

*The efficacy of acceptance and
commitment therapy on self-stigma
reduction among people with mental
illness: a quasi-experimental design*

Article

Accepted Version

Kao, S. Y. S., Li, A. C. M., Mak, W. W. S. and Cheung, R. Y. M.
ORCID: <https://orcid.org/0000-0003-0998-7991> (2024) The
efficacy of acceptance and commitment therapy on self-stigma
reduction among people with mental illness: a quasi-
experimental design. *Stigma and Health*, 9 (2). pp. 162-172.
ISSN 2376-6964 doi: <https://doi.org/10.1037/sah0000474>
Available at <https://centaur.reading.ac.uk/113025/>

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To link to this article DOI: <http://dx.doi.org/10.1037/sah0000474>

Publisher: American Psychological Association

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Title:

The Efficacy of Acceptance and Commitment Therapy on Self-Stigma Reduction among
People with Mental Illness – A Quasi-Experimental Design

Abstract

Self-stigma is prevalent and has adverse impact on people with mental illness, including negative effects on self-esteem, help-seeking, quality of life, and personal recovery. This study investigated the efficacy of Acceptance and Commitment Therapy (ACT) in reducing self-stigma of people with mental illness in a five-week group intervention. Thirty-six individuals with mental illness were recruited and completed the ACT intervention. The participants from the intervention group were matched by propensity scores on pre-intervention outcome variables with another 36 individuals with mental illness from the control group. Levels of self-stigma, believability of stigmatizing thoughts, psychological flexibility, and mindfulness were assessed before the intervention, immediately after the intervention, and one month after the intervention. Significant interaction effects were found in psychological flexibility and mindfulness but not self-stigma and believability of stigmatizing thoughts. For the intervention group, time effects were found in self-stigma, believability of stigmatizing thoughts, psychological flexibility, and mindfulness at post- and follow-up assessment. These findings suggested that ACT is potentially effective in improving psychological flexibility and mindfulness. Mediation analyses suggested that psychological flexibility and mindfulness did not mediate changes in self-stigma or the believability of stigmatizing thoughts. Randomized controlled trials are necessary to further determine its effect on self-stigma and self-stigmatizing thought processes.

Keywords: Acceptance and commitment therapy; Self-stigma; Mental illness; Mindfulness; Psychological flexibility

Word counts: 203

Clinical Impact Statement

Self-stigma impacted the quality of life for people with mental illness. However, existing evidence on self-stigma reduction interventions was mixed. Acceptance and commitment therapy (ACT) showed preliminary benefits in reducing self-stigma. The current study evaluated the effects of ACT groups on self-stigma processes and reduction in Hong Kong. Using a quasi-experimental design, individuals in the ACT groups showed more improvements in psychological flexibility and mindfulness, compared with matched controls. However, no significant difference was found between two groups on self-stigma. This study provided insights into the potential benefits of ACT for people with mental illness.

Background

Self-Stigma and its Impact

Self-stigma is the endorsement, concurrence, and application of public stigma to the self, leading to internalization of public stigma (Mak & Cheung, 2010; Watson, et al., 2007). People with mental illness are often associated with being dangerous, violent, incompetent, and unlikely to recover (Corrigan, 2000; Corrigan & Kleinlein, 2005; Crisp et al., 2000). For self-stigma to occur, individuals who are perceived to be different and inferior by the dominant group in the society identify themselves with the stigmatized group, e.g., people with mental illness (Luoma et al., 2008; Mittal et al., 2012), become aware of and concur with the stereotypes about their own group, and subsequently internalize and apply the stereotypes to themselves (Corrigan et al., 2006), thereby deeming themselves as socially unacceptable and resulting in a loss of status (Vogel et al., 2013).

It is common for people with mental illness to experience self-stigma. In Asia, a cross-sectional study found that 43.2% of participants with mental illness in two Chinese cities reported having self-stigma (Young & Ng, 2016). Some researchers suggested that self-stigmatization may be deeply influenced by the traditional Chinese culture (Mak et al., 2015), and a meta-analysis showed that collectivistic cultures tend to have a stronger relationship between public and self-stigma, suggesting a stronger internalization process among individuals living in collectivistic cultures (Yu et al., 2021). Similar to individuals living in Western cultures, those with higher levels of self-stigma also reported lower levels of self-esteem and higher levels of hopelessness, compared to their counterparts with lower levels of self-stigma (Mak & Cheung, 2010).

