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**Evaluating Effectiveness of Cognitive–Behavior Therapy for Hong Kong Adolescents
With Anxiety Problems**

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Abstract

Objectives: The aims of this study were to examine the effects of group cognitive–behavior
therapy (CBT) on improving anxiety symptoms and enhancing personal growth among
adolescents at risk of developing anxiety disorders in school settings in Hong Kong. Method:
A total of 26 participants received an eight-session CBT group and 20 received treatment as
usual in the waitlist control condition. Instruments measuring anxiety symptoms, types of
anxiety in children, dysfunctional thoughts, and personal growth were used to assess the

changes in severity of anxiety symptoms, dysfunctional thoughts, and personal growth among the participants. Results: A 2 x 2 mixed model analyses of variance were employed, results demonstrated significantly greater improvements in overall anxiety symptoms, generalized anxiety symptoms, and personal growth—use of resources in the participants of the CBT group compared to the control group. Conclusion: Group CBT may potentially improve anxiety symptoms of adolescents in school settings in Hong Kong.

Keywords: cognitive–behavior therapy, adolescents, anxiety, minority groups, treatment

In the literature, pathological childhood anxiety is defined as persistent or excessive anxieties that severely affect a child's normal and adaptive functioning. On a continuum, anxiety can be expressed in terms of mild to severe, with severe anxieties characterized by the presence of an anxiety disorder (Keenan & Evans, 2009). In the United States, childhood anxiety affects up to 12% of children, compared to approximately 1% for depression and co-occurrence of different subtypes of anxiety disorders is also common among these children. Another source suggests that 10–20% of children and adolescents in the United States have anxiety disorders (Costello, Mustillo, Keeler, & Angold, 2004). In Asia, there is an absence of prevalence studies on childhood anxieties. In mainland China, several studies have found Chinese children and adolescents displayed a high level of anxiety symptoms (Delvecchio, Mabilia, Riso, Mivoni, & Li, 2015; Zhao, Xing, & Wang, 2012). In Hong Kong, there is no established prevalence study on childhood anxiety, and a recent study suggests that 11.5% of children and adolescents suffer from some form of anxieties (Wong & Tung Wah Group of Hospitals, 2013). Generally speaking, childhood anxiety is relatively stable, and without appropriate intervention, can adversely affect a child's or adolescent's academic performance (Duchesene, Vitaro, Larose, & Tremblay, 2008) and adaptive functioning (Langley, Bergman, McCracken, & Piacentini, 2004). Moreover, childhood and adolescent anxieties are not always transitory and, in many cases, persist into adulthood (Cartwright-Hatton, McNicol, & Doubleday, 2006). In the literature, childhood anxiety can be further classified into child and adolescent anxieties. Although there is a lack of consensus regarding the age ranges separating children and adolescents, Kendall and Peterman (2015) suggest that children aged 12–18 would be regarded as adolescents.

Cognitive-behavioral therapy (CBT) is considered a well-established psychological choice of treatment for childhood anxieties (Cartwright-Hatton, Roberts, Chitsabesan, Fothergill, &

Harrington, 2004; Reynolds, Wilson, Austin, & Hooper, 2012) and has been widely practiced in different countries. In a meta-analytic study conducted by Compton et al. (2004), they found that CBT had achieved moderate-to-large effect sizes for childhood anxieties. Another meta-analysis of 55 randomized controlled trials on childhood anxieties indicated the overall effect size for CBT intervention was moderate to large whereas the effect size for non-CBT intervention was not significant (Reynolds et al., 2012). In addition, studies have found maintenance effects of CBT for childhood anxieties ranging from 1 to 19 years (Kendall & Peterman, 2015). In this literature, there are at least three popular CBT programs for childhood anxieties. The Coping Cat Program designed by Kendall (1994) is generally considered one of the best evaluated CBT programs for childhood anxiety. Another program called FRIENDS has an early intervention and prevention focus for treatment of adolescents with negative emotions (Barrett, 1998). The Cool Kids program developed by Rapee et al. (2006) is a skill-based program aiming at helping children and their parents learn practical skills in dealing with children's anxieties. A look at the program content reveals some common core components that can be found in these CBT programs for childhood anxieties including (1) recognizing anxious feelings and physical reactions to anxiety, (2) developing a coping plan, (3) learning adaptive cognitive and behavioral strategies to deal with anxieties (e.g., cognitive restructuring), and (4) exposure. In particular, cognitive restructuring and exposure are said to make substantial contributions to reducing youth anxieties (Peris et al., 2015).

Despite its potential benefits, there are at least two issues surrounding CBT for child and adolescent anxieties that are worth further exploring. First, meta-analytic studies on childhood anxiety reveal that the majority of research that had examined the efficacy of CBT had used combined child and adolescent samples, and far fewer studies were conducted on

adolescents alone (Kendall & Peterman, 2015; Reynolds et al., 2012). When comparing the independent effects of CBT on child and adolescent anxiety problems, a meta-analytic study reveals that CBT exerted greater benefits on adolescents than younger children, with effect size for CBT for younger children being small to medium and the effect size for CBT for adolescents being very large (Reynolds et al., 2012). On the other hand, Kendall and Peterman's review on CBT for childhood anxiety suggests that adolescents and children had comparable positive outcomes to CBT. The above research findings appear to suggest that the two groups have differential characteristics and needs that warrant different ways of conceptualizing and intervening in order to address the unique treatment concerns of the two groups (Waite & Creswell, 2014). As Hess, Magnuson, and Beeler (2012) echo, children and adolescents are at different stages of cognitive development and engage in cognitive processing differently. In the Asian and Chinese contexts, a literature search finds very few studies on the effects of CBT for Chinese adolescents with anxiety problems. Of the three studies that are found in the literature, all of them focused on younger children with anxiety problems (i.e., below the age of 12; Lau, Chan, Li, & Au, 2010; Siu, 2007; Yen et al., 2014). There is a lack of evidence of positive effects of CBT on anxiety problems of Chinese adolescents.

