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# Adaptation of an internet-based depression prevention intervention for Chinese adolescents: from “CATCH-IT” to “grasp the opportunity”

## Abstract

**Background:** There is a dearth of information on the compatibility of Western-developed, internet-based interventions that prevent onset and precipitation of depression in global settings. Recently, Project CATCH-IT (Competent Adulthood Transition with Cognitive-behavioral, Humanistic and Interpersonal Training), an information technology-based intervention, was adapted to prevent depression in Hong Kong Chinese adolescents. This paper evaluates qualitative data from consultations to develop a revised intervention of CATCH-IT for Hong Kong youth.

**Methods:** A theoretical thematic analysis approach was used to analyze data. Materials from three consultation trips which included focus groups (2007), an expert panel (2007), a public health campaign (2009), and a joint primary care physician-social worker review group (2010) were compiled. Authors (KS and AZ) independently reviewed the data and applied the theoretical framework of behavioral vaccines to code the data. These data were subsequently consolidated to provide a coherent narrative analysis.

**Results:** The cognitive behavioral therapy (CBT), behavioral activation (BA), and resiliency modules were maintained, while the interpersonal therapy (IPT) modules of CATCH-IT were excluded in the Hong Kong adaptation. Concurrent self-reports of drinking, smoking, illicit drug use and gambling behavior were added. Rather than primary care consultations, social worker consultations may be the best point of entry for intervention.

**Conclusion:** Socio-cultural relevance of psychotherapeutics and delivery context of internet-based interventions will require significant adaptation for the Hong Kong setting. However, because of community engagement throughout the process of adaptation, we believe the CATCH-IT intervention can be adapted for Chinese adolescents in Hong Kong with retained fidelity. The revised intervention is called “Grasp the Opportunity”.

**Keywords:** adolescence; Chinese; depression; Hong Kong; internet; mental health.

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## Introduction

A recently proposed model from Van Voorhees and collaborators on behavioral vaccines (1) may be used to address the growing concern from the World Health Organization and the Institute of Medicine (IOM) on the need for low-cost, evidence-based, preventative interventions integrated in primary care settings that can improve mental illness care worldwide (2–5). According to this model, information technology-based approaches have the potential to prevent the onset and precipitation of certain mental illnesses. Behavioral vaccines include four components: 1) life-course schedule; 2) effective components; 3) framework for motivation; and 4) implementation structure (Figure 1). The model resembles the process by which vaccines confer immunity. Prevention of onset of mental

illness by early life interventions is followed by subsequent “booster shots” (i.e., further interventions) throughout one’s lifetime to maintain immunity. An “antigen”, or effective inducer of immunity for specific populations, is necessary. Furthermore, an “adjuvant” to ensure proper use and adherence to the vaccine, such as professional and personal support, is required. Finally, the vaccine itself must be delivered through a proper mechanism (i.e., platform and context) to optimize immunity and minimize side-effects.

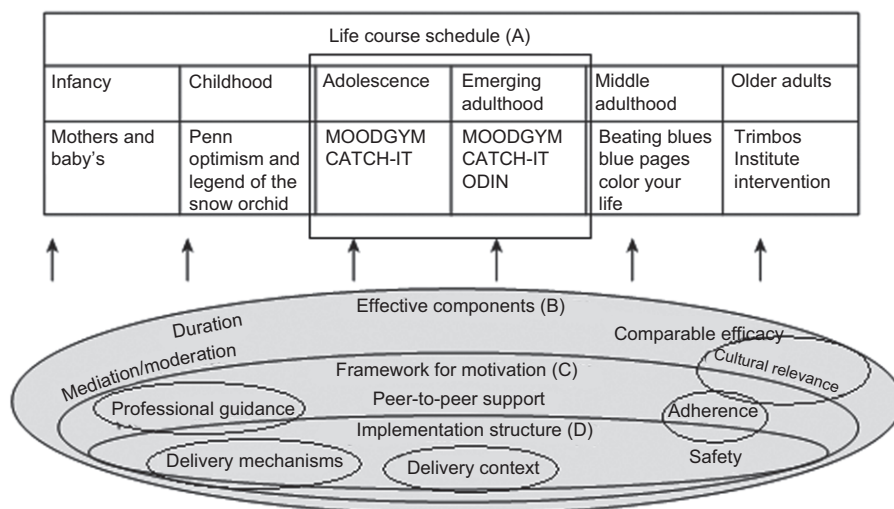
Information technology-based interventions have the potential to improve the delivery of mental health not only in the West but also worldwide. However, because these interventions were mostly developed in Western cultures, it is unclear whether they are applicable in foreign settings (1). The need for cultural adaptation, “the systematic modification of an evidence-based treatment (EBT) or intervention protocol to consider language, culture, and context in such a way that it is compatible with the client’s cultural patterns, meanings, and values” (6), continues to grow with increasing mental illness disease burden overseas (7). Further, recent meta-analyses suggest that adapted interventions are effective (8, 9). To address disparities of mental health on the global scale and add to the limited literature on cultural adaptation in global settings, more research in this area is needed (10, 11).

