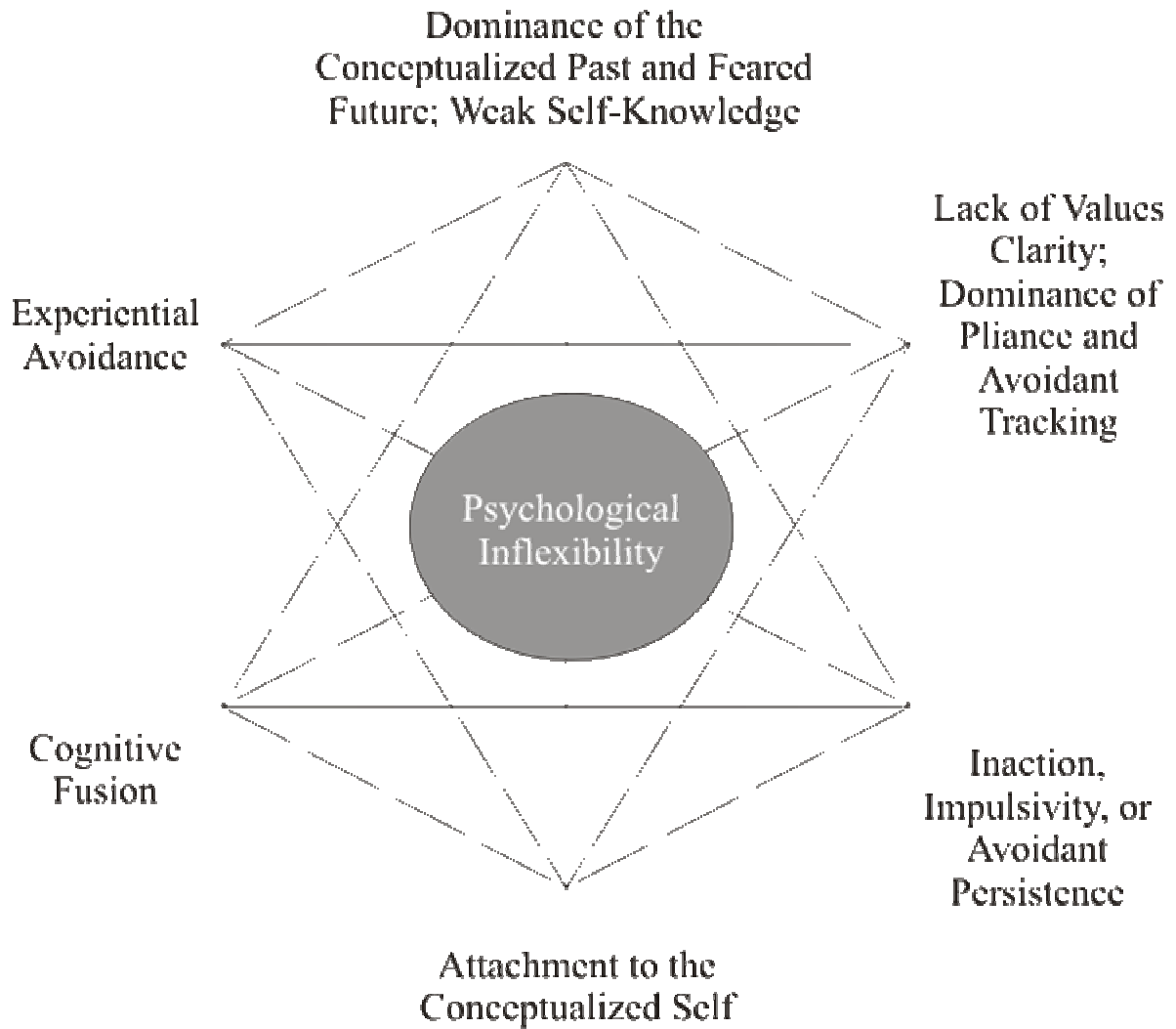


Figure 1. An ACT / RFT model of psychopathology.