Secondly, apart from treating clinical samples, CBT has also been applied to naturalistic settings such as community clinics and schools, using a prevention approach to target children and adolescents who are at risk of developing anxiety disorders (e.g., Reynolds et al., 2012). However, Kendall and Peterman (2015) maintain that such effort is still relatively sparse and lacking. This is an important research and practice issue that is worth examining because (i) the vast majorities of children and adolescents with high levels of anxiety do not seek treatment and suffer from untreated clinical conditions (van Starrenburg et al., 2013) and

(ii) although CBT for child and adolescent anxiety evidenced significant improvements in symptoms at posttreatment assessment in community settings, the effect sizes had been lower than in efficacy trials (i.e., university clinics) and are sometimes comparable to those of treatment as usual (Kendall & Peterman, 2015). In other words, the effects of CBT for adolescent anxieties in naturalistic settings have yet to be demonstrated. In the Asian and Chinese contexts, of the three studies that are found in the literature on CBT for Chinese children with anxiety problems, only one study was conducted in a school setting (Yen et al., 2014). As such, evidence is lacking on the effects of CBT on anxiety problems of Chinese adolescents in naturalistic settings. In this study, we adopted a prevention approach targeting the at-risk populations on the mild-to-moderate end of the anxiety continuum. A cutoff score of 9 or above on the anxiety subscale of Hospital Anxiety and Depression Scale (HADS) was used to identify possible cases of anxiety problems in adolescents (Zigmond & Snaith, 1983). This was cross confirmed by the form teacher and/or school social worker.

CBT Applications in Chinese Populations

Most of the previous studies on the effects of CBT on childhood anxiety were conducted in Western countries, and very few studies have examined the effects of CBT on anxious Chinese adolescents in Asia (Yen et al., 2014). However, numerous studies have revealed that Chinese children and adolescents have higher levels of anxieties than those in other countries. Studies conducted by Zhao, Xing, and Wang (2012) found that Chinese adolescents in mainland China displayed a higher level of anxiety symptoms than adolescents in Holland, Germany, and Italy. Other studies also suggest that Chinese and Taiwanese children and adolescents had significantly higher levels of anxiety symptoms than their American counterparts on the Multidimensional Anxiety Scale for Children (Yao et al., 2007; Yen et al., 2010). Such an elevated rate of anxiety in Chinese children and adolescents may be related to

strict socialization processes resulting in possibly excessive self-control and emotional restraints (Xie & Leong, 2008), fear of disobedience of authorities, and fear of poor academic performance (Delvecchio et al., 2015).

Surprisingly, despite the abovementioned findings, a literature search finds very few studies on the effects of psychological intervention (including CBT) for Chinese adolescents with anxiety problems. Of the three that can be found, Lau and colleagues (2010) adapted the Coping Cat program for children with anxiety problems in the clinic settings. They found a significant decrease in anxieties and a significant improvement in coping skills among participants between pretest and posttest and at 3 and 6 months follow-up (Lau et al., 2010). Another evaluation of the FRIENDS program, which was run for primary school students aged 8–10, in Hong Kong revealed a significantly greater reduction in anxiety symptoms and externalizing behaviors in the treatment group than in control group at posttest (Siu, 2007). In Taiwan, Yen et al. (2014) adapted the Coping Cat program to treat children between 7 and 12 with a diagnosable anxiety disorder in hospital settings. The results indicated significant improvement in the severity of anxieties among the participants.

There are several limitations in the above-cited studies: (1) the three studies conducted in Hong Kong and Taiwan focused on children below the age of 12. There is no study on Chinese adolescents with anxiety problems, and therefore inadequate evidence of the effects of CBT for Chinese or Hong Kong adolescents with anxiety problems, and (2) there is a problem with transportability of CBT to other community settings (Lau et al., 2010). For example, in Lau's study, interventions were carried out in a government clinic by a limited number of clinical psychologists in social services and educational contexts. It is difficult to transfer such "ideal" practice to other settings in Hong Kong. On the other hand, every

school in Hong Kong has one school social worker who has daily contact with adolescents with anxiety problems. It may be more practical to develop and train professionals, such as school social workers, to implement the CBT intervention, so that adolescents who are at risk of developing anxiety disorders can benefit from the intervention.