Recently, Project CATCH-IT (Competent Adulthood Transition with Cognitive-behavioral, Humanistic and Interpersonal Training), a behavioral vaccine intervention, was adapted for Chinese adolescents in Hong Kong. CATCH-IT, an internet-based depression prevention intervention for early- and late-stage adolescents,

utilized aspects of cognitive behavioral therapy (CBT), interpersonal therapy (IPT), behavioral activation (BA), and resiliency theory (12). CATCH-IT was developed in concordance with the prevention intervention research cycle. This widely adopted process to create interventions was introduced by the Institute of Medicine (13). The process emphasizes five steps for intervention development:

- Step 1: Identify the problem or disorder and review information to determine its extent.
- Step 2: Review relevant information about risk and protective factors from both prevention and non-prevention studies.
- Step 3: Design, conduct, and analyze pilot studies and replication trials of the preventive intervention.
- Step 4: Large-scale field trials “to assess the generalizability of the efficacy of the program with different personnel, participants, settings, cultures, and conditions”.
- Step 5: Facilitate large-scale implementation and evaluation of the preventive intervention program in the community.

Currently, CATCH-IT is at Step 4. Two previous trials of the CATCH-IT (14–16) intervention demonstrated high levels of user engagement with the internet component and favorable outcomes on lowering depressed mood and strengthening protective factors for depression. Moreover, the intervention included short stories relevant to adolescents in varying social and cultural backgrounds in the US setting; the most recent trial included over 30% minority participants (14).



**Figure 1** Behavioral vaccine model showing the aspects that were relevant to this investigation (adolescents/emerging adulthood, cultural relevance, professional guidance, adherence, delivery mechanisms and delivery context). [Adapted from Van Voorhees et al., 2011 (1).]



Figure 2 Screenshot from the new “Grasp the Opportunity” website for the Hong Kong adaptation.

Despite some success with diverse populations, using this intervention in foreign countries presents a new challenge. As a result of the transitions under British and Chinese rule, Hong Kong has both Eastern and Western cultural elements. Consequently, Hong Kong is an ideal country to investigate the cultural adaptation of a Western psychiatry intervention for a Chinese audience. Recently, models describing the process of cultural adaptation of interventions have been developed (17, 18). These models were originally developed for HIV/AIDS interventions in international settings, and emphasize collaboration with community partners. In regards to these models, the current state of the adaptation is outlined in Table 1.

In this paper, we evaluated qualitative data from consultations to develop a CATCH-IT adaptation for Chinese adolescents with local collaborators as well as a public health campaign in Hong Kong. We used four components of the behavioral vaccine model as a theoretical framework to highlight themes of the Hong Kong adaptation. We then synthesized these findings into a revised intervention entitled “Grasp the Opportunity”.

## Methods

A theoretical thematic approach was used to review materials derived from four engagement processes: 1) focus group (2007); 2) expert panel (primarily psychologists, 2007); 3) public health campaign with four schools in Hong Kong including parents, adolescents, teachers and staff to comment on adapted materials (2009); and 4) joint primary care physician-social worker system review (2010). Authors (KS and AZ), while not involved in the original processes, reviewed all materials using grounded theory and compared them within the framework of “behavioral vaccines”.