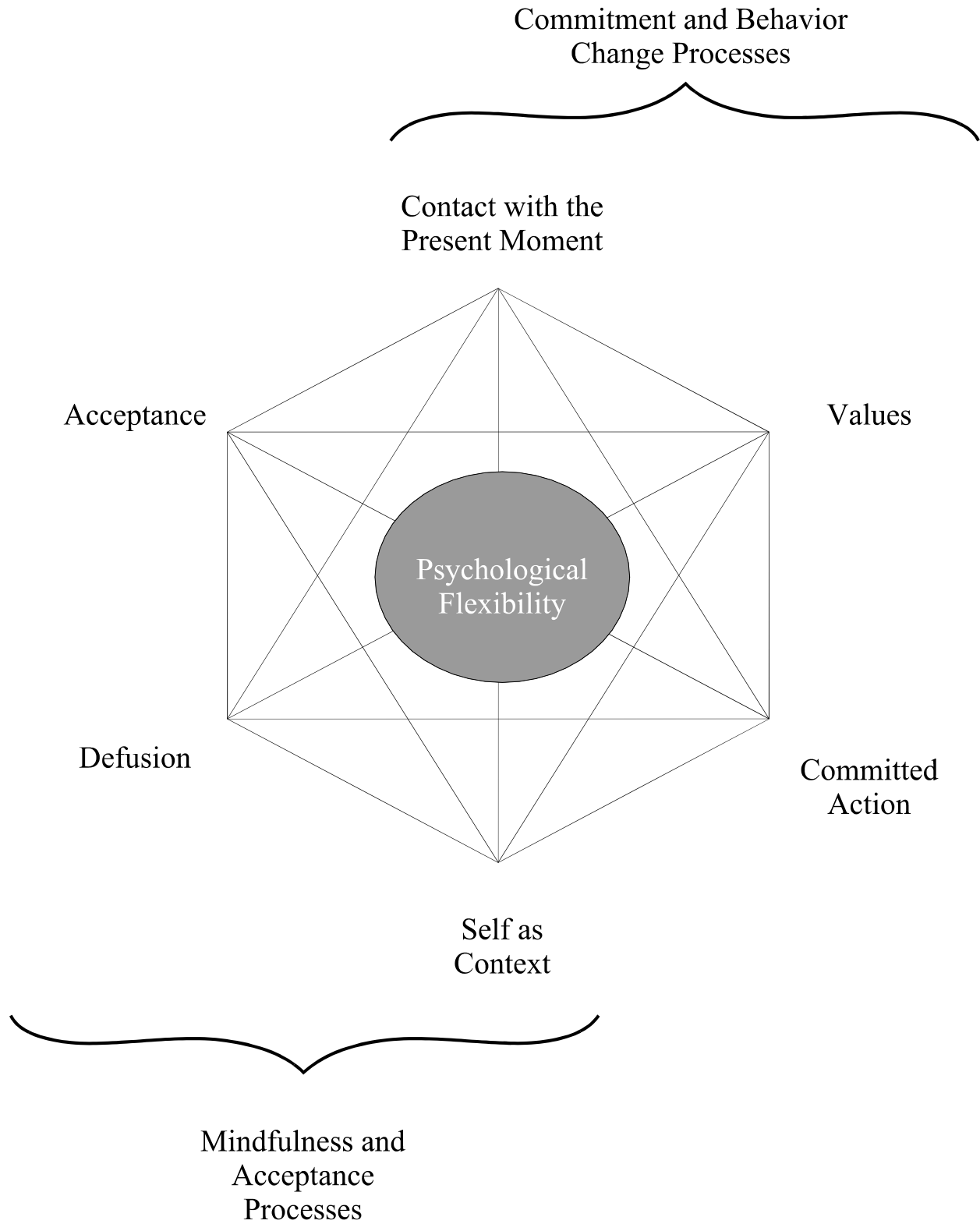


Figure 2. A model of psychological processes ACT seeks to strengthen.