Modified CBT for Adolescents With Anxiety Problems in Hong Kong

Kendall and Peterman (2015) suggest that whereas initial findings appear to support the effects and transportability of CBT for anxious adolescents to other cultures, there is still much need to continue to develop guidelines for culturally sensitive adaptations that maintain the integrity of CBT. Our group CBT intervention followed the contents of the original Coping Cat program developed by Kendall (1994). Each group had six to eight participants. There were eight sessions per group and 2 hr per session. The first four sessions covered topics of (1) recognizing anxious feelings and somatic reactions to anxiety, (2) clarifying feelings in anxiety-provoking situations, (3) developing a coping plan (e.g., modifying anxious self-talk into coping self-talk, determining what coping actions might be effective, and learning relaxation skills), and (4) evaluating performance and administering self-reinforcement. The rest of the sessions helped participants practice the learned skills in low, moderate, and high anxiety-provoking real-life situations using exposure tasks. In order to accommodate to the usual practice of after-school and other school-related activities, the group sessions were reduced from 16 one-hr sessions to 8 two-hr sessions. Similar modifications were successfully implemented in Hong Kong (Lau et al., 2010). All groups were run by school social workers who were trained by two experienced CBT therapists.

To cultivate participants' interests in the group, the manual was written in Chinese with relevant case examples and activities. Video clips of cartoons and movies in Chinese were

chosen to illustrate the various CBT concepts such as anxious feelings, somatic reactions, and helpful and unhelpful responses. The 10 types of cognitive distortions such as catastrophizing, arbitrary inference, and assumption of responsibility that might be linked to anxiety reactions were translated into colloquial terms, so that the participants could readily understand and remember them. Coping strategies were framed as a “5-Step Strategies” which included (1) recognizing one’s idiosyncratic somatic response pattern, (2) thought stopping, (3) self-disputing questions, (4) distraction, and (5) positive coping thoughts. Before conducting exposure, each member in the group had to develop a hierarchy of fear and rated the intensity of his or her anxiety against each of the fearful situations. In the remaining sessions, the group participants were encouraged to face the fearful situations and practice their 5-Step Strategies. In the next session, the participants were asked to share their experiences with other group members. All participants in the experimental group had a workbook with homework assignments and some of the activities had to be completed together with one of their parents outside of the group session.

As mentioned before, an elevated rate of anxiety in Chinese adolescents may be related to strict socialization processes resulting in possibly excessive self-control and emotional restraints (Xie & Leong, 2008), fear of disobedience of authorities, and fear of poor academic performance (Delvecchio et al., 2015). To address these underlying factors, the group leaders carefully facilitated participants to learn to express and assert themselves through verbal encouragement and modeling. For those who were lacking emotive words to accurately express their emotions, they were given an A-3 size paper chart with faces of various emotions and were encouraged to name their emotion using the chart. All social workers in this project abided by a “no criticism, positive encouragement” policy, so that adolescents could feel that the group was a place for playful learning rather than being another

extracurricular activity that they had to join. These positive experiences, in effects, laid the ground for the participants' greater willingness to engage in exposure activities and, in turn, further increased their self-confidence.

In summary, our group CBT intervention (1) was run as an after-school program for junior secondary school students between Grade 7 and Grade 9 (age of 11–14), (2) adopted a prevention approach and recruited adolescents at risk of having an anxiety disorder, (3) modified to suit the needs of Chinese adolescents, and (4) used a group format. According to previous studies, there was no significant difference between individual and group CBT in treating childhood anxieties (e.g., Wergeland et al., 2014). However, a group approach has other therapeutic effects such as mutual support and sharing of information (Yalom & Leszcz, 2005).

The objectives of the present evaluation study were (1) to examine the effects of a culturally attuned group CBT intervention for helping adolescents manage their anxiety problems in Hong Kong and (2) to test whether the changes in cognition and personal growth might be associated with changes in anxieties among adolescents with anxiety problems. This study had the following hypotheses:

Hypothesis 1: The participants in the experimental group would have reduced anxiety symptoms when compared to the participants in the waitlist control group after group CBT intervention,

Hypothesis 2: The participants in the experimental group would achieve positive changes in cognition when compared to the participants in the waitlist control group after group CBT intervention.

Hypothesis 3: The participants in the experimental group would achieve positive changes in personal growth initiative when compared to the participants in the waitlist control group after group CBT intervention.

Method

Participants

A quasi-experimental pretest and posttest waitlist control design was adopted in this study.

Randomization could not be carried out because most of the school personnel preferred to let adolescents and their family members choose the treatment options (yes/no treatment).

Sample size was calculated based on a high moderate effect size of .70 for clinical outcome research. For 80% power, an error of .05, and a test of two independent groups, the required sample size was 15 per group. The participants' inclusion criteria were (1) junior secondary school Chinese students between the age of 11 and 14 (Grade 7 to Grade 9), (2) able to understand Cantonese or Chinese, and (3) currently experiencing symptoms of anxiety, as perceived by the teachers and/or social workers in school and achieved a score of mild-to-moderate anxieties in HADS–Anxiety (HADS-A) subscale. Although a few participants did not score high enough in HADS to qualify as at risk of developing an anxiety disorder, form teacher and/or social worker of the individual student recommended inclusion in the group, based on their understanding of the student. Those who had severe mental illness (e.g., psychosis), special education needs (e.g., autism or attention deficit and hyperactivity disorder [ADHD]), and/or suicidal attempt or ideation in the past 3 months were excluded.

All participants were recruited by the school social workers of Tung Wah Group of Hospitals. Initially, 28 participants in the experimental group and 21 in the control group who met our inclusion criteria were recruited. Two participants in the experimental group withdrew (i.e., one due to health reason and one with excessive homework) and one in the control group was excluded due to special education needs (i.e., ADHD, with severe disruptive behaviors in the group). A flow diagram of the different stages of the study is presented in Figure 1.

