THE EFFECT OF SINGLE-SESSION EXPRESSIVE ART THERAPY ON ALLEVIATING PSYCHOLOGICAL DISTRESS AND PROMOTING WELLBEING IN SUBCLINICAL YOUNG ADULTS: A RANDOMISED CONTROLLED TRIAL

BY

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Abstract

Objectives: This study investigated the efficacy of single-session expressive art therapy in reducing symptoms of psychological distress in the form of depression, anxiety and stress, and improving psychological wellbeing in subclinical populations, as well as the role of autonomy in moderating such treatment effect. **Methods:** Subjects were 60 university students or graduates aged 18-30, with high stress and possessing moderate proficiency in Cantonese listening and English reading. Half underwent a session of expressive art therapy as the treatment while the other half were assigned to waitlist-control and required to sit for a comparable amount of time. All filled out the Depression Anxiety Stress Scales short version(Lovibond & Lovibond, 1995) and the World Health Organization Well-Being Index(World Health Organization, 1998) at baseline, post-intervention and two-week follow-up timepoints, and the Autonomy–Connectedness Scale (Bekker & van Assen, 2006) only at baseline. **Results:** Results indicated that the treatment arm significantly improved in both psychological distress and wellbeing, compared to waitlist-control. No moderation effect of autonomy was detected. **Conclusion:** Single-session expressive art therapy showed some prospect as a secondary prevention strategy in addressing mental health issues in subclinical populations.

Keywords: Single-session, Expressive Art Therapy, Mental Health, Wellbeing, Subclinical Population, Autonomy

Declaration form

Thesis Submission Declaration Form

THE EDUCATION UNIVERSITY OF HONG KONG
Department of Psychology

Thesis Submission Declaration Form

Student Name: Chan Wing Yu

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Title of Thesis: The Effect of Single-Session Expressive Art Therapy on Alleviating Psychological Distress and Promoting Wellbeing in Subclinical Young Adults: A Randomised Controlled Trial

Course: PSY4075 Scientific Study in Psychology II: Honours Project

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1 Introduction

Depressive disorders are one of the most common mental disorders globally, with an estimated prevalence rate of around 3.8%. In Hong Kong, a local study reported that 13.2% to 18.1% of citizens suffered from major depressive disorder during the time period between May 2019 and June 2022 (Wong et al., 2023). This high prevalence is coupled with social stigma and limited public psychiatric resources for mental disorders, making mental difficulties an even more stressful problem for these populations. As a result, it is approximated that up to 74% of local people suffering from mental health issues refrain from seeking professional help (Lam et al., 2015), and those who seek psychiatric help in hospitals could wait up to almost 2 years (Hospital Authority, 2025). For a majority of the general public, they would even be unaware of mental health services outside of hospital care (Mind Hong Kong, 2018).

In view of the inaccessibility of long-term care in formal mental health institutions and the stigmatisation of many conventional mental health services, it may be conducive to take advantage of non-traditional approaches that can also yield similar benefits. One such example is expressive art therapy.

1.1 Expressive art therapy

Expressive art therapy is defined by the American Art Therapy Association as “an integrative mental health and human services profession that brings meaning to the life of people through active art-making, creative process, applied psychological theory, and human experience within a psychotherapeutic relationship” (Smriti et al., 2022).

Rubin (2011), a practitioner with 50 years of experience, provided an integrative view of expressive art therapy in her book. Expressive art therapy has some roots in the psychodynamic

approach where psychopathology is conceptualised as mental conflicts. The role of the practitioner is to understand the cognitive and affective aspects of clients' art behaviours represented in both the process and the product of art making, as well as interpreting the contextual meanings of symptoms manifested by existing psychic conflicts. Even though its definition has become broader or ambiguous at times through its development, expressive art therapy remains to separate oneself from merely art making with its distinctive therapeutic element. Rubin explicated it in nine phases: 1) testing 2) trusting 3) risking 4) communicating 5) facing 6) understanding 7) accepting 8) coping 9) separating. Expressive art therapy entails a therapeutic relationship, assessment processes and therapeutic techniques, which are core parts of any form of psychotherapy, and is designed to address issues relating but not limited to personality and functioning.

Contrary to traditional psychodynamic approaches, the mechanism by which expressive art therapy help individuals is not limited to gaining insight to intrapsychic conflicts but also assimilating some humanistic characteristics, for instance the belief that people have an inherent tendency towards growth. It offers a "framework for freedom", where clients can safely explore and experiment with a genuine way of creating and "let go, express strong feelings with free movements, and remain in control of impulses that turn out neither to be as destructive nor as disorganising as anticipated" (Rubin, 2011), in a therapeutic environment that stresses vital values including respect, interest, unconditional positive regard and empathy. This allows clients to not only gain better awareness of their unconscious or repressed thoughts and emotions but also achieve congruence through facilitating symbolic self-expression that sits between boundaries of reality and fantasy, permitting them to grow. Its sensory nature also uniquely

strengthens sensory integration and regulation, which may positively impact the processing and regulation of emotions and impulses (Czamanski-Cohen & Weihs, 2023).

Other than completely spontaneous art making, some techniques of expressive art therapy may include doodling, drawing a dream, setting a specific theme or medium and using props. In the assessment process, apart from talking about the artwork, the practitioner may also initiate interviews with the client, pay attention to the client's verbal and nonverbal responses, and observe and interpret the form of the product as well as its projected images and latent content (Rubin, 2011).

1.2 Expressive art therapy and mental health

Compared to various types of commonly-used psychotherapy, expressive art therapy has some distinct features offering unique advantages to people with mental health struggles. Firstly, expressive art therapy may be useful in addressing the barrier to mental health care due to stigmatisation and self-stigmatisation because of its experiential and nonverbal nature (Schouten et al., 2014). Secondly, the artistic expression aspect in expressive art therapy provides additional gain other than core improvements in psychopathology. These include increase in positive affect, learning of a new coping strategy, development of positive self-image (Slayton et al., 2010); socio-emotional skills and functioning, as well as wellbeing (Karkou et al., 2022). Last but not least, expressive art therapy can bring in better engagement and treatment outcomes in artistic people since it draws on their strengths, as well as promoting self-efficacy and quality of life in the process.

Expressive art therapy has shown some effectiveness in reducing symptoms in people with a moderate to severe depression diagnosis (Blomdahl et al., 2018) and comorbid post-traumatic stress disorder (Ugurlu et al., 2016), with additional efficacy when used adjuvant to

medication (Ciasca et al., 2018). Apart from alleviating psychopathology in individuals with existing clinical diagnoses, expressive art therapy has great potential in preventing psychopathology in subclinical populations, as well as actively promoting wellbeing. A review by Beerse and colleagues (2020) indicated that expressive art therapy has established efficacy in improving subclinical anxiety and stress. Another randomised controlled study revealed significant increases in health-related quality of life, and wellbeing and psychosocial functioning of primary school-aged children following expressive art therapy interventions (Moula et al., 2020).

1.2.1 Cultural consideration

As in the insight from a review from Ho (2020), specifically on the context of Hong Kong, the interdependent self-construal leads to controlled emotional expression, expressive art therapy's less verbal nature, yet supporting expression and communication facilitated by the art process and product, can be conducive to better self-awareness and emotion regulation. There is also consistent evidence in other non-Western ethnic groups or cultures, for example the effectiveness of expressive art therapy in addressing mental health problems and trauma in Black people (Harris & Marcelo, 2021) and refugees (Knettel et al., 2023) where stigma is high, coupled with emotion expression and individualistic values often discouraged.

There have been very limited studies conducted on the efficacy of expressive art therapy in Chinese populations. However, one study by Li and Peng (2022) inquiring its effectiveness in increasing resilience in Chinese university students found significant improvements in the self-efficacy, self-acceptance and problem-solving. It also has some clinical significance in populations with chronic medical and comorbid mental health concerns. A study focusing on Chinese older adults having mild cognitive impairment showed promising effectiveness in

alleviating anxiety and depression, while also heightening psychosocial quality of life (Yan et al., 2021). Another research reported significant reduction in depression and anxiety in Chinese patients with chronic obstructive pulmonary disease and pre-existing depressive symptoms (Zuo et al., 2022).

1.3 Single-session intervention

As discussed above, the less stigma of expressive art therapy could make it more approachable for people, especially in cultures stressing interdependence like the Chinese population, to participate in, hence rendering it a considerably feasible yet efficacious answer. On the other hand, the urgent need of more flexible therapeutic approaches should be considered. To battle the long waiting time before admission – partly attributed to the rather long-term commitment necessary in traditional psychotherapy – as well as the time limitations of many metropolitan inhabitants, some new research on single-session interventions has arisen to investigate its efficacy as an immediate way of dealing with mental health problems. Indeed, there has been some success in single-session therapy in psychopathology. Systematic reviews conducted by Bertuzzi et al. (2021) and Kim et al. (2023) revealed that single-session interventions offered significant improvement in depression and anxiety, two of the most common psychiatric disorders.

1.4 Subclinical population

Owing to the unprecedented prevalence of subclinical mental health concerns, coupled with the very limited psychiatric resources that barely have sufficient capacity to address clinical psychopathology, it is crucial to invest in primary and secondary prevention to enhance mental health from a humanitarian perspective, as well as relieving the pressure on the public health sector from an economic standpoint. Primary and secondary prevention refer to strategies to

prevent a problem from occurring at all, and eliminate or reduce the impact of the problem before it reaches the threshold – which in this case a formal clinical diagnosis – respectively. As discussed previously, expressive art therapy is an effective form of psychotherapy that helps with symptoms and wellbeing, which may also reduce stigma, thus rendering it an appropriate option for addressing subclinical mental health problems without triggering avoidance or defensiveness in receiving treatment.

1.5 Research gap

Despite the proven effectiveness of expressive art therapy, as well as a rising trend in single-session psychotherapy, the combination of both in a single study has not emerged from the review of current literature. Also, there has not been any research aimed at studying the effect of expressive art therapy specifically in subclinical population in the context of mental health.