Across cultures, detrimental effects of self-stigma have been documented, including lower levels of hope, self-efficacy, self-esteem, and quality of life (Corrigan & Watson, 2002; Corrigan et al., 2006; Mak et al., 2007). Self-stigma is also associated with poor adherence to

treatment, reduced help-seeking behaviors, and interference with employment, social functioning, and independent living, which compromise recovery and rehabilitation (Barney et al., 2006; Caltaux, 2003; Fung et al., 2010; Kim et al., 2015; Livingston & Boyd, 2010; Mak et al., 2017; Mo & Mak, 2010; Vogel et al., 2013; Yanos et al., 2012). Although most research on self-stigma focuses on the impact of the content of these self-stigmatizing thoughts on people with mental illness, the process associated with these thoughts can also add to the distress experienced by people with mental illness in their everyday lives.

Living with self-stigma can be challenging, as the perpetuation of self-stigma over time may impede on both clinical and personal recovery (Mak et al., 2017). Some people with mental illness may adopt maladaptive coping, such as avoiding the label and suppressing stigmatizing thoughts (Corrigan, 2004). This avoidance towards self-stigmatizing experiences reflects a metacognitive process called “experiential avoidance” (Hayes et al., 1999), which may paradoxically lead to an increase in self-stigmatizing thoughts and preoccupation (Abramowitz et al., 2001). In addition to experiential avoidance, the frequent repetition of self-stigmatizing thinking may become a dominant process in the mind and develop into an automatic, unconscious, and uncontrollable thought process called mental habit (Chan & Mak, 2017; Verplanken et al., 2007). Therefore, while the endorsement of the content of the stigmatizing thoughts can diminish well-being, the frequency in which these thoughts appear in one’s mind can also contribute to the decrement in one’s well-being, above and beyond the effects of the content (Chan & Mak, 2017; Rüsç et al., 2010; Yang & Mak, 2017).

Intervention for Self-Stigma

Several types of interventions have been developed to reduce self-stigma in people with mental illness. According to a critical review, the most common intervention is psychoeducation (Mittal et al., 2012). Psychoeducation is often delivered in groups and could also be delivered in the form of brochures, web-based materials, or face-to-face sessions

conducted by trainers or therapists. The content of psychoeducation varies, which might include learning the consequence of stigma, discussing behavioral strategies, developing hopes and goals, or learning the medical aspects of illness management (Mittal et al., 2012). In addition to psychoeducation, cognitive behavioral therapy (CBT) is another common approach. Based on the cognitive model of self-stigma, self-stigmatized beliefs, for example “I have mental illness and I am useless”, are regarded as irrational beliefs upheld by people with mental illness and these irrational self-stigmatizing beliefs can be challenged and replaced with more positive and rational beliefs, for example “I can take care of myself and do things I like” (Corrigan & Rao, 2012). CBT reduces self-stigma by challenging stigmatizing beliefs. Other interventions adopt a multi-modal approach by combining psychoeducation, CBT, and different skills including motivational interviewing, social skills training, and goal attainment (Mittal et al., 2012). In addition to these three types of interventions, acceptance and commitment therapy (ACT) is a growing intervention that has demonstrated preliminary significant findings (Luoma et al., 2008). In ACT, participants are instructed to observe their thoughts and feelings mindfully and respond to stigmatizing thoughts with ACT components, including “acceptance” and “defusion” (Luoma et al., 2008).

Given a wide range of interventions, the findings on their efficacy and effectiveness are mixed. According to a systematic review and meta-analysis, small to moderate effect sizes were found for psychoeducation (Tsang et al., 2016). Another narrative synthesis and meta-analysis showed that for people with schizophrenia, CBT, psychoeducation, and social skill training did not have significant effects in reducing self-stigma (Wood et al., 2016). Nonsignificant effects were also found for psychoeducation, CBT, and multimodal intervention according to a systematic review of randomized controlled trials (Buchter et al., 2017). Last but not the least, a systematic review showed that psychoeducation and multimodal interventions had the strongest effects in reducing self-stigma however the effects

of CBT and revelation interventions were inconclusive (Alonso et al., 2019). From these review papers, not only were the findings mixed, the content and design of interventions also varied. These reviews had not examined the efficacy of ACT as only one ACT study was included and this study showed a significant effect in reducing self-stigma at follow up (Luoma et al., 2008).

The mixed findings in psychoeducation and CBT may be attributed to the unintentional suppression of self-stigmatizing thinking due to direct challenge or control of such thoughts, which may paradoxically increase the frequency of these thoughts and further perpetuate self-stigma (Corrigan & Penn, 1999; Macrae et al., 1994; Verplanken et al., 2007; Wenzlaff & Wegner, 2000). Others have argued that stigma and stereotypes are hard to disconfirm because ambiguous information may be interpreted as stereotype-confirming, thereby questioning the effectiveness of cognitive strategies (Haghighat, 2001). In order for self-stigma interventions to be effective and sustainable, the thinking process needs to be addressed apart from the content of stigmatizing thoughts.

