The Online Strength-Informed Acceptance and Commitment Therapy Among COVID-19-Affected Adolescents

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Abstract

Purpose: This study develops and investigates the changes in anxiety symptoms and quality of life (QoL) among participants of the online Strength-informed Acceptance and Commitment Therapy (SACT) across three tests. Methods: A small-scale, quasi-experiment with no control group was conducted. Repeated-measures analysis was employed to assess the changes of the three tests, which were the pre-experimental, post-test, and 3-month follow-up test. A total of 47 adolescents (ages 10–12) completed the 45-min intervention that lasted 10 weeks. Results: Compared with the pre-experimental, the post-test indicated significant anxiety symptoms reduction but not a statistically significant increase in QoL. The 3-month follow-up test indicated reduced anxiety symptoms and improved QoL compared with the pre-experimental. The within-subject changes were substantial. Conclusions: The online SACT is a promising model to reduce anxiety symptoms and promote QoL among adolescents during the current COVID-19 pandemic, which show both short- and long-term benefit to the participants.

Keywords

strength-informed act, adolescent, anxiety symptoms, quality of life, COVID-19

Worldwide education systems, such as that in China (Zhu & Liu, 2020), France, Greece, Italy, Japan, and other countries (Chang & Yano, 2020), have adopted an online learning approach through the use of electronic devices (such as mobile phones, computers, and tablets) and the Internet in a synchronous or asynchronous environment to cope with the changes brought by the COVID-19 pandemic. Students study and interact with teachers or classmates regardless of their locations (Singh & Thurman, 2019). However, long-term home quarantine and online learning have had negative psychological and behavioral effects to adolescents (Panda et al., 2021). For example, conducting an investigation of 1784 adolescents in China, Xie et al. (2020) found that the lack of outdoor activities and face-to-face social interaction increased depressive symptoms. Wong et al. (2021) reported that the overuse of digital screen time gave rise to the onset of the increased risk of myopia among adolescents. In Palestine, the use of social media among adolescents played a main role in the rapid spread of panic (Radwan, Radwan, & Radwan, 2020).

Given its negative effects, several programs and interventions have been constructed to address these effects on adolescents. For example, Zheng et al. (2021) developed a novel digital behavior change intervention involving a cluster randomized controlled trial (RCT) that required adolescents to upload photographs or short videos of their physical activities or eye relaxation activities to the live-streaming platform daily. This 2-week intervention has an immediate effect on reducing anxiety symptoms and eye strain. Ding and Yao (2020) developed an exercise model and the results of their 2-month randomized control intervention indicated that during the COVID-19 pandemic, the adolescents’ anxiety and depression levels were significantly reduced, and their quality of sleep was improved. Xu et al. (2021) designed an 8-week intervention that combined aerobic exercise with Acceptance and Commitment Therapy (ACT) to improve adolescents’ mental health levels during the outbreak of the COVID-19 pandemic.

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An immediate reduction of psychological distress and improved well-being and psychological flexibility were confirmed. Several other interventions were also conducted. For instance, Chen (2020) developed an online solution focused on brief therapy. Tymofiyeva (2020) developed training for awareness resilience and action, and Pavarini (2020) designed peer support training.

Although the above-mentioned interventions seemed to effectively reduce negative emotions (e.g., anxiety and depression symptoms) or maintain physical health among adolescents (Ding & Yao, 2020; Xu, Shen, & Wang, 2021; Zheng et al., 2021), two issues are still worth discussing. The first issue is the working mechanism of the intervention. The interventions in the above-mentioned studies were physical exercise-oriented, and mainly hypothesized that negative emotions may be alleviated through physical exercise. Rodriguez-Ayllon et al. (2019) conducted a meta-analysis of 12 intervention studies that met the eligibility criteria. and found that the effect of physical activities on children and adolescent’ (ages 6–18) mental health was significant, although the effect size was small (effect size = 0.173, p < .001). Adolescents and children showed significant and insignificant results, respectively. Bao and Jin (2015) designed an intervention based on Tai Chi and the results of the non-RCT showed that this intervention significantly reduced anxiety symptoms and improved adolescents’ self-concept. However, Kall, Malmgren, Olsson, Linden, and Nilsson, (2015) designed an intervention based on curricular physical activity, and the results of non-RCT showed that this intervention did not significantly improve the health-related quality of life of children. Thus, Rodriguez-Ayllon et al. (2019) considered that the effects of physical activity on the improvement of children’s and adolescents’ mental health still needs to be confirmed. Therefore, psychotherapy intervention is worth developing and being evaluated.