Eventually, there were 26 participants in the experimental group and 20 in the control group, with more males in the experimental group than control group. In the experimental group, the mean age was about 13.35 years old, and there were more students from Grade 7 (i.e., Form 1). Sixty-five percent lived in public housing estates and around 85% were living with their mother and siblings (Table 1). For participants of the control group, the mean age was about 13.15 with a higher percentage studying Grade 7 (i.e., Form 1). About 50% lived in public housing and with the majority living with parents and siblings (Table 1). In addition, none of the participants had a formal psychiatric diagnosis or was receiving psychiatric follow-up. w^2 tests and analyses of variance (ANOVAs; two tailed) were performed and found no statistical significance in demographic characteristics between the participants of the experimental and control groups.

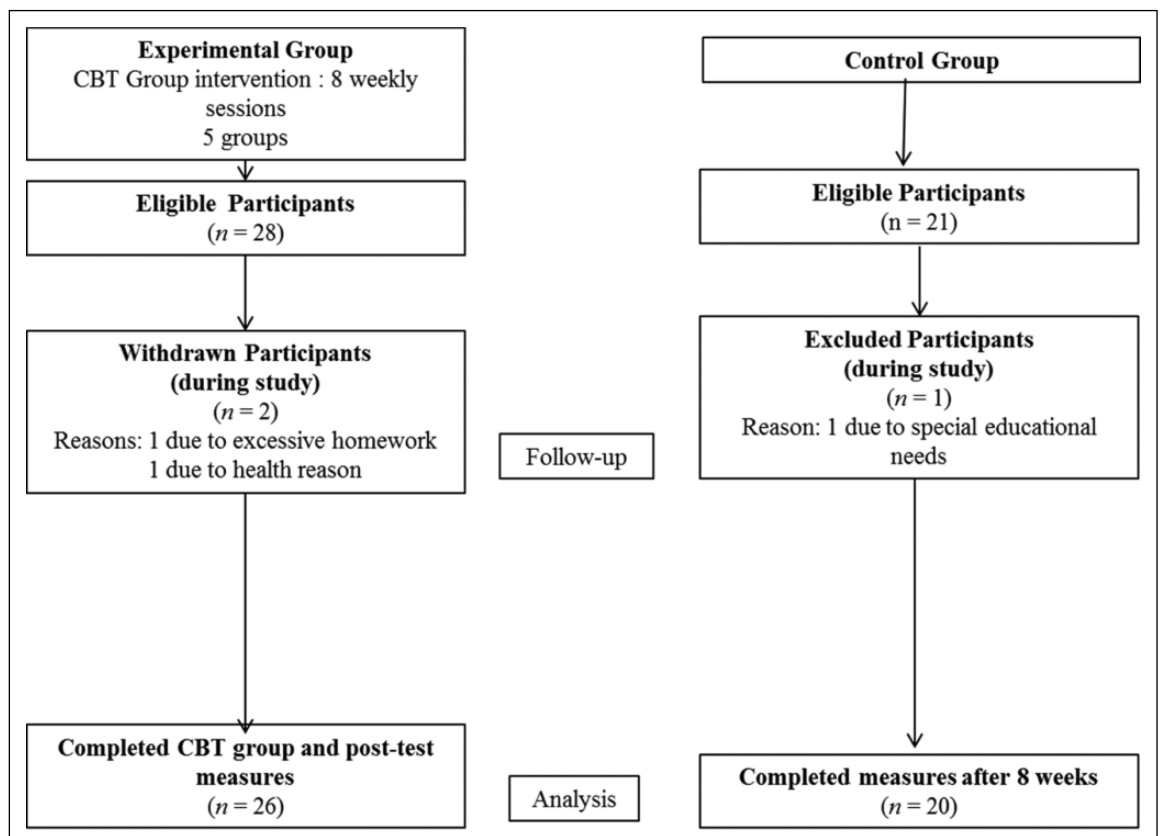


Figure 1. Flow diagram of intervention through the stages of the study.

Table 1. Demographics of Participants.

| | | Control Group (<i>n</i> = 20) | Experimental Group (<i>n</i> = 26) | $\chi^2/F(1, 44)$ (<i>p</i>) |
|--------------------------|--|--------------------------------|-------------------------------------|--------------------------------|
| | | <i>n</i> (%) | <i>n</i> (%) | |
| Gender | Male | 8 (40.00) | 13 (50.00) | 0.46 (.50) |
| | Female | 12 (60.00) | 13 (50.00) | |
| Birth place | Hong Kong (HK) | 17 (85.00) | 23 (88.50) | 0.12 (.73) |
| | China (Mean year of stay in Hong Kong) | 3 (6.14) | 3 (10.00) | |
| Age | Mean (<i>SD</i>) | 13.15 (0.99) | 13.35 (0.98) | 0.45 (.51) |
| Health status | Physically healthy | 12 (60.00) | 19 (73.10) | 2.18 (.70) |
| | Anxiety disorders | 4 (20.00) | 3 (11.50) | |
| | Chronic illness | 1 (5.00) | 1 (3.80) | |
| | Others | 2 (10.00) | 3 (11.50) | |
| Education | Grade 7 | 14 (70.00) | 12 (46.20) | 3.43 (.18) |
| | Grade 8 | 2 (10.00) | 8 (30.70) | |
| | Grade 9 | 4 (20.00) | 6 (23.10) | |
| Living with ^a | Mother | 18 (90.00) | 22 (84.60) | 0.29 (.59) |
| | Father | 14 (70.00) | 19 (73.10) | |
| | Sibling | 13 (65.00) | 17 (84.60) | |
| | Grandparents | 4 (20.00) | 5 (19.20) | |
| | Others | — | 5 (19.20) | |
| Household income | HK\$10,000 or below | 5 (25.00) | 2 (7.70) | 0.17 (.98) |
| | HK\$10,001–20,000 | 9 (45.00) | 14 (53.80) | |
| | HK\$20,001–30,000 | 4 (20.00) | 3 (11.50) | |
| | HK\$30,001–40,000 | 2 (10.00) | 6 (23.10) | |
| | HK\$40,001+ | — | 1 (3.80) | |
| Housing type | Public | 10 (50.00) | 17 (65.40) | 4.81 (.31) |
| | Village | 3 (15.00) | 1 (3.80) | |
| | Subsidized | 2 (10.00) | — | |
| | Private | 5 (25.00) | 8 (30.80) | |