Acceptance and Commitment Therapy and Self-Stigma

ACT is a third wave treatment approach based on the relational frame theory derived from basic behavioral research on human cognition and language (Hayes et al., 2001). It originates from a pragmatic philosophical understanding called “functional contextualism” which posits that language is at the core of human suffering and psychological distress. Humans experience suffering when individuals become too close, or too fused, with their thoughts. Therefore, ACT interventions aim to exert more control over the use of language, so that language becomes a resource when it is useful, rather than an unconscious process that causes distress to individuals (Hayes et al., 1999). Unlike CBT, ACT addresses people’s relationship to their thoughts. ACT advocates for accepting and allowing the presence of thoughts, without necessarily believing in the thought content. The six core processes in ACT,

namely 1) acceptance, 2) defusion, 3) self as context, 4) contact with the present moment, 5) values, and 6) committed action, are interrelated that they all carry the general goal of improving individuals' psychological flexibility (Hayes et al., 2006). Psychological flexibility allows individuals to be in contact with the present moment fully as conscious human beings, rather than becoming fused with their thoughts. When being conscious, individuals can serve their values and foster commitment to their chosen values with actions (Hayes et al., 1999).

ACT has been applied in the reduction of stigma towards people with mental illness. For instance, ACT was found to reduce the believability of stigmatizing attitudes and to reduce stigma for a group of drug abuse counselors (Hayes et al., 2004). It was also found to reduce mental health stigma among college students (Masuda et al., 2009). ACT was found to be significantly better at reducing prejudice towards people with mental illness and reducing stigma compared with education, regardless of participants' levels of psychological flexibility (Kenny & Bizumic, 2016; Masuda et al., 2007). One meta-analysis examining the effect of various ACT interventions on different types of stigma found consistent reductions in public and self-stigma and improved psychological outcomes following ACT interventions, with a medium-to-large positive association between stigma and psychological inflexibility (Krafft et al., 2018). A guided self-help ACT intervention showed reduction in weight self-stigma, emotional eating, weight-management behaviors, depression, and improvement in quality of life, along with improved psychological inflexibility and valued action, which are important processes of change in ACT (Levin et al., 2018).

Change Process of ACT

In ACT, individuals are taught to observe their experiences nonjudgmentally through mindfulness and acceptance techniques without internalizing the experiences. In other words, they become cognitively defused from their experiences and their psychological flexibility is enhanced. This may mitigate self-stigma as individuals may focus less on habitual self-

stigmatizing thoughts, become more aware of and monitor automatic self-stigmatization, and reduce experiential avoidance of self-stigma (Chan & Mak, 2017; Yang & Mak, 2017; Verplanken & Fisher, 2014; Verplanken et al., 2007). As a component of ACT, mindfulness was found to be positively related to stigma resistance among people with psychiatric disorders (Chan et al., 2018). A significant negative correlation between mindfulness and stigma was also found among women with schizophrenia (Tang et al., 2021).

Studies involving acceptance- and mindfulness-based interventions, including ACT, found improvements in ACT-related mechanisms including experiential avoidance, acceptance coping, distress with stigmatizing thoughts, believability of thoughts, and psychological flexibility, mediated changes in self-stigma (Levin et al., 2018; Lillis et al., 2009; Luoma et al., 2008; Skinta et al., 2014). Another study by Lillis et al (2009) found that participants who completed a one-day mindfulness and acceptance-based workshop showed greater reductions in obesity-related stigma and psychological distress, and improvements in distress tolerance and psychological flexibility. Mediation analyses also found that changes in weight-specific acceptance coping and psychological flexibility mediated the changes in the outcomes. Moreover, ACT emphasizes the importance of living with these thoughts while taking actions to live according to one's valued directions and identify one's values and goals. Valued living, together with psychological flexibility and mindfulness, was associated with better personal recovery (Mak et al., 2021).

Aims

In view of the need to target self-stigmatizing thinking process among people with mental illness and the emerging evidence of ACT on self-stigma, the present study investigated the efficacy of ACT in reducing self-stigma among people with mental illness in Hong Kong a five-week group intervention, compared with a control group. Apart from self-stigma and the maintaining factors for self-stigmatizing thoughts including the believability of

stigmatizing thoughts, ACT's effects on psychological flexibility and mindfulness, which were processes targeted by ACT, were also examined. Lastly, psychological flexibility and mindfulness were examined as mediating factors in the change of self-stigma and believability of stigmatizing thoughts.