1.6 Present study

The attempt in studying single-session was opted for in the research design in hopes of reflecting the need of cost-effectiveness and inquiring into the possibility of significant improvement in one session. In view of the feasibility of expressive art therapy and the research gap in its single-session application, the primary aim of this study was to determine whether single-session expressive art therapy could serve as a viable option for subclinical populations.

1.6.1 Psychological distress

According to the American Psychological Association (2018), psychological distress is "a set of painful mental and physical symptoms that are associated with normal fluctuations of mood in most people". Psychological distress is the antecedent of clinical problems, most commonly major depressive disorder and anxiety disorder. Therefore, in the investigation of

mental health in individuals with subclinical psychological conditions, one of the parameters was psychological distress.

1.6.2 Wellbeing

Wellbeing is defined by the American Psychological Association (2018) as "a state of happiness and contentment, with low levels of distress, overall good physical and mental health and outlook, or good quality of life". It is recognised that wellbeing is as equally important as addressing manifestations of mental illnesses (Cloninger, 2006). The current study aimed to investigate whether there is any positive impact of expressive art therapy on an individual's psychological health apart from prevention of psychological distress or psychopathology. Thus, wellbeing will be co-investigated with psychological distress as a second indicator of mental health.

1.6.3 Autonomy

Moreover, this study aspired to discover factors that influence the efficacy of expressive art therapy. The American Psychological Association (2018) states that autonomy is "the experience of acting from choice, rather than feeling pressured to act" hypothesised in the self-determination theory (Ryan & Deci, 2000, as cited in American Psychological Association, 2018). It is recognised that sense of autonomy is a determining factor in the efficacy of psychotherapy in general (Ryan & Deci, 2008; Dwyer et al., 2011). From a multicultural perspective, autonomy support from practitioners fosters understanding and empowers clients to be feel more enabled, which are seen as essential to culturally responsive psychotherapy outcomes (Ryan & Lynch, 2011). It was assumed that autonomy has some predictive power in the effectiveness of expressive art therapy.

Furthermore, research published by Weinstein and Hodgins (2009) demonstrated evidence that autonomy has a moderating effect on the effectiveness of expressive writing on improving wellbeing, anxiety symptoms and vitality. Between participants who were dispositionally more autonomous and more controlled, and who were "primed for autonomy" and who were "primed with control", higher dispositional and state autonomy brought about more improvement. Currently, there is no previous research done on the moderating role of autonomy on the efficacy of expressive art therapy. While considering expressive writing's and expressive art's similar nature, the current study's second objective thus was to answer this research gap, examining the moderating role of autonomy in expressive art therapy. Due to the difficulty of manipulating autonomy support, trait autonomy was measured instead of its state counterpart. However, given the comparable results of primed autonomy and high dispositional trait autonomy in the stated literature and their positive correlation (Zuroff et al., 2012), it may be assumed that, if higher trait autonomy predicts treatment outcomes, greater autonomy support also has similar effects.

1.6.4 Colour Inkblot Therapeutic Storytelling

Colour Inkblot Therapeutic Storytelling (CITS) proposed by Sakaki (1995) was inspired by the use of Rorschach inkblots as a psychological assessment material and his experience working with Japanese adolescents who were less adept in or uncomfortable with verbal communication. There was also a cultural concern of repression of emotion expression and communicating personal problems (consistent with prior discussion), leading to difficulties reponding to the free association stage of the Rorschach test. It was found to be less challenging for these adolescents to express themselves when resproducing the presented Rorschach inkblots. The evolvement of CITS was considered to bring out more accurate understanding and

assessment, as well as greater treatment outcomes. CITS works by increasing engagement with the psychodynamic material that fosters a sense of control, while a safe space for self-expression is created by the projection technique which allows indirect ways of relating to one's problems to distance stigma and reduce defensiveness. This instrument was adopted due to its explicit protocol, and alignment with the cultural considerations regarding stigma and complication of emotion expression in Chinese cultures as discussed in prior sections.

To conclude, the present study sought to explore the prospect of single-session expressive art therapy as a possible means to achieve psychological health in subclinical populations and dispositional autonomy as a moderator of its efficacy. This study hypothesised 1) single-session expressive art therapy to be effective in enhancing psychological health and that 2) higher trait autonomy would increase its effectiveness.

2 Methodology

2.1 Trial design

This trial employed a two-factor (group x time) mixed design. The minimum sample size of 42 was determined using G*Power 3 (Faul et al., 2007) assuming 1) main effect's effect size at 0.20, which was determined with reference to the lower bound of effect sizes available in existing research studying single-session interventions and mental health (Pang et al., 2022; Schleider &Weisz, 2017) 2) correlation among repeated measures at 0.5, a conservative estimation with no available existing findings, with a targeted *p*-value of .05 and power of .80. A parallel balanced-arm design was used to allow for a waitlist-control group to be compared with the treatment group, aiming to account for repeated testing and possible social support perceived during treatment. Three timepoints – baseline, post-intervention, and two-week follow-up – were used as a guide to the treatment's immediate and residual effects. Block randomisation (12:12 x3, computer software) was used to determine group assignment. In case of dropouts, initially assigned participants were replaced with new recruits. Recruitment, allocation and data collection were to be terminated in mid-February, even if the sample size was not met. No allocation concealment was applied.

2.2 Participants

The participants of the current experiment were university students or graduates of age ranging from 18 to 30, who possessed moderate English reading ability and Cantonese listening ability, with high stress. The registration form contained a question asking participants to rate the level of stress experienced in the past week on a scale of 1 to 10, and self-reported score of 4 or above were identified as high stress.

2.3 Measures

2.3.1 Psychological distress

Owing to the correlations within stress, depression, and anxiety (Ross et al., 2017) and them being some of most prevalent mental health concerns, these three comprised the assessment of psychological distress, measured using the Depression Anxiety Stress Scales short version (DASS-21) (Lovibond & Lovibond, 1995). The self-report scale contained 21 statements rated on a scale of 0 to 3, where 0 indicated "did not apply to me at all" and 3 "applied to me very much, or most of the time". The original English version was used, with a Cronbach's alpha of .90, .86 and .88, respectively, for each subscale in a previous literature conducted on Hong Kong university students (Li et al., 2021). Given the nature of single-session interventions, the baseline and post- questionnaire were adapted in simple present tense rather than simple past tense to better represent the "state" psychological distress. Sample questions for subscales "stress", "depression" and "anxiety" included "I find it hard to wind down", "I can't seem to experience any positive feeling at all", and "I experience breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)", respectively. Sums of scores were obtained for each subscale.

2.3.2 Wellbeing

Wellbeing was measured with the World Health Organization Well-Being Index (WHO-5) (World Health Organization, 1998). It contained five statements, for instance "I have felt cheerful in good spirits" rated on a six-point scale from "at no time" to "all of the time". The English version was administered, with a Cronbach's alpha at .93 in a previous Hong Kong validation literature (Chan et al., 2022). Similar to DASS-21, its baseline and post- versions were

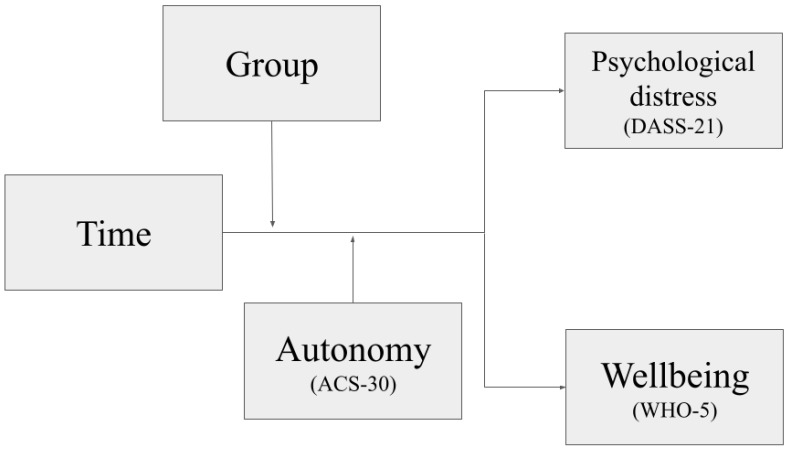
altered, with 0 representing “not at all”, and 6 representing “extremely”, as well as the statements being presented in simple present tense. The sum of scores were used in analyses.

2.3.3 Autonomy

Autonomy was measured using the Autonomy–Connectedness Scale (ACS–30) (Bekker & van Assen, 2006) – a 5-point scale with 1 as “disagree”, 3 as “disagree slightly and agree slightly”, and 5 as “agree”. It was selected with the consideration of it designed to reflect more of a continuum of autonomy and control, which are simultaneously displayed in Chinese cultures (Kagitcibasi, 2005). Its original English language was used. Without validation in Chinese cultures, the available Cronbach’s alphas available were .81, .82, and .83 in its development study (Bekker & van Assen, 2006); .76, .75, and .70 in an immigrant sample from a collectivistic country of origin (Bekker et al., 2011); .83, .74, and .76 in a Portuguese population, which is a collectivist culture similar to Chinese (Moleiro et al., 2017). There was also previous literature using this scale in a study in relation to anxiety disorders (Mass et al., 2019). The scale consisted of 30 questions, samples of which were “I am rarely occupied with other people’s view of me”, “I often long for love and warmth” and “I quickly feel at ease in new situations”. The negatively stated questions were reverse scored, and sums of scores were compiled for each subscale.

Figure 1

Conceptual Model



2.4 Procedures

Participants were recruited using convenience sampling. The recruitment process consisted of social media and university email promotion. Recruited individuals were screened according to the inclusion criteria and randomly assigned to either treatment condition or waitlist-control condition. After the signing of informed consent, subjects from each condition participated in one of the 6 groups, each consisting of 3-8 individuals in a conference room with basic tables and chairs. The time allowed for the session was roughly 60-90 minutes, depending on individual therapy pace. This time range was derived with reference to several single-session expressive art intervention studies or studies including participants attending one session in final analysis (Chapman et al., 2001; Crawford et al., 2012; Hass-Cohen et al., 2018; Isis et al., 2023; Lefèvre et al., 2015; Sandmire et al., 2012; Schwartzberg et al., 2021). They all filled out the ACS-30, DASS-21 and WHO-5 before the group session, and the latter two again immediately after and two weeks after the session. The whole process of the experiment lasted for around 70-100 minutes.