The other issue was the perspective of traditional intervention approaches. Most of these studies focused on reducing specific symptoms, such as anxiety symptoms, eye strain, depression, and sleep disorder (Ding & Yao, 2020; Zheng et al., 2021), while paying little attention to cultivating positive attributes to improve mental health. Compared with traditional interventions (e.g., Cognitive Behavior Therapy), the strength-based intervention focused on recovery from the negative to normal levels and emphasized the further improvement from the normal level to the positive level (Gander, Proyer, Ruch, & Wyss, 2013). The principle was that strength-based intervention highlighted the focus on individual potential and strengths and learning to use one’s strengths, skills, and abilities to face problems or challenges to achieve problem-solving and positive emotion enhancement (Gander et al., 2013; Rashid, 2015; Scheel, Davis, & Henderson, 2012). Carr et al. (2020) conducted a rigorous meta-analysis of this kind of intervention, including 347 clinical and non-clinical studies in 41 countries with 72,000 diverse participants. Their results indicated the effectiveness of strength-based interventions in improving health had a broad evidence base. Thus, incorporating the strengths perspective into traditional psychotherapy models is a promising approach.

Adolescence is a crucial stage of an individual’s development because it is the time when individuals are highly sensitive to the social environment and have an increased need for peer interaction (Orben, Tomova, & Blakemore, 2020). In the context of COVID-19, school closure, online learning, restricted travel, the persistence of the pandemic, lack of outdoor activities, reduced face-to-face socialization, quarreling with parents, excessive use of electronic devices, rumors spreading on social media, and uncertainty about the future (Abdoli, 2020; Liu et al., 2021; Shah, Mann, Singh, Bangar, & Kulkarni, 2020; Wajahat, 2020; Xiang, Zhang, & Kuwahara, 2020) have caused teenagers to display short-term anxiety symptoms, which can have long-term damage to their quality of life (Duan et al., 2020; Ravens-Sieberer et al., 2021; Tang, Xiang, Cheung, & Xiang, 2021). In previous studies, anxiety symptoms served as a short-term emotional response (Lader, 1972) while quality of life emphasized the long-term and stabilized life status (Prasoon & Chaturvedi, 2016). Hence, a promising intervention should be efficient in addressing short-term problems and, more importantly, facilitating long-term changes of stabilized outcomes.

ACT was targeted to restore participants’ psychological flexibility by focusing on experience, staying in the present moment, changing or maintaining a behavior in the process, and moving towards a valuable life (Hayes, 2016; Hayes, Luoma, Bond, Masuda, & Lillis, 2006). In other words, ACT focused on short- and long-term changes, which can help solve the problems encountered in the present and face the future for a better and more adaptive life. Nevertheless, the strengths perspective has not been well-reflected. Howell and Passmore (2019) demonstrated through the evidence reviewed that ACT could be used as a positive psychological intervention and enhance university student well-being. However, the conditions under which ACT operated and the mechanisms that produced this effect in terms of its success in enhancing well-being were unclear, and its positive manifestation was vague. Therefore, further operationalization of the combination of ACT and strengths perspectives is necessary to clarify what exactly ACT uses as its strengths and the mechanisms at play in its operation. Notably, while the strengths perspective has been acknowledged, it has not been viewed as a practicable treatment modality (Blundo, Bolton, & Lehmann, 2019). Therefore, we enriched the strengths perspective by focusing on the positive characteristics that make it a practicable treatment modality. Our previous experiences on developing strength-based interventions (Bu & Duan, 2019, 2021; Duan & Bu, 2019; Duan, Ho, Tang, & Zhang, 2014; Duan, Bu, Zhao, & Guo, 2019) had also confirmed its feasibility and indicated that the combination of strength-related components with the ACT framework is feasible. Accordingly, in the present study, we fill this gap by formulating
strength-informed ACT (the development process can be found in the Design of the Intervention section).