Methods

Participants

Individuals with mental illness from Hong Kong were recruited through a public university, social media, and a local non-governmental organization that provides myriad mental health services to people with mental health needs. In the present study, individuals who self-identify as people with mental illness were eligible to participate.

Recruitment posters and e-mail were sent through a university mass mailing to all students and staff. The researchers also posted the recruitment poster on social media to attract a wider audience in the general population with mental illness. In addition to these outlets, we also recruited service users at a local non-governmental organization that provided services to people with mental health needs in the community through posting flyers and e-mail lists at their community centers.

An a priori power analysis was conducted using G*Power 3.1 to test the minimum sample size needed for this study. A power analysis for mixed ANOVA with two condition groups and three time measurements was conducted, instead of a linear mixed model power analysis as the main purpose of linear mixed model was only to address the missing data issue. With a small effect size ($d = .20$) and an alpha of .05, a total sample of 42 participants, with 21 participants in each condition was required to achieve a power of .80.

A quasi-experimental design was used because an insufficient number of participants were enrolled in each batch, which did not allow for randomization to intervention and control groups. Eighty-eight participants were recruited (36 in the intervention group and 52

in the control group). The 36 participants in the intervention group were matched with 36 participants in the control group. All participants received services as usual, while the intervention group received the ACT group in addition to their usual services. A propensity score based on the baseline levels of outcome variables, including the level of self-stigma, believability of stigmatizing thoughts, psychological flexibility, and mindfulness, was calculated for each participant. Participants from the intervention group was matched with participants in the control group with the nearest score, i.e., using the nearest neighbor matching method (Austin, 2011). Sixteen participants in the control group who cannot be matched with the intervention group participants were not included in the analyses (see **Supplemental Material 1** for the CONSORT diagram). All participants met the following inclusion criteria: 1) had a self-reported mental illness, 2) scored three or four in at least one of the items in the Self-Stigma Scale-Short Form, indicating the presence of self-stigma, and 3) had the ability to read Chinese and understand Cantonese.

Intent-to-treat analysis

All participants were included in the intent-to-treat analysis and their demographic characteristics are presented in Table 1. The sample contained a majority of female participants and a majority reported a history of depression or anxiety. The ACT group participants ($M = 45.08$, $SD = 15.86$) were significantly older than the control group ($M = 33.56$, $SD = 12.43$); $t(66.22) = -3.43$, $p < .01$. The intervention group participants ($M = 11.90$, $SD = 4.83$) were also less educated than the control group ($M = 14.74$, $SD = 2.30$); $t(41.40) = 2.79$, $p < .01$). Based on Levene's tests of homogeneity of variance, the equality of variances was compromised between groups. Hence, the adjusted dfs and p -values were reported. No significant differences were found between conditions in the outcome variables.

The means and standard deviations of the outcome variables among participants with different psychiatric diagnoses are shown in Table 2. No significant difference in self-stigma

was found across participants with different psychiatric diagnoses ($F(3, 68) = 0.23, p = .875$). Similarly, no significant difference in the believability of stigmatizing thoughts was found ($F(3, 68) = 0.68, p = .570$) among participants with different diagnoses. Furthermore, no significant difference in psychological inflexibility was found regardless of the psychiatric diagnoses. Lastly, no significant difference in mindfulness was found ($F(3, 68) = 1.47, p = .230$) among participants with different psychiatric diagnoses.

Procedures

Five weekly two-hour sessions of ACT for self-stigma reduction groups were delivered in person to individuals with mental illness in the ACT group. Four batches of ACT groups, each comprising six to twelve participants, were conducted. The intervention was delivered by one clinical psychologist in training and observed and supervised by a clinical psychologist trained in ACT to maintain consistency. Participants from the control group did not receive any ACT for self-stigma intervention during the study.

Informed consent was obtained from all the participants prior to the study and ethics approval was obtained from the Survey and Behavioral Research Ethics Committee at **the Chinese University of Hong Kong**. All participants were asked to complete the same set of questionnaires at three time points: prior to the intervention, immediately after the last session, and one month after the last session. Participants were given 50 Hong Kong dollars (US\$6.41) after completion of all three questionnaires, and the control group participants were invited to attend a half-day ACT workshop after all questionnaires were completed.