^aVariables that allow more than one primary answer.

Measures

HADS-A subscale. The scale was designed by Zigmond and Snaith (1983). Only the anxiety subscale (i.e., 7 items) was used. All items are scored on a 4-point scale from 0 to 3. Higher scores denote greater severity of anxieties. In addition, scores can be summed to indicate cases and noncases, with a score of 0–8, 9–11, or 12 and above, suggesting a normal, possible, or probable case of anxiety disorder, respectively. The Chinese version of HADS was validated by Leung, Wing, Kwong, Lo, and Shum (1999), the reliability of the anxiety subscale was .77. This scale had been used to assess anxiety in Hong Kong adolescents (Chan, Leung, Fong, Leung, & Lee, 2010).

The Spence Children's Anxiety Scale. This scale was designed to measure six types of childhood anxiety according to *Diagnostic and Statistical Manual of Mental Disorders*,

fourth edition, criteria: separation anxiety disorder, social phobia, obsessive–compulsive disorder, panic attack, fear of physical injury, and generalized anxiety disorder (Spence, 1997). This scale had been used on adolescents up to the age of 18 (Muris, Merlkelbach, Ollendick, King, & Bogie, 2002). There are 44 items with each item rated on a 4-point scale (1 $\frac{1}{4}$ *never* to 4 $\frac{1}{4}$ *always*). Higher scores denote greater severity of anxieties. Li, Lau, and Au (2011) validated the Chinese version of the scale. In the present study, the Cronbach's α for the total scale was good (pretest $\frac{1}{4}$.90, posttest $\frac{1}{4}$.92). All the subscales achieved a marginally acceptable to acceptable Cronbach's α at pretest (.46 to .78) and posttest (.52 to .83)

Dysfunctional Attitudes Scale (DAS)—9 items version. The DAS was developed by Andrews, Lewinsohn, Hops, and Roberts (1993). The 9-item version of DAS assesses the tendency of the adolescents to endorse certain dysfunctional attitudes. This measure has been applied in various populations including adolescents (Lewinsohn, Seeley, & Gotlib, 1997). Participants were asked to read each statement and indicated how much they agreed or disagreed with the statement from totally agree to totally disagree. In the present study, the Cronbach's α was acceptable (pretest $\frac{1}{4}$.74, posttest $\frac{1}{4}$.76).

Personal Growth Initiative Scale II (PGIS-II). The PGIS-II is a revised multidimensional measure of the complex processes of personal growth initiative, which can be described as a person's active and intentional involvement in changing and development. The PGIS includes 4 subscales: Readiness for Change, Planfulness, Using Resources, and Intentional Behavior. A study into the psychometric evaluation of the PGIS-II (Robitschek et al., 2012) provided exploratory and confirmatory evidence for the four-factor structure, strong internal consistency for the subscales, and concurrent and discriminant validity of the PGIS-II. In the

present study, the Cronbach's α was good for all subscales: Readiness for Change (pretest $\frac{1}{4}$.67 posttest $\frac{1}{4}$.84), Planfulness (pretest $\frac{1}{4}$.84, posttest $\frac{1}{4}$.82), Using Resources (pretest $\frac{1}{4}$.80, posttest $\frac{1}{4}$.82), Intentional Behavior (pretest $\frac{1}{4}$.89, posttest $\frac{1}{4}$.84), as well as the total scale (pretest $\frac{1}{4}$.92, posttest $\frac{1}{4}$.94).

Procedures

Ethical approval was obtained from the Ethics Committee of the City University of Hong Kong. A consent form and an invitation letter that clearly explained the procedures were sent to parents of each eligible student. Upon receiving the consent from the parents, a questionnaire containing a battery of instruments was given to the student in school. The questionnaire was filled out by the students themselves. Data collection was conducted within 2 weeks before and after the group. The participants of the experimental group went through an 8-week group CBT intervention while the participants in the control group did not. Once the group was over, the participants of the control group were given the same 8-week group CBT intervention. All the CBT groups were conducted between April 2014 and August 2015.

Treatment Fidelity

In order to ensure fidelity to treatment, all group contents were standardized and all social workers participating in the project had been trained to follow the same group manual. The involved social workers had to hold an undergraduate level of social work qualification with a minimum of 3 years of social work experience. A demonstration group was first run by a trained CBT therapist with over 8 years of CBT practice. Participating social workers watched the video tapes of all group sessions and were guided to observe and learn the strategies/skills in running the CBT group. In addition, they received ongoing supervision from the therapist as well.

