Promotion of Thriving among Chinese Adolescents in Hong Kong:

Findings from Eight Waves of Data

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Abstract

Objectives: This study evaluated the longitudinal effect of a positive youth development (PYD) program entitled "Positive Adolescent Training through Holistic Social Programmes" (Project P.A.T.H.S.) on perceived thriving amongst Chinese adolescents in Hong Kong. **Method**: Individual growth curve modeling analyses were performed using eight waves of data collected over five years from 23 experimental schools (N = 3,607) and 24 control schools (N = 3,574). **Results**: Adolescent thriving declined faster among control school students relative to experimental school students. While the two groups did not differ at Wave 1 and Wave 2 on the mean thriving levels, experimental school students showed higher thriving levels at Wave 3 to Wave 7 than did the control group students. Such differences between the two groups were more salient among girls than among boys, suggesting a stronger intervention effect for girls. **Conclusion**: The present findings suggest that PYD programs can promote thriving in Chinese adolescents.

Keywords: positive youth development (PYD), thriving, Chinese adolescents, longitudinal study, experimental design.

Promotion of Thriving among Chinese Adolescents in Hong Kong:

Evidence from Eight Waves of Data

Background on the Positive Youth Development (PYD) Approach

For a long time, adolescence has been described as a period of "storm and stress" in which the development of adolescents is regarded as "tumultuous" in nature. Guided by this "deficit" view of adolescence, the focus has been placed on identifying adolescent developmental problems such as delinquency and depression as well as treating these maladjustments. With the argument that the absence of illness is not necessarily equivalent to the presence of well-being (Ryff & Singer, 1996), an alternative perspective entitled "positive youth development" (PYD) has emerged to highlight developmental plasticity, potentials, and capabilities of adolescents, which constitutes a constructive response to the criticism that "studies of positive psychological functioning have been far outweighed by those concerned with psychological distress and dysfunction" (Joseph & Wood, 2010, p. 830).

Shek, Dou, Zhu, and Chai (2019) summarized different strands of PYD models in their review, including the "developmental assets framework" consisting of 20 internal assets (i.e., adolescents' inner strengths, such as prosocial values and personal competencies) and 20 external assets (i.e., nurturing and supportive environment, such as positive parent–child relationship and empowering), the "social and emotional learning" (SEL) framework, the "5Cs model" ("competence", "confidence", "character", "connection", and "care"), and the 15 basic PYD constructs (e.g., resilience, moral competence, self-efficacy, spirituality, and emotional competence) extracted from effective PYD programs reviewed by Catalano et al. (2004). A common thesis across these PYD models is that the cultivation of inner qualities and

psychosocial competencies helps promote youth holistic development, which ultimately prevents

the development of youth developmental problems (Shek, Dou, et al., 2019; Tolan, Ross, Arkin,

Godine, & Clark, 2016).

Empirically, the above-mentioned PYD qualities have been examined as protective

factors in terms of promotion of adolescent positive outcomes (e.g., academic achievement, life

satisfaction, and happiness) and prevention of developmental problems (e.g., depression,

hopelessness, and delinquency). For example, both integrated measures of PYD and PYD

qualities in specific domains (e.g., resilience, emotional competence, moral competence, and

spirituality) have been consistently found to be positively associated with life satisfaction while

negatively associated with depression or adolescent delinquency in both Western and Chinese

contexts (Di Fabio & Palazzeschi, 2015; Geldhof et al., 2014; Lent, 2004; Sánchez-Álvarez,

Extremera, & Fernández-Berrocal, 2015; Shek & Zhu, 2018, 2019; Sun & Shek, 2012; Zhou,

Shek, Zhu, & Dou, 2020).

PYD Programs and Related Evaluation Studies

The perspective of PYD has also been widely adopted in youth prevention programs in

terms of nurturing adolescents' positive attributes, such as internal strengths and psychosocial

competencies, which help adolescents better adapt to developmental challenges and maintain

healthy functioning (Catalano et al., 2012). A wealth of evaluation findings supports the

beneficial influence of PYD programs in promoting healthy development and reducing

developmental problems among adolescents (Waid & Uhrich, 2020). For example, the asset-

building program entitled "Building Assets Reducing Risk" (BARR) successfully enhanced the

learning experience and academic achievement among Grade 9 students in the United States

(BARR, 2018). Several review studies showed that school-based social and emotional learning

(SEL) programs were effective in promoting participants' social and emotional skills, which served as protective factors to enhance adolescent social and academic adjustment as well as to reduce emotional and behavioral problems (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Sklad, Diekstra, Ritter, Ben, & Gravesteijn, 2012). For instance, based on a meta-analysis of 213 school-based, universal SEL programs, Durlak et al. (2011) reported that SEL programs promoted the social, emotional, and academic performance, as well as the emotional adjustment of the student participants.