## Focus groups

In order to explore the feasibility and acceptance of an internet-based program to improve resiliency in youth at risk for depression, a convenient sample ( $n=16$ ) of bilingual Chinese adolescents (18–21 years old) were recruited by e-mail and personal contact from the University of Hong Kong and the Wah Yan College, a secondary school on Hong Kong Island (2007). Students were consented and asked to complete the Patient Health Questionnaire (PHQ) to ascertain their mental status. No students tested above the four-point threshold for exclusion. Adolescents were individually directed to a

**Table 1** Application of CATCH-IT adaptation to cultural adaptation stage models.

Map of the adaptation process [McKleroy et al., 2006 (18)]	ADAPT-ITT [Wingood and DiClemente, 2008 (17)]
1. Assess: target population; potential evidence-based treatments; and capacity of implementing agency	1. Assessment: focus groups with target population and key community stakeholders to understand risk factors
2. Select: use assessment to select the intervention that will work best for the target population and for the agency	2. Decision: decide on which EBI will be selected, and whether to adopt or adapt the EBI?
3. Prepare: make necessary changes to EBI (but maintain fidelity to core elements); prepare the organization; pre-test with focus groups, test materials for reading level, attractiveness	3. Administration: specific decisions about which treatment components are adopted or adapted
4. Pilot: test the adapted version of the intervention	4. Production: create first draft version of the adaptation EBI
5. Implement: implementation with continued monitoring of fidelity and outcomes	5. Topical experts: identify experts in relevant areas to assist in adaptation
	6. Integration: integrate input from topical experts to create second draft of the adaptation
	7. Training: train personnel to implement refined version of the adaptation
	8. Testing: conduct pilot research and short-term outcome study to evaluate efficacy of the adaptation

The steps already taken in the adaptation of CATCH-IT are highlighted in both models. EBI, evidence-based interventions.

computer terminal where they reviewed two modules of the 14-module US CATCH-IT (version 2) internet-based program. Subsequently, adolescents completed an online post-module questionnaire which obtained adolescents' opinions on usability, structure, content and cultural appropriateness of the internet-based program.

Following the completion of the modules and questionnaire, adolescents participated in a 1-h discussion of the internet site. The aim of the focus group discussion was to assess usability, structure, content and cultural appropriateness of an internet-based resiliency-building program. Participants were encouraged to freely express their views and to provide frank information about the modules they observed and the relevance of the material to the Hong Kong context. Specific questions addressed in the focus group included: "What did you like and dislike about the intervention?"; "What would motivate you to use this internet site?"; "Who should recommend this internet site?"; "What does family harmony mean?"; "What are your goals/values for life?" Most of the discussions were in English; however Cantonese was used to help express specific concepts. An author (BVV) and Lillian Chan served as English and Cantonese moderators, respectively. The study was approved by the University of Hong Kong Institutional Review Board.

### Expert panel (2007)

An expert panel consisting of faculty from several Hong Kong universities was assembled to review the CATCH-IT concept in regards to the Hong Kong context. The diverse panel included: Peter Lee, PhD, clinical psychology; Kitty Chan, MD, student health services; Michael Bond, PhD, Chinese psychology; Eugenia Leung, MD, student interventions; Sophia Chan, MD, nursing involvement; Josephine Wong, MD, psychiatry; and Sam Ho, PhD, positive psychology. Key questions posed were: 1) the degree to which elements required adaptation and why; 2) the degree to which motivational approach would be feasible and effective in Hong Kong; and 3) feasibility in the Hong Kong primary care setting.

All experts were provided with a 15–30-min overview of the program and phase two clinical trial preliminary results. In some cases, several experts participated in one session; in others, sessions were separate.

### Public health campaign (2009)

A consortium of schools invited a senior author (BVV) to Hong Kong to follow-up a prior visit with public discussions of depression. A simple set of five videos was produced covering key elements of the CATCH-IT program with adaptation to concerns expressed in 2007. The five scenarios were: "I Am Bored at School" (Community); "Two Dresses" (School and Peer); "Homework Blues" (Family); "Scared Test" (Individual); "ABCs for Resiliency" (Depressed Mood). Presentation included a background on depression, prevention methods, and parenting practices, followed by a video and discussions. Audiences included (teachers and staff, n=100), parents (n=150), and students (n=1650). All audiences were informed that their general comments could be used to further develop research concepts. All schools provided letters of support. After meeting, all comments were summarized by an author (BVV).

