

A Review of Acceptance and Commitment Therapy (ACT) Empirical Evidence: Correlational, Experimental Psychopathology, Component and Outcome Studies

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ABSTRACT

This article analyzes the general empirical evidence concerning Acceptance and Commitment Therapy (ACT). In the first place, a brief description of the ACT philosophical and theoretical roots is presented. Subsequently, the most fundamental characteristics of the ACT model for psychological intervention are described. Then, a review of the correlational, experimental psychopathology and component, and outcome studies that are relevant for the ACT model empirical status is exposed. In general, the evidence regarding all these types of studies is very coherent and supports the ACT model. Specifically, experiential avoidance is found to be related with a wide range of psychological disorders and mediates the relation between different type of symptoms and psychological constructs; component studies are showing that acceptance-based protocols are usually more efficacious than other control-based protocols; outcome studies show the efficacy of ACT in a wide range of psychological problems and suggest that it is working through its hypothesized processes of change. However, the limitations of the actual empirical status of ACT are recognized and further research is emphasized.

Key words: Acceptance and Commitment Therapy, Relational Frame Theory, Functional Contextualism.

RESUMEN

El presente artículo analiza la evidencia empírica general concerniente a la Terapia de Aceptación y Compromiso (ACT). En primer lugar, se realiza una breve descripción de las raíces filosóficas y teóricas de ACT. Posteriormente, se presentan las características fundamentales del modelo propuesto por ACT para la intervención psicológica. Se revisan los estudios correlacionales, de psicopatología experimental y de componentes, y los estudios de eficacia que son relevantes para este modelo. En general, la evidencia de estos tipos de estudios es coherente y apoya el modelo ACT. Concretamente, se ha encontrado que la evitación experiencial está relacionada con un amplio rango de trastornos psicológicos y que media la relación entre diferentes tipos de síntomas y constructos psicológicos; los estudios de componentes están mostrando que los protocolos basados en estrategias de aceptación son generalmente más eficaces que los protocolos basados en estrategias de control; y, los estudios de eficacia muestran que ACT es eficaz en un amplio rango de problemas psicológicos y sugieren que ACT funciona a través de sus procesos de cambio hipotetizados. Sin embargo, se reconocen las limitaciones de la literatura actual sobre ACT y se enfatiza la importancia de investigaciones futuras.

Palabras clave: Terapia de Aceptación y Compromiso, Teoría del Marco Relacional, Contextualismo Funcional.

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Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999) is one of the most representative therapies of the so called third wave of behavior therapy (see Hayes, 2004 for a description of the three waves). ACT is a model of psychological intervention that is philosophically rooted in *Functional Contextualism* (Hayes, 1993; Hayes, Hayes, & Reese, 1988) and theoretically rooted in *Relational Frame Theory* (Hayes, Barnes-Holmes, & Roche, 2001). ACT is conceived as the treatment of the Experiential Avoidance Disorder (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996; Wilson & Luciano, 2002), a functional dimensional approach to psychopathology.

Functional contextualism is a pragmatic philosophy that was developed in order to clarify some philosophical issues that could remain unclear in behavior analysis and, particularly, in radical behaviorism (Biglan, & Hayes, 1996; Hayes, Hayes, & Reese, 1988). In general, contextualism views events as ongoing actions in a context. These actions are whole events that can only be separated for pragmatic purposes. Functional contextualism is a specific variety of contextualism whose goals (and truth criterion) are the prediction and the influence of events with precision, scope and depth (Hayes, 1993). Because its goals are prediction and influence, functional contextualism understands that every behavior has to be explained in terms of contextual variables, because, otherwise, it could not be influenced. Therefore, from this perspective, thoughts and feelings do not directly cause other actions.

As based on functional contextualism, ACT itself reflects it in some ways. For example, ACT emphasizes workability as a truth criterion. Therefore, thoughts are not seen as being correct or incorrect but seen as being useful in obtaining a more valued life. Also, since private events do not cause other behaviors, no attempt on changing the content of private events would be necessary.

Relational Frame Theory (RFT; Hayes *et al.*, 2001) is a contextual behavioral approach to human language and cognition that has growing empirical evidence. RFT is based on the laws that were established within the functional analysis of behavior, but it represents a qualitative leap because it integrates disparate areas of behavioral research such as equivalence relations and rule-following for doing an experimental analysis of the complex human behavior. The core RFT assumption is that human beings learn to relate stimuli under arbitrary contextual control, in other words, to relate stimuli that do not share formal properties. RFT defends that this is an operant behavior that is learned through a multiple exemplar training in which the abstraction of the contextual cue (e.g. "is", "more than", "contains") that relates arbitrary stimuli is produced. Once the abstraction has been produced, this contextual cue (what is called relational frame) will be applicable to new stimuli without being necessary that they formed part of a previous training.

RFT proposes three requisites for considering the existence of a relational frame: mutual entailment, combinatorial entailment and transformation of functions. Mutual entailment involves the bidirectionality of stimuli relations in a way that if a person learns that stimulus A is related in some way to stimulus B, then she/he will derive that B is related in some way to A. For example, considering a relational frame of comparison, if a child is told that Juan *is taller* than Manuel, she/he will derive that Manuel *is smaller* than Juan. Combinatorial entailment involves that two or more stimuli that

have acquired the property of mutual entailment can be combined. For example, if a person learned that A and B were related in some way, and that B and C were related in some way; this person will be able to derive a relation between A and C without a direct training. In our example, if the child is told now that Manuel is taller than María, it will be derived that Juan is also taller than María, and, therefore, María is smaller than Juan. The implication of mutual and combinatorial entailment is that a myriad of stimuli relations can be learned without a direct training.

Transformation of functions involves that the functions of one of the members of a relational network can change the functions of the other members of the network. In other words, having been taught the relations A-B, and B-C, if A acquires a reinforcing function, B and C functions will be affected according to the specific type of relational network that has been established between them. In our example, if the child is told that in order to play basketball, being taller is better, and we asked her/him to choose between Juan, Manuel and María, then the child would choose Juan.

RFT has a large number of implications for the area of psychopathology and psychotherapy that are extensions of the main concepts previously described. We will highlight only some of them (see more extended reviews in Hayes *et al.*, 1999; Törneke *et al.*, 2008; Wilson, Hayes, Greig, & Zettle, 2001; Wilson & Luciano, 2002): 1) once a person has a minimal relational repertoire, the transformation of aversive functions according to the relations contained in a relational network cannot be prevented; 2) direct attempts of changing or suppressing the content of the relational networks is not psychologically sound because it leads to an extension of the network (verbal relations work by addition not by subtraction), and 3) since relational responding is contextually controlled, it is possible to directly change the context of relational networks without changing their content.

In summary, RFT principles suggest that change attempts focused on the functions of private events are more in accordance with the nature of language and cognition than change attempts focused on the content of them.

Experiential Avoidance Disorder (EAD) or Destructive Experiential Avoidance is a functional category that includes the most of the psychological disorders because, instead of their topographical differences, all of them share a same functional pattern: destructive experiential avoidance (see Boulanger, Hayes, & Pistorello, 2010 for a review of the areas in which experiential avoidance has been detected). Specifically, experiential avoidance has been defined as the occurrence of deliberate efforts to avoid and/or escape from private events such as affects, thoughts, memories and bodily sensations which are experienced as aversive (Hayes *et al.*, 1996; Luciano & Hayes, 2001). In other words, experiential avoidance is a functional class of behaviors that is negatively reinforced by the effect of avoiding or diminishing some type of discomfort.

Experiential avoidance is not problematic per se, but it becomes a problem when it leads to psychological inflexibility, in other words, when it becomes a necessary previous step for doing valued actions. The problem with such a pattern of experiential avoidance is that it has a paradoxical effect. In the short run, avoidance behavior is reinforced but in the long run the feared private events are extended provoking the person to act at the service of the feared private events throughout his or her life (see

Törneke *et al.*, 2008, for a RFT conceptualization of the specific rule-governed behavior involved in destructive experiential avoidance).

ESSENTIAL ACT PRINCIPLES AND METHODS

The principal aim of ACT is to dismantle the inflexible repertoire that characterizes EAD. ACT looks for generating psychological flexibility, in other words, to generate the ability to contact the present moment more fully as a conscious human being, and to change or persist in behavior that serves their valued ends (Hayes, Masuda, Bond, Masuda, & Lillis, 2006). Furthermore, ACT proposes acceptance of the feared private events when the attempt to control them is counterproductive in the long term in order to involving oneself in valued actions.

The detailed description of ACT phases and methods is out of the scope of the present work (see Hayes *et al.*, 1999; Wilson, & Luciano, 2002 for such descriptions). However, we will very briefly describe them. The therapeutic work in ACT can be summarized in two principles: (1) promoting values clarification and actions that are in accordance with such values; and (2) promoting defusion as a way to be involved in the valued ends when the feared private events are present.