However, most of the evaluation studies assessed immediate program effect upon the completion of PYD program implementation, with only a handful of studies examining how PYD programs affect participants' development over a longer period of time. As such, Catalano et al. (2004) argued that the sustainability of the positive effects of PYD interventions needs to be determined. In their review, Weare and Nind (2011) also pointed out that while the immediate effect of school-based youth interventions had been supported, their long-term effect remained inconclusive.

Against this background, research efforts have been devoted to determining the long-term effect of youth enhancement programs. In a recent meta-analytic review of eighty-two universal SEL programs in school contexts involving follow-up assessments, Taylor, Oberle, Durlak, and Weissberg (2017) found that these programs were able to promote social and emotional skills and attitudes with sustained impact. Nevertheless, in another recent meta-analysis of PYD interventions using randomized controlled trials, only 7 out of 24 reviewed studies had one or more follow-up tests showing minimal long-term effects based on different outcome indicators, such as prosocial behavior and academic performance (Ciocanel, Power, Eriksen, & Gillings, 2017). Obviously, more longitudinal studies with a longer time frame are needed.

PYD Programs and Evaluation Studies in Chinese Contexts

In addition to the lack of evaluation studies and equivocal findings on the long-term effects of PYD programs, another limitation is that most of the PYD programs have been implemented and evaluated in the Western context, particularly in the United States. Although empirical work on PYD in non-US contexts has increased in the past few years and the evidence helps "extend the generalizability of the PYD framework beyond the US context", Wiium and Dimitrova (2019) yet commented that "more research is needed to ascertain the appropriate developmental assets to facilitate PYD, as defined by the specific context where young people are embedded" (p. 147). In fact, most of the recent Chinese studies have focused on conceptual issues (Chen, Li, & Chen, 2017; Cheung, Lee, Kwong, & Busiol, 2015), scale development (Chai et al., 2020; Chen, Wiium, & Dimitrova, 2018), and relationships between PYD qualities and other developmental outcome indicators (Ding et al., 2017; Su, Guo, & Lin, 2017; Zhou et al., 2020). In contrast, validated PYD programs and rigorous evaluation studies are very few in different Chinese societies.

In fact, in different review studies on PYD programs in the global context, only very few programs were carried out in non-US contexts. For example, in Durlak et al.'s (2011) review, only 13% of the reviewed SEL programs were implemented outside the United States. Similarly, in Ciocanel et al.'s (2017) review, none of the 24 programs were conducted in different Chinese societies. In a recent review studies on community-based PYD programs targeting adolescents at psychosocial risk (García-Poole, Byrne, & Rodrigo, 2019), 72% of the reviewed programs were carried out in the United States and none in different Chinese societies. Shek and Yu (2011) directly reviewed PYD programs in Asia that had been evaluated through experimental or quasi-experimental designs. The authors concluded that the number of validated PYD programs in

different Asian communities was extremely low as compared to Western societies, with very few

rigorously designed studies evaluating the long-term effects of PYD programs in Asia contexts.

There are at least three reasons why we need more PYD studies in the Chinese context.

First, Chinese adolescents constitute over 14% of the world adolescent population (United

Nations, 2019). Therefore, youth studies involving Chinese data are imperative to establish the

universality of the related findings. Second, growing adolescent developmental problems have

been identified among Chinese adolescents, such as the growing prevalence of emotional and

behavioral problems and declining well-being (Shek & Liang, 2018; Shek & Zhu, 2018). This

worrying picture urgently calls for effective intervention programs to promote youth holistic

development. Third, developmental needs and related solutions may not be the same among

Chinese and Western youths as developmental emphases in the Chinese culture (e.g., collective

welfare over individual well-being) are different from those in the Western culture (e.g.,

individual rights and priorities over the collective whole). Thus, it is necessary to evaluate the

effectiveness, especially the long-term effect, of PYD programs in Chinese contexts.

Unfortunately, as remarked by Wiium and Dimitrova (2019), "PYD research has mainly been

conducted within the US context" (p. 1).