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 et al. (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 & 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 & 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 & Bond (2004)	General Health Questionnaire	290	.36
	Physical health	290	.32
Dykstra & 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 et al. (submitted)	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 & 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
Karekla et al. (2001)	Quality of Life Inventory	381	.40
Karekla et al. (2004)	State-Trait Anxiety Inventory	54	.16
	Subjective Units of Discomfort	54	.17

	Scale		
Marx & Sloan (in press-a)	PTSD severity	185	.31
	Peritraumatic Dissociative Experiences Questionnaire	185	.24
McCracken (1998)	Depression about pain*	160	.58
	Anxiety about pain*	160	.66
McCracken & 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
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).

Table 2: ACT Outcome Literature

<i>ACT as Compared to Structured Interventions Designed to Impact the Problem</i>				<i>d (N)</i>	<i>d (N)</i>	<i>F-up</i>
<u>Study</u>	<u>Problem focus</u>	<u>Primary Measure</u>	<u>Comparison condition</u>	<u>Post</u>	<u>F-up</u>	<u>Weeks</u>
Block, 2002	Social phobia	Speaking time	Group CBT Workplace	0.49 (26)		
Bond & Bunce, 2000	Work Stress End stage	GHQ	Innovation	0.8 (60)	0.72 (60)	12
Branstetter et al, 2004	Cancer	Distress	CBT	0.9 (31)		
Gifford et al., 2004	Smoking	Not smoking	Nicotine Patch	0.06 (62)	0.57 (55)	52
Gregg, 2004	Type II Diabetes	Self management	Diabetes Education		3.63* (78)	8
Hayes, Bissett, et al, 2004	Stigma and Burnout	Maslach Burnout Inventory	Biological Education	0.74 (59)	0.61 (53)	12
Hayes, Bissett, et al, 2004	Stigma and Burnout	Maslach Burnout Inventory	Multicultural Training	0.26 (64)	0.57 (58)	12
Hayes, Wilson et al., 2004	Polysubstance abuse	Objective UA Opiates	Methadone Maintenance	0.41 (51)	0.95 (43)	24
Levitt et al., 2004	Agoraphobia	Willingness to do exposure	Suppression	0.67 (40)		
Zettle & Hayes, 1986	Depression	BDI	Cognitive Therapy	1.23 (18)	0.92 (18)	12
Zettle & Rains, 1989	Depression	BDI	Cognitive Therapy Systematic	0.53 (21)	0.75 (21)	8
Zettle, 2003	Math anxiety	MARS (Math anxiety)	Desensitization	-0.55 (24)	-0.12 (18)	
Weighted Average Effect Size for ACT vs. Structured Interventions:				.58 (381)	1.41 (343)	

ACT as Compared to Wait List, Placebo, or General Treatment as Usual

<u>Study</u>	<u>Problem focus</u>	<u>Primary Measure</u>	<u>Comparison condition</u>	<u>d (N)</u> <u>Post</u>	<u>d (N)</u> <u>F-up</u>	<u>F-up</u> <u>Weeks</u>
Bach & Hayes, 2002	Psychosis	Rehospitalization	Treatment as Usual		0.45 (70)	16
Block, 2002	Social phobia	Speaking time	Control	0.52 (26)		
Bond & Bunce, 2000	Work Stress	GHQ	Wait list control	0.72 (60)	0.7 (60)	12
Dahl et al., 2004	Chronic pain	Sick leave (days)	Treatment as Usual	1.17 (19)	1 (19)	24
Gaudio & Herbert, in press	Psychosis	Clinically large BPRS improvement	Enhanced TAU	1.11 (29)**		
Gratz & Gunderson, in press	BPD	Self harm	Treatment as Usual	0.98 (22)		
Levitt et al., 2004	Agoraphobia	Willingness to do exposure	Distraction	0.81 (40)		
Lundgren, 2004;						
Lundgren & Dahl, 2005	Epilepsy	Seizure frequency X 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)		12
<i>Weighted Average Effect Size for ACT vs. Wait List, Placebo, or General TAU:</i>				.99 (248)	.72 (176)	
<i>Total Weighted Average Effect Size for ACT vs. All Other Conditions:</i>				.74 (629)	1.17 (519)	

* based on difference scores since pre-scores were different between groups

** the effect size on the raw BPRS scores was .52