### Joint primary care physician and social worker review (2010)

An author (DC) elected to further develop the concepts and invited a fellow author (BVV), local primary care physicians, and social workers to conduct a full review of the intervention in preparation for cultural adaptation and linguistic translation. This panel met for 5 days and reviewed the CATCH-IT (version 2) intervention page by page with the following questions: 1) the degree to which elements required adaptation and why; 2) the degree to which the motivational approach would be feasible and effective in Hong Kong; and 3) which

Hong Kong setting is most feasible for a culturally-adapted CATCH-IT (version 2). Comments were collected by authors (DC and BVV).

## Data analysis

A theoretical thematic analysis approach was used to analyze data. Materials from three consultation trips were compiled. Two authors (KS and AZ) independently reviewed the data and applied the theoretical framework of behavioral vaccines to code the data. Specifically, coding was guided by the four constructs of behavioral vaccines: prevention and life-course schedule; effective components; framework for motivation; and implementation structure. Finally, these data were consolidated to provide a coherent narrative analysis.

## Results

The developmental and behavioral plasticity of adolescence make it an optimal time to implement depression prevention interventions. The US version of the CATCH-IT program targets adolescents from age 13 to 21 years. The Chinese adaptation targets an age group of 15–24 years old, which includes adolescents and emerging adults. Table 2 explains the results of the 4 engagement processes [1) focus group 2) expert panel, 3) public health campaign and 4) joint primary care physician-social worker system review] in the context of the behavioral vaccine model.

### Effective components

The behavioral vaccine model calls for interventions that emphasize content and delivery mechanisms that have been shown to have the greatest positive effects. In order to accomplish this task, researchers should focus on comparable effectiveness, duration of benefits, moderators and mediators, and cultural relevance. The cultural relevance of the intervention can be assessed.

### Cognitive behavioral therapy (CBT)

The joint physician-social worker review group supported the emphasis of realistic and constructive thinking in the CBT modules, and recommended little adaptation. Parents and adolescents who participated in public health campaign found CBT to be a relevant form of therapy.

### Behavioral activation (BA)

Focus group participants, who evaluated the BA modules, felt that the content resounded well and did not require adaptation. Similarly, the joint physician-social worker

review panel thought the BA modules could be retained in its current form. However, they recommended increasing references to engagement in pleasant activities with other people. Participants in the public health campaign found BA to be an acceptable form of therapy.

### Interpersonal therapy (IPT)

Parents and children who partook in the public health campaign lectures expressed concern that IPT was too direct a form of communication to resolve conflict. Particularly, they felt that IPT did not concur with the Chinese value of “harmony”. The joint physician-social worker review group concluded that IPT’s direct confrontational style on conflict resolution was counterproductive in Chinese culture, and may actually escalate conflict between adolescents and their seniors.

### Resiliency

In the focus groups, the concept of resiliency seemed to have some resonance. The physician-social worker review panel also endorsed the resiliency modules. They believed that the pro-social involvement will be helpful for Chinese youth.

### High-risk behaviors relevant to Hong Kong

The joint physician-social worker review group suggested that substance abuse and gambling are increasingly becoming a problem among adolescents in Hong Kong and may warrant study.

### Framework for motivation

Motivating clients to initially utilize the intervention as a resource and maintaining adherence is a key component of the behavioral vaccine model.

### Role of professional guidance

Adolescents in the focus group were unable to identify a viable, trusted adult figure who would direct them to the site. Because of the episodic and hectic nature of primary care, relationships with primary care physicians were not well established. Furthermore, parents, coaches, teachers, or religious figures were not deemed appropriate for guidance. However, adolescents would be comfortable if a peer recommended the website. In Hong Kong, many

Table 2 Application of CATCH-IT adaptation to behavioral vaccine model.