A notable exception is the multi-year PYD program entitled "Positive Adolescent

Training through Holistic Social Programmes" (Project P.A.T.H.S.), which was designed by

researchers from five universities in Hong Kong and implemented from 2005 to 2019 to promote

the holistic development of Chinese junior secondary school students in Hong Kong. Systematic

evaluation using multiple strategies has been carried out to understand the impact of the "Project

P.A.T.H.S." (Shek & Sun, 2013). Regarding the long-term effects, a randomized group trial was

conducted for five years (2006 to 2011) and eight waves of data were collected to assess the

effect of "Project P.A.T.H.S." over time. Using PYD attributes (e.g., cognitive and social skills and self-efficacy) as outcome indicators, individual growth curve (IGC) modelling analyses revealed that students joining the program showed better development in PYD qualities than did students not receiving the program (Shek & Ma, 2012). Similarly, IGC findings showed that risk behavior (e.g., delinquency, illicit drug use, smoking, and drinking) among students joining the project increased at a slower rate than did the control school students (Shek & Yu, 2012b).

The above-mentioned two studies represent pioneering attempts in different Chinese societies to underscore the long-term effect of a PYD program. However, there are some limitations on the outcome indicators in these two studies. First, apart from participants' perception of their own qualities, it would be illuminating to understand how the participants perceive others' evaluations of them (e.g., I have emotional competence in others' eyes). Second, while the PYD attributes assessed in the above-mentioned two studies have covered psychosocial competencies, it is essential to assess participants' caring for others, which is commonly regarded as an important outcome for adolescent development (Lerner, von Eye, Lerner, Lewin-Bizan, & Bowers, 2010). Third, there are other important aspects that have not been assessed in previous studies. For example, as an over-emphasis on material values hinders adolescent development, it is necessary to assess whether the program can help to shape the spiritual values among the program participants. In addition, there is also a need to look at whether the program can help to cultivate empathy and respect for diversity. Noteworthy, these aspects can be subsumed under the rubric of "thriving" in positive psychology, which represents an overall evaluation of positive development. Thus, assessing thriving as an integrated outcome measure of PYD program is a good way to address the research gaps.

With reference to the limitations mentioned above, this study attempted to give additional evidence on the effect of the "Project P.A.T.H.S." on adolescents' thriving in the secondary school years. Based on the existing findings on the effect of PYD programs, we expected that students joining the "Project P.A.T.H.S." would perform better in thriving than those not joining the project.

Overview of the "Project P.A.T.H.S."

The "Project P.A.T.H.S." was financially supported by The Hong Kong Jockey Club Charities Trust in collaboration with the Social Welfare Department, Education Bureau (known as Education and Manpower Bureau before July 1, 2007), and the research team consisting of Principal Investigator and Co-Principal Investigators from five public universities in Hong Kong. The research team developed 120 curricula-based units focusing on the 15 PYD attributes such as "resilience", "bonding", "moral competence", "self-efficacy", and "spirituality", which have been commonly incorporated in effective youth programs (Catalano et al., 2004). Each unit lasts for 30 minutes of teaching. During the 3-year junior secondary school years, participating students took either 40 units each year (i.e., full program with 20 hours of teaching each year) or 20 core units each year (i.e., core program with 10 hours of teaching per year).

The implementation of the "Project P.A.T.H.S." included several phases. Specifically, the first phase is the school-based initial phase (i.e., P.A.T.H.S. I) from January 2005 to August 2009, including a longitudinal evaluation study from 2006 to 2011 that covers three years of program implementation and two years of follow up. The second phase is the extension phase (i.e., P.A.T.H.S. II) from summer 2009 to August 2013, including both school-based project and a 6-year longitudinal study from 2009 to 2015. The third phase is the community-based implementation phase (i.e., P.A.T.H.S. III) from September 2013 to June 2019, including further

updating of the curriculum materials (Ma, Shek, & Leung, 2019; Shek & Sun, 2013; Shek & Wu, 2016). The present study evaluated the long-term effect of this project implemented in the initial phase.

To ensure high-quality program implementation, potential program implementers, including teachers, social workers, and allied helping professionals, were required to complete a 20-hour training before program implementation at each grade. The training programs were conducted by developmental psychologists, professional social workers, and counsellors in the research team who designed the curricula. The training programs covered PYD concepts, rationales of the program, curriculum content, teaching skills as well as reflections on one's own knowledge, attitude, and skills related to program implementation. Process evaluation through systematic observations of the teaching process and interim evaluation based on teachers' and students' responses revealed high fidelity and adherence as well as positive teaching and learning experience in program implementation (Law & Shek, 2011; Shek & Yu, 2012a).