This study is a pilot study conducted to explore the short- and long-term changes introduced by the strength-informed ACT. In the past, most crisis intervention programs adopted face-to-face offline methods (Powell & Thompson, 2016). However, the pathogenicity of COVID-19 and its transmission through person-to-person makes face-to-face interventions infeasible (Shereen, Khan, Kazmi, Bashir, & Siddique, 2020). Because of the COVID-19 pandemic, China’s education systems closed schools and adopted online learning (Zhu & Liu, 2020), which facilitated the embedding of online interventions in a “normal” education context. The online approach can reduce the possibility of infection caused by person-to-person contact and the cost of the client’s access to services (Rauschenberg et al., 2021; Wasil et al., 2021). Luo et al. (2020) showed that online interventions were no worse than face-to-face interventions. In the current study, we design a 10-week online strength-informed ACT intervention among adolescents to (a) immediately decrease anxiety symptoms after the intervention and (b) improve the level of quality of life after the completion of the intervention 3-month later.

Method

Trial Design and Setting

We tested the proposed strength-informed ACT in adolescents with a quasi-experiment without a control group. This study was conducted from May to July 2020 in a primary school through the video conferencing system embedded in Tencent QQ (a social media platform) in Wuhan City, China. During the intervention, the pandemic in China was moving in a positive direction, with ongoing prevention and control and the pathogenicity of COVID-19 and its transmission through person-to-person makes face-to-face interventions infeasible (Shereen, Khan, Kazmi, Bashir, & Siddique, 2020). Wuhan is the capital city of Hubei province, which is located in central China. It has a population of 12,326,518 and a medium economic level (i.e., annual per capita disposable income of urban residents: 50,362 CNY, approximately USD 7894; rural residents: 24,057 CNY, approximately USD 3771; Wuhan Bureau of Statistics, 2021).

Participants

Participants were 76 fifth grade students (43 girls and 33 boys) with ages ranging from 10–12 years (M = 10.72, SD = 0.48) from a primary school in Wuhan. According to Smetana and Rote (2019), the age of 10–12 years belongs to early adolescence. During the COVID-19 pandemic, these students had to take online classes at home instead of offline classes. Participants were recruited through an online broadcasting platform. The inclusion criteria were (a) adolescents (ages 10–12 years) who lived in Wuhan during the COVID-19 pandemic, (b) adolescents willing to participate in an online intervention voluntarily, (c) adolescents whose parents permitted them to take part in this program, (d) adolescents who did not participate in a similar intervention, and (e) adolescents who were in good health without severe physical or mental health problems. The participants were asked to take a pre-experimental, a post-test, a 3-month follow-up test, but 38% of participants randomly dropped out during the intervention period. All 76 students participated in the intervention activities, but 29 of them failed to fill out the questionnaire during the intervention and thus, these students were treated as dropouts. No difference was observed between the dropouts and the remaining participants in terms of anxiety symptoms (Pre-experimental: t = 0.61, p = .54) and QoL (Pre-experimental: t = −0.30, p = .76) at the pre-experimental stage (see Table 1). The CONSORT of the current study can be found in Figure 1. Finally, 47 participants were retained for final analysis, including 25 girls (53.19%) and 22 boys (46.81%) with ages ranging from 10–12 years (M = 10.70, SD = 0.51). All data analyses were performed using the JASP (JASP Team, 2020). Ethics approval was obtained from the Human Subjects Ethics Sub-Committee of the Social and Public Administration School, East China University of Science and Technology.

Measures

Anxiety Symptoms. This study adopted the two-item Generalized Anxiety Disorder Scale (GAD-2) (Kroenke, Spitzer, Williams, Monahan, & Lowe, 2007) to evaluate the participants’ anxiety symptoms levels. A four-point Likert scale was used for the GAD-2. The presence and severity of anxiety symptoms were measured from 1 = not at all to 4 = nearly every day. The higher the score meant a higher level of anxiety symptoms. We adapted the GAD-2 to the COVID-19 context and included items, such as “The COVID-19 pandemic makes me feel nervous, anxious, or uneasy” and “For me, my worry is that COVID-19 cannot be stopped and controlled” (Kroenke et al., 2007). GAD-2 demonstrated good internal reliability (Cronbach’s α = .85) in the application to Chinese children around 12 years old (Wang et al., 2019). Li et al. (2020) demonstrated the applicability of GAD-2 to adolescents in the context of COVID-19 (Cronbach’s α = 0.78). The Cronbach’s alpha of the pre-experimental, post-test, and 3-month