Data Analysis

A quasi-experimental pretest and posttest waitlist control design was adopted for this study. Data analyses were conducted for all participants who completed the treatment or the waiting period. Adopted an intention-to-treat analysis, all missing data for each outcome measure were imputed using the method of “last observation carried forward.” A series of 2 x 2 mixed model ANOVAs were performed to examine the main and interaction effects of time and group on the outcome measures at pretest and posttest (Howell, 2013). Post hoc pairwise comparisons using Bonferroni test were used to examine the level of significance between pretest and posttest in the outcome measures in the experimental and control groups (Howell, 2013). Finally, Cohen’s *d* was used to measure the magnitude of change between pretest and posttest in both experimental and control groups (Cohen, 1988).

Results

Based on the cutoff score on the HADS-A, different sets of score were used to indicate individuals as cases and noncases, with a score of 0–8, 9–11, or 12 and above, indicating normal, possible, or probable cases of anxiety disorder, respectively. Our results suggested that about 70% of the participants in the experimental group of junior secondary school students could be classified as possible cases and probable cases (38% and 31%) of anxiety, respectively, at pretest (Table 2). Similarly, for the control group, around 70% could be classified as possible cases and probable cases (50% and 20%) of anxiety, respectively, at pretest. These figures contrasted greatly with those taken at posttest especially for the experimental group, as there were only 30% who remained to be possible and probable cases and around 70% could be considered as normal cases, compared to a 60% who remained as possible and probable cases and 40% who became normal cases in the control group. Z-tests were conducted to compare the differences in the number of anxiety cases across the three categories (i.e., normal, possible, and probable cases) between pretest and posttest for both experimental and control group. Analyses revealed that, for participants of the experimental group, there was a significant increase in the number of cases falling back into the normal range ($z \frac{1}{4} -2.77, p < .00$) and a significant decrease in the number of probable cases ($z \frac{1}{4} 2.11, p \frac{1}{4} .03$), while the number of possible cases showed an insignificant decrease ($z \frac{1}{4} 1.20, p \frac{1}{4} .23$). In contrast, changes in the number of anxiety cases were insignificant for the control group across all three categories. Hypothesis 1 was largely supported.

Table 2. Differences in the Percentage of Normal, Possible, and Probable Cases of Anxiety Among Participants in the Group Cognitive–Behavior Therapies and Control Group at Pretest and Posttest.

| | Experimental Group $n \frac{1}{4} 26$ Group $n \frac{1}{4} 20$ | | Control | |
|---|---|------------------|-----------------|------------------|
| | Pretest n (%) | Posttest n (%) | Pretest n (%) | Posttest n (%) |
| 0–8 Score on HADS-A (normal) | 8 (30.77) | 18 (69.23) | 6 (30.00) | 8 (40.00) |
| 9–11 Score on HADS-A (possible cases) | 10 (38.46) | 6 (30.00) | 10 (50.00) | 8 (40.00) |
| 12 and above score on HADS-A (probable cases) | 8 (30.77) | 2 (7.69) | 4 (20.00) | 4 (20.00) |

Note. HADS-A $\frac{1}{4}$ Hospital Anxiety and Depression Scale—Anxiety.

Descriptive statistics for all outcomes measures for both experimental and control group are found in Table 3. ANOVAs (two tailed) were used to test for baseline differences between experimental and control group and found no significant baseline differences ($ps > .05$) between the two groups. A 2 x 2 mixed model ANOVAs (two tailed) revealed that there were significant Time x Group interaction effects in Hospital Anxiety Scale—Anxiety subscale, $F(1, 44) \frac{1}{4} 3.93, p \frac{1}{4} .05$, Spence’s Generalized Anxiety subscale, $F(1, 44) \frac{1}{4} 5.12, p \frac{1}{4} .03$, Personal Growth—Using Resources subscale, $F(1, 44) \frac{1}{4} 5.27, p \frac{1}{4} .03$, and Personal Growth—Mean Score, $F(1, 44) \frac{1}{4} 3.93, p \frac{1}{4} .05$; Table 4). Simple main effects of time within each group were then tested for the above findings, using Bonferroni adjustment. Only the experiment group showed a significant decrease in Hospital Anxiety Scale—Anxiety subscale, $F(1,44) \frac{1}{4} 8.31, p \frac{1}{4}.01$, with a moderate effect size (Cohen’s $d \frac{1}{4} .63$), and significant increase in Personal Growth—Using Resources subscale, $F(1, 44) \frac{1}{4} 12.65, p < .01$; Cohen’s $d \frac{1}{4} .72$, and Personal Growth—Mean Score, $F(1, 44) \frac{1}{4} 12.90, p < .01$; Cohen’s $d \frac{1}{4} .50$, between pretest and posttest, while the control group showed insignificant increases or decreases in the above variables. So Hypothesis 3 was partially supported. Since there was no Time x Group interaction effects in dysfunctional attitudes between pretest and posttest for both experimental and control groups, Hypothesis 2 was rejected (Table 4).