Methods

Ethical Statement

This study was conducted with approval from the ethics review from the Human Subjects Ethics Subcommittee of the authors' institution. At each wave, we explained study purposes and re-iterated the confidentiality of data collected and anonymity in data analyses and research findings dissemination. With the presence of trained research personnel, participants were requested to complete the questionnaire by themselves. We obtained written consent from the participating schools, student participants and their parents.

Design and Sampling

In the 2006/07 school year, a randomized group trial was conducted with the help of the Education Bureau (EB). EB planned to randomly select 24 pairs of schools stratified by district with equivalent school characteristics, including location, banding (i.e., academic characteristics of the students), religion, and gender of the students, from the 132 participating schools that adopted the full program (i.e., 20 hours of teaching for 40 units each year). Schools in each pair were randomly assigned to the experimental group or the control group. For the experimental group, schools implemented "Project P.A.T.H.S." from 2006. For the control group, schools implemented the project one year later (i.e., from 2007), meaning that the students admitted to Grade 7 in 2006 in these schools did not join the "Project P.A.T.H.S." in their secondary school years.

When inviting schools to participate in the present study, a list of 36 pairs of schools (50% more than the targeting number of schools) was formed to include reserve schools. EB contacted 31 potential experimental schools and 24 schools agreed to join the study. Among the 36 potential control group schools, only 20 accepted the invitation, as other schools wanted to implement the "Project P.A.T.H.S." without any delay. In view of this situation, EB selected four equivalent schools not joining the "Project P.A.T.H.S." and invited them to join the control group. Finally, the present study included 24 pairs of schools with equivalent or similar background characteristics (i.e., district, school banding, religion, and gender ratio of the students). The research team outlined the procedures of recruiting these 48 schools in previous publications (e.g., Shek, Siu, Lee, Cheung, & Chung, 2008)

Participants and Procedures

Grade 7 students admitted in 2006 in the 24 pairs of students were the student participants in the present study. Students in the experimental group joined the "Project

P.A.T.H.S." during their junior secondary school years (i.e., the intervention period from the 2006/07 year to the 2008/09 year) while students in the control schools did not. Eight waves of data were collected during the three-year intervention period (i.e., Wave 1 and Wave 2 in the 2006/07 year; Wave 3 and Wave 4 in the 2007/08 year; Wave 5 and Wave 6 in the 2008/09 year) and the two-year follow-up period (i.e., Wave 7 in the 2009/10 year and Wave 8 in the 2010/11 year). The procedures are illustrated in Figure 1.

At Wave 1, baseline data were collected from 4,121 and 3,854 Grade 7 students in the experimental group and the control group, respectively. One experimental school ($n = 207$) withdrew from the study after Wave 1. Because of school transfer and missing data (e.g., students were unavailable at the time of data collection), another 307 students in the experimental schools and 280 students in the control schools only had data at Wave 1. Thus, all these 794 students were excluded from data analyses. In other words, participants with at least two waves of data were included in data analyses. The final working sample included 3,607 students (Mean age = 12.20 ± .90 at Wave 1; 2,006 boys and 1,599 girls) from 23 experimental schools and 3,574 students (Mean age = 12.31 ± .91 at Wave 1; 1,926 boys and 1,645 girls) from 24 control schools. All students were Chinese. The two groups were comparable in terms of demographic characteristics (i.e., age, gender composition, family economic status, and family intactness) and baseline thriving (see Table 1). In addition, there were no big differences between the final working sample and the dropouts. More details can be found in Table 1.

Measures

At each wave, students responded to a questionnaire including multiple measures of adolescent developmental outcomes (e.g., PYD attributes, thriving, life satisfaction, and risk behavior). In this paper, the focus was thriving, which is described in detail in the section below.

Thriving. In developmental psychology, thriving is conceived as "vital signs" of positive development. For instance, King et al. (2005) proposed that thriving youths are characterized by eight categories of attributes, including the "5Cs" ("competence", "confidence", "character", "caring", and "connection"), self-regulation, assets, and positive affect. Scales et al. (2000) proposed that adolescent thriving includes school success, showing leadership, respecting diversity, assisting others, resilience, and spiritual engagement. Despite different conceptualizations, thriving represents "the joint experience of development and success" (Brown, Arnold, Fletcher, & Standage, 2017, p. 168), which includes not only individual competence but also meaningful individual–context relationships (Benson & Scales, 2009).

Based on the consensus that thriving reflects positive development among youths, some scholars measured thriving in terms of "5Cs" (Tirrell et al., 2019). In contrast