Behavioral vaccine component	Focus group	Expert panel	Public health campaign	PCP review panel
Life course schedule	N/A	No adaptation necessary	N/A	No adaptation necessary
Adolescents	N/A	No adaptation necessary	N/A	No adaptation necessary
Emerging adulthood	N/A	No adaptation necessary	N/A	No adaptation necessary
Effective components				
Socio-cultural relevance	The content was culturally relevant. Students could relate to the stories. Minor adjustments of details to match Hong Kong context recommended	Recommended adapting some materials to Chinese parenting styles and unique risk factors such as hyper-criticism of children	Adolescents expressed relevance of CBT and BA as did parents. However, parents and adolescents stated the IPT concept of direct communication to resolve conflict was inconsistent with Chinese cultural emphasis on harmony	BA, CBT and Resiliency modules can be retained with minimal changes. IPT modules (9–12) should be dropped
	Resiliency seemed to resonate		Parents also believed parent training focused on direct communication with child and reducing conflict was not consistent with Chinese style of criticism	Intervention should include questions with regards to substance use frequency and amount
Framework for motivation				
Professional guidance	PCP, coach, teacher, religious figure, or parents not seen as recommender to use site	N/A	Motivation focused around school performance for both parents and adolescents	In Hong Kong, social workers with CBT training are good recommenders to use the site
Adherence	Peers may be a viable option Unless instructed, students may not participate	N/A	Parents worry adolescents will not do it	Suggested using motivational interviewing in intervention
Implementation structure	Positive focus (e.g., well-balanced and successful life) is motivating. Testimonials of successful people also motivating			
Delivery mechanisms	Content too long Wordiness and theoretical jargon was hard to comprehend. Not engaging enough. Pictures, graphics, and/or interactive elements needed	Willing to consider new approaches to delivery care Suggest internet-based advertising	Worry about internet addiction	Content too long. Balance needed for brevity yet effective communication of CBT and BA

(Table 2 Continued)

Behavioral vaccine component	Focus group	Expert panel	Public health campaign	PCP review panel
Delivery context	<p>More guidance, especially in exercises is necessary</p> <p>Internet-based parent intervention is not appropriate for older parents</p> <p>No natural point of entry. School may be best venue for intervention</p>	<p>Recommend use of providers besides PCPs</p> <p>Possible alternative settings (NGOs, schools, internet-based advertising)</p> <p>Use internet to save physicians' time</p>	<p>Interested in internet- or community-based learning, some interest in professional settings</p> <p>Some interest in school settings</p>	<p>Social workers with ties to Hong Kong schools may be the best venue for intervention</p>

BA, behavioral activation; CBT, cognitive behavioral therapy; IPT, interpersonal therapy; NGO, non-governmental organization; PCP, primary care physician.

youths with low socioeconomic backgrounds have consistent relationship with their social workers. Social workers may be a more appropriate adult figure than primary care physicians for this purpose.

### Adherence

Most focus group participants did not feel they would participate in the program unless they were told it was compulsory. However, they endorsed positive marketing of the program to build resiliency. In addition, respondents were motivated by the ideal of being a well-balanced and successful adult (monetarily and socially), and by guidance on how to accomplish such success. In this regard, participants suggested incorporating testimonials from successful people. Parents and adolescents in the public health campaign suggested that successful academic performance would be a motivator to use the site. However, parents thought that adolescents would not complete the online intervention. The physician-social worker review group suggested that the established adolescent-social worker relationship may be useful to encourage adolescents to try the website consistently.

### Implementation structure

Behavioral vaccines are internet based and should have a comprehensible web design. Also, these interventions must be provided in the proper context. The use of the internet as a method of delivery of care was well received in Hong Kong. Focus group participants and the expert panel supported use of an internet-based intervention. The expert panel concluded that the internet-based intervention was a viable alternative to face-to-face care, but was concerned that it could still be time consuming for physicians and nurses. Focus group participants expressed a number of concerns regarding the website content. Participants found the online program to be too long, repetitious and theory-heavy. Participants also had difficulty navigating through the website because of a lack of page numbers. Similarly, participants wanted more direction on how to complete exercises, and solutions to the exercises. In addition, there were complaints regarding the lack of graphic features (e.g., pictures or videos) and interactive elements. Finally, participants wanted to see the stories earlier in each module, or perhaps spaced throughout each module to help keep their interest. Parents who attended public health campaign presentations expressed concerns about whether an internet-based



intervention would further the problem of internet addiction in Hong Kong adolescents.