Intervention design

The ACT for self-stigma program in the current study was designed based on the original ACT manual, with modifications made to focus on self-stigma. A five-week group therapy was employed to allow participants to learn the processes and content about self-stigma and ACT. The first session of the program was psychoeducation materials developed

based on scientific literature on self-stigma, such as the definition of self-stigma, process of internalizing misconceptions towards people with mental illness into self-stigma, and the impact of self-stigma, which were also common in many existing self-stigma interventions for mental illness (Lucksted et al., 2011; Yanoes, Roe, & Lysaker, 2011). Other than the first session, each subsequent session focused on one to two of the six core processes in ACT. The structure of the group was developed with reference to a self-help book by Hayes and Smith (2005). The phenomenon of experiential avoidance was first introduced, the ACT processes were subsequently introduced, including acceptance and cognitive defusion, as alternative ways to relate to their internal processes, including self-stigma. Mindfulness practices were introduced to enable participants to come into contact with the present moment, instead of becoming fused with their internal processes and self-stigma. In the last two sessions, the concept of values and committed actions were introduced to facilitate participants to clarify their valued actions and goals, while learning to live with their self-stigma with more psychological flexibility.

Participants were guided by the therapist to practice the skills and internalize the learning of ACT across five weeks together with group sharing. Assignments were given between sessions to strengthen the learning and generalization of skills learned in the sessions. The details of the sessions are as follow:

Session 1: The concept of self-stigma was introduced. Participants were guided to explore the impact of self-stigma, existing coping strategies against self-stigma, and their relationship with self-stigma. Myths of mental illness were also debunked, for example, having mental illness does not mean one is stupid or dangerous.

Session 2: Experiential avoidance and the problems associated with it were introduced. Experiential exercises of “pink elephant” were used to illustrate the concept of thought suppression. Participants were guided to reflect if experiential avoidance is a helpful

strategy in tackling self-stigma. The concepts of acceptance and contact with the present moment were introduced through a mindful breathing exercise.

Session 3: Cognitive defusion and self as context were introduced in this session. Participants were guided to understand how self-stigmatizing thoughts can lead to psychological distress. The therapist guided the participants to explore how to maintain a healthy distance from thoughts by using cognitive defusion exercises, for example, sing the thoughts. Participants were also guided to practice mindfulness in the session.

Session 4: The concept of values was introduced in this session. ACT metaphors (i.e. compass, bus driver) were used to illustrate the importance of values. Participants were guided to clarify their values and the importance of values. Reflective exercises were used for exploration, including tombstone and funeral exercises. Participants were also guided to reflect if their behaviors were aligned with their values.

Session 5: Committed actions were introduced and discussed in this session. Participants were guided to plan their short-term and long-term goals and coping strategies for potential obstacles using worksheets. Participants were guided to come up with steps to better align their behaviors with values.

Measures

Demographics

Demographic information including age, gender, level of education, and self-reported psychiatric diagnosis were collected.

Experience of Self-Stigma

Self-stigma. The Self-Stigma Scale-Short Form (SSS-S) is a 9-item scale developed in Hong Kong to measure self-stigma of minorities, including people with mental illness. It measures affective, behavioral, and cognitive aspects in self-stigma. Higher scores indicate higher levels of self-stigma. The scale showed good reliability and construct validity (Mak &

Cheung, 2010). Its Cronbach's alpha in the present study ranged from 0.87 to 0.91 across the three time points.

Believability of stigmatizing thoughts. Stigmatizing Attitudes - Believability (SAB) is a 10-item scale measuring how much one believes in specific stigmatizing thoughts if they were to occur in the moment (Hayes et al., 2004). Higher scores indicate higher levels of cognitive fusion with stigmatizing thoughts (Luoma et al., 2008). Its Cronbach's alpha ranged from 0.84 to 0.92 in the present study.

Psychological Inflexibility

The Acceptance and Action Questionnaire (AAQ-II) is a 7-item Likert-scale measure that assesses the global level of psychological flexibility, experiential avoidance, and action in the face of emotional barrier (Hayes et al., 2004). Higher scores indicate higher levels of psychological inflexibility and experiential avoidance. Preliminary evidence supported the validity and reliability of the Chinese version of AAQ-II used in the present study (Chang et al., 2017). Its Cronbach's alpha ranged from 0.90 to 0.93 across the three time points in the present study.

Mindfulness

The Five Facet Mindfulness Questionnaire - Short Form (FFMQ-SF) is a 20-item scale that measures everyday mindfulness in five domains: observing, describing, acting with awareness, non-judging, and non-reacting. Participants rate each statement on a 5-point Likert scale, with higher scores indicating higher levels of mindfulness (Hou et al., 2013). In the present study, its Cronbach's alpha ranged from 0.78 to 0.81 across the three time points.

Results

Data Analysis

IBM SPSS Statistics (Version 22.0) and Mplus (Version 7.2) was used for statistical analysis. The means and standard deviations of the participant sample are presented in Table

1. The Pearson's correlation coefficients among the outcome variables at baseline are presented in Table 3.

Linear mixed models were used to examine the effect of conditions on the various outcome and process variables over time, considering the missing data as a result of dropout. Age was controlled in the analysis as between-group difference was observed. Education was not controlled in the analysis, due to the large amount of missing data. Cohen's d was used to calculate the effect size. The adjusted means and standard deviations from the model, and effect sizes can be found in Table 3.