The first point is implemented through the following phases: creative hopelessness, values clarification and the promotion of the willingness to experience the feared private events. The aim of *creative hopelessness* is to facilitate the patients' discrimination of the short and long term effects of the actions that they are doing in order to control or avoid their feared private events, and experience the futility of trying to control them. The aim of *values clarification* is to facilitate patients to realize what is important in their life and, if necessary, to establish a hierarchy of values. Finally, willingness to experience the feared private events is promoted as a way to behave in accordance with the chosen personal values.

Cognitive defusion and experiencing *self as a context* are promoted to allow patients to choose to behave in accordance with their values in the presence of discomfort or whatever other private events. ACT is not looking for a direct reduction of the discomfort, but to allow the patient to behave in a valued way in the presence of it. Furthermore, ACT looks for changing the avoidance verbal functions of the feared private events instead of looking for the change in their content. Cognitive defusion involves practicing to experience own thoughts, memories, sensations, etc., as the way they are, weakening the tendency to treat them as facts. In cognitive defusion, promoting the experience of self as a context involves realizing that there is an I behind all private events that actually contains them. This allows the person to be aware of one's own flow of experiences without being attached to them and, from this perspective, to choose to avoid discomfort or involve in valued actions in spite of its presence.

In order to obtain its objectives, ACT makes use of paradoxes, metaphors and experiential exercises. Experiential and exposure exercises are very important in ACT. However, it is worth noting that exposure exercises have a different rationale than in second wave therapies. While classic exposure exercises are conducted in order to promote the extinction of discomfort, exposure exercises in ACT are carried out for

training the patients to be present with their feared private events and to choose to behave in a valued way.

A SUMMARY OF ACT EMPIRICAL REVIEWS

The first critique was provided by Corrigan (2001). This author warned that ACT, and other recent behavioral therapies, have been developed ahead of the data. Although this was partially true at that time, it should be taken into consideration that ACT has not been developed with the usual rationale (see Zettle, 2005), since the philosophical and theoretical roots were developed first. However, only 3 years later, there were 10 published ACT controlled studies and 15 case studies (Hayes, Masuda, Bissett, Luoma, & Guerrero, 2004). A couple of years later, the first exhaustive review of ACT empirical evidence was published (Hayes *et al.*, 2006). This review contained the correlational evidence concerning experiential avoidance, the experimental psychopathology and ACT component studies, the randomized controlled trials (RCT) and processes of change studies. Specifically, over 20 RCTs, the authors reported that ACT was superior to control conditions, wait-lists and treatment as usual (TAU) ($d = .99$ at post-treatment and $d = .71$ at follow-up) and superior to structured interventions ($d = .48$ at post-treatment and $d = .63$ at follow-up).

Subsequently, Öst (2008) carried out a qualitative and quantitative review of the ACT empirical evidence from RCTs. The reported effect sizes were very similar to ones presented by Hayes *et al.* (2006). Specifically, over the 15 RCTs considered, the effect sizes were: $d = .96$ versus no treatment control condition, $d = .79$ versus TAU, and $d = .53$ versus active treatments. In order to establish a path for comparing ACT versus *Cognitive Behavioral Therapy* (CBT), this author selected a “twin” CBT study published in the same journal within a difference no greater than one year. The conclusion was that ACT studies showed lower scores in a methodological scale compared with CBT studies. Finally, Öst (2008) concluded that ACT does not fulfill the criteria for being considered as an empirical validated treatment (Chambless & Ollendick, 2001).

However, Gaudiano (2009) has conducted a re-analysis of this review. According to it, 38% of the ACT studies could not be “matched” with a CBT study because the studies were conducted over different disorders. In fact, most of the ACT studies described treatments implemented to more difficult problems shown by more resistant populations than the CBT studies did (specifically, ACT: 2 studies in depression, 3 in anxiety disorders, 2 in chronic medical conditions, 2 with psychotic symptoms, 2 in addictions, 1 in chronic pain and 1 in borderline personality disorder; while CBT: 2 studies in depression and 11 in anxiety disorders). Another relevant issue was that CBT studies were 4.5 more times funding than ACT studies were. Furthermore, the difference in the methodological rigor between CBT and ACT studies could be due to these two factors (the more difficult problems treated in ACT studies and the difference in funding that ACT and CBT studies received).

More recently, Powers, Zum Vörde Sive Vörding, & Emmelkamp (2009) have conducted another meta-analytic review of ACT empirical evidence in RCT studies. The conclusions of this review were that ACT is better than wait-lists and placebo attention

conditions ($g = .68$), better than TAU ($g = .42$), but not significantly better than established treatments ($g = .18$; $p = .13$). However, Levin & Hayes (2009) have re-analyzed the database reported by Powers *et al.* (2009) concluding that ACT was better than established treatments ($g = .27$; $p = .03$).

In sum, during the last years several controversies have appeared with respect to the empirical status of ACT. These controversies have been focused on a specific type of studies (the RCTs), comparing the differential effect of ACT versus other conditions and comparing the methodology of ACT studies with those employed in CBT studies. Accordingly to these studies: (1) ACT is better than control and TAU conditions (Hayes *et al.*, 2006; Öst, 2008; Power *et al.*, 2009); (2) more evidence is needed in order to determine if ACT is better than established treatments (Levin & Hayes, 2009; Powers *et al.*, 2009); (3) the RCTs conducted in ACT literature can be methodologically improved (Öst, 2008), although such limitations are characteristic of the earlier RCTs of any emerging psychotherapeutic approach (Gaudiano, 2009).

However, in our opinion, the debate has been narrowed into very specific issues and a global vision of the ACT model characteristics and empirical evidence has been lost. About four years have passed since the Hayes *et al.* (2006) global review of ACT model, and a good number of studies have been conducted during this time. The aim of this article is to summarize the current evidence of the ACT model to take a global vision of the singular characteristics of it.

EMPIRICAL EVIDENCE OF ACT MODEL

To review the ACT empirical evidence, studies will be separated as: correlational studies, experimental psychopathology and component studies, outcome studies and case studies. We will cover all published articles and other available data (e. g., dissertations, submitted articles, etc.). We believe that this review references nearly all the extant ACT literature as Winter 2009.

Correlational Studies

The main aim of correlational studies has been to study the relationships among experiential avoidance and psychological symptoms and other psychological constructs. Most of the studies have used the *Acceptance and Action Questionnaire* (AAQ; Hayes *et al.*, 2004). This questionnaire is a general measure of experiential avoidance with several versions according to the number of items. A new version is now available, the AAQ-II (Bond *et al.*, under review) that has better psychometric properties and factorial structure. AAQ has been adapted to several specific domains in order to measure change processes of ACT interventions (for example, the *Chronic Pain Acceptance Questionnaire: CPAQ*; McCracken, Vowles, & Eccleston, 2004) and specific populations (see the *Avoidance and Fusion Questionnaire: AFQ*; Greco, Lambert, & Baer, 2008). Note that AAQ has been keyed both positively and negatively in the literature, depending on what people would like to emphasize: experiential avoidance or acceptance/psychological flexibility. In this paper, we will use the scores as an indication of experiential avoidance.

A detailed review of correlations on experiential avoidance and symptoms and psychological constructs is out of the scope of the present work, but the synthesis is that experiential avoidance is positively related with virtually all the psychological symptoms and negatively related with quality of life and general health measures (Hayes *et al.*, 2006). We are only going to actualize the data provided by Hayes *et al.* (2006) with those published since it with respect to the relation of experiential avoidance and depression and anxiety symptoms. The picture is as follows.

As shown in Table 1, 20 studies have obtained 22 correlations between some version of AAQ and standard measure of *depressive symptoms*. Correlations have been positive in a range between $r = .37$ and $r = .77$. Taking into account all the studies (with 3323 participants), the weighed correlation is $r = .55$. With respect to *anxiety symptoms*, 14 studies has been conducted (with 3043 participants), reporting correlations between $r = .16$ to $r = .76$. The weighed correlation across studies is $r = .52$.

Table 1. Correlations between experiential avoidance and symptoms of depression and anxiety.