Although most behavioral vaccines emphasize primary care as an entry point for intervention, this setting does not seem appropriate in Hong Kong. As a result of constraints on physicians' and nurses' time, as well as the brief, episodic nature of primary care visits in Hong Kong, the expert panel suggested utilization of alternative settings such non-governmental organizations (NGOs) or schools. For focus group participants there was no consensus on an existing adult figure, including physicians, to recommend the website. The most viable option for intervention entry point may be NGOs or schools.

### Revised “Grasp the Opportunity” intervention

We developed the revised intervention called “Grasp the Opportunity”, so-called because it captures the aspirational ethic of Hong Kong culture as well as the thematic meaning of “CATCH-IT”. Like CATCH-IT, “Grasp the Opportunity” seeks to build momentum for positive development within a non-stigmatizing, normative framework.

Several major changes were made to key content areas. The IPT modules were excluded from the adapted intervention. In addition, questionnaires measuring high-risk behaviors such as substance/alcohol use (Substance Use Report) and gambling were added.

Similarly, we revised elements of the delivery model. With regard to the text, we shortened it by 50%. The stories were revised for the Hong Kong audience interests to ensure socio-cultural relevance. Also, motivational interviews will not be conducted in the intervention. Instead, adolescents will meet with social workers twice a month.

## Discussion

In this paper, data from efforts to adapt the CATCH-IT intervention were analyzed and presented in a thematic fashion. Overall, the data suggest that there will be substantial alteration necessary for successful adaptation in Hong Kong. The targeted age group (15–24 years) for the Hong Kong intervention includes more late-stage adolescents than the original CATCH-IT program. Notably, the IPT modules of the intervention were removed in the Hong

Kong adaptation, while CBT, BA and resiliency modules were maintained.

There was no strong consensus on the appropriate adult figure to direct adolescents to the website. Furthermore, unless mandatory, focus group participants doubted they would use the program. Parents were not confident adolescents would complete the program. However, both parents and adolescents who participated in the public health campaign and focus group participants found academic success to be a motivating factor to use the program. In addition, focus group participants thought professional success was a motivating factor to use the program. The physician-social worker review group believed the established youth-social worker relationship may help increase use and adherence of the website. In Hong Kong, it is not feasible for most youths to regularly consult a physician or clinical psychologist. A social worker with training in CBT may find our website to be a useful tool in decreasing negative thoughts and high-risk behavior in adolescents lacking access to clinical professionals.

How Hong Kong's unique cultural aspects affect adolescent co-morbid conditions of depression are also worth studying in the upcoming trial: 1) there is zero tax on beer and wine with drinking endorsed by many prominent members of society, whereas smoking is highly discouraged; 2) gambling has high public exposure as a result of twice-weekly horse races and the proximity of Macao's casinos. Co-morbid prevalence of depression and addiction is well documented in the West; it is unclear whether this is consistent with Chinese adolescents.

The results concerning implementation structure were mixed. Focus group participants expressed that content (lack of pictures, wordiness etc.), lack of guidance, and the lack of interactive components make the website less engaging. The expert panel concluded that the internet is an appropriate modality for the intervention; however parents were concerned that it may increase the problem of internet addiction. Although the US intervention was based in primary care, the physician-social worker panel concluded that the Hong Kong intervention should be based in NGOs who have a track record of collaboration with physicians.

The “effective components” and “implementation structure” aspects of the behavioral vaccine model required significant adaptation. There is great variance in healthcare systems around the world, particularly in the area of mental health (19). Because of the diversity in policy, infrastructure, and available resources, adapting the implementation structure is important. Still, much of the mental health literature has advocated primary care-based intervention (20) because it utilizes the existing

workforce, builds on a long-term relationship, and is less stigmatized. However, primary care in Hong Kong is very brief and episodic, especially for adolescents, and may not be conducive to forming a strong physician-patient relationship. This same concern has been voiced as a barrier to mental health services in low-income and middle-income countries (21). In addition, because psychiatric care is highly stigmatized in Hong Kong (22, 23) many patients shun treatment. This stigma might extend to primary care as well, especially if the physician-patient relationship is lacking.