Table 1. Independent Samples T-test of Participants (N = 47) and Dropouts (N = 29) for Outcome Variables at the Pre-experimental.

| Variables | t   | df  | p    | Lower | Upper | Cohen’s d |
|-----------|-----|-----|------|-------|-------|-----------|
| AS        | 0.61| 74  | .54  | −0.23 | 0.44  | 0.14      |
| QoL       | −0.30|74  | .76  | −0.30 | 0.22  | −0.07     |

Note. CI = confidence Intervals; df = degree of freedom; AS = anxiety symptoms; QoL = quality of life; * p < .05, ** p < .01, *** p < .001.
A follow-up test was 0.55, 0.91, and 0.89, respectively, indicating good overall internal consistency.

Quality of Life. This study adopted the Mini Quality of Life Enjoyment and Satisfaction Questionnaire (Mini-Q-LES-Q) (Rush, South, Jha, Grannemann, & Trivedi, 2019) to measure the participant’s Quality of Life (QoL) levels in the current study. This 7-item scale was rated based on how satisfied the participants were in the past week using a 5-point Likert scale (From 1 = very poor to 5 = very good). The mean scores of the seven items were calculated to determine the level of QoL. The higher the score means the higher the level of QoL. The questionnaire includes items such as “Taking everything into consideration, during the past week how satisfied have you been with your household activities” and “Taking everything into consideration, during the past week how satisfied have you been with your social relationships” (Rush et al., 2019). Q-LES-Q-SF as applied in China showed good internal consistency (Cronbach’s $\alpha = .87$) (Lee et al., 2014). In the current study, Cronbach’s alpha of the pre-experimental, post-test, and 3-month follow-up test was 0.83, 0.87, and 0.93, respectively.

Design of the Intervention

The ACT framework indicates that participants would benefit through two general processes: (a) Mindfulness and Acceptance Processes and (b) Commitment and Behavior Change Processes (Hayes et al., 2006). The ACT model includes six core techniques, namely, acceptance, cognitive defusion, being present, self as context, values, and committed action (Hayes et al., 2006). The two processes and six core techniques do not correspond strictly to one another.

During the COVID-19 outbreak, the local government of Wuhan suggested that all its residents stay isolated at home to protect themselves and reduce the spread of the disease (Lau et al., 2020). Therefore, students were required to take part in online learning at home (Wang, Zhang, Zhao, Zhang, & Jiang, 2020). Given the negative effects of the pandemic and the long-term social isolation, mental health problems, such as anxiety symptoms (Chen, Cheng, & Wu, 2020) and decreased QoL, emerged in adolescents (Ravens-Sieberer et al., 2020). Accordingly, we combined our previous experiences in developing strength-based intervention (Bu & Duan, 2021; Duan & Bu, 2019; Duan, Bu, Zhao, & Guo, 2019) and the ACT model to establish the current online strength-informed ACT. We used the well-established strengths model (Duan, Ho, Bai, & Tang, 2013; Duan & Bu, 2017; Duan & Wang, 2018) to select the strengths of judgment (i.e., decision-making based on comprehensive information or evidence), gratitude (i.e., sincere thankfulness and joy for the gifts you received), appreciation of...
beauty and excellence (i.e., appreciation of concrete beauty, outstanding ability, and virtue), and perseverance (i.e., hard work to achieve goals despite obstacles).

