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A Meta-Analysis of the Efficacy of Acceptance and Commitment Therapy for
Clinically Relevant Mental and Physical Health Problems

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Abstract

Background: The current study presents the results of a meta-analysis of 39 randomized controlled trials on the efficacy of ACT, including 1,821 patients with mental disorders or somatic health problems.

Methods: We searched PsycINFO, MEDLINE, and the Cochrane Central Register of Controlled Trials. Information provided by the Association of Contextual Behavioral Science (ACBS) community was also included. Statistical calculations were conducted using Comprehensive Meta-Analysis software. Study quality was rated using a methodology rating form.

Results: ACT outperformed control conditions (Hedges's $g = 0.57$) at post-treatment and follow-up, in completer and intent-to-treat analyses for primary outcomes. ACT was superior to waitlist (Hedges's $g = 0.82$), to psychological placebo (Hedges's $g = 0.51$) and to TAU (Hedges' $g = 0.64$). ACT was also superior on secondary outcomes (Hedges's $g = 0.30$), life satisfaction/quality measures (Hedges's $g = 0.37$) and process measures (Hedges's $g = 0.56$) when compared to control conditions. The comparison between ACT and established treatments (i.e., CBT) did not reveal any significant differences between these treatments ($p = .140$).

Conclusions: Our findings indicate that ACT is more effective than treatment as usual or placebo and that ACT may be as effective in treating anxiety disorders, depression, addiction, and somatic health problems as established psychological interventions. More research that focuses on quality of life and processes of change is needed to understand the added value of ACT and its trans diagnostic nature.

Keywords: Acceptance and Commitment Therapy; mental disorders, meta-analysis

Introduction

Acceptance and Commitment Therapy (ACT) is a relatively new form of Cognitive Behavioral Therapy (CBT) that focuses on the acceptance of private events, rather than the attempt to change those. Additionally, ACT addresses patients' goals and values to guide the process of behavior change and increase psychological flexibility [1]. To date, a large number of clinical trials have investigated the efficacy of ACT. Three meta-analyses have been completed of studies evaluating the efficacy of ACT for symptom improvement in clinical populations. First, in a meta-analysis of 15 studies, Öst [2] reported an overall mean effect size (ES) of 0.68 for ACT. Next, Powers, Zum Vörde Sive Vördung and Emmelkamp [3] included 18 RCTs in a second meta-analysis examining the efficacy of ACT. ACT outperformed all control conditions on primary outcome measures with an ES of 0.42. However, ACT was not significantly more effective than established treatments (ES = 0.18). Finally, a recent meta-analysis by Ruiz [4] included 16 studies comparing the efficacy of ACT to CBT on outcome and process measures. The findings significantly favored ACT over CBT on primary outcomes (Hedges's g= 0.40).

These previous meta-analyses have included only a narrow spectrum of target problems. Also, many recently published clinical trials on the efficacy of ACT were not included in the previous meta-analyses. Although the meta-analysis by Ruiz [4] was conducted recently, this meta-analysis included several studies involving non-clinical populations. Also, due to its focus on the comparison between ACT and CBT, this analysis did not include several intervention studies examining the efficacy of ACT compared to other treatment or control conditions. As research of a certain treatment method becomes more mature, one would expect the methodological quality to improve. Öst [2]concluded that the research methodology used in trials

investigating ACT was significantly less stringent compared to the research methodology used in trials investigating CBT.

Accordingly, the aim of the present meta-analysis was to provide an updated review of the efficacy of ACT with more specific studies. The overarching goal was to compare the efficacy of ACT with CBT and other control conditions on primary and secondary outcome variables in adults with specific disorders. Further aims were the comparison of overall treatment outcomes of ACT using both intent-to-treat (ITT) as well as completer data with control conditions on measures of quality of life and process measures. We additionally assessed the quality of the research methodology.