Furthermore, although the majority of the cross-cultural literature focuses on the cultural relevance of adaptations, there is still very limited evidence. Indeed, such cultural tailoring may require a deep understanding of the values, beliefs and norms of a culture (24, 25). The effective components aspect of the behavioral vaccine model best captures these cultural nuances, and thus requires significant adaptation. To date, there have been limited data on the acceptability of psychotherapies for Chinese audiences. To the authors' knowledge, only CBT and IPT have been successfully used for Chinese patients with depression. There is some evidence to support the compatibility of CBT with Chinese culture. Recent studies in Hong Kong have demonstrated that group CBT (26, 27) decreases depressive symptoms in depressed subjects compared to a wait-list control group. These results are in line with papers detailing the key components of CBT that align with dimensions of Chinese culture (28).

IPT was previously used to decrease depressive symptoms in postpartum Chinese mothers (29). Thus, IPT may be more appropriate for Chinese adults rather than adolescents. Adapting IPT for Chinese adolescents warrants further investigation. The issue may be the core emphasis of IPT. CBT, BA and resiliency focus on individuals: their mood, thoughts, and how they interact in their environment. Compared to these psychotherapies, IPT is more socially focused. Our IPT modules help adolescents to learn to identify and manage difficult relationships and life transitions, and to strengthen social support in family, school, and peer settings. However, the direct confrontational style of IPT to resolve interpersonal conflicts may be inappropriate for adolescents interacting with their seniors in Hong Kong, where showing respect to one's elders is particularly valued. Further research on the compatibility of these psychotherapies in Chinese patients is necessary.

Whether non-primary care facilities such as NGOs (and their associated schools) can serve as an entry point for CATCH-IT will be explored. Yu and Seligman used schools as the entry point for their adaptation of the Penn

Resiliency Program, a depression prevention intervention, in mainland China (30). As the expert panel suggested, it may be possible to use internet-based advertising to enroll adolescents. However, studies have shown that stand-alone internet interventions which lack human interaction decrease adherence to the intervention (31) and are ineffective (32).

As mentioned earlier, CATCH-IT is an example of an intervention developed according to the IOM's prevention research cycle. Recently, a number of researchers and even the IOM have criticized the prevention research cycle (33–36). As Barrera and colleagues (34) point out, the prevention research cycle does not consider the alignment of interventions in different settings and cultures until its later stages. The criticism harkens back to the debate of fidelity vs. fit: the tension between retaining the efficacy of the original intervention vs. aligning the intervention with the population in question. However, development of Grasp the Opportunity utilizes many of the recommendations of the stage models of culture adaptation (17, 18), which emphasize retention of fidelity as well as fit. The key to these models is community engagement, which was a major component of this adaptation. Because every stage of the adaptation involved community partners, CATCH-IT is better suited to the population in Hong Kong. Ultimately, the pilot study will elucidate whether the lack of IPT and change in delivery will affect the fidelity of the Grasp the Opportunity adaptation.

## Limitations

This study has several limitations. First, this paper reflects the preliminary steps of the adaptation of the CATCH-IT program. The trial use of this adaptation has yet to occur. The information gathered for this paper was compiled from a number of different consultations in Hong Kong. Later consultations such as the primary care physician review built on prior data, and may have been somewhat biased in their conclusions. Most of these data were not streamlined for analysis. However, the flexibility for thematic analysis allows investigators to encompass a wide range of data. Using the thematic framework of behavioral vaccines allowed the analysis to be more specific and not merely descriptive. It is possible that using the behavioral vaccine framework caused exclusion of some information.

It is also important to note that all the methods were qualitative in nature. There was a small sample size ( $n=16$ ) in the focus groups. Also, not all comments from participants in the public health campaign were collected. Thus,

these findings may not be representative of the thoughts of the greater Hong Kong population. However, the use of multiple methods in the adaptation increases the validity of these findings.

## Conclusion

In conclusion, we analyzed data from consultations to adapt a depression prevention intervention for Chinese adolescents in Hong Kong. The CATCH-IT intervention can be adapted for a Chinese audience in Hong Kong. Socio-cultural relevance of psychotherapeutics and delivery context of internet-based interventions will require significant adaptation for the Hong Kong setting. Further research on compatibility of psychotherapies to Chinese culture and the use of non-primary care settings is necessary.

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