Table 3. Means and Standard Deviations for Pretest and Posttest by Outcome Measures.

| | Experimental Group | | Control | |
|---------------------------------|--------------------|---------------|---------------|---------------|
| | Pretest | Posttest | Pretest | Posttest |
| | <i>M (SD)</i> | <i>M (SD)</i> | <i>M (SD)</i> | <i>M (SD)</i> |
| Hospital anxiety total (HADS-A) | 9.77 (3.54) | 7.77 (2.73) | 9.53 (2.09) | 9.62 (4.23) |
| Spence anxiety total | 45.73 (18.49) | 37.24 (16.41) | 43.50 (14.89) | 42.30 (18.73) |
| Panic attack anxiety | 6.65 (4.43) | 6.19 (4.72) | 7.70 (4.51) | 7.55 (4.95) |
| Separation anxiety | 5.92 (4.00) | 5.43 (3.65) | 6.45 (3.76) | 5.65 (3.22) |
| Social anxiety | 9.23 (3.81) | 8.15 (3.93) | 8.50 (3.98) | 8.30 (3.80) |
| Fear of physical injury | 8.19 (4.05) | 3.69 (2.09) | 7.40 (4.11) | 4.35 (1.76) |
| Obsessive compulsive | 8.15 (3.95) | 6.46 (3.72) | 7.80 (3.47) | 7.75 (4.02) |
| Generalized anxiety | 8.65 (3.44) | 7.31 (3.50) | 7.40 (2.85) | 78.70 (4.54) |
| Dysfunctional attitudes | 2.89 (0.65) | 2.75 (0.62) | 3.04 (0.76) | 2.98 (0.60) |
| Personal growth mean | 2.70 (0.91) | 3.16 (0.93) | 2.93 (0.82) | 3.00 (0.71) |
| Readiness for change | 2.81 (1.01) | 3.19 (1.01) | 2.91 (0.83) | 3.01 (0.76) |
| Planfulness | 2.75 (1.01) | 3.18 (0.94) | 3.04 (0.90) | 2.96 (0.67) |
| Using resources | 2.19 (1.21) | 3.01 (1.07) | 2.80 (1.24) | 2.82 (1.25) |

| | | | | |
|----------------------|-------------|-------------|-------------|-------------|
| Intentional behavior | 2.91 (1.25) | 3.21 (0.92) | 3.21 (0.92) | 3.21 (0.71) |
|----------------------|-------------|-------------|-------------|-------------|

Note. HADS-A ¼ Hospital Anxiety and Depression Scale—Anxiety.

Table 4. Interaction Effects and Effect Size of Outcome Measures.

| | Interaction Effect (Time x Group) | | Experimental Group | | | Control Group | | |
|---------------------------------|-----------------------------------|----------|------------------------------|----------------|----------------|------------------------------|----------------|----------------|
| | <i>F</i> (1, 44) | <i>p</i> | Cohen's <i>d</i> Effect Size | Pretest | Posttest | Cohen's <i>d</i> Effect Size | Pretest | Posttest |
| | | | | [95%, CI] | [95%, CI] | | [95%, CI] | [95%, CI] |
| Hospital anxiety total (HADS-A) | 3.93 | .05* | 0.63 | [8.58, 10.96] | [6.40, 9.14] | -.02 | [8.18, 10.88] | [8.06, 11.18] |
| Spence anxiety total | 2.43 | .13 | 0.50 | [39.00, 58.46] | [30.34, 44.14] | .11 | [35.82, 51.18] | [34.44, 50.16] |
| Panic attack anxiety | 0.04 | .84 | 0.10 | [4.89, 8.42] | [4.29, 8.10] | .03 | [5.69, 9.71] | [5.38, 9.72] |
| Separation anxiety | 0.10 | .76 | 0.13 | [4.38, 7.46] | [4.06, 6.80] | .23 | [4.69, 8.21] | [4.09, 7.21] |
| Social anxiety | 0.62 | .44 | 0.30 | [7.70, 10.77] | [6.62, 9.68] | .06 | [6.75, 10.25] | [6.56, 10.05] |
| Fear of physical injury | 1.78 | .19 | 1.42 | [6.58, 9.80] | [2.92, 4.47] | .99 | [5.56, 9.24] | [3.47, 5.23] |
| Obsessive compulsive | 1.83 | .18 | 0.45 | [6.67, 9.64] | [4.94, 7.99] | .02 | [6.11, 9.49] | [6.01, 9.49] |
| Generalized Anxiety | 5.12 | .03* | 0.21 | [7.39, 9.92] | [5.73, 8.88] | -.38 | [5.96, 8.84] | [6.91, 10.50] |
| Dysfunctional attitudes | 0.14 | .71 | 0.22 | [2.61, 3.17] | [2.51, 2.99] | .09 | [2.73, 3.36] | [2.71, 3.26] |
| Personal growth mean | 3.93 | .05* | 0.77 | [2.36, 3.05] | [2.83, 3.49] | .09 | [2.53, 3.32] | [2.62, 3.38] |
| Readiness for change | 1.52 | .23 | 0.38 | [2.44, 3.18] | [2.83, 3.55] | .13 | [2.49, 3.33] | [2.60, 3.42] |
| Planfulness | 3.40 | .07 | 0.44 | [2.37, 3.13] | [2.85, 3.51] | -.10 | [2.60, 3.47] | [2.58, 3.34] |
| Using resources | 5.27 | .03* | 0.72 | [1.71, 2.68] | [2.56, 3.47] | .02 | [2.25, 3.35] | [2.30, 3.33] |
| Intentional behavior | 1.63 | .21 | 0.27 | [2.47, 3.36] | [2.88, 3.62] | 0 | [2.71, 3.72] | [2.79, 3.63] |

Note. HADS-A ¼ Hospital Anxiety and Depression Scale—Anxiety.

p* < .05, *p* < .01, ****p* < .001.