Feasibility and Acceptability

In the ACT group, 33.3% of the participants ($n = 12$) attended all of the group sessions, 30.6% ($n = 11$) of the participants attended four sessions, 19.4% ($n = 7$) attended three sessions, and 16.7% ($n = 6$) of participants attended one session.

In terms of the questionnaire completion, 80.6% ($n = 29$) of the ACT group participants completed the post-intervention questionnaire, and 86% ($n = 31$) completed the one-month follow-up questionnaire. In the control group, 72% ($n = 26$) of the participants completed the post-intervention questionnaire, and 61% ($n = 22$) of the participants completed the follow-up questionnaire. No significant difference was observed in the questionnaire completion between the ACT group and the control group ($t(36) = -1.88, p = .065$). Overall, a majority of participants attended more than half of the intervention sessions and completed all of the questionnaires.

Qualitative feedback from the ACT group showed that some participants found the group helpful in learning a new perspective to understand themselves and their thoughts, and to clarify their values and goals. Some participants reported that being able to share their experiences of public and self-stigma in the group was beneficial to them. Participants also shared that they could apply the defusion techniques outside of the session. Based on the

intervention adherence data and the qualitative feedback from participants, the ACT intervention appeared to have acceptable level of feasibility and acceptability.

Experience of Self-Stigma

Linear mixed model did not suggest significant interaction effect of group over time on self-stigma, $F(2,111.58) = 0.73, p = .484$. The model also did not show significant main effect on time, $F(2,111.58) = 2.60, p = .079$. As such, the intervention group did not differ from the matched control group in self-stigma.

In addition, no significant interaction of condition group and time effect on believability of stigmatizing thoughts was found, $F(2, 105.54) = 0.98, p = .381$. Further analyses indicated a significant main effect of time, $F(2,105.54) = 4.89, p = .009$. In the intervention group, the participants showed reduced believability in stigmatizing thoughts over time, from the pre-intervention assessment ($M = 3.38, SD = 1.23$) to post-intervention assessment ($M = 2.87, SD = 1.28, t(28) = 3.70, p = .001$) and to follow-up assessment ($M = 2.67, SD = 1.30, t(30) = 5.17, p < .001$). In the control group, the participants showed reduced believability in stigmatizing thoughts from the pre-intervention assessment ($M = 3.66, SD = 1.28$) to post-intervention assessment ($M = 3.34, SD = 1.43, t(25) = 2.14, p = .042$). However, the participants did not show a reduction in believability in stigmatizing thoughts at follow-up assessment ($M = 3.12, SD = 1.63, t(21) = 1.32, p = .201$).

In other words, both the intervention and the matched control group showed lowered believability of stigmatizing thoughts at post-intervention assessment, but only the intervention group showed lowered believability of stigmatizing thoughts at follow-up assessment.

Psychological Flexibility

Linear mixed model suggested a significant interaction effect of condition over time on psychological inflexibility, $F(2, 108.35) = 3.71, p = .028$. Post-hoc within-group

comparisons suggested that the ACT group showed significant reduction in psychological inflexibility from pre-intervention assessment ($M = 4.40$, $SD = 1.25$) to post-intervention ($M = 3.53$, $SD = 1.33$, $t(28) = 3.40$, $p = .002$), with a medium effect size ($d = -0.67$). At one-month follow-up, the ACT group also showed significant reduction in psychological inflexibility ($M = 3.85$, $SD = 1.34$, $t(30) = 2.67$, $p = .012$) with a medium effect size ($d = -0.65$). No significant difference in psychological inflexibility was found in the control group, from pre-intervention ($M = 4.44$, $SD = 1.30$) to post-intervention ($M = 4.25$, $SD = 1.49$, $t(25) = 0.96$, $p = .345$) or follow-up assessment ($M = 4.05$, $SD = 1.75$, $t(21) = 0.90$, $p = .377$). In addition, main effect of time was found, $F(2,108.35) = 5.19$, $p = .007$. Post-hoc analysis found that the participants showed reduced psychological inflexibility over time, from the pre-intervention assessment ($M = 4.42$, $SD = 1.27$) to post-intervention assessment ($M = 3.89$, $SD = 1.42$, $t(54) = 3.18$, $p = .002$) and to follow-up assessment ($M = 3.95$, $SD = 1.55$, $t(52) = 2.52$, $p = .015$).