2.4.1 Treatment group

The treatment adopted only the first six steps of the CITS (Sakaki, 1995) procedure, due to the need of a qualified specialist for the remaining steps. The six steps included 1. client chooses the colours and makes an inkblot; 2. client covers the inkblot with white paper; 3. client projects a fixed image; 4. client draws the projection; 5. client tells a story; 6. client titles the story (Sakaki et al., 2007). The dominant language used was Cantonese, supplemented with Mandarin or English as per participants' needs.

The first phase (steps 1-4) was done individually for 30-40 minutes. Participants were given a set of six colour inks, then asked to drop ink onto a sheet of A4 white paper and fold the paper in half, repeated as many times as desired. Next, they were prompted by the experimenter to imagine what they see from the inkblot. This was followed by drawing a picture of the inkblot using corresponding colour pencils, and modifying it according to their projection using colour pencils of the same six colours.

During the second phase (10-20 minutes), the experimenter swapped inkblots among group attendees and each participant independently (without looking at the drawing of the inkblot's creator) projected an image and drew on a new piece of paper to facilitate more interaction and engagement. Afterwards, they took turns to share a story or personal experience that explained the scene of their projection within small focus groups composed of the participants who swapped their inkblots. This was to allow for more interpersonal connection and stimulate cognitive frameworks because of the different projections from different participants, increasing awareness of psychological flexibility or even challenge the narratives of represented mental challenges, aiming to promote positive interpersonal functioning and de-fusion.

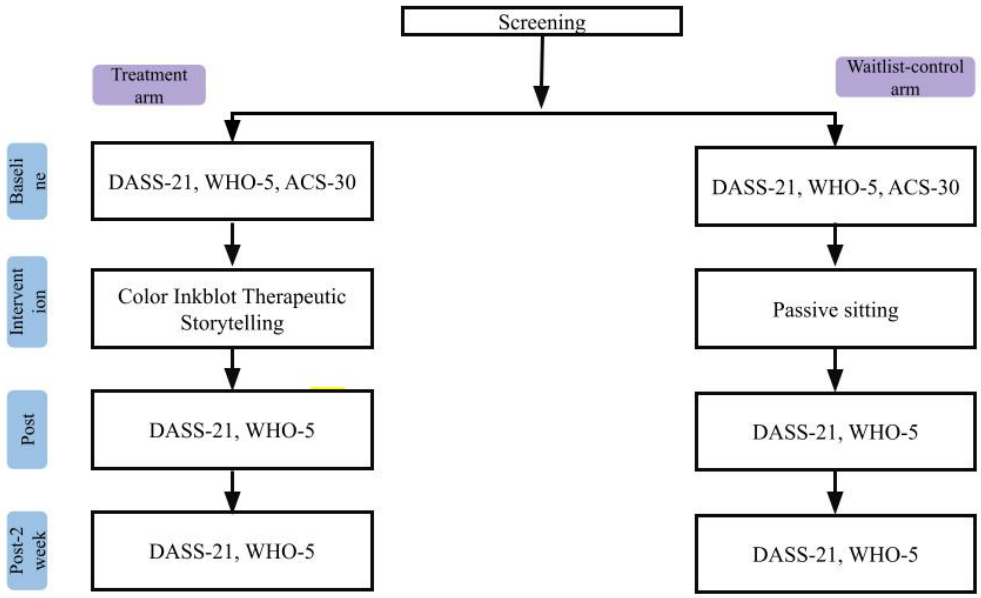
The third phase (steps 5-6) involved sharing with all attendees, during which the experimenter might apply empathic communication (e.g. validating the experience, explaining how participants' stories resonate with them) and questioning skills, as well as encouraging other group members' feedback. Participants then summarised the story with a title if possible. This took 20-30 minutes. Towards the end of the experiment, participants attended an informal debriefing session by the experimenter explaining the rationale for the experiment and the psychology behind the employed expressive art therapy technique, and completed the post-test.

2.4.2 Waitlist-control group

Waitlist-condition participants were required to sit with other group attendees, when social interaction was allowed (Sandmire et al., 2012) and the use of social media or entertainment platforms was prohibited.

Figure 2

Procedures Flowchart



2.5 Data analysis

All assessments of DASS-21, WHO-5 and ACS-30 were first scored accordingly and imputed into a data frame. DASS-21 scores were also transformed into classifications – normal (0-4, 0-3, 0-7); mild (5-6, 4-5, 8-9); moderate (7-10, 6-7, 10-12); severe (11-13, 8-9, 13-16); extremely severe (>14, >10, >17) – for DASS-depression, DASS-anxiety, DASS-stress, and treated as categorical data (represented by numbers 0-4). All statistical analyses were performed using R statistical software (v4.4.2; R Core Team, 2024). For all the tests, a *p*-value less than .05 was set as the level of significance.

2.5.1 Baseline

Participants' demographic data and baseline characteristics were compared using Welch's t-test and Pearson's Chi-square test of independence.

2.5.2 Treatment efficacy

In the investigation of treatment efficacy, primary analysis involved using a series of mixed repeated measures Analysis of Covariance (ANCOVA), comparing the two arms' complete DASS-21 and WHO-5 scale scores at post-intervention timepoint after centering their baselines. Secondary analyses were carried out regarding the three subscales of DASS-21 to speculate the main effect of condition on distinct constructs of depression, anxiety and stress. Effect sizes will be computed and reported as Eta-squares. Their resulting classifications were further analysed by performing Analysis of Variance (ANOVA) on hierarchical ordinal logistic regressions (null model: baseline classifications; alternative model: group); effect sizes identified by Nagelkerke *R*-squared.

Additionally, treatment long-term effects were evaluated as a secondary outcome. Given the considerably short data collection period, the natural time-related fluctuation of mood (not

attributed to the interventions) was not balanced out between subjects, if not even worsen from baseline to follow-up due to the trial starting at the beginning of an academic semester with progressively more stress expected throughout the semester. Therefore, only between-subject main effect was of the study's interest. The two-week follow-up data of DASS-21, WHO-5 and DASS-21 subscales and their classifications were compared using Welch's t-test and simple ordinal logistic regression to assess whether there were significant differences between arms; effect sizes identified by Cohen's *d* and Nagelkerke *R*-square. Any missing data was handled by Multivariate Imputation by Chained Equations (MICE) (van Buuren & Groothuis-Oudshoorn, 2011) and intention-to-treat (ITT) analyses would be done by fitting the means of multiple imputations into the corresponding missings.

2.5.3 Moderation effect

In the inspection of autonomy as a moderating factor in the prescribed therapy, hierarchical regression analyses (null model: baseline assessments; alternative model: autonomy) were executed to predict post assessments in treatment arm cases. Linear regressions and ordinal logistic regressions were used for continuous and ordinal variables respectively.

2.5.4 Qualitative evaluation

Participants from the treatment arm were invited to complete an optional brief qualitive evaluation on their experience. They were provided with four guiding questions: 1) "what were some positive changes in your mood, thinking and intrapersonal or interpersonal functioning after participating in the session?" 2) "what do you think were the contributing factors of those positive changes?" 3) "what was your overall impression on different elements of the session (e.g. the atmosphere, the content or technique used, the guidance and support from the

instructor)?" 4) "any suggestions of improvement?". Thematic analysis was performed on the collected responses.

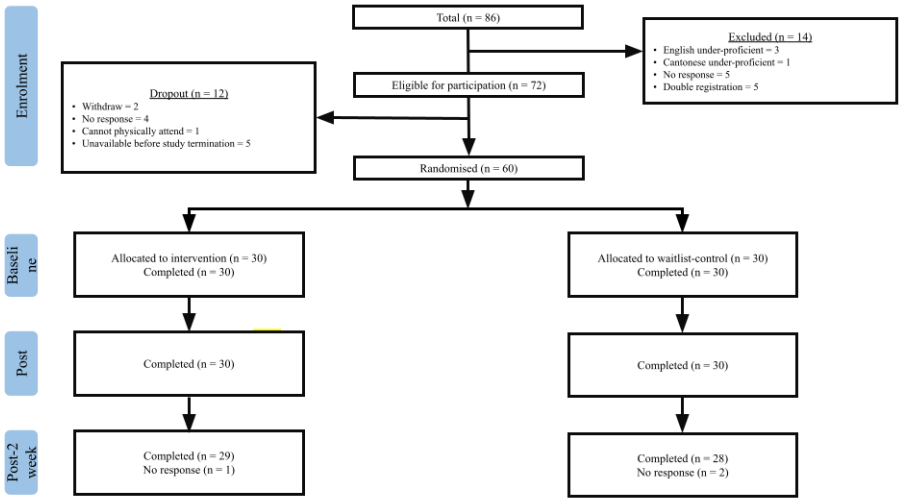
3 Results

3.1 Descriptive statistics

Between 13 December 2024 and 16 February 2025, 86 individuals registered for study participation (Figure 1). 72 were eligible, with English under-proficiency ($N = 3$, 21.4%), Cantonese under-proficiency ($N = 1$, 7.1%), no response ($N = 5$, 35.7%) and double registration ($N = 5$, 35.7%) as reasons for exclusion. 60 were randomised before study termination, in which withdrawal ($N = 2$, 16.7%), no response ($N = 4$, 33.3%), inability to attend physically ($N = 1$, 8.3%) and unavailability prior to study termination ($N = 5$, 41.7%) contributed to a total dropout rate of 16.7%. All 60 randomised participants, which included 30 in each arm, successfully completed baseline and post assessments during the group session. A total of 3 participants withdrew during the 2-week follow-up timepoint. Follow-up rate for treatment and waitlist-control arm was 96.7% ($N = 29$) and 93.3% ($N = 28$) respectively; this did not differ significantly by arm, $X^2(1) = 0.35$, $p = .554$.