Discussion and Application to Practice

The present study provided initial support for the effects of a school-based group CBT intervention in reducing anxieties among adolescents in junior secondary schools in Hong Kong. Since there is an absence of any empirical data for CBT for Chinese adolescents with anxiety problems, these findings serve as an encouragement for the further development of CBT for Chinese adolescents with anxiety problems in Hong Kong and elsewhere. In our design of this group CBT intervention, we took into account of the characteristics and needs of our group of Chinese adolescents in Hong Kong, being fairly passive, obedience to authorities and restraints of emotion, and encouraged them to express and assert themselves through verbal encouragement, modeling, and group activities. To enhance the interests of our adolescents in the group processes, we developed a colorful workbook in Chinese with relevant case examples and activities for the participants and used video clips of cartoons and movies in Chinese to illustrate the various CBT concepts. Such an adaptation of the CBT model might have contributed to the positive receptivity of the group by the Chinese adolescents. In turn, this might have enhanced their learning in the group. Given the fact that the vast majority of children and adolescents with high levels of anxiety do not seek treatment (van Starrenburg et al., 2013) and that Chinese adolescents have a higher rate of anxiety problems than their counterparts in other countries (Delvecchio et al., 2015; Zhao et al., 2012), this group CBT prevention program, which was run as an after-school “developmental program,” may be able to attract adolescents who would otherwise refuse to attend any treatment. However, there are three important ways to improve the study design, so that it can provide a stronger evidence for its effects. These are (1) increase the sample size to provide more power for analysis, (2) design a follow-up test to ascertain longer term effects, and (3) provide an opportunity for randomization of the subjects in the study.

An important agenda of this study was to find out whether group CBT for adolescent anxiety can be successfully run under circumstances that more closely approach real-life situations in routine community settings. The application of this group CBT intervention was conducted as an after-school prevention program by the school social workers in school settings in Hong Kong. These workers conducted the CBT groups alongside the many daily duties that they were performing. They also had to overcome many administrative and practical difficulties when running the groups. Furthermore, the study purposely did not recruit clinical cases but targeted at a larger group of at-risk adolescents who could be commonly identified in school settings. Thus, the results of this study provide initial support for the potential transportability of this manualized group CBT intervention into the school setting for adolescents with anxiety problems in Hong Kong.

In this study, there was no significant difference found in the changes in cognition between the participants of the experimental and control groups after group CBT intervention. One possible explanation of this lack of difference may lie in the positive change in cognition that was also observed in the control group, thus canceling the positive effects gained in the experimental subjects. Indeed, slight positive changes in some subscales in this study were also noted in the control group between pretest and post. A number of reasons may account for these positive changes in the control group. First, it is possible that genuine positive gains did occur among some members in the control group. Second, such positive changes may be related to the possibility that the participants in our waitlist control group were aware of the running of the experimental groups and were able to communicate with fellow school-mates who were in the experimental group, thus increasing the likelihood of the positive self-reporting of their performances (i.e., John Henry effect and diffusion/imitation of treatments). Similarly, it is equally possible that the participants (i.e., adolescents) in the experimental

group could have engaged in positive self-reporting of their performances because they would like to impress the social workers/teachers who were responsible for organizing this after-school activity (i.e., CBT group). One important message that comes out of this discussion is that, there may be confounding factors that had affected the outcomes of this study. A more affirmative claim of the effectiveness of this group CBT for Chinese adolescents with anxiety problems can only be achieved by increasing the internal validity of this study (e.g., through randomization, single- or double-blinded trial, increase in the sample size, and the choice of comparison group).

Our study has several limitations. First, this study does not have a follow-up test. Therefore, the longer term effects of CBT for adolescent anxieties have yet to be substantiated. Second, more vigorous research design, such as the use of randomization, a single- or double-blinded trial, and choice of comparison group, should have been adopted to increase the internal validity of this study. Last, due to a smaller sample size, we did not test the mediating role of cognitive processes in anxiety outcomes. Future studies may want to test the mediating roles of cognitive (e.g., coping self-talk) and behavioral processes (e.g., exposure) in facilitating changes in anxiety symptoms among Chinese adolescents.

In conclusion, this study provide initial support of the effects of a school-based group CBT intervention in reducing anxieties of Chinese adolescents who were at risk of developing anxiety problems in Hong Kong. Findings reveal that our group CBT intervention decreased adolescents' overall anxiety symptoms and symptoms of fear of physical injury and generalized anxiety. Further and more vigorous study is needed to ascertain whether this group CBT intervention can be implemented in a school setting as an after-school prevention program for Chinese adolescents who are at risk of having anxiety problems in Hong Kong.

Declaration of Conflicting Interests

The authors declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: Daniel F. K Wong, Sylvia Y. C. L. Kwok, Yiu Tsang Low, and Priscilla S. Y. Ip declare no conflict of interest. However, Ka Wai Man is affiliated and employed as a social worker supervisor under Tung Wah Group of Hospitals, Hong Kong.

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