Mindfulness

The linear mixed model also showed a significant interaction of condition over time on mindfulness, $F(2, 109.62) = 3.10$, $p = .049$. Post-hoc within-group comparisons suggested that participants in the ACT group showed significant improvement in mindfulness from pre-intervention assessment ($M = 2.88$, $SD = 0.38$) to post-intervention ($M = 3.13$, $SD = 0.41$, $t(28) = -2.74$, $p = .011$), with medium effect size ($d = 0.63$). Compared with the baseline assessment, the ACT group's improvement in mindfulness at follow-up assessment was significant ($M = 3.06$, $SD = 0.41$, $t(30) = -2.50$, $p = .018$), with a small to medium effect size ($d = 0.46$). In the control group, no significant improvement was found from the pre-intervention assessment ($M = 2.82$, $SD = 0.40$) to post-intervention assessment ($M = 2.87$, $SD = 0.49$, $t(23) = -0.17$, $p = .865$) or at follow-up assessment ($M = 2.95$, $SD = 0.56$, $t(21) = -$

0.40, $p = .694$). The model also did not show a main effect of mindfulness on time, $F(2,109.62) = 1.32, p = .272$.

Mediation Analysis

Exploratory mediation analysis was conducted with Mplus (Version 7.2) to examine the mechanism of change of self-stigma and believability of stigmatizing thoughts among the completer sample. The completer sample comprised 66% of participants ($n = 25$) who attended over half of the group sessions and completed all questionnaires, as well as 65% of participants in the control group ($n = 34$) who completed all questionnaires. No significant difference was found across all demographic variables and pre-intervention outcome variables between the completers and non-completers. The demographic characteristics of the completer sample are presented in Table 1.

In the mediation analysis, the ACT group was dummy coded as “1” and the control group was coded as “0”. Self-stigma and believability of stigmatizing thought at follow-up were entered as outcomes. Psychological inflexibility and mindfulness were entered as mediators. The pre-intervention effects of the mediators and outcome variables were controlled in all models. The mediating effect was examined by the *ab* cross product test, which is the significant effect of the a-path by b-path product term (also the indirect effect). It may be the best available method in testing mediation as it directly tests mediation instead of doing so by inference (MacKinnon et al., 2002).

The exploratory mediation analyses suggested that neither psychological inflexibility nor mindfulness mediated the change in self-stigma (see Table 4). The model fit was adequate with psychological flexibility as the hypothesized mediator ($X^2(2) = 2.74, p = .25, CFI = 0.99, TLI = 0.97, RMSEA = 0.09, SRMR = 0.05$), while the model was fit was inadequate for mindfulness as the hypothesized mediator ($X^2(2) = 2.74, p < .05, CFI = 0.93, TLI = 0.76, RMSEA = 0.24, SRMR = 0.09$).

Similarly, the mediation analyses suggested that neither psychological inflexibility nor mindfulness mediated the change in the believability of stigmatizing thoughts (see Table 4). The model fit was inadequate with psychological flexibility as the hypothesized mediator ($X^2(2) = 16.99, p < .001, CFI = 0.86, TLI = 0.50, RMSEA = 0.39, SRMR = 0.13$), while the model was fit was adequate for mindfulness as the hypothesized mediator ($X^2(2) = 0.23, p = .89, CFI = 1.00, TLI = 1.00, RMSEA = 0.00, SRMR = 0.015$). Results were presented in Table 5.

Discussion

The present study examined the efficacy of ACT group intervention in reducing self-stigma for people with lived experience of mental illness. As the number of past studies is limited and ACT is a growing intervention in the field of self-stigma intervention for people with mental illness, it is critical to pilot and examine whether ACT could potentially benefit people with mental illness who are experiencing self-stigma (Mittal et al., 2012). Since the evidence of existing intervention, namely psychoeducation, CBT, and other multimodal strategies, was also mixed and inconclusive, exploring new intervention modality could potentially provide additional avenues for people with mental illness to reduce their self-stigma (Wood et al., 2016; Tsang et al., 2016; Buchter et al., 2017; Alonso et al., 2019).

Significant interaction effects of group condition over time on psychological flexibility and mindfulness were found. In other words, participants in the ACT group had significantly lower levels of psychological inflexibility and higher levels of mindfulness at post-intervention and follow-up assessment, when compared with the matched control group. However, interaction effect of group condition over time was not found in self-stigma and believability of stigmatizing thoughts. The nonsignificant effects were not consistent with our hypothesis nor with previous studies (Levin et al., 2018; Lillis et al., 2009; Luoma et al., 2008; Skinta et al., 2014). However, it is worth noting that a small to medium effect size in

the reduction of self-stigma and believability of stigmatizing thoughts was observed from baseline assessment to post-assessment and follow-up assessment in the ACT group.