Cognitive changes were achieved through mindfulness and acceptance processes and include, using judgment to examine the differences between participants’ thoughts and facts more comprehensively and objectively, keeping a certain distance from one’s thoughts, not labeling oneself inappropriate (especially negative labeling), and not being controlled by negative perceptions to calm down quickly. Maintaining an accepted attitude toward what had happened or one’s positive or negative emotions and thoughts, facing them proactively instead of controlling, fully experiencing what is happening now, recording and reflecting on them, and being grateful for various events and experiences bring one’s growth. In the stage of mindfulness and acceptance processes, the strengths of judgment and gratitude were used to achieve cognitive defusion, self as context, acceptance, and being present. Then, behavior changes were determined by using commitment and behavior change processes. For front-line medical staff, express delivery staff, logistics staff, and donors to Wuhan, opening their senses, fully experiencing the present, and discovering the surrounding beauty reduced their attention to negative information and allowed them to perceive a broader sense and a more comprehensive reality. In this process, individuals must insist on or discover what the most beautiful or valuable was, clarify what they want to pursue, and be guided by individuals’ values. They should reflect on the things that have been accomplished and have been unfinished, use these experiences as the background, draw strength from these experiences to deal with the current challenges, formulate plans, and carry out actions, and persevere in maintaining the actions for a long time. In the commitment and behavior change processes stage, they should use the strengths of appreciation of beauty and excellence and perseverance. These strengths lead to achieving the purpose of being present, values, self as context, and committed action, producing psychological flexibility by reducing anxiety symptoms and improving QoL using the strength-informed ACT framework, and promoting the growth of students.

The entire intervention was organized as 10 lessons (45 minutes) held once a week for 10 weeks. The intervention consisted of five activities, including one lesson for activity 1 (i.e., Identifying Personal Strengths), two lessons for each of the remaining four activities (i.e., Best Debater, Gratitude Diary, Pursuing the Beauty of Ideals, and Plan and Implement) and the last lesson was the concluding lesson. The intervention was delivered following an intervention session plan developed by social workers, educators, and psychologists. We had set up interactive sessions in each activity, taking the form of asking participants to ensure their participation by speaking or displaying the number 1 on the screen to ensure the reactions of the participants. The five activities developed are as follows:

(a) Identifying Personal Strengths. By watching videos and thinking about the strengths of the characters, the participants’ self-awareness of their personal strengths was promoted and their cognition of their strengths was further reconstructed.
(b) Best Debater. When conducting a debate on the pros and cons of online learning at home for students during the COVID-19 pandemic and identifying facts, ideas, and opinions, the students were required to use facts to support their opinions, they learned to use evidence-based thinking through the format of the debate contest and keep a certain distance from their ideas, which reduced their anxiety symptoms.
(c) Gratitude Diary. By writing down the three good things that happened every day and recording their feelings, the students were trained to promote their self-awareness of gratitude strength, maintain an accepting attitude toward positive and negative things or emotions, treat them normally, and improve their QoL.
(d) Pursuing the Beauty of Ideals. By recording three persons or things they found beautiful and their experiences every week, the students were trained to promote their self-awareness of appreciation of beauty and excellence strength, clarify their values and the way forward, and further improve their QoL.
(e) Plan and Implement. By accomplishing something the students once wanted to do but did not do or something they currently wish to pursue, the students were able to promote their self-awareness of perseverance strength, reduce anxiety symptoms, and better cope with challenges in the future.

Results

Table 2 shows the total sample, intervention group, and dropout group for the descriptive analysis of the variables (i.e., age, sex, anxiety symptoms, and QoL) at the pre-experimental. Table 3 shows the intervention group for the descriptive analysis of the outcomes (i.e., anxiety symptoms and QoL) at three time points. Table 4 presents the repeated-measures analysis of the outcomes in the intervention group to evaluate changes of participants after the intervention. Table 5 describes the post hoc tests of outcomes of the intervention group. The effect size was estimated using the partial eta squared ($\eta^2$). In this study, the significance level was $p < .05$. Cohen (1988) classified the effect size (d) into three levels, namely, large (0.80), medium (0.50), and small (0.20), and classified the partial eta-squared effect sizes into three levels, namely, large (0.14), medium (0.06), and small (0.01).

For Anxiety symptoms, a significant with-in subject change $F(2, 92) = 8.76, p < .001, \eta^2_p = 0.16, 1−\beta = 0.97$ was found (see Table 4). The results of the post hoc tests indicated significant changes in anxiety symptoms at T2 and T3 compared with T1 (See Table 5). During the post-test, participants’ anxiety symptoms reduction had a small effect size ($M = 1.80, p = .004$, Cohen’s $d = 0.48$); anxiety symptoms reduction had a medium effect size based on the 3-month follow-up test ($M =$
1.73, p < .001, Cohen’s d = 0.56), indicating that the change from the pre-experimental to 3-month follow-up test was an improvement and promising (See Table 5).