Figure 3

Participant Progress Flowchart



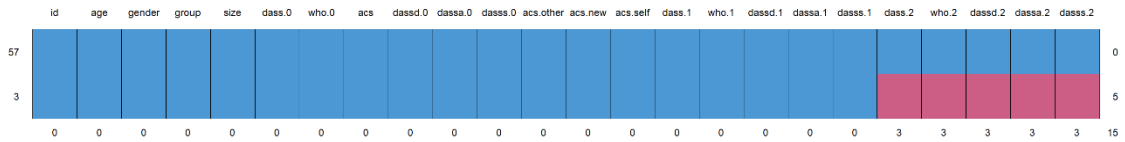
Prior to the end of study termination, all 60 randomised participants successfully participated in a group session. 12 groups with an average size of 5.4 (*SD* = 1.40) were formed in total. The intervention arm had an average group size of 5.47 (*SD* = 1.55; minimum = 3, maximum = 7); while the waitlist-control arm had the average at 5.33 (*SD* = 1.27; minimum = 3, maximum = 7). The group size between arms were not significantly different, $t(58) = -0.36$, $p = .717$. In the treatment arm, each participant completed an inkblot and a drawing of their projection on it ($N = 30$). A total of 36 drawings were produced based on projections of their peers' inkblot. Samples can be found in the Appendix (Supplementary Figures 1-3).

3.2 Missing data

All items from baseline and post-intervention timepoints were complete (Figure 4). Items from 2-week follow-up timepoints were missing in the three participants who dropped out. All baseline demographic characteristics and assessment results were inputted as predictors in a logistic regression model predicting response at 2-week follow-up. None of the baseline demographic and clinical characteristics were identified as predictive of loss to follow-up ($Z = 0.00$, $p = 1.000$).

Figure 4

Missing Data Pattern



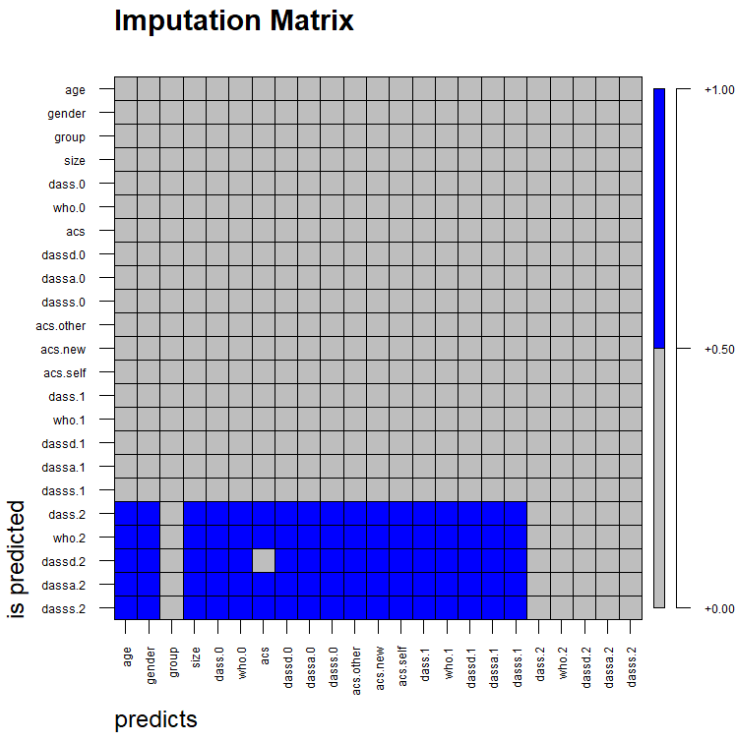
Note. 0, 1 and 2 referred to the assessments recorded at baseline, post and follow-up timepoints respectively. Only raw data, but recoded data, were included.

Sets of follow-up data from 3 participants were manually removed because they displayed clear signs of not being completed in an earnest manner, with 0 as response in all questions, which greatly deviated from their previous response and were extreme outliers. As a result, complete sets of data from 54 participants were inputted in their original form, and the rest was imputed using MICE. During the imputation process, a predictor matrix was developed from all demographic data and assessment results (including scale global scores and subscale scores) from all three timepoints following two principles: 1) their association with the missing data to be imputed were at least $r = .05$ 2) the minimum proportion of usable cases within each predictor were set to be 0.05.

Initially, a mean of 17.8 predictors were applied to impute each variable with missing data. To avoid overlooking nuanced differences in 2-week follow-up data between arms, imputations were generated separately for the treatment arm and the waitlist-control arm. Figure 5 visualised the final imputation matrix employed. The number of imputed data sets and MICE iterations both set at 50 (Supplementary figure 4).

Figure 5

Imputation Matrix



Note. "group" and "size" represented trial arm and the size (total number of participants) of the group session each participant attended.

3.3 Baseline descriptive outcomes

Participants had an average age of 21.4, with 88.3% (N = 53) being female. The average scores for baseline DASS-21, DASS-D, DASS-A, DASS-S, WHO-5, in all cases were 42.3 (SD = 21.13), 11.0 (SD = 8.09), 13.4 (SD = 7.85), 17.9 (SD = 8.93) and 55.6 (SD = 15.28). The average ACS-30, ACS-others, ACS-new and ACS-self scores were 97.5 (SD = 7.46), 59.3 (SD = 8.45), 17.7 (SD = 3.30) and 20.8 (SD = 4.60).

Table 1 presented the demographic variables and average score of each baseline assessment for treatment and waitlist-control conditions separately, together with their significance levels. Differences in all demographic characteristics and baseline assessments were

insignificant (all $p > .05$) between the two arms, indicating there was no pre-existing difference before the intervention. Figure 6 visualised the proportion of DASS-21 classifications across arms.

Table 1

Demographics and Baseline Clinical Characteristics

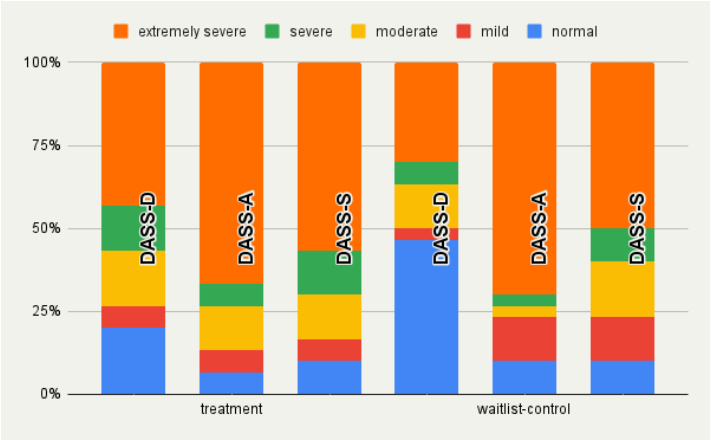
	Treatment (*N*=30)	Waitlist-control (*N*=30)	*t* / X^2 statistic	*p*-value (two-sided)
Age	21.3 (2.46, [18, 28])	21.6 (2.39, [18, 29])	*t*(58) = 0.53	.597
Gender (female:male)	29:1	24:6	$X^2(1)$ = 2.59	.108
DASS-21 score	44.0 (18.8, [16, 76])	40.6 (23.4, [2, 80])	*t*(58) = -0.62	.538
DASS-D score	12.7 (7.38, [2, 30])	9.27 (8.53, [0, 28])	*t*(58) = -1.65	.104
DASS-D classification	3.0	1.5	$X^2(4)$ = 5.04	.283
DASS-A score	13.3 (7.71, [2, 28])	13.5 (8.11, [2, 28])	*t*(58) = 0.10	.922
DASS-A classification	4.0	4.0	$X^2(4)$ = 3.02	.554
DASS-S score	18.0 (8.24, [4, 40])	17.8 (9.72, [0, 36])	*t*(58) = -0.09	.932
DASS-S classification	4.0	3.5	$X^2(4)$ = 1.05	.903
WHO-5 score	52.9 (13.56, [28, 84])	58.27 (16.63, [12, 80])	*t*(58) = 1.36	.179
ACS-30 score	97.9 (7.41, [82, 114])	97.6 (7.63, [84, 122])	*t*(58) = -0.16	.878

ACS-others score	59.7 (8.84, [36, 75])	58.9 (8.18, [46, 79])	$t(58) = -0.38$	.706
ACS-new score	17.6 (2.90, [12, 22])	17.8 (3.70, [11, 24])	$t(58) = 0.23$	.817
ACS-self score	20.6 (4.98, [10, 31])	20.9 (4.26, [11, 28])	$t(58) = 0.28$	.782

Note 1. Mean (standard deviation, [minimum, maximum]) for each continuous measurement was given
Note 2. Proportion for gender measurement was given
Note 3. Median for each ordinal measurement was given
Note 4. #.1 > p > .05, *p < .05, **p < .01, ***p < .005

Figure 6

DASS-21 Classification Baseline Composition



3.4 Main treatment efficacy outcomes

Results showed the post-intervention DASS-21, DASS-D, DASS-S and WHO-5 scores for all cases clustered around means of 32.4 (*SD* = 27.2), 8.73 (*SD* = 9.37), 10.5 (*SD* = 9.53), 13.1 (*SD* = 10.9) and 15.1 (*SD* = 4.98).

Table 2 displayed the post assessment means and standard deviations for treatment and waitlist-control arms distinctly, together with results of tests of significance and effect sizes on the right. There was significant difference in the change in DASS-21 global score between arms,

$F(1, 57) = 15.92$, $p < .001$, where it dropped a mean of -17.9 points (95% CI [-23.42, -12.31]) in the treatment arm and -1.93 points (95% CI [-7.85, 3.9845]) in the waitlist-control arm from baseline to post timepoint. Such significant change was also observed when DASS-21 was broken down to DASS-D ($F(1, 57) = 20.02$, $p < .001$), DASS-A ($F(1, 57) = 6.74$, $p = .012$) and DASS-S subscale scores ($F(1, 57) = 7.68$, $p = .008$), with the treatment arm showing a bigger drop after intervention. The mean pre-post differences between the treatment arm and the waitlist-control arm were -5.73 points (95% CI [-7.89, -3.58]) and 1.27 points (95% CI [-0.82, 3.36]) for DASS-D; -5.00 points (95% CI [-7/21, -2.79]) and -0.80 points (95% CI [-3.30, 1.70]) for DASS-A; -7.13 points (95% CI [-9.85, -4.42]) and -2.40 points (95% CI [-4.55, -0.25]) for DASS-S. Similarly, the change in WHO-5 score between arms pre- and post-intervention was significant, $F(1, 57) = 8.13$, $p = .006$. The mean pre-post difference diverged between the two arms, with the treatment arm showing a positive change of 11.33 points (95% CI [6.01, 16.66]) whilst the waitlist-control exhibiting an average decrease of -1.60 points (95% CI [-8.15, 4.95]). All effect sizes were 0.1 or above (DASS-21: $\eta^2 = 0.22$; DASS-D: $\eta^2 = 0.26$; DASS-A: $\eta^2 = 0.11$; DASS-S: $\eta^2 = 0.12$; WHO-5: $\eta^2 = 0.12$).

When DASS subscales were viewed in classifications, the pre-post difference between arms converged (Figure 7). Only DASS-D classification showed a significant contrast, $X^2(1) = 8.17$ ($p = .004$). While DASS-S classification was marginally different across arms post-intervention ($X^2(1) = 3.76$, $p = .053$), DASS-A classification revealed to be insignificant ($X^2(1) = 0.42$, $p = .517$). The effect size of DASS-D classification was $R^2 = .14$, indicating approximately 14% of variance in DASS-D classification was accounted for by the treatment.

Table 2

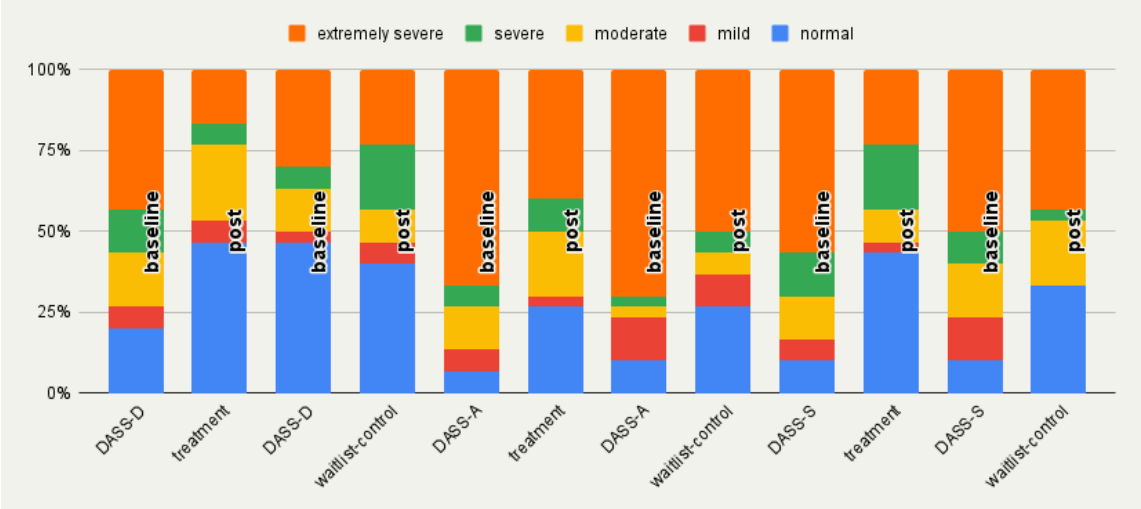
Pre-post Comparison of Assessments between Arms

	Pre		Post		F / X^2 statistic	p-value (two-sided)	Effect size
	Treatment (N = 30)	Waitlist-control (N = 30)	Treatment (N = 30)	Waitlist-control (N = 30)			
DASS-21 score	44.0 (18.8)	40.6 (23.4)	26.1(19.9)	38.7(32.0)	$F(1, 57) = 15.92$	$p < .001$***	$\eta^2 = 0.22$
DASS-D score	12.7 (7.38)	9.27 (8.53)	6.93(7.37)	10.5(10.9)	$F(1, 57) = 20.02$	$p < .001$***	$\eta^2 = 0.26$
DASS-D classification	3.0	1.5	1	2	$X^2(1) = 8.17$	$p = .004$***	$R^2 = .14$
DASS-A score	13.3 (7.71)	13.5 (8.11)	8.33(6.46)	12.7(11.5)	$F(1, 57) = 6.74$	$p = .012$*	$\eta^2 = 0.11$
DASS-A classification	4.0	4.0	2.5	3.5	$X^2(1) = 0.42$	$p = .517$	$R^2 = .008$
DASS-S score	18.0 (8.24)	17.8 (9.72)	10.9(8.85)	15.4(12.3)	$F(1, 57) = 7.68$	$p = .008$**	$\eta^2 = 0.12$
DASS-S classification	4.0	3.5	2	2	$X^2(1) = 3.76$	$p = .053$#	$R^2 = .07$
WHO-5 score	52.9 (13.56)	58.27 (16.63)	64.27 (16.64)	56.67(22.38)	$F(1, 57) = 8.13$	$p = .006$**	$\eta^2 = 0.12$

Note 1. Mean (standard deviation) for each continuous measurement was given
Note 2. Median for each ordinal measurement was given
Note 3. #.1 > p > .05, *p < .05, **p < .01, ***p < .005

Figure 7

Pre-post Comparison of DASS-21 Classification Compositions between Arms



3.5 Residual treatment efficacy outcomes

The means for assessments at 2-week follow-up between the two arms under imputed data ($N = 60$) and original data ($N = 53$) were presented in Table 3. DASS-21 subscale classifications were visualised in Figure 8.

Table 3

2-week Follow-up Assessment between Arms

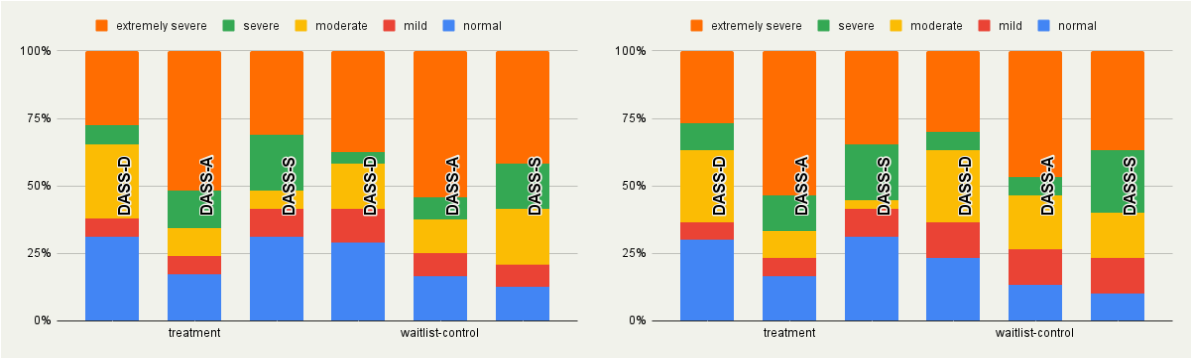
	Original dataset					Imputed dataset				
	Treatment (N = 29)	Waitlist-control (N = 24)	t / X^2 statistic	p-value (two-sided)	Effect size	Treatment (N = 30)	Waitlist-control (N = 30)	t / X^2 statistic	p-value (two-sided)	Effect size
DASS-21 score	36.1 (24.42)	40.8 (24.94)	$t(52) = 0.69$	$p = .494$	$d = 0.19$	36.7 (24.20)	38.3 (22.98)	$t(58) = 0.27$	$p = .792$	$d = 0.07$
DASS-D score	10.3 (8.28)	10.8 (8.06)	$t(51) =$	$p = .83$	$d = 0.06$	10.3 (8.14)	10.3 (7.28)	$t(58) = -$	$p = .97$	$d = -0.01$

			0.21	4				0.03	9	
DASS-D classification	2.0	2.0	$X^2(3) = 1.60$	$p = .659$	$R^2 = .002$	2.0	2.0	$X^2(3) = 1.11$	$p = .774$	$R^2 = .001$
DASS-A score	12.2 (9.28)	12.8 (9.34)	$t(51) = 0.24$	$p = .808$	$d = 0.07$	12.4 (9.18)	11.5 (8.82)	$t(58) = -0.38$	$p = .703$	$d = -0.10$
DASS-A classification	4.0	4.0	$X^2(3) = 0.45$	$p = .930$	$R^2 = .000$	4.0	3.0	$X^2(3) = 2.30$	$p = .512$	$R^2 = .01$
DASS-S score	13.8 (9.03)	17.3 (10.18)	$t(51) = 1.29$	$p = .202$	$d = 0.36$	14.1 (9.05)	16.5 (9.52)	$t(58) = 1.01$	$p = .316$	$d = 0.26$
DASS-S classification	3.0	3.0	$X^2(3) = 3.19$	$p = .364$	$R^2 = .03$	3.0	3.0	$X^2(3) = 3.60$	$p = .308$	$R^2 = .02$
WHO-5 score	55.4 (16.72)	56.0 (11.85)	$t(51) = 0.14$	$p = .889$	$d = 0.04$	55.0 (16.64)	56.9 (10.96)	$t(58) = 0.52$	$p = .605$	$d = 0.13$

Note 1. Mean (standard deviation) for each continuous measurement was given
Note 2. Median for each ordinal measurement was given
Note 3. #.1 > p > .05, *p < .05, **p < .01, ***p < .005
Note 4. The imputation could not run with a prerequisite of the sum of subscale scores equalling global score, so the imputed subscale scores were adopted to make up the sum for imputed global scores. The classifications were also derived after procuring the mean imputed subscale scores for each missing.

Figure 8

DASS-21 Classification Follow-up Composition



Note. Original dataset on the left and imputed dataset on the right

The results for ITT analyses conveyed significant differences in none of the follow-up assessments between arms (all $p > .05$). Delving deeper, the treatment arm was on average 1.62 points lower in DASS-21, 95% CI [-10.58, 13.81]. Contrarily, it scored a mean of 0.05 (95% CI [-4/04, 3.94]) and 0.89 (95% CI [-5.54, 3.76]) points higher than the waitlist-control arm in DASS-D and DASS-A, despite a 2.43-point (95% CI [-2.37, 7.23]) lower DASS-S mean score. As for WHO-5, there was a negative mean difference of 1.89 points (95% CI [-5.39, 9.18]) in the treatment arm, compared to the other. While there were some nuanced variations in the original dataset from the imputed data, similar results were yielded, with no significant differences in DASS-21, DASS-D, DASS-A, DASS-S, their classifications and WHO-5 (all $p > .05$).

3.6 Moderation analyses

3.6.1 A priori

Table 4 contained the results of ACS-30 global score and ACS subscales regressed on pre-post deviation in DASS-21 global score, DASS-21 subscale scores, DASS-21 subscale classifications and WHO-5 score for the treatment arm ($N = 30$). All F-statistics and Chi-squared statistics were insignificant, with p-values over .05. ACS-30 and ACS-subscale moderation on intervention efficacy was not evident in the treatment arm in the study sample. Accordingly, the

R-squared change, comparing the moderation (i.e. alternative) model and the main effect (i.e. null) model, representing effect size ranged from 0 to .05 (Table 5), meaning up to 5% of variance was explained by each of the moderation models.

Table 4

Regression Analysis of ACS Moderation on Treatment Efficacy

	ACS-30		ACS-others		ACS-new		ACS-self	
DASS-21 score	$F(1,27) = 0.20$	$p = .660$	$F(1,27) = 0.23$	$p = .638$	$F(1,27) = 1.72$	$p = .201$	$F(1,27) = 0.68$	$p = .419$
DASS-D score	$F(1,27) = 1.44$	$p = .240$	$F(1,27) = 0.20$	$p = .660$	$F(1,27) = 0.01$	$p = .918$	$F(1,27) = 1.64$	$p = .211$
DASS-D classification	$X^2(1) = 1.27$	$p = .259$	$X^2(1) = 0.02$	$p = .897$	$X^2(1) = 0.04$	$p = .846$	$X^2(1) = 1.39$	$p = .239$
DASS-A score	$F(1,27) = 1.01$	$p = .323$	$F(1,27) = 0.09$	$p = .767$	$F(1,27) = 0.05$	$p = .473$	$F(1,27) = 0.32$	$p = .578$
DASS-A classification	$X^2(1) = 0.83$	$p = .362$	$X^2(1) = 0.40$	$p = .528$	$X^2(1) = 0.09$	$p = .761$	$X^2(1) = 0.05$	$p = .825$
DASS-S score	$F(1,27) = 0.56$	$p = .463$	$F(1,27) = 1.08$	$p = .308$	$F(1,27) = 1.14$	$p = .295$	$F(1,27) = 0$	$p = .987$
DASS-S classification	$X^2(1) = 0.36$	$p = .539$	$X^2(1) = 1.71$	$p = .191$	$X^2(1) = 1.15$	$p = .284$	$X^2(1) = 0.50$	$p = .477$
WHO-5 score	$F(1,27) = 0.31$	$p = .582$	$F(1,27) = 0.06$	$p = .802$	$F(1,27) = 1.16$	$p = .292$	$F(1,27) = 0.55$	$p = .464$

Note 1. *F*-statistic (*p*-value) for each measurement was given

Note 2. Chi-squared statistic (*p*-value) for each measurement was given

Note 3. #.1 > *p* > .05, *$p < .05$, **$p < .01$, ***$p < .005$

Table 5

Effect Size of ACS Moderation on Treatment Efficacy

	ACS-30	ACS-others	ACS-new	ACS-self
DASS-21 score	$R^2 = .004$	$R^2 = .004$	$R^2 = .03$	$R^2 = .01$
DASS-D score	$R^2 = .03$	$R^2 < .001$	$R^2 = .005$	$R^2 = .03$
DASS-D classification	$R^2 = .05$	$R^2 < .001$	$R^2 = .001$	$R^2 = .05$
DASS-A score	$R^2 = .02$	$R^2 = .002$	$R^2 = .01$	$R^2 = .006$
DASS-A classification	$R^2 = .03$	$R^2 = .01$	$R^2 = .003$	$R^2 = .002$
DASS-S score	$R^2 = .01$	$R^2 = .02$	$R^2 = .02$	$R^2 = 0$
DASS-S classification	$R^2 = .01$	$R^2 = .06$	$R^2 = .04$	$R^2 = .02$
WHO-5 score	$R^2 = .008$	$R^2 = .002$	$R^2 = .03$	$R^2 = .01$

3.6.2 A posteriori

Some demographic and baseline characteristics were inputted as alternative models to test for moderation effects on pre-post assessment divergences in the treatment arm ($N = 30$) (Table 6). Age, gender and group size had shown to be insignificant moderators of treatment

efficacy, with the lowest *p*-value at .214, which far exceeded the $\alpha=.05$ standard. All the variables investigated in a posteriori moderation analyses were to be certainly considered having zero effect.

Table 6
Regression Analysis of a Posteriori Moderation on Treatment Efficacy

	Age		Gender		Group size	
DASS-21 score	$F(1,27) = 0.04$	$p = .849$	$F(1,27) = 0.11$	$p = .738$	$F(1,27) = 1.43$	$p = .242$
DASS-D score	$F(1,27) = 0.04$	$p = .838$	$F(1,27) = 0.03$	$p = .861$	$F(1,27) = 1.50$	$p = .231$
DASS-A score	$F(1,27) = 0.003$	$p = .956$	$F(1,27) = 0.80$	$p = .380$	$F(1,27) = 1.62$	$p = .214$
DASS-S score	$F(1,27) = 0.003$	$p = .955$	$F(1,27) = 0.09$	$p = .769$	$F(1,27) = 0.24$	$p = .625$
WHO-5 score	$F(1,27) = 0.23$	$p = .637$	$F(1,27) = 0.46$	$p = .502$	$F(1,27) = 0.20$	$p = .656$

Note. Analyses on DASS-21 subscale classifications were not carried out due to the exceptionally high *p*-values in raw scores

3.7 Qualitative evaluation

A total of 6 responses were received. Results from participants' feedback provided more insight into the mechanism by which expressive art therapy facilitated personal changes and their experience. Detailed themes were presented in Tables 7 to 9. Additionally, suggestions to improvement mainly surrounded the atmosphere of the room before the start of the treatment, which could be filled with music to induce relaxation and reduce awkwardness among participants, and more space for participants to explore their emotional experiences before the intervention of the instructor.

Table 7

Responses to Self-reported Changes following Treatment and Factors Promoting Change

Theme	Subtheme	Definition
Affect	Tension and arusal	The emotional experience of discomfort and alertness to threatening cues, and unpleasant mood and thoughts, associated with cortical activation.
	Interest	A complex emotional experience of curiosity and motivation driven a desire to selectively attend to an activity.
	Hedonia	The emotional experience of intrinsic happiness and contentment.
	Vatality	The emotional experience of vigour and living in the present.
Cognition	Psychological flexibility	The cognitive capacity to persist in or change the way of thinking and behaving.
	Self-conpassion and congruence	The thinking that one can hold a nonjudgemental stance towards oneself and commit to one's values.
	Self-awareness	Attention and knowledge focused on one self.

Intraperonal functioning	Self-confidence and sense of internal locus of control	Trust in oneself and the perception that one can exert control over one's internal states and life outcomes.
Social functioning	Connectedness and capacity	The feeling of being connected to others experientially, and the emotional capacity to socialisation.
Affect	Emotion stimulation and expression	The evocation of emotional experiences, and objective opportunities and subjective space allowed for external conveying of emotions.
	Mindfulness	The state of being in the present and aware of one's internal states and environmental cues with a nonjudgemental attitude.
Cognition	De-fusion	The ability to reappraise internal and external cues, and change the role of thoughts play in one's emotional experiences and behaviours.
Interperson	Acceptance and warmth	The perception of unconditional positive regard from others that allow one to feel comfortable with self-expression and understood.
	Information exchange	The reception of others' input help one better verbalise and reflect on experiences, as well as seeing other perspectives.

Process	Task	Elements exclusive to the task, including the use of bright colours and the element of surprise in the creation of inkblots.
	Experience	Being able to experience new things and the activity bing well-organised.

Table 8

Responses to Biggest Takeaway from the Treatment

Theme	Subtheme	Definition
Attitude and functioning	Self-discovery	The uncovering one's potential, and consideration for further inquiry.
	Self-appreciation and self-compassion	The appreciation and utilisation of ones' intrinsic resources, and acceptance of experiences with a noncritical stance.
	Self-awareness and de-stigmatisation	The understanding of oneself with self-reflection and the realisation of having thoughts without judgement.
	Cognitive de-fusion	The process of creating space between persisting maladaptive thoughts.
	Expression	The opportunity to make sense of, express and reflect on emotional experiences.
Process	Creativity	The use of one's creative agencies.
	Psychoeducation	The understanding of psychotherapeutic work.

Table 9

Responses to Overall Impression of the Treatment

Theme	Subtheme	Definition
Activity		The nature being entertaining and pleasant.

Instructor	Technical support and guidance	The organisation of activity, provision of sufficient instructions and attending to individual needs.
	Emotional support	Attempts to understand participants' emotional experience and provide empathy and reflection.
	Facilication of engagement	The supply of stimulation to increase interactions among participants.
Atmosphere		Plesant and friendly environment.

4 Discussion

This study evaluated the efficacy of single-session expressive art therapy in subclinical populations (with more than half of the current study's sample identified as having "severe" to "extremely severe" symptoms on the DASS-21 which was designed to measure non-clinical samples (Figure 6)). This study is the first to touch upon the effectiveness of expressive art therapy, without the co-administration of other forms of psychotherapy and conducted in single-session mode, even though it had been included as an adjunct component in a single-session counselling study inquiring non-mental health themes (Suargani et al., 2023). It had contributed to knowledge regarding the use of single-session psychotherapy techniques, which may prove to be useful in addressing contemporary challenges in improving mental health in the general public. As a pilot study, albeit the relatively small sample size and short investigation period, it provided basis for more refined research on single-session expressive art therapy in the subclinical population, and possibly application in clinical populations, in the future.

4.1 Treatment efficacy

No significant baseline differences were detected between the treatment and waitlist-control arms, verifying that there were no significant pre-existing differences across groups and signifying minimal bias attributed to the interaction effect between individual differences and the intervention. The study found significant reduction in scores of DASS-21 and subscales of DASS-21 in the treatment arm, indicating alleviation of both more generic psychopathological symptoms, as well as distinctly depression, anxiety and stress symptoms. Effect sizes revealed a large effect of the treatment in the decrease in generic psychopathological symptoms and depression symptoms, and a moderate effect in anxiety and stress symptoms. In terms of

classifications (i.e. normal, mild, moderate, severe, extremely severe), a significant change was exhibited in depression and a marginally significant change in stress. Accordingly, the treatment attained a moderate and a small effect, respectively, on the levels of symptom presentation severity. These results supported the efficacy of the employed single-session expressive art therapy as a means to reduce psychological distress. Apart from that, a significant increase in WHO-5 score was detected in the treatment arm, compared to the waitlist-control arm, with a moderate effect size found. This provided evidence for single-session expressive art therapy's effectiveness in improving psychological wellbeing, which is subsequently predictive of quality of life (Nylén-Eriksen et al. 2022).

These results were partially consistent with previous results. Conducted in similar age groups, a study on single-session acceptance commitment therapy-based mindfulness intervention in college students (Pang et al., 2022) and a meta-analysis of single-session interventions in adolescents (Schleider & Weisz, 2017) demonstrated the efficacy of single-session psychotherapy in promoting mental health. Despite that, both revealed more prominent effects in anxiety over depression, contrary to the current study's larger effect in latter than the former. Nonetheless, individual differences across the three studies' samples and the mechanisms by which different psychotherapy techniques act on psychological health may have contributed to the variations in the results. Other meta-analyses investigating the efficacy of psychodynamic psychotherapy (Driessen et al., 2015; Caselli et al., 2023) – even though it might not be delivered one-off, the sessions were relatively brief in duration – offered supporting evidence for the significant improvement of depression. Given the psychodynamic nature of the treatment protocol in the current study, the validity of its results could be warranted.

Regarding the treatment's long-term effect, insignificant DASS-21 and WHO-5 scores between the two arms at two-week follow-up demonstrated that there was no residual improvement in psychological wellbeing following treatment. The non-significant results were not surprising, given that any long-term change in psychotherapy was considered to be most likely predicted by more permanent changes to cognition and behaviour (Huber et al., 2017) in recent orientation on psychotherapy. However, some previous literature had shown significant improvement at follow-up. A comparable study, similarly with treatment and waitlist-control arms, conducted by Perkins (2006) revealed the benefits of single-session treatment delivered to children and adolescents troubled with mental health concerns lingered one month after intervention, and a later publication confirmed the maintenance effect at 18 months (Perkins & Scarlett, 2008). Unlike the one-month results, the 18-month outcomes should be interpreted with caution since no control group and clinician measures were applied. The takeaway from the literature would be the possible remission period within a month, where future replication of the present study should be carried out in a large sample for verification.

Despite having no previous results available examining the efficacy of single-session expressive art therapy in improving psychological health, other studies conducted in similar contexts could be compared to assess the validity of the current study. In Yusoff's (2011) study on the effects of a single-session stress reduction intervention, DASS-21 was used as an instrument to rate psychological wellbeing. The results from that study were consistent with the current study's, which employed the same measure. Although DASS-21 was initially devised to evaluate depression, anxiety and stress in a one-week span, this authenticated the use of DASS-21 in a shorter timeframe, which would be helpful to single-session psychotherapy research in capturing more immediate psychological changes. With that said, caution should be taken to the

bias attributed to the repeated administration, which would necessitate the implementation of a parallel control group.

4.2 Moderation of autonomy

Results from the present study communicated no moderating effect of autonomy on the treatment efficacy of the administered single-session expressive art therapy, where none of the complete or sub-level measures of autonomy had a significant relationship with the study's several assessments of psychological health. This was not coherent with the hypothesis. Autonomy was found to be a predictor of excellent socio-emotional functioning and overall wellbeing in numerous areas of life (Deci & Ryan, 2013; Yu et al., 2018; Chen, 2025; De-Juanas et al., 2020; Ferreira et al., 2024). Besides, as explicated in the introduction, psychotherapy outcomes were predicted by the level of autonomy. Further literature also reinforced the moderating effect of autonomy on remission and lower severity of depression following treatment (Zuroff et al., 2007), which provided grounds for the speculation of the validity of the present study's non-significant results, especially considering the substantial change in depressive symptoms captured.

There may be a few factors contributing to the non-significant moderation effect. Firstly, the sample size was small. A meta-analysis only reported effect sizes in Cohen's *d* (Su & Reeve, 2011), making it impossible to reliably predict the required sample size necessary to detect a significant moderation effect. One literature reported an *R*-square of .11 and *p*-value of <.001 in a sample of 95 depressive patients (Zuroff et al., 2007). Using this statistic, the computed sample size would be 66 with targeted *p*-value of .05 and power of .80. While the sample size ($N = 30$) used in the current analysis was lacking by half according to this computation, the much smaller

resulted *R*-square in the current study revealed that a much larger sample may be required. This may be attributed to the short treatment duration.

Secondly, the instrument applied for measuring autonomy might not be appropriate. At the present moment, there are limited standardised but brief measures available on generic autonomy, where the Relative Autonomy Index (Grolnick & Ryan, 1989) was considerably complicated. As an illustration, many published measures assessed individuals' autonomy in terms of narrower constructs, for instance, their transition from adolescence to adulthood (Bernal et al., 2019). In the area of psychological wellbeing, some previous publications developed their own measure of autonomy specifically for their study (Kasser & Ryan, 2006), which had yet to be validated in a large scale to ensure validity and reliability.

The instrument of the present study – ACS-30 was selected due to it being readily available and published in a validation study. Despite that, its application had not been widely spread and little cultural difference had been factored in, which may affect its validity when adopted in a study done on an Asian community as the current study. This limitation was evident in the correlational results between each item of the ACS-30 others (Supplementary Table 1), new (Supplementary Table 2) and self (Supplementary Table 3) subscales. It was apparent that most relationships between the items were insignificant, and if not, were still considered generally weak, which signified the incompatibility of the ACS-30 scale with this study to evaluate autonomy. To conclude, even though ACS-30 was initially appraised as a theoretically suitable measure during the study design development stage, actual implementation revealed it as practically unfit. Future investigation on autonomy may require a larger sample size and a better instrument, for example the Index of Autonomous Functioning (Weinstein et al., 2012) that has great internal consistency among subscales, or the Autonomous and Controlled Motivation for

Treatment Questionnaire (Zuroff et al., 2007) to measure treatment-related autonomy rather than generic autonomy, to perfect execution.

4.3 Qualitative evaluation

Apart from the momentary changes of affect, there were some self-reported changes to cognition and functioning of participants. Even though some may argue the temporariness to these alterations, the heightened self-awareness can be a powerful agency to transform themselves. It is indeed more sustainable to empower individuals to embark on a continuous journey of self-discovery to reconstruct maladaptive ways of functioning to achieve outcomes irrelevant to external motivation and directing. The opportunity of emotion expression, under an environment promoting socially supported de-stigmatisation and allowing for self-initiated reflection of thought patterns, may be a catalyst to healthier perception of and attitude towards expression and relationship with cognitions and affects. In fact, the role of metacognition in predicting mental health has also been supported by research (Marino et al., 2018). Nonetheless, the inevitable limitation of single-session interventions is recognised.

4.4 Limitations and future directions

4.4.1 Research design

There were some limitations regarding the study design. Firstly, as noted in the proportion of the two genders participating in the current study, there was a considerable gender imbalance. This is consistent with the more negative help-seeking attitude in males (Narendorf, et al., 2018), and could also be accounted for by the perception of the femininity of art-related activities in Chinese society. Secondly, the sample was comprised of predominantly ethnically Chinese participants, due to the inclusion criteria of Cantonese listening proficiency. Both factors may affect the generalisability of treatment efficacy, and thus replication in a more balanced

gender ratio and ethnically diverse population would be recommended. Thirdly, as previously discussed, the small sample size may have partially contributed to the lack of treatment maintenance effect and moderation effect of autonomy. Further investigation would be needed.

More importantly, the open-label design meant participants in the waitlist-control arm were fully aware that they would not immediately receive treatment. Even though they were informed of their allocation before baseline assessments were administered to minimise unnecessary interaction effect of expectancy on outcome measures within the pre-post period, some biases were inevitable. As treatment-as usual is not an available option as the control in most subclinical populations, and some even argue the pervasive bias in active control groups (Boot et al., 2013), a cross-over trial design, measuring within-subject rather than between-subject differences, would be advised. Nonetheless, a better design of control groups would remain to a major concern to be addressed. Upon further inquiry into the practice of expressive art therapy from Rubin's (2011) book on the subject, the author of the current study considered the feasibility of using two active controls – 1) art making only 2) psychodynamic counselling or psychoeducation, to observe any additional benefit of single-session expressive art therapy compared to its separate facets, in future replication. Additionally, the interventions were delivered by the experimenter personally due to resource constraints. Although allocation was aided by computer-generated randomisation and treatment delivery followed a prescribed protocol, some level of bias existed because of experimenter's allegiance effect (Dragioti et al., 2015). Replication with instructor blinding to the design would be advised as well.

4.4.2 Clinical impact

Clinically, future directions should be aimed to understand the underlying mechanism of expressive art therapy. Although the current study administered a brief evaluation on participant

experience, a more comprehensive evaluation should be developed. Besides the individual form that was opted in the present study, focus group discussions can be another means to inform experimenters of how the treatment impacts participants. Such a group-based evaluation may be a more accurate representation of group dynamics, thus give more insight into its impact on treatment efficacy. Mediators could also be investigated after thorough consultation of theories and literature.

Relevant to the maintenance of mental health, despite the current study being conducted merely on single-session context, as the non-significant residual benefits at two-week follow-up could also possibly indicate the lack of residual effects (besides an insufficient sample size), it is worth looking more into the reason behind. Understandably, the single-session nature may limit how much benefits participants could reap. Much can be further probed into in order to locate the exact factors and, subsequently, address them. For instance, if the concern is participants' perception of and attitude towards self-disclosure and group interaction, more can be done to facilitate emotional safety and build excellent group dynamics. Further inquiry into the optimal number of sessions from the perspectives of both cost-effectiveness and clinical impact would also be a possible next step.

5 Conclusion

Single-session expressive art therapy proved to have some prospect in preventing psychopathology and improving psychological wellbeing in the subclinical population. Currently, both single-session interventions and expressive art therapy were not studied as extensively as more conventional psychotherapy approaches. This study served as one of the pioneering literatures to explore this area and paved the way to future application as a primary or secondary prevention strategy in mitigating the prevalence of psychopathology manifestation and, additionally, stress on psychiatric services.

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Appendix

Supplementary figure 1

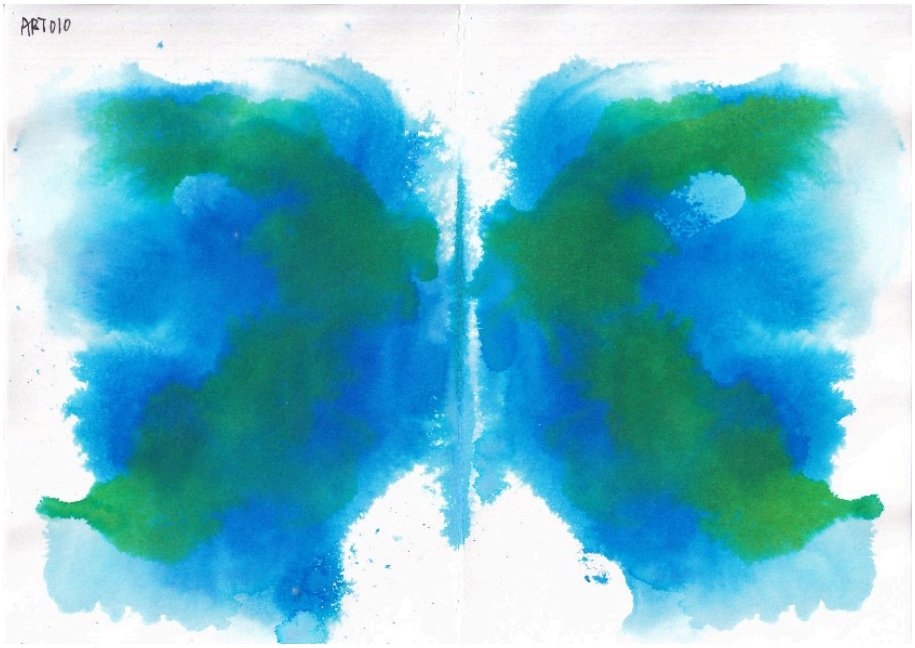
Sample Inkblot

Supplementary figure 2

Sample Drawing of Projection

Supplementary figure 3a

Sample Inkblot from Peer

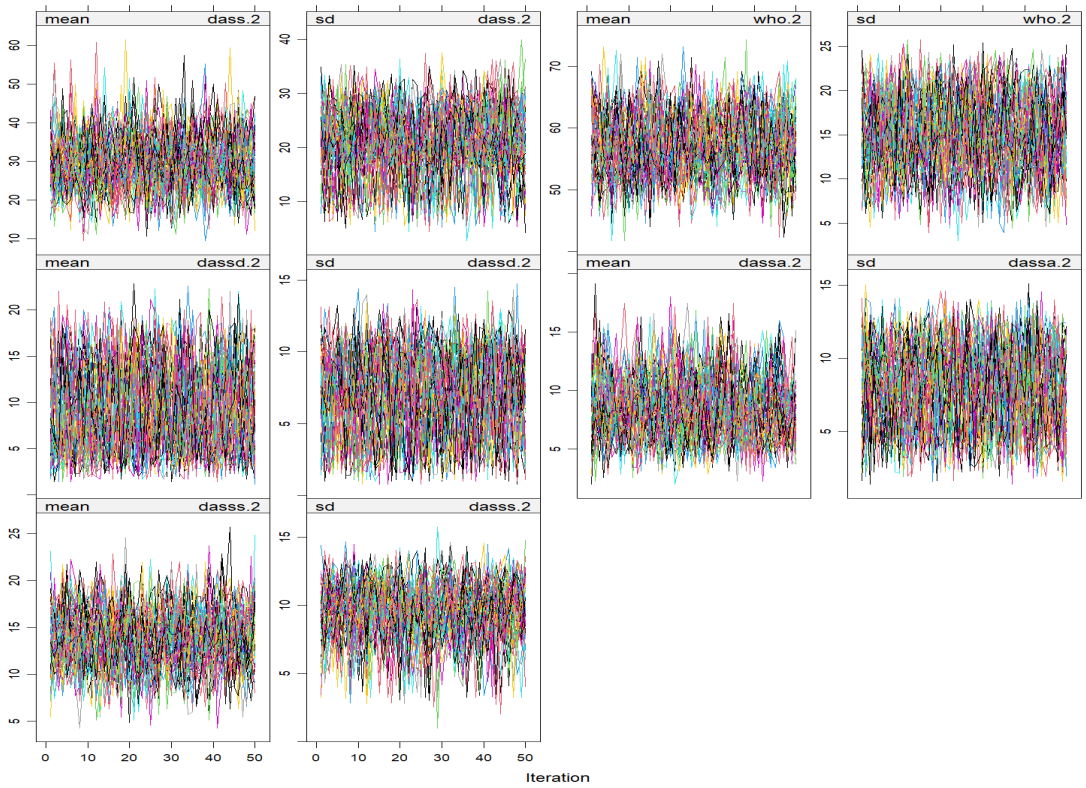


Supplementary figure 3b

Sample Drawing of Projection of Peer's Inkblot

Supplementary figure 4

Trace Plots of MICE



Supplementary Table 1

Correlation of ACS-others subscale items

	O1	O2	O3	O4	O5	O6	O7	O8	O9	O10	O11	O12	O13	O14	O15	O16	O17
O1	1	-.16	.06	.29*	-.02	.11	.22#	.01	-.004	-.11	.06	.05	.07	.16	.08	.22#	.31*
O2	-	1	.46**	.24#	.30*	-.04	.12	.16	.05	.24#	.04	.15	.28*	.38**	.26#	.19	.13
O3	-	-	1	.58**	.49**	.23#	.26*	.39**	.35**	.47**	.13	.12	.07	.32*	.21	.41*	.22#
O4	-	-	-	1	.28*	.12	.25#	.31*	.36**	.11	-.05	.23#	.30*	.25#	.35**	.47**	.39**
O5	-	-	-	-	1	.25#	.16	.32*	.21	.40**	.17	.35**	.39**	.25#	.18	.49**	.04
O6	-	-	-	-	-	1	.35**	-.10	.31*	.21	.18	.17	.27*	.04	.11	.32*	.23#
O7	-	-	-	-	-	-	1	-.12	.41**	-.13	.02	-.16	.28*	-.03	.22#	.41**	.28*
O8	-	-	-	-	-	-	-	1	.10	.44**	.23#	.31*	-.23#	.40**	.18	.06	-.02
O9	-	-	-	-	-	-	-	-	1	-.116	.28*	.06	.17	-.09	.27*	.46**	.25
O10	-	-	-	-	-	-	-	-	-	1	.06	.25#	-.12	.42**	.05	.20	-.18
O11	-	-	-	-	-	-	-	-	-	-	1	.17	.05	.15	.14	.15	-.01
O12	-	-	-	-	-	-	-	-	-	-	-	1	.30*	.45**	.07	.10	-.04
O13	-	-	-	-	-	-	-	-	-	-	-	-	1	.11	.29*	.39**	.20
O14	-	-	-	-	-	-	-	-	-	-	-	-	-	1	.08	.17	.21
O15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	.26	.14
O16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	.19
O17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1

Note. #.1 > p > .05, *p < .05, **p < .01, ***p < .005

Supplementary Table 2

Correlation of ACS-new subscale items

	N1	N2	N3	N4	N5	N6

N1	1	.19	.41**	.24#	.17	.10
N2	-	1	.18	.26*	-.04	.13
N3	-	-	1	.20	.29*	.18
N4	-	-	-	1	-.14	.01
N5	-	-	-	-	1	.38**
N6	-	-	-	-	-	1

Note. #.1 > *p* > .05, *$p < .05$, **$p < .01$, ***$p < .005$

Supplementary Table 3

Correlation of ACS-self subscale items

	S1	S2	S3	S4	S5	S6	S7
S1	1	.26*	.63*	.34**	.10	.52**	.38**
S2	-	1	.12	.17	.23	.09	.19
S3	-	-	1	.31*	.01	.45**	.61**
S4	-	-	-	1	-.03	.32*	.27*
S5	-	-	-	-	1	.12	-.04
S6	-	-	-	-	-	1	.26*
S7	-	-	-	-	-	-	1

Note. #.1 > *p* > .05, *$p < .05$, **$p < .01$, ***$p < .005$