Method

Identification and Selection of Studies

We selected randomized controlled trials (RCTs) of ACT for mental disorders and physical health complaints using a comprehensive search strategy. We searched the following databases: PsycINFO 1806 to present, MEDLINE 1950 to present, and the Cochrane Central Register of Controlled Trials. The last search was conducted on March 07, 2013 and included the term "acceptance and commitment therapy" that was limited to "clinical trial" or "controlled clinical trial" or "randomized controlled trial". The search string yielded 366 hits. When duplicate and irrelevant studies were removed, 90 articles remained from the search string. Furthermore, we consulted the website of the Association of Contextual Behavioral Science (ACBS; http://contextualscience.org) that contains an overview of RCTs on ACT. The most recent update at that time (June, 2012) was used for this meta-analysis, which lead to an additional 10 studies which were further reviewed for inclusion criteria for the present study (see below). Through the international listserve

of the ACBS we further obtained one additional relevant unpublished manuscript and a relevant article published in the Journal of Contextual Behavioral Science. This led to a total of 102 articles to be further investigated for potential inclusion in our meta-analysis.

Studies meeting the following inclusion criteria were selected for the meta-analysis: (a) random assignment including at least one ACT-based treatment. To be included studies had to contain at least 80 % ACT interventions in the active condition; (b) either an active or inactive control group; (c) diagnosis of a clinically relevant disorder, and (d) at least 10 participants in the active condition(s) at post treatment. Authors of selected studies were contacted directly for further information if there were insufficient data provided in their articles to be included in the meta-analysis.

The first, third and last author judged independently of each other which of the 102 articles met the inclusion criteria. Full consensus was reached among the three authors and led to 41 studies, described in 42 articles, to be included in the meta-analysis. However, two of these studies were later excluded due to lack of available data. Figure 1 presents a flow diagram of the study selection process.

Figure 1 about here

Quality Assessment

All studies were rated with a methodology rating form for psychotherapy outcome studies developed by Öst [2] . This rating form consists of 20 items that are rated as 0 (poor), 1 (fair), or 2 (good). Examples of the scale include *'clarity of sample description*', *'reliability of the diagnosis*', or '*design*'. Two raters (the second and fifth author) independently rated all studies. The Intraclass Correlation

Coefficient (ICC) of the total score for all studies combined was ICC = .99, 95% CI [.97-.99], indicating excellent inter-rater reliability.

Results

Description of Studies

In online appendix 1 a summary of the 40 included publications describing 39 studies and the references of these publications can be found. We divided the studies into four overarching topics: anxiety and depression (*N*=8), addiction (*N*=8), other mental health problems (*N*=8) and somatic health problems (*N*=15). We defined TAU as the standard treatment in a particular institution. Mostly this consisted of medication, psycho-education, some form of psychotherapy, counseling or case management, or a treatment program with several parts. In some cases we deviated from the labeling by the authors and called control conditions TAU (e.g. [5], [6], [7], [8]. In some instances we labeled CBT-based control conditions as CBT even though the authors defined them as TAU (e.g. [9], [10]. The psychological placebo conditions were al designed to match attention and did not contain specific psychological interventions.

Our study overlaps eight studies included in Öst [2], 11 studies included in Powers et al. [3], seven studies included in Ruiz [4] and consists of 22 additional studies not included in previous meta-analyses.

Statistical Analysis

The control conditions utilized in the included studies were TAU (12 comparisons), a waitlist condition (WL; 9 comparisons), and a psychological placebo control intervention (5 comparisons). In addition, ten comparisons utilized established interventions, including CBT (6 comparisons), CT (3 comparisons), and habituation-based exposure (HAB; 1 comparison). Six comparisons combined an

ACT intervention with TAU and compared this combination to a TAU or enhanced TAU control condition. One comparison combined ACT plus methadone and compared this to TAU plus methadone. The 43 total comparisons are detailed in online appendix 1.

Studies used both completer and ITT samples for their analyses. Of the 39 studies included in the meta-analysis, 25 studies reported completer analyses only, 11 studies reported ITT analyses only, and three studies reported both completer and ITT analyses. For the following analyses, completer samples were used when available, and ITT samples were utilized if completer samples were not provided. In order to examine the potential impact of ITT vs. completer analyses, we compared the overall outcomes reported below using only ITT vs. only completer in those studies that reported both. When both types of analyses were reported, no outcomes differed between completer and ITT samples in either post-treatment or follow-up comparisons. We used the procedures of the Comprehensive Meta-Analysis software for statistical calculations [11].

Homogeneity

A homogeneity analysis was performed and revealed significant heterogeneity across studies and variables ($Q = 104,13$, $p < .001$). Thus, the moderator analyses performed below are justified.

ACT vs. Control Conditions on Primary Outcome Variables

In an overall analysis of primary outcome measures across pooled time points and types of disorders, which included 39 studies and 1,821 participants, ACT outperformed control conditions (Hedges's $g = 0.57$ [SE = 0.09, 95% CI: 0.40 to 0.74, $p < .001$]). The overall effect at post-treatment (Hedges's $g = 0.54$ [SE = 0.10, 95% CI: 0.35 to 0.73, $p < .001$]), which included 32 studies and 1,767 participants,

was no different from that at follow-up (Hedges's $g = 0.36$ [SE = 0.08, 95% CI: 0.20 to 0.51, $p < .001$]), which included 25 studies and 1,259 participants. However, follow-up assessments differed in length between studies (from 1.5 weeks to 18 months).

ACT vs. Control Conditions: Completer vs. ITT

When examining the overall effect between types of analyses, ACT outperformed control conditions on primary outcome measures in both completer samples (Hedges's $g = 0.64$ [SE = 0.10, 95% CI: 0.45 to 0.83, $p < .001$) and ITT samples (Hedges's $g = 0.44$ [SE = 0.15, 95% CI: 0.14 to 0.73, $p = .004$]). The completer sample analysis involved 28 studies and 1,052 participants while the ITT sample analysis involved 12 studies with 790 participants. It should be noted that one study used a completer analysis at post-treatment and an ITT analysis at follow-up and was included in both the completer and ITT analyses. Figure 2 shows a forest plot of ACT versus control conditions on primary outcome measures.

Figure 2 about here

ACT vs. Control Conditions on Secondary Outcome, Quality of Life and Process Measures

ACT was also superior to control conditions across pooled time and types of disorders on secondary outcome measures in an analysis involving 30 studies and 1,254 participants (Hedges's $g = 0.30$ [SE = 0.07, 95% CI: 0.16 to 0.44, $p < .001$]), life satisfaction/quality measures in an analysis involving 19 studies and 931 participants (Hedges's $g = 0.37$ [SE = 0.10, 95% CI: 0.16 to 0.57, $p < .001$]), and process measures in an analysis involving 23 studies and 1,142 participants (Hedges's $g = 0.56$ [SE = 0.10, 95% CI: 0.37 to 0.76, $p < .001$]).

Effect Size as a Function of Control Condition

Examining the effect of ACT across different types of control conditions, ACT was superior to waitlist in an analysis with 9 studies and 346 participants (Hedges's $g = 0.82$ [SE = 0.14, 95% CI: 0.54 to 1.09, $p < .001$]), to psychological placebo in an analysis with 5 studies and 238 participants (Hedges's $g = 0.51$ [SE = 0.13, 95% CI: 0.26 to 0.77, $p < .001$]), and to TAU in an analysis with 12 studies and 457 participants (Hedges' $g = 0.64$ [SE = 0.18, 95% CI: 0.28 to 1.00, $p < .001$]). This effect was similar when examining conditions which utilized combinations of ACT plus another treatment (e.g., ACT+TAU) compared to TAU in analysis with 18 studies and 885 participants (Hedges's $g = 0.56$ [SE = 0.12, 95% CI: 0.33 to 0.79, $p < .001$]). However, there was no significant difference between ACT and established treatments (i.e., CBT, CT, or HAB) in an analysis with 9 studies and 456 participants (Hedges's $g = 0.32$ [SE = 0.22, 95% CI: -0.10 to 0.74, $p = .140$]).

Effect Size as a Function of Target Problem

To examine the primary outcome measures within different target problems, comparisons were pooled across control condition and time. ACT was superior to control conditions for anxiety/depression in an analysis of eight studies with 378 participants (Hedges's $g = 0.37$ [SE = 0.17, 95% CI: 0.04 to 0.70, $p = .030$]), addiction in an analysis of eight studies with 503 participants (Hedges's $g = 0.40$ [SE = 0.13, 95% CI: 0.15 to 0.66, $p = .002$]), somatic complaints in an analysis of 15 studies with 683 participants (Hedges's $g = 0.58$ [SE = 0.13, 95% CI: 0.33 to 0.84, $p < .001$]), and other mental disorders in an analysis of eight studies with 258 participants (Hedges's $g = 0.92$ [SE = 0.29, 95% CI: 0.35 to 1.48, $p = .001$]).

Publication Bias: The File Drawer Problem

In order to account for the "file drawer problem", a fail-safe N was computed. This is a conservative method to address this problem which assumes that the effect

sizes of unpublished studies are equal to zero and then computes the number of studies that would be required to reduce the overall effect size of the analysis to a nonsignificant level. In this study, the required number of studies would be 205. An analysis of publication bias revealed a fail-safe N of 1100, indicating that it would require more than 1100 current or future unpublished studies with an effect size of zero to reduce the effect size of the current analysis to non significant. This suggests that the findings of the current study are robust.

Additionally, to further determine if potential outliers significantly impacted our effect size estimate, we created a funnel plot of standard errors by effect sizes (see online appendix 2 for the funnel plot). Both our observed analysis (Hedges's $g = 0.57$ [95% CI: 0.40 to 0.74]) and the analysis with an adjusted effect size based on imputed values (Hedges's $g = 0.29$ [95% CI: 0.09 to 0.48) indicated that ACT outperformed control conditions; however, the reduced adjusted effect size does suggest that there may have been studies with extreme values that contributed to the overall analysis. However, these values were not deemed true outliers and removed, as they did not exceed 3.3 SDs of the mean for all studies, which is the recommended cut-off for outliers in meta-analyses [12], [13]. The possibility for inclusion of studies with extreme values warrants caution in estimating the exact value of the effect size.

Study Quality

Each study was rated for quality based on the criteria by Öst [2]. A meta-regression revealed that there was a significant relation between study quality ratings and effect sizes for primary outcome measures ($\beta = -0.05$, $p < .001$), such that studies with higher quality ratings were associated with smaller effect sizes. This relation between study quality ratings and effect sizes remained significant across pooled outcome measures ($\beta = -0.05$, $p < .001$). Our ratings yielded a mean score of 23.88

for ACT studies (*SD* = 4.96). See online Appendix 3 for further information on these ratings.

Discussion

This meta-analysis including 39 RCTs on ACT (*N* = 1,821) revealed that ACT outperformed control conditions on both primary and secondary outcome measures at post-treatment and follow-up. Further, findings indicate that ACT was not more effective than established treatments such as CBT, CT, and HAB. Meta-regression analyses revealed that there was a significant relation between study quality ratings and effect sizes, such that studies with higher quality ratings were associated with smaller effect sizes.

With regard to primary outcome variables, we found an effect size of 0.57 in favor of ACT as compared to control conditions. This effect size is somewhat lower than the one reported by Öst [2] ES = 0.68) and somewhat higher than the one reported by Powers et al. [3] ES = 0.42). A comparison of completer vs. ITT analyses revealed similar results. A comparison of ACT with control conditions on secondary outcome measures led to a small effect size of 0.30. ACT similarly outperformed control conditions on measures of life satisfaction with an effect size of 0.37, as well as process measures with an effect size of 0.56. These findings are also similar to those by Powers et al. [3] and support the efficacy of ACT in treating mental disorders. This efficacy is further supported by the results from the comparison between ACT and waitlist, yielding an effect size of 0.82 and ACT and placebo, yielding an effect size of 0.51. Finally, ACT demonstrated a moderate effect size compared to TAU (ES = 0.64). It should be noted, however, that the precise indication of this finding is unclear as TAU commonly includes different forms of therapy, including potential differences among countries.

The comparison of ACT with established treatments revealed no significant difference between the two. Though the effect sizes for ACT appear slightly larger than for established conditions, the difference is not significant. This finding is in line with the results of Powers et al. [3]. Although Ruiz found ACT to be superior to CBT [4], this may be explained by methodological differences. Ruiz' meta-analysis also included studies utilizing non-randomized trials with small sample sizes, subclinical psychological problems and different labeling of control conditions. Furthermore, only seven of the 16 studies included by Ruiz were included in our analysis.

Another relevant finding from the current meta-analysis is that the methodological quality of the ACT studies seems to have improved over the years, whereas the efficacy of ACT remains comparable. We found improvements on most of the items from the rating form developed by Öst [2] and on the total rating. Öst [2] reports that his methodology ratings regarding CBT studies yielded a mean of 27.8 ($SD = 4.2$) whereas the total mean score for ACT studies was 18.1[1] ($SD = 5.0$). It should be noted, however, that studies with higher quality ratings were associated with smaller effect sizes. Yet, this is not uncommon in meta-analytic reviews on the efficacy of psychotherapy (e.g., [14]).]This finding, however, suggests caution in attempts to generalize findings from less rigorous studies. Also, we believe there is still room for improvement in this regard. Improvements should focus on matching the amount of contact when utilizing treatment as usual comparisons, monitoring for competence of therapists, and monitoring use of concurrent treatments. [15]. Furthermore, we recommend inclusion of waitlist and/or psychological placebo conditions in future trials when ACT is compared to TAU [16, 17].

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[1] We calculated the total mean for ACT from available data and found a mean of 18.32

The results of this meta-analysis are strengthened by the amount of RCTs included, a large number of study participants, and the breadth of the clinical characteristics of participants. In comparison, the meta-analysis by Öst [2] was based on 13 RCTs with a total of 677 participants and the meta-analysis by Powers et al. [3] was based on 18 RCTs and 917 participants.
We clustered the studies into four areas (anxiety/depression, addiction, other mental health problems, and somatic health problems), some of which are very broad. This decision was made due to the lack of sizeable studies to form more individual groups. Due to the aim of the study and our inclusion and exclusion criteria, we included only RCTs and did not include prevention studies or studies with subclinical populations.

In general, larger samples are needed to further support the evidence regarding the efficacy of ACT. For depression, mixed anxiety disorders, obsessive-compulsive disorder, and psychosis, there is a modest amount of research into the efficacy of ACT, according to the Society of Clinical Psychology [18] . With regard to anxiety disorders only three ACT RCTs with relatively small sample sizes have been published to date concerning generalized anxiety disorder, public speaking anxiety, and obsessive compulsive disorder, respectively, and one large trial on mixed anxiety disorders. Accordingly, there is need for more ACT trials aimed at specific anxiety disorders.

Our findings support the use of ACT in treating anxiety disorders, depression, addiction, and somatic health problems and suggest that it can provide similar outcomes as established psychological interventions. Apart for the efficacy regarding symptom reduction, ACT may possesses some potential advantages over other treatments. Since the goal in ACT is to assist clients to engage in behaviors that work best in allowing them to reach their stated goals, symptom reduction is regarded more

as a byproduct of treatment. Accordingly, ACT might be associated with broader substantial changes regarding psychological functioning and lead to less disappointment if patients do not perceive a significant symptom reduction. ACT may further lead to less reactance during treatment as therapeutic action only occurs in accordance with people's values. ACT is based on a trans diagnostic model and ACT research is on the fore front of process research with initial data supporting the ACT model (see for a recent meta-analysis Levin, Hildebrandt, Lillis and Hayes [19]). As focus on this issue was beyond the scope of our analysis, future research needs to examine the extent to which the processes responsible for treatment results are indeed trans diagnostic. Further, research with a specific focus on improving quality of life and the processes responsible for treatment gains could help distinguish in what ways ACT is different from other treatments and if and how that difference is associated with better treatment outcome.

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