For QoL, a significant within-subject change [F (2, 92) = 4.28, p = .017, η²_p = 0.09, 1−β = 0.73] was found (see Table 4). The results of the post hoc tests indicated significant changes in QoL at T3 compared with T1 (See Table 5). An upward trend of QoL was observed after the intervention, reaching significance at 3-month follow-up. Based on the 3-month follow-up test, an improvement in QoL with a small effect size (M = 3.87, p = .019, Cohen’s d = −0.41) could be observed, which suggested that the change from the pre-experimental to the 3-month follow-up test is improved and desirable (See Table 5).

**Discussion and Application to Practice**

This study using online methods was conducted to integrate the strengths perspective and ACT-related technologies to relieve anxiety symptoms and enhance the QoL among the participants.
COVID-19-affected adolescents in Wuhan. The adolescents who participated in the online SACT intervention had a significant beneficial change in the 3-month follow-up tests for anxiety symptoms and QoL. The analysis results showed that the online SACT could alleviate anxiety symptoms and improve personal QoL (See Figure 2).

In this study, adolescents who have experienced crisis events and employed SACT had a significant reduction in anxiety symptoms after the intervention and significant improvement of QoL 3 months after the intervention, which was consistent with the theoretical assumptions of SACT. It should be noted that QoL was observed to have improved significantly in the 3-month follow-up tests, but did not change noticeably in the post-test, which was similar to the result of our previous study (Bu & Duan, 2021). Bu and Duan (2021) indicated that strength-based flourishing intervention for people with physical disabilities significantly promoted resilience in the 3-month follow-up test, but no significant improvement was found in the post-test. According to the proposed proximal-distal model of Brenner et al. (1995), we can see that the anxiety symptoms were the proximal outcome on which the intervention had the strongest effects, and therefore, the anxiety symptoms could be easily improved in the short-term, whereas QoL was the distal outcome on which the intervention had a diminished effect and involved a broader domain. Therefore, improvement in QoL requires a long-term process.

The offline intervention approach is challenging to carry out under the context of the COVID-19 pandemic, and providing timely treatment for adolescents is impossible. Emerging evidence has proven that the online approach could be an alternative to the offline approach (Liu et al., 2020). The online approach emphasizes embracing digital technology and its advantages include satisfying adolescents’ idea of using familiar equipment (Keeley & Little, 2017) and having accessible methods (Mukhtar, Javed, Arooj, & Sethi, 2020) to solve problems. Thus, compared with the traditional face-to-face offline method, online methods may draw in more adolescents. These methods also provide a promising way to provide convenient and feasible services when encountering infectious diseases in the future. However, the online approach has certain challenges, such as personal information security and privacy protection risks (Lustgarten, 2015). The issues introduced by the new technology and approach should be addressed in future studies.

This study also has some limitations. First, this study is a quasi-experiment without a control group. Because of the lack of a control group, we could not determine whether the improvement in anxiety symptoms and QoL were the results of the intervention or other factors. Furthermore, the sample size is small. Thus, in future studies, RCTs and larger samples should be used to reproduce these outcomes, such as ACT versus SACT, ACT versus Cognitive Behavioral Therapy, intervention group versus control group, etc. Second, individuals lacking electronic equipment and network facilities have difficulty participating in online interventions, which exacerbates service inequality. Third, the post-test and 3-month follow-up tests were completed. However, the long-term changes of the intervention are uncertain, and future research should focus on this problem. Fourth, the random dropout rate was 38% because some of the participants forgot to complete the online questionnaire in time for the measurement. Hence, future studies can employ methods, such as phone calls, text messages, and emails to remind participants to complete the online questionnaires promptly.

To conclude, this study developed the online SACT intervention, which integrates a strengths perspective with the existing ACT model to relieve anxiety symptoms and enhance QoL among adolescents in the context of a crisis. Furthermore, for adolescents, the online approach is accessible, convenient, and flexible, specifically when the movement of people is restricted. However, this study needs to be verified by more scientifically designed RCTs and with larger sample sizes to promote its generality.

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