DEPRESSION				ANXIETY			
First author	Depression measure	N	r	First author	Anxiety measure	N	r
Andrew (2007)	GDS-dep.	208	.37	Andrew (2007)	GAI-anxiety	208	.43
Barraca (2004)	BDI	114	.74	Barraca (2004)	STAI	114	.76
Boelen (2008)	SCL-90 dep.	402	.63	Boelen (2008)	SCL-90 anxiety	60	.57
Boelen (2008)	SCL-90 dep.	99	.56	Boelen (2008)	STAI	99	.59
Boelen (2008)	SCL-90 dep.	60	.66	Forsyth (2003)	ASI	94	.71
Bond (2000)	BDI	97	.66	Greco (2008)	MASC	513	.58
Chapman (2007)	BDI-II	74	.49	Kashdan (2006)	STAI	382	.65
Dykstra (1998)	BDI	41	.72	Kashdan (2006)	ASI	382	.37
Forsyth (2003)	BDI	94	.57	Karekla (2004)	STAI	54	.16
Gold (2007)	BDI-II	145	.65	Roemer (2005)	DAAS-anxiety	19	.47
Gold (2009)	BDI	72	.77	Langer (2009)	ASI	132	.46
Kashdan (2007)	BDI-II	144	.59	Stewart (2002)	ASI	205	.52
McCracken (2009)	BC-MCDI	144	.69	Stroshal (1998)	BAI	419	.58
Pistorello (1998)	BDI-II	51	.60	Toarmino (1997)	BAI	202	.35
Plumb (2004)	BDI	37	.50	Tull (2004)	BSI anxiety	160	.53
Polusny (2004)	BDI	304	.51	Overall Anxiety		3043	.52
Roemer (2005)	DAAS-dep.	19	.40				
Langer (2009)	BDI	123	.45				
Santanello (2007)	BDI-II	125	.52				
Stroshal (1998)	BDI	419	.36				
Tull (2004)	BSI dep.	160	.55				
Tull (2008)	DASS-21	391	.55				
Overall Depression		3323	.55				

More than 30 longitudinal and mediational studies have analyzed the role of experiential avoidance over different types of symptoms and psychological constructs. *Chronic pain* is the field with more studies. Specifically, Kratz, Davis, & Zautra (2007) have showed that acceptance of pain predicted posterior positive affect. Esteve, Ramírez Maestre, & López Martínez (2007) showed that pain acceptance determined the functional status and functional disability. In McCracken & Vowles (2007), pain acceptance explained a significant part of the variance in 8 different measures of functioning; in Wicksell, Renöfält, Olsson, Bond, & Melin (2008) acceptance predicted pain severity, pain interference in everyday life and physical and mental well being; in Vowles, McCracken, & Eccleston (2008) acceptance mediated the effects of catastrophizing thoughts, depression and anxiety. Acceptance of pain and valued directed behavior accounted for a significant variance of pain, anxiety, depression and physical disability (McCracken & Vowles, 2008). As measure of acceptance, persistence in an activity was associated with a better long term functioning over time while control-oriented responses were associated with greater difficulty (McCracken, Vowles, & Gaurlett-Gilbert, 2007). McCracken & Eccleston (2006) found that acceptance variables were stronger predictors of distress and disability compared with several coping strategies. General psychological acceptance added a significant increment of explained variance to the prediction of patient functioning (McCracken & Zhao-O'Brien, in press). Also, McCracken & Velleman (2010) showed that psychological flexibility accounted for more variance in measures of health than pain intensity.

In *work settings*, the level of experiential avoidance has predicted mental health (Bond & Bunce, 2003; Donaldson-Feilder & Bond, 2004) and the performance in learning a new software, mental health and work performance (Bond, & Flaxman, 2006).

With respect to *stressful vital events*, experiential avoidance has showed to be a mediator between the stress of having a preterm birth and the postdischarge adjustment (Greco, Heffner, Ritchie, Polak, Poe, & Lynch, 2005), between the September 11 terrorist attacks and anxiety problems (Farach, Mennin, Smith, & Mandelbaum, 2008) and between internalized homophobia and PTSD symptoms in sexual assault survivors of the same sex person (Gold, Dickstein, Marx, & Lexington, 2009; Gold, Marx, & Lexington, 2007).

Experiential avoidance has also been a mediator between childhood psychological abuse and current mental health symptoms (Reddy, Pickett, & Orcutt, 2005), between perceived criticism in the family of origin and the resulting distress (Rosenthal, Polusny, & Follette, 2006), between maladaptive perfectionism and worry (Santanello & Gardner, 2006), between objective and subjective quality of life in the elderly (Butler & Ciarrochi, 2007), between several dysfunctional beliefs and hair-pulling severity (Norberg, Wetterneck, Woods, & Conelea, 2007) between skin picking and depressive and anxiety symptoms in chronic skin picking patients (Flessner & Woods, 2006), between materialistic values and different dimensions of well-being (Kashdan & Breen, 2007), between anxiety sensitivity and Borderline Personality Disorder (Gratz, Tull, & Gunderson, 2008) and depression (Tull & Gratz, 2008), between social anxiety and posttraumatic stress in quality of life (Kashdan, Morina, & Priebe, 2008), and between tinnitus and depression and quality of life (Westin, Hayes, & Andersson, 2008). Expe-

riential avoidance accounted for a relevant part of the variance in aggressive behavior (Tull, Jakupack, Paulson, & Gratz, 2007) and moderated the relation between automatic alcohol motivation and hazardous drinking (Ostafn & Marlatt, 2007). Finally, Berking, Neacsiu, Comtois, & Linehan (2009) obtained data that are coherent with the hypothesis that experiential avoidance impedes the reduction of depression in the treatment of *Borderline Personality Disorder*.

Experimental psychopathology and ACT component studies

Three types of studies have been conducted: studies focused on the effect of experiential avoidance repertoire in some experimental task, those focused on the effect of acceptance coping instructions, and those focused on the effect of brief ACT protocols.

Studies about the effect of Experiential Avoidance repertoire in experimental tasks.

The predictive power of the level of experiential avoidance in participants' performance in experimental tasks has been obtained by selecting participants with high and low scores in AAQ. For example, with a cold pressor task, participants with higher scores in AAQ had lower tolerance and kept their hand in the cold water for less time than participants with lower AAQ scores (Zettle *et al.*, 2005) and lasted more time in recovering (Feldner, Hekmat, Zvolensky, Vowles, Secrist, & Leen-Feldner, 2006). Similarly, in a study in which an experimental task simulated the effect of being drunk, participants with higher scores in AAQ evaluated the induced sensations of the task as more discomforting and had a worse performance on a challenging perceptual-motor task than the participants with low scores in AAQ (Zettle, Petersen, Hocker, & Provines, 2007).

Using a carbon dioxide-enriched air challenge, Feldner, Zvolensky, Eifert, & Spira (2003) evaluated the effect of acceptance versus suppression protocols with participants with high and low AAQ scores. Participants with high levels of AAQ showed more anxiety and emotional discomfort, but not more physiological activation. Also, participants with high AAQ scores who received the suppression protocol showed higher levels of anxiety than those who received the acceptance protocol. Using this same task, Karekla, Forsyth, & Kelly (2004) observed that participants with high experiential avoidance showed more panic related symptoms, however, there were not differences between high and low AAQ participants in the physiological measures.

Sloan (2004) compared the emotional reactions of participants during the viewing of pleasant, neutral, and unpleasant flms. Participants with high level of experiential avoidance showed higher emotional experience and higher heart rate with the pleasant and unpleasant flms than participants with lower levels. In a similar study, participants with higher AAQ scores showed more discomfort, negative affect and electrodermal response during the viewing of an emotional flm (Salters-Pedneault, Gentes, & Roemer, 2007). Finally, Cochrane, Barnes-Holmes, Barnes-Holmes, Stewart, & Luciano (2007) reported that participants with higher level of experiential avoidance showed higher latency in the selection of a response that involved the posterior presentation of unpleasant images. Also, the data of the event-related potentials suggested that this group of participants engaged in verbal strategies to regulate their emotional responses.

Effect of acceptance coping instructions. An alternative experimental strategy has been to compare instructions that summarize different coping strategies while doing an experimental task that involved aversive stimulation. Keogh, Bond, Hanmer, & Tilston (2005) used a cold-pressor task and showed that an acceptance coping instruction obtained better results than one distraction coping instruction with women, albeit both instructions had the same effect with men.

Marcks & Woods (2005) compared the effect of suppression versus acceptance instructions in the management of intrusive thoughts. Results showed that participants who received the acceptance coping instruction had less discomfort when they were experiencing the intrusive thoughts. In a subsequent study, these authors showed that suppression was related with more intrusions and higher levels of anxiety and negative evaluation compared with acceptance while doing a task that consisted in saying aloud and imagining that a loved one were having a traffic accident (Marcks & Woods, 2007). Finally, Najmi, Riemann, & Wegner (2009) observed similar effects with participants suffering of *Obsessive Compulsive Disorder* (OCD). Specifically, suppression coping instructions lead to greater distress than both acceptance and focused distraction coping instructions.

Low, Stanton, & Bower (2008) have examined the effect of acceptance-oriented versus evaluative emotional processing on cardiovascular habituation and recovery. The used experimental task consisted of writing about an ongoing stressful experience. Results showed that participants in the acceptance condition had better efficient heart rate habituation and recovery than participants in the evaluative condition.

Several studies have used films with emotional content. Campbell-Sills, Barlow, Brown, & Hofmann (2006) compared the differential effect of suppression versus acceptance instructions in dealing with a highly emotional film. Participants in the suppression condition showed higher heart rate than participants in the acceptance condition. Also, acceptance participants showed less negative affect during the viewing of the film. In a related study, Liverant, Brown, Barlow, & Roemer (2008) showed, with depressed participants, that although suppression produced short-term reduction in sadness with low levels of anxiety, suppression was no longer effective at moderate and higher levels. Hofmann, Heering, Sawyer, & Asnaani (2009) compared the effect of suppression, cognitive reappraisal and acceptance instructions in coping with an impromptu speech in front of a video-camera. Cognitive reappraisal and acceptance showed better results than suppression in the physiological measures (participants in the suppression condition had higher heart rate) and cognitive reappraisal was better than acceptance in the subjective experience of anxiety. Dunn, Billotti, Murphy, & Dalgleish (2009) analyzed suppression versus acceptance in dealing with processing distressing material. In this case, suppression showed better results, but it should be noted that what these authors understand as suppression is very similar to the cognitive reappraisal coping instruction in Hofmann *et al.* (2009).

To sum up, the use of coping instructions does not seem to be the best way to analyze the components of therapies because they substantially differ from what is the treatment practice in applied settings. For example, ACT does not instruct acceptance. On contrary, protocols are done to promote the experience of acceptance through meta-

phors and experiential exercises as a way to manage discomfort in order to do valued actions. This type of intervention has not been captured by the instructions used in these experiments. Another problem is that coping strategies have similarities among them and there is still no a consensus about their verbal processes. For example, both cognitive reappraisal and acceptance strategies involve distancing from thoughts. Finally, acceptance coping protocols in these studies did not include valued oriented behaviors or any valued context. It should be noted that acceptance per se has no sense; acceptance in ACT is always at the service of values. Accordingly, it is not very important if acceptance leads to more or less distress or physiological activation, but, rather, if acceptance allows participants to be involved in valued actions.

Effect of ACT protocols. An alternative and more coherent strategy is to compare brief protocols that sum up some of the main components of therapies. Hayes, Bissett, *et al.* (1999) compared the differential effect of a control based versus an acceptance based protocol applied in 90 minute protocols to cope with a cold-pressor task. Results showed that participants who received the acceptance-based protocol kept their hand in the cold water longer than the participants who received the control-based protocol although no differences were found in the intensity of pain. Takahashi, Muto, Tada, & Sugiyama (2002) analyzed if the acceptance-defusion rationale would have a similar effect even if it would be combined with traditional CBT exercises designed to control pain. Results showed that participants in the condition with the acceptance-defusion rationale and the ACT exercises increased their pain tolerance greater than participants who received the acceptance-defusion rationale and the CBT exercises. In another study with the cold-pressor task, Masedo & Esteve (2007) showed that an acceptance-based protocol was better than a suppression one.

Another series of studies were conducted using electric shocks as aversive stimulation. Gutiérrez, Luciano, Rodríguez, & Fink (2004) compared the differential effect of a 20 minute acceptance-based versus cognitive-control-based protocol in coping with this pain tolerance task. The acceptance protocol aimed to disconnect pain-related thoughts and feelings from literal actions and control-based protocol focused on changing or controlling them. In both conditions, the task involved an overall value-oriented context that encouraged the participants to continue with the task despite their exposure to pain. Participants who received the acceptance protocol showed significantly higher tolerance to pain and lower believability of experienced pain than participants in the control-based condition. Importantly, the effect of acceptance protocol was due to the decrease of the believability of discomfort, defined by the evaluation of maximum discomfort while with participants keeping in the task.

McMullen, Barnes-Holmes, Barnes-Holmes, Stewart, Luciano, & Cochrane (2008) replicated the Gutiérrez *et al.* (2004) study with a video-clip presentation of the protocols and adding two conditions that involved the instruction of acceptance and control based coping strategy. Only the full non-instructed acceptance protocol increased the participants' tolerance to the electric shocks.

In a subsequent study Páez Blarrina, Luciano, Gutiérrez Martínez, Valdivia, Rodríguez Valverde, & Ortega (2008) advanced on these studies establishing coherence between values and their respective rationales. There were not significant differences

in the effect of the protocols, but the ACT protocol was the one which decreased the believability of discomfort. Páez Blarrina, Luciano, Gutiérrez Martínez, Valdivia, Ortega, & Rodríguez Valverde (2008) established the valued context according to the control or acceptance rationales without implementing any specific exercise. The ACT values protocol had a greater effect than the control values protocol. Specifically, 70% of the participants in the ACT protocol tolerated the maximum number of shocks while only 10% of the participants in the control protocol did. Branstetter-Rost, Cushing, & Douleh (2009) have conducted a similar study but using the cold-pressor task. Specifically, this study compared the effects of an ACT-based acceptance intervention with and without the values component. Results indicated that the inclusion of the values component lead to significantly greater pain tolerance.

A more recent study by Luciano *et al.* (in press) extended previous studies by analyzing the conditions under which aversive stimulation is experienced as more or less discomforting. The aim of the study was to isolate the impact of two different strategies for dealing with discomfort: contextualizing discomfort as the first thing to get rid of in order to pursue valued directions (experiential avoidance protocol) versus contextualizing discomfort as part of valued actions and hence, as something to be present with while choosing to behave meaningfully (ACT protocol). In RFT terms, the study aimed to analyze the impact of framing discomfort and valued actions through an opposition (experiential avoidance) versus an inclusion (ACT) relational frame. Results showed an important reduction of experienced discomfort when it is framed as an integral part the valued task (inclusion relational frame) and an increase of discomfort when it is framed as opposite to the valued task.

Luciano *et al.* (under review) have conducted a series of experimental studies in which they created an analog to a phobic disorder. Specifically, the main aim in the first experiment was to establish the effect of respondent extinction of directly conditioned stimuli over avoidance behavior of stimuli with direct and derived aversive/avoidance functions. Although respondent extinction was obtained in almost every case, only 25% of participants stopped avoidance with both direct and derived stimuli when they were allowed to do that. In addition to respondent extinction, in experiment 2 participants were instructed that both contexts (the one in which respondent conditioning and extinction took place and the one in which avoidance was available) were similar. Again, only 17% of participants stopped showing avoidance. Instead of respondent extinction, in experiment 3 participants were randomized to a condition with a general motivational component for keeping in the aversive task or to a condition with the same instructions but with the addition of a multiple exemplar defusion training. While 40% of participants in the former condition stopped showing avoidance, 100% of participants in the latter did with all stimulus functions, directly established or derived.

Forman, Hoffman, McGrath, Herbert, Brandsma, & Lowe (2007) analyzed the effectiveness of a control-based protocol that includes distraction and cognitive restructuring versus an acceptance-based protocol in coping with food cravings. Participants were given transparent boxes of chocolates and instructed to keep the chocolates with them but not to eat them for 48 hours. Acceptance-based protocol was associated with better outcomes among those reporting the highest susceptibility to the presence of food, but greater cravings among those reporting lowest susceptibility to it.

Eifert & Heffner (2003), using a carbon dioxide-enriched air challenge, compared the differential effect of an acceptance-based protocol consisting in a physical exposure of the finger trap metaphor (Hayes *et al.*, 1999) versus a control-based protocol (diaphragmatic breathing) in women with high scores in anxiety sensitivity. Participants in the acceptance condition were less avoidant behaviorally and reported less intense fear and cognitive symptoms and fewer catastrophic thoughts during the CO₂ inhalations. In a similar study, Levitt, Brown, Orsillo, & Barlow (2004) compared the effect of acceptance versus suppression in participants suffering *Panic Disorder*. Acceptance participants were significantly less anxious and less avoidant than the suppression participants in terms of subjective anxiety and willingness to participate in a subsequent challenge, but not in terms of self-report panic symptoms or physiological measures.

Masuda, Hayes, Sackett, & Twohig (2004) showed that a deliteralization exercise (the milk, milk, milk exercise; Hayes *et al.*, 1999) had a greater effect than diaphragmatic breathing plus distraction in reducing the believability and the discomfort that self-relevant negative thoughts provoked. In subsequent studies, Masuda, Hayes, Twohig, Drossel, Lillis, & Washio (2009) and Masuda, Twohig, Storno, Feinstein, Chou, & Wendell (2010) showed that the same deliteralization exercise was better than thought distraction in dealing with negative self-referential thoughts.

Outcome studies

Outcome studies are reviewed below for areas. First, studies in clinical psychology are presented. Subsequently, studies in health psychology are reviewed and, finally, studies in other areas such sport performance, work stress or in prejudice are exposed. At the end of each area, tables that summarize the studies are presented. Such tables contain relevant data: comparison treatment, number of participants and sessions, effect sizes and processes of change. Effect sizes that have been not reported in the original works have been calculated using Cohen's *d* when data were available. Since the aim is not to conduct a meta-analytic review, all types of outcome studies are taken into account.

Clinical Psychology. Presently, two studies have investigated the effect of ACT in depressed patients. In a small RCT, Zettle & Hayes (1986) compared an initial version of ACT called *Comprehensive Distancing*, applied in 12 sessions, with two versions of *Beck's Cognitive Therapy* (CT). ACT was better than the two CT versions in the reduction of depressive symptoms at post-treatment and at the 2 month follow-up. Recently, Hayes *et al.* (2006) have conducted a mediational analysis of the data of this study. The conclusion is that the scores in the ATQ-B (Automatic Thoughts Believability Questionnaire; Hollon & Kendall, 1980) that was taken as measure of cognitive fusion, mediated the results of the *Beck Depression Inventory* (BDI) and the *Hamilton's Depression Scale* (HRS-D) according to the four steps of the mediational model proposed by MacKinnon (2003). Specifically, the higher the changes in the believability of the depressive thoughts were at mid-treatment, the higher the effect in the scores of BDI and HRS-D were at post-treatment and follow-up.

In a subsequent study, Zettle & Rains (1989) compared the differential effect of ACT in group format versus the previous two CT versions applied also in groups. There

were not statistically significant differences at post-treatment or at the 2 month follow-up. However, a recent analysis (Hayes *et al.*, 2006) have found a medium differential effect size between ACT and the complete version of CT ($d = .53$ at post-treatment and $d = .75$ at follow-up). Zettle, Rains, & Hayes (in press) have conducted a mediational analysis concluding that the level of cognitive fusion at post-treatment mediated the effect at follow-up.

With respect to *anxiety disorders*, there are two studies in OCD, one in which a multiple baseline design across participants was used ($N = 4$) showing positive results with all participants (Twohig, Hayes, & Masuda, 2006b) and a RCT that compares ACT with *Progressive Relaxation Training* (Twohig, 2007). Preliminary data in the later study showed that at post-treatment and at the 3 month follow-up, the ACT group showed less compulsions than the relaxation group. The results of the mediational analysis revealed that changes in experiential avoidance and cognitive fusion were produced previously and mediated the changes in the measures of the level of severity of OCD.

Four studies have been conducted in *Social Phobia* (SP). In the first study, Block (2002) compared 6 group sessions of ACT versus 6 group sessions of *Cognitive Behavioral Therapy* (CBT) in participants with subclinical social anxiety ($N = 26$). At post-treatment, the ACT group was better than CBT in a behavioral measure of public speaking. Three open trials have been conducted showing that ACT is a promising treatment for SP (Dalrymple & Herbert, 2007; Kocovski, Fleming, & Rector, 2009; Ossman, Wilson, Storaasli, & McNeill, 2006).

On *Generalized Anxiety Disorder* (GAD), Roemer & Orsillo (2007) have conducted an open trial in which they founded that a largely based ACT protocol obtained large effect sizes in reducing GAD symptoms. In a subsequent RCT study, Roemer, Orsillo, & Salters-Pedneault (2008) compared their protocol versus a wait-list control condition. Once again, the effects of the protocol were large. Interestingly, Hayes, Orsillo, & Roemer (in press) have analyzed the mechanisms of change of the previous two studies by focusing on session-by-session changes in acceptance of private events and engagement in meaningful activities. Changes in both, acceptance and engagement in meaningful activities, were related to responder status at post-treatment. Also, change in acceptance was related to the quality of life at post-treatment.

Zettle (2003) conducted a small RCT comparing 6 sessions of ACT versus the same number of session of *Systematic Desensitization* in the treatment of math anxiety. There were no statistically significant differences at the two month follow-up in participants' experienced anxiety. Montesinos, Luciano, & Ruiz (2006) conducted a RCT comparing a very brief protocol of only 1 session with a control condition in the treatment of *subclinical worries*. Participants in the ACT condition decreased their scores in the intensity and interference of worries at the 6 week follow-up.

In a related problem with anxiety as *Trichotillomania*, two studies have been conducted in which ACT has been combined with *Habit Reversal* (HR): one with a multiple baseline design (Twohig & Woods, 2004) and the other study compared ACT with a wait-list condition (Woods, Wetterneck, & Flessner, 2006). Both studies reported positive results in decreasing the number of hairs pulled. With respect to the treatment of *skin picking*, Twohig, Hayes, & Masuda (2006a) have conducted a study with a

multiple baseline design across participants in which good results in reducing the levels of picking were obtained at post-treatment although they were not fully maintained at follow-up.

A couple of RCTs have analyzed the effectiveness of ACT compared with CBT or CT in the treatment of diverse symptoms related with *anxiety and/or depression*. In both studies, the treatments were conducted by novice-level therapists. Lappalainen, Lehtonen, Skarp, Taubert, Ojanen, & Hayes (2007) showed that ACT obtained more improvements in the SCL-90 GSI (Global Severity Index of SCL-90; Derogatis & Cleary, 1977) at post-treatment and at the 6 month follow-up. Improvements in the ACT condition correlated with the decrease of experiential avoidance and the improvements in the CBT condition correlated with the increase of self-confidence. In Forman, Herbert, Moitra, Yeomans, & Geller (2007) study, no significant differences were found in any measure at post-treatment. Once again, there are some indications of the different process of change. Changes in patients treated with ACT were correlated with the decrease in AAQ and the increase in acceptance without judgment and acting with awareness of the *Kentucky Inventory of Mindfulness Skills* (KIMS; Baer, Smith, & Allen, 2004). Changes in the CT condition were correlated with increases in the observation and description scales of KIMS. This study has not reported follow-up data.

There are two RCTs with *psychotic symptoms*. Bach & Hayes (2002) analyzed the differential effect of four 45 minute sessions of ACT as adjunct to the TAU for preventing rehospitalizations versus TAU. Results at the 4 month follow-up showed that the ACT+TAU condition had a significantly lower level of rehospitalizations. Results in ACT+TAU correlated with the decrease of hallucinations and delusions believability.

In a subsequent study, Gaudio & Herbert (2006a) replicated the previous study with a smaller sample but accounting for some methodological deficiencies (for example: including the same number of extra sessions in the TAU condition). Results were very similar to the previous study. In another article, Gaudio & Herbert (2006b) confirmed that the decrease of hallucinations believability mediated the results in the ACT condition.

With respect to *personality disorders*, Gratz & Gunderson (2006) conducted a study with patients with *Borderline Personality Disorder* in which they analyzed the differential effect of TAU versus ACT+TAU. There were significant differences at post-treatment between both conditions, and participants in ACT+TAU reached normative functioning levels.

Two studies have been conducted in *addictive behaviors*. Hayes, Wilson *et al.* (2004) presented a RCT in which they examined the treatment of polysubstance abusing individuals being maintained on methadone. Participants were assigned to either ACT, *Intensive Twelve-Step Facilitation*, or the methadone maintenance only. Participants in the ACT condition showed a greater decrease in objectively measured total drug use than participants in the methadone maintenance alone at the 6 month follow-up. Also, ACT participants showed greater decreases in self-reported total drug use than participants of the other two conditions.

On the other hand, Twohig, Schoenberger, & Hayes (2007) presented three case studies with marijuana dependence treated with 8 session ACT interventions. The effects

of the intervention were assessed using a nonconcurrent multiple baseline across participants design. At the 3 month follow-up, 1 participant was still abstinent and the other 2 were using but at a lower average level of consumption compared to baseline.

In the treatment of at-risk adolescents, Gómez, Luciano, Páez, & Valdivia (under review) conducted a preliminary study where an ACT protocol was implemented with 5 adolescents with a history of antisocial behavior and current legal issues. In post-treatment, all participants showed less impulsivity, higher self-control and more valued-oriented actions than in pre-treatment. These improvements were increased in the one year follow-up.

Based on the previous study, Luciano, Vizcaíno, Ruiz, Sánchez, & Gil (2009) analyzed the effect of two brief group protocols (a values and a defusion protocol) in the treatment of adolescents with high or moderate risk (N= 15) of having impulsivity or emotional problems. The values clarification protocol focused on participants taking perspective to see themselves now and in the future, promoting choosing and taking responsibility for own choices and it was based on deictic framing transformation of functions. It was applied during the first session and showed a large effect in reducing problematic behaviors only in the moderate risk adolescents. The implementation of the defusion protocol began two weeks later. It consisted of a multiple exemplar training in discriminating private events through deictic and hierarchical relational frames because these were hypothesized to be the specific context for transformation of functions involved in such defusion experiences (Luciano, Valdivia-Salas, Cabello-Luque, & Hernández-López, 2009; Luciano, Valdivia-Salas, Gutiérrez-Martínez, Ruiz, & Páez-Blarrina, 2009). This protocol improved the effect of values protocol in moderate risk adolescents and produced a large effect size in the high risk adolescents at post-treatment. These improvements were maintained at the 4 month follow-up. Table 2 summarizes the ACT studies in Clinical Psychology.

Health Psychology. As we have mentioned previously, *chronic pain* is the field that has received the most attention by ACT researchers. Dahl, Wilson, & Nilsson (2004) conducted a RCT in which a brief 4 session ACT protocol was implemented to prevent long term disability associated with pain and stress. Nineteen workers at risk of developing disability were randomly assigned to two groups. One of the groups received the TAU and the other received the ACT protocol in addition to TAU. At post-treatment and at the 6 month follow-up, the ACT group had showed less sick days and had used fewer medical treatment resources.

A series of large open trials with positive outcomes has been conducted with patients who suffered resistant chronic pain (McCracken, MacKichan, & Eccleston, 2007; McCracken, Vowles, & Eccleston, 2005; Vowles, & McCracken, 2008; Vowles, McCracken, & Eccleston, 2007).

Wicksell, Ahlqvist, Bring, Melin, & Olsson (2008) analyzed the efficacy of ACT with longstanding pain due to whiplash versus a wait list control condition. ACT showed significant improvements in functioning, life satisfaction, fear of movements and depression that were maintained at the 7 month follow-up.

Vowles, Loebach-Wetherell, & Sorrell (2009) have conducted two pilot studies with good outcomes. In one of them, they compared the differential effectiveness of

Table 2. Overview of ACT studies in Clinical Psychology. RCT studies are overshadowed. Asterisks in processes column indicate that a formal mediational analysis was conducted. BPRS: Brief Psychiatric Rating Scale; DSHI: Deliberate Self-Harm Inventory; ETAU: Enriched Treatment as Usual; GAD-CSR: GAD Clinician's Severity Rating; GAF: Global Assessment of Functioning Scale; LSAS: Liebowitz Social Anxiety Scale; KIMS: Kentucky Inventory of Mindfulness Skills; MBL: multiple base line; MGH-HS: Massachusetts General Hospital Hair Pulling; OCI: Obsessive Compulsive Inventory; SPAI: Social Phobia and Anxiety Inventory; VLQ: Values Living Questionnaire; Y-BOCS: Yale-Brown Obsessive Compulsive Scale.

First Author	Problem	Comparison	Measure	N	Sessions	Post	F-up weeks	Processes
Zetlle (1986)	Depression	CT	BDI	18	12	1.23	.92 (8)	ATO-B*
Zetlle (1989)	Depression	CT	BDI	21	12	.53	.75 (8)	ATO-B*
Lappalainen (2007)	Anx-Depr	CBT	SCL-90	28	10	.62	.47 (24)	AAQ
Forman (2007)	Anx-Depr	CT	GAF	101	15	.08	---	AAQ, KIMS
Twohig (2006)	OCD	MBL	OCI Distress	4	8	3.08	4.63 (12)	AAQ
Twohig (2007)	OCD	Relaxation	Y-BOCS	34	8	?	? (12)	AAQ*
Block (2002)	Social Anxiety	CBT	Public speaking	26	6	.49	---	Willingness
Ossman (2006)	Social Phobia	---	SPAI-DIFF	12	10	.86	---	AAQ, VLQ
Dalymp (2006)	Social Phobia	---	SPAI-SP	16	12	1.05	1.41 (12)	AAQ*
Kocovski (2009)	Social Phobia	---	LSAS	29	12	1	1 (12)	---
Roemer (2007)	GAD	---	GAD-CSR	16	16	2.42	1.93 (12)	Accept. and values*
Roemer (2008)	GAD	Wait-list	GAD-CSR	31	16	2.97	2.34 (36)	Initial AAQ
Zetlle (2003)	Math Anxiety	S. Desens. Control	Math anxiety	18	6	-.55	-.12 (8)	AAQ
Montesinos (2006)	Worries	Control	Fear Interference	20	1	.33	1.38 (6)	AAQ
Twohig (2004)	Trichotillomania	MBL	MGH-HS	6	7	3.05	2.91 (12)	AAQ
Woods (2006)	Trichotillomania	Wait List	MGH-HS	25	10	2.22	.98 (12)	AAQ
Twohig (2006)	Skin picking	MBL	Skin picking	5	8	2.81	1.64 (12)	AAQ
Bach (2002)	Psychotic S.	TAU	Rehospitalization	70	4	---	.45 (16)	Believability
Gaudiano (2006)	Psychotic S.	ETAU	BPRS	29	3	1.19	---	Believability*
Gratz (2006)	BPD	TAU	DSHI	22	14	1.01	---	---
Hayes (2004)	Polidation	M. Method.	Analtic	51	48	.41	.95 (24)	ATO-B
Twohig (2007)	Marijuana	MBL	Self-report	3	8	---	---	---
Gómez (subm.)	Antisocial Beh.	---	Self-control	5	12 h.	1.29	---	---
Luciano (2009)	High risk adol.	---	Prob. behaviors	8	4-5	1.55	1.1 (16)	Acceptance
Luciano (2009)	Moderate risk adol.	---	Prob. behaviors	7	4-5	2.44	2.25 (16)	Acceptance

ACT versus a standard CBT and ACT showed better results. With respect to pain in adolescents, two uncontrolled studies have shown positive outcomes (Greco, Blomquist, Sari, & Dedrick, under review; Wicksell, Melin, & Olsson, 2007).

Wicksell, Melin, Lekander, & Olsson (2009) conducted a RCT in which they evaluated the differential effectiveness of ACT versus TAU (a multidisciplinary treatment that included amitriptyline) in the treatment of chronic pain in children. ACT participants showed significant improvements that were maintained at the 6 month follow-up and was better than TAU in fear of re-injury, pain interference and in quality of life.

Two studies have been conducted in *smoking cessation*. Gifford *et al.* (2004) conducted a RCT in which the efficacy of an ACT intervention consisting of 7 individual and group sessions versus the standard application of *Nicotine Replacement Therapy* was analyzed (N= 62). Significant differences were found at the one year follow-up favoring ACT. The mediational analysis revealed that the decrease in smoking-related experiential avoidance mediated the results obtained by the ACT condition.

In a quasi-experimental study, Hernández López, Luciano, Bricker, Roales-Nieto, & Montesinos (2009) compared a 7 session group ACT intervention with a CBT intervention applied with the same number of sessions and format (N= 81). ACT showed greater abstinence rates at the 12 month follow-up than the CBT intervention. Specifically, 30.2% of participants (48.1% of completers) remained abstinent in the ACT condition compared with 13.2% of participants (17.2% of completers) for the CBT condition.

There are presently three studies in *cancer*. The first RCT in this field was carried out by Branstetter, Wilson, Hilderbrandt, & Mutch (2004). These authors analyzed the effect of 12 sessions of CBT versus ACT interventions in reducing the distress produced by end-stage cancer. The level of distress in the ACT condition was lower than in the CBT condition and the effects of ACT protocol was mediated by the reduction in mental disengagement.

Montesinos & Luciano (2005) compared a brief 1 session ACT protocol for breast cancer patients with relapse risk to a wait-list condition. At the 3 month follow-up, the patients in the ACT condition showed less interference of the relapse worries than patients in the control condition. The effect size of the ACT intervention was very large ($d= 2.53$). Finally, Páez, Luciano, & Gutiérrez (2007) conducted a small RCT (N= 12) in which the differential effect of ACT versus a standard CBT was analyzed. The protocols were applied in 3 individual and 5 group sessions. Although no statistically significant differences were found at post-treatment in the number of affected valued areas, differences were observed at the 12 month follow-up ($d= 1.78$).

Two RCTs have been conducted with patients of *epilepsy*. Lundgren, Dahl, Melin, & Kees (2006) compared the differential efficacy of 9 group ACT sessions versus an attention placebo condition. A large decrease in the number of seizures was found for patients in the ACT condition. The scores in an epilepsy-related experiential avoidance measure at post-treatment fully mediated the results in both seizures and quality of life at the 12 month follow-up. In a subsequent study, Lundgren, Dahl, Yardi, & Melin (2008) evaluated the differential effect of ACT versus yoga. The results indicated that both ACT and yoga significantly reduced their seizure index and increased their quality of life. However, ACT reduced the seizure index significantly more compared to yoga.

With respect to *weight loss*, Forman, Butryn, Hoffman, & Herbert (2009) conducted a preliminary open trial for analyzing the effectiveness of an ACT based intervention for weight loss in obese women. Results showed that participants lost 6.6% of body weight at post-treatment and 9.6% at the 6 month follow-up. Tapper, Shaw, Iislev, Hill, Bond, & Moore (2009) conducted an exploratory study in which they analyzed the efficacy of ACT versus a control condition in the weight loss in women. In the 6 month follow-up, participants in the ACT condition who reported using what they learned during treatment showed a greater weight loss than participants in the control condition. This weight loss was mediated by the decrease in binge eating.

On the other hand, Lillis, Hayes, Bunting, & Masuda (2009) have conducted a six hour ACT intervention for stigma reduction with participants who had completed at least 6 months of any structured weight loss program in the past 2 years. They compared the ACT protocol to a no-treatment control condition. No strategies were applied for a direct weight loss. At the 3 month follow-up, participants in ACT condition showed greater reduction in obesity-related stigma, better psychological functioning and quality of life, and had been lost greater body mass compared with control participants. Mediation analyses indicated that changes in weight-specific experiential avoidance mediated changes in outcomes.

There have been conducted several studies in *other health related areas*. Gregg, Callaghan, Hayes, & Glenn-Lawson (2007) analyzed the differential effect of ACT plus diabetes education versus diabetes education alone in a RCT in *Type II diabetes*. ACT condition obtained better results in promoting self-management behaviors. These results were mediated by the reduction in diabetes related experiential avoidance measure.

Hesser, Westin, Hayes, & Andersson (2009) have reported the positive effect of ACT in reducing *tinnitus distress* at post-treatment and at the 6 month follow-up. But, more importantly, the frequency of cognitive defusion behaviors and the peak level of cognitive defusion and acceptance (rated in session 2) predicted the symptom reduction at the 6 month follow-up. Furthermore, this study observed that changes in the mentioned processes measures occurred previously to the decrease in tinnitus distress.

Fernández, Luciano, & Valdivia (under review) have analyzed the efficacy of a brief 1 session ACT protocol versus a TAU control condition in *postsurgical recovery* (N= 13). Patients in ACT condition stayed significantly less days in the hospital after surgery (36 h) than participants in the control condition (92.5 h) and demanded fewer analgesics.

Also, good outcomes have been reported in preliminary studies focused in multiple sclerosis (Sánchez, & Luciano, 2005), in the *prevention of HIV* (Gutiérrez, Luciano, Bermúdez, & Buena-Casal, 2007) and in *systemic lupus erythematosus* (Quirosa, Luciano, Navarrete, Gutiérrez, Sabio, & Jiménez, 2009). Table 3 summarizes the ACT studies conducted in health psychology.

Other areas of intervention

Several studies have been conducted in the sport performance enhancement analyzing the effect of brief ACT protocols. Specifically, Fernández, Secades, Terrados,

García, & García (2004) carried out a RCT in which they compared the differential effect of ACT versus hypnosis in the improvement of the *strength in rowing*. At the end of the intervention, ACT showed greater improvement of the strength but without reaching a statistical significant differences.

With respect to *chess-players' performance*, two studies have shown the improvement of international-level chess-players' performance (Ruiz & Luciano, under review) and in promising young chess-players (Ruiz & Luciano, 2009b) compared with their respective control conditions. Interventions took no longer than 4 hours. In both cases, the chess-players who showed the greatest improvement in their performance were the ones who had higher levels of experiential avoidance during competitions at pre-treatment.

In *work settings*, Bond & Bunce (2000) carried out a study in which they compared the differential effect of an ACT 3 hour sessions intervention versus *Innovation Promotion Program* (IPP) and wait-list condition (N= 90). ACT showed better effect in post-treatment and in the 3 month follow-up in the improvement of general mental health. These results were mediated by the decrease in AAQ scores.

A couple of studies have analyzed the potential efficacy of ACT in reducing the *resistance to the use of empirical validated treatments* among professional counselors. On the one hand, Luoma *et al.* (2007) compared the differential effect of 8 ACT group sessions with a control condition. They found that in the ACT condition, counselors followed using the empirical validated treatment at the 2 and 4 month follow-up more frequently than in the counselors of the control condition. On the other hand, Varra, Hayes, Roget, & Fisher (2008) compared a 6 hour ACT session with an educative intervention (N= 59). They found that participants in ACT condition showed a more frequent use of the empirical validated treatment. The mediational analysis revealed that the reduction on barriers believability and the increase of psychological flexibility mediated the effect of the intervention.

A series of studies have been conducted to analyze the effect of ACT protocols in the *reduction of prejudice and stigma*. For example, Hayes, Bissett, *et al.* (2004) compared the differential effect of an ACT protocol versus *Multicultural Training and Biological Education* in diminishing the stigma and burnout among substance abuse counselors. Results found that ACT obtained better results than the other interventions in the reduction of stigma, burnout and the believability of stigmatizing attitudes at post-treatment and at the 3 month follow-up. The formal mediational analysis indicated that the decrease in stigmatizing attitudes believability mediated the results obtained by ACT at the follow-up.

In a similar study, Masuda *et al.* (2007) compared the effect of an ACT intervention versus an educational intervention in reducing stigma towards people with mental disorders (N= 95). As an additional aim, the study was designed for studying the differential effect of the protocols among participants with high and low AAQ scores. Results showed that in post-treatment and at the 1 month follow-up, ACT produced a decrease on stigma both in participants with high and low AAQ scores, but with a higher effect in the high avoidant participants. However, the educational intervention only had an effect with the participants with low AAQ scores.

Table 3. Overview of the ACT studies in Health Psychology. RCT studies are overshadowed. Asterisks in processes column indicate that a formal mediational analysis was conducted. FDI: Functional Disability Index; PDI: Pain Disability Index; BMI: Body Mass Index; MGPQ: McGill Pain Questionnaire-Short Form; WSQ: Weight Stigma Questionnaire.

First Author	Problem	Comparison	Measure	N	Sessions	Post	F-up weeks	Processes
Dahl (2004)	Chronic pain	TAU	Sick days	19	4	1.17	1.0 (24)	---
Greco (submitted)	Chronic pain	---	FDI	15	12-14	1.28	1.48 (4)	---
McCracken (2005)	Chronic pain	---	Pain intensity	108	3-4 weeks	.95	.61 (12)	CPAQ
Wicksell (2006)	Chronic pain	---	Pain intensity	14	16	1.25	2.11	---
McCracken (2007)	Chronic pain	---	Pain distress	54	3 weeks	.75	---	---
Vowles (2007)	Chronic pain	---	Pain intensity	252	3-4 weeks	.49	.47	CPAQ
Vowles (2008)	Chronic pain	---	Pain intensity	114	3-4 weeks	.65	.56 (12)	---
Vowles (2009)	Chronic pain	---	MGPQ	11	8	1.28	---	---
Vowles (2009)	Chronic pain	---	MGPQ	11	4	.77	---	---
Wicksell (2008)	Chronic pain	Wait-list	PDI	21	10	.96	.68 (16)	---
Wicksell (2009)	Chronic pain	TAU	Pain intensity	32	10	.53	.38 (26)	---
Gifford (2004)	Smoking	Nicotine Repl.	Abstinence	62	14	.06	.57 (48)	Smoking AAQ*
Hernández López (2009)	Smoking	CBT	Abstinence	81	7	.46	.58 (48)	---
Gregg (2007)	Diabetes	Psychoed.	HbA _{1c}	78	7 h.	---	.57 (12)	Diabetes AAQ*
Lundgren (2007)	Epilepsy	Placebo att.	Seizures	27	9 h.	1.43	1.23	Epilepsy AAQ*
Lundgren (2008)	Epilepsy	---	Seizures	9	12 h.	---	1.3 (48)	---
Sánchez (2006)	Multiple sclerosis	TAU	Valued areas	7	4	?	?	---
Branstetter (2004)	Cancer	CBT	Distress	31	12	.9	---	Mental disengagement*
Montesinos (2005)	Cancer	Wait-list	Worries interf	12	1	---	2.53 (12)	---
Páez (2007)	Cancer	CBT	Valued areas	13	8	.53	1.78 (48)	---
Fernández (subm.)	Posturgical	TAU	Days recovery	15	1	1.42	---	---
Gutiérrez (2006)	HIV prevention	Information	Risk HIV	45	1	?	? (24)	---
Lillis (2009)	Obesity stigma	Control	WSQ	84	6 h.	---	1.07 (12)	Weight AAQ*
Tapper (2009)	Weight loss	Control	BMI	47	8 h.	---	.20 (24)	Binge eating*
Forman (2009)	Weight loss	---	Bodily mass	29	12	.42	.58 (24)	Food AQQ
Quitosa (2009)	Lupus	Wait-list	?	17	11 h.	---	-- (24)	---
Hesser (2009)	Tinnitus	---	Distress	19	10	---	.91 (24)	Defusion & acceptance*

Lillis & Hayes (2007) have conducted a pilot study in which they analyzed the potential efficacy of ACT in reducing racial and ethnic prejudice with a 75 minute ACT based protocol compared with an education condition. Results showed that only ACT protocol was effective in increasing positive behavioral intentions and was mediated by an acceptance measure.

Finally, two uncontrolled studies have analyzed the effect of ACT in reducing addiction-related stigma (Luoma, Kohlenberg, Hayes, Bunting, & Rye, 2008) and in the support of parents of children diagnosed with autism. Both studies showed promising results. Table 4 summarizes the reviewed ACT studies in this section.

Case studies

There are also a good number of published case studies with problems in which any controlled study has been conducted or in which the details of the intervention for adapting to the personal characteristics of every patient are exposed. Case studies have been presented in the treatment of *depression* (Dougher & Hackbert, 1994; Luciano & Cabello, 2001), in *GAD* (Huerta, Gómez, Molina, & Luciano, 1998), *anxiety* (Ferro, 2000; Hayes, 1987, Luciano & Gutiérrez, 2001), *agoraphobia* (Carrascoso, 2000; Morón, 2006; Zaldívar & Hernández, 2000), *panic disorder* (Eifert, Forsyth, Arch, Espejo, & Langer, 2009), *PSTD* (Batten, & Hayes, 2005; Orsillo, & Batten, 2005; Twohig, 2009), *OCD* (Eifert *et al.*, 2009), *social phobia* (Eifert *et al.*, 2009), *psychotic symptoms* (García, Luciano, Hernández, & Zaldívar, 2004; García & Pérez, 2001; Hernández, García, Luciano, & Gómez, 2003; Veiga Martínez, Pérez Álvarez, & García Montes, 2009), *anorexia nervosa* (Heffner, Sperry, Eifert, & Detweiler, 2002), *schizotypic personality disorder* (Olivencia & Cangas, 2005), *familiar and couples problems* (Biglan, 1989; Peterson, Eifert, Feingold, & Davidson, 2009), patients with *intellectual disabilities* (Brown & Hooper, 2009; Pankey & Hayes, 2004) *exhibitionism* (Paul, Marx, & Orsillo, 1999), *sexual dysfunction and orientation* (Montesinos, 2003), *alcoholism* (Luciano, Gómez, Hernández, & Cabello, 2001; Heffner, Eifert, Parker, Hernández, & Sperry, 2003), *heroin addiction* (Stotts, Masuda, & Wilson, 2009), *chronic pain* (Kleen, & Jaspers, 2007; Luciano, Visdómine, Gutiérrez, & Montesinos, 2001; Wicksell, Dahl, Magnusson, & Olsson, 2005), *cancer* (Montesinos, Hernández, & Luciano, 2001), *swimming and weightlifting* (Gardner, & Moore, 2004), *chess* (Ruiz, 2006) and *lacrosse* (Lutkenhouse, 2007).

DISCUSSION

According to the review of outcome studies, we can conclude that ACT is showing to be efficacious in a wide range of problems in which a common pattern of experiential avoidance, in a context of cognitive fusion, is present. In general, the effect sizes are large and typically even better at follow-up. Also, it is worthy to note that a good number of the ACT studies have applied extremely short interventions that have showed relevant effects.

The comparison of the efficacy of ACT versus CBT is in its beginnings. Nevertheless, the available empirical evidence is promising for ACT. Specifically, some

Table 4. Overview of ACT studies in several areas different from Clinical and Health Psychology. RCT studies are overshadowed. Asterisks in processes column indicate that a formal mediational analysis was conducted. ATQ-B: Automatic Thought Questionnaire-Believability; CAMI: Community Attitudes toward the Mental Ill; GHQ-12: General Health Questionnaire; IPP: Innovation Promotion Program; ISS: Internalized Shame Scale; PBADQ: Prejudicial Biases Awareness, Defusion and Action Questionnaire; SAB: Stigma Attitudes-Believability.

First Author	Problem	Comparison	Measure	N	Number Sessions	Post	F-up weeks	Processes
Fernández (2004)	Canoeing	Hypnosis	Strength rowing	16	3	?	?	---
Ruiz (subm.)	Chess performance	Control	ELO performance	10	4 h.	---	.79 (.28)	Chess AAQ
Ruiz (2009)	Chess performance	Control	ELO performance	14	4 h.	---	.52(.36)	Chess AAQ
Bond (2000)	Worksite stress	IPP	GHQ-12	60	9 h.	.8	.72	AAQ*
Bond (2000)	Worksite stress	Wait list	GHQ-12	60	9 h.	.72	.7	AAQ*
Blackledge (2006)	Parents autism children	---	GSI	20	14 h.	1.8	.81 (.12)	ATQ-B
Hayes (2004)	Stigma & Burnout	Biological ed.	MBI	64	6 h.	.74	.61 (.12)	SAB*
Hayes (2004)	Stigma & Burnout	Multicultural T.	MBI	59	6 h.	.26	.57 (.12)	SAB*
Masuda (2007)	Stigma (high AAQ)	Education	CAMI	24	2.5 h.	.80	.88 (.4)	---
Masuda (2007)	Stigma (mid AAQ)	Education	CAMI	61	2.5 h.	-.13	-.37 (.4)	---
Luoma (2008)	Addiction Stigma	---	ISS	48	6 h.	.66	---	AAQ
Lillis (2007)	Racial prejudice	Education	PBADAQ	32	1	?	? (1)	Acceptance*
Varra (2008)	Use validated treatments	Education	Use of treatments	57	6 h.	---	1.03 (.12)	AAQ & believability*
Luoma (2007)	Use validated treatments	Control	Use of treatments	30	8	---	1.45 (.16)	---

studies have shown that ACT and CBT had similar effects (Forman *et al.*, 2007; Zettle & Rains, 1989), and other studies have shown better results for ACT (Block, 2002; Branstetter *et al.*, 2004; Hernández López *et al.*, 2009; Lappalainen *et al.*, 2006; Páez *et al.*, 2007; Zettle & Hayes, 1986). However, further, better controlled studies are needed (with larger samples, conducted in ACT and CBT laboratories, etc.).

With respect to the processes of change, it is remarkable that ACT researchers have put a high emphasis on it. In general, data suggest that ACT is working through their main hypothesized processes: reduction of experiential avoidance and cognitive fusion. This is very important in view of the reduced empirical evidence about the processes of change that other type of therapies (e.g. CBT) has shown. Although we might consider that ACT results in this field are still preliminary, they are coherent with the literature of experimental psychopathology and component studies that will be commented later. Further research is emphasized with respect to processes of change that could satisfy the strictest criteria for mediation (Kazdin, 2007). In this sense, the strategy used in Hesser *et al.* (2009) study (in line with the data presented in time-series in the case studies edited Luciano, 2001) is highly recommended.

The review of the correlational studies strongly support the ACT model: experiential avoidance seems to be significantly involved in a wide range of psychological disorders in view that its status as mediator has been systematically proved. Interestingly, the results of experimental psychopathology and component studies are very coherent with the correlational evidence. Some conclusions can be pointed out: (1) highly experiential avoidance participants respond differently to several experimental challenges; (2) acceptance-values based protocols are efficacious in improving the performance of participants in the experimental challenges; and, (3) more effect has been found in ACT protocols than in control-based ones.

Although the review of the RFT state of evidence was out of the scope of the current study, in our opinion, RFT is called to be the most differential characteristic between ACT and other second and third wave therapies. The implication of having a promisingly sound functional-contextual theory of human language and cognition is enormous. In this sense, although RFT definition of acceptance, values and cognitive defusion (Barnes-Holmes, Barnes-Holmes, McHugh, & Hayes, 2004; Luciano *et al.*, in press) is in its beginnings, it is perhaps the most important area of research that needs to be done in order to improve ACT results. For example, consider two specific issues: (1) to better know what are the specific transformations of functions involved in cognitive defusion and values clarification exercises would allow to redefine or invent new exercises that become more powerful; (2) to better know the specific verbal processes involved in the transformation of functions through analogical relations involved, for example, in values clarification, would allow therapist to be trained to use more effective metaphors in practice. Some of this research is being conducted (see Luciano, Vizaíno, *et al.*, 2009; Ruiz, 2009; Ruiz & Luciano, 2009a; Stewart, Barnes-Holmes, Roche, & Smeets, 2002 only for these specific issues) and it is expected that this research will improve ACT clinical methods in the long run.

In summary, ACT fundamental tenets seem to have a strong support in view of the correlational, the experimental psychopathology, and the outcome evidence. It is

worth noting that ACT is a therapy with very singular characteristics. It is explicitly rooted in specific philosophical assumptions (Hayes, 1993; Hayes *et al.*, 1988) and in a contextual approach to human language and cognition (Hayes *et al.* 2001). It also has a sound model of psychopathology in EAD or psychological inflexibility and its clinical methods are precisely directed to dismantle it. Once these characteristics are noted, the controversies about the similarities between ACT and CBT (e. g. Arch & Craske, 2008; Hofmann & Asmundson, 2008) or between other types of therapies (e.g. Hofmann, 2008) can be considered from a broader perspective (see Hayes, 2008).

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