The significant interaction effects of group condition over time found on psychological flexibility and mindfulness in individuals with lived experience with mental illness were consistent with the hypothesis and previous studies, in that ACT has an impact on internal processes and experiences of individuals (Levin et al., 2018; Lillis et al., 2009; Luoma et al., 2008; Skinta et al., 2014). This suggested that participants in the current study were able to use the core processes taught in the ACT group intervention to change their relationship with their internal experiences, reduce their experiential avoidance, become less fused with their thoughts, and become more in contact with the present moment.

Contrary to our hypothesis and previous studies, the current study did not find psychological flexibility or mindfulness to be mediating factors in the change of self-stigma or believability of self-stigma (Levin et al., 2018; Lillis et al., 2009; Luoma et al., 2008; Skinta et al., 2014). This suggested that, while participants were able to use the core processes taught in the ACT intervention to enhance their mindfulness and psychological flexibility in various internal processes, mindfulness and psychological flexibility did not mediate the reductions of self-stigma and self-stigma believability. Given the relatively short duration of the intervention, it is possible that participants needed a longer time to practice for the skills to have an impact on their experience of self-stigma. Participants might be able to use the skills in other areas of their life but might not in changing self-stigmatizing internal processes yet. In addition, self-stigma might have formed over many years from their lived experiences of stigma in the society, thus a longer time may be needed to change their relationship with self-stigma. It would be helpful to adjust the intervention length in future practice and research so that participants have sufficient time to consolidate the learning.

The nonsignificant interaction effects might also be contributed by the poor adherence of homework assignments. Past studies showed that mindfulness practice time was significantly related to the clinical and wellbeing outcomes (Carmody & Baer, 2008). Some participants verbally reported to the therapist that they did not practice mindfulness or skills taught outside of sessions. The effects of ACT may possibly be attenuated by the lack of practice. Hence, even though their mindfulness and psychological flexibility were improved, more practice might be needed to generate change in self-stigma and believability of stigma.

Last but not the least, this study recruited people with different diagnoses of mental illness instead of people with the same diagnosis. Although people with mental illness in the present study showed no significant differences in their levels of self-stigma and believability of stigmatizing thoughts at baseline, given they have different diagnoses, they may possibly have different stigmatizing beliefs (e.g., “I am violent” for people with schizophrenia and “I am weak” for people with depression). This wide range of experiences of mental illness might affect the group dynamics. The lack of specificity for different diagnoses may also impact how participants learn and apply the intervention content. Future research needs to address what intervention works best for people with different mental disorders which echoes with what was recommended by a review paper (Yanos et al., 2015).

Since ACT is originated in the Western culture, further adjustment might be needed to cater to the needs of participants from the Asian culture. A systematic review showed that cultural factors and values may play significant roles in self-stigma in the Pacific Rim Region. In particular, evidence demonstrated that face concern was strongly related to self-stigma and manifestation of self-stigma was influenced by the role of family and social status (Ran et al., 2021). Adaptations of ACT might be needed in future research so that the content can address the cultural factors of the local context to maximize the effectiveness of the intervention.

Limitations

This study has several limitations. First, non-randomized control was used due to difficulty in logistics. Although the two groups were matched on outcome measures at pre-intervention, the lack of a randomization made it difficult to attribute the improvement or non-improvement in outcomes solely to the intervention. The small sample size also limited the power of the study to detect changes in self-stigma and believability of stigmatizing thoughts in the present study despite medium effect sizes being shown. In future studies, a randomized controlled trial with larger sample size is recommended to better shed light on the effect of ACT intervention on self-stigma.

Another limitation is that there was only one instructor in this study and we could not rule out the instructor effect. Future studies can include additional instructors so that we could be more certain about the effect of the intervention per se. Furthermore, the current study did not measure the intervention fidelity, homework and intervention adherence, and intervention satisfaction. Structured diagnostic interview was not used to confirm the diagnosis self-reported by the participants and data on mental health service utilization were not collected. These may be potential confounding variables that affect intervention efficacy. Future studies should consider measuring these variables to understand the effects of dosage and acceptability of the intervention.

During the intervention development and research planning, mainly clinical psychologists were involved with little involvement of service users. The authors were mindful of how their positionality would affect the research in terms of intervention design and choice of measurement. Future studies should consider involving people with mental illness in all stages of research to bridge the gap between researchers and intervention recipients.

Conclusions

Overall, this study provides preliminary evidence for the use of ACT in enhancing mindfulness and psychological flexibility for individuals with mental illness. Nevertheless, a more rigorous research design is needed to examine if ACT can affect change on stigmatizing thought processes and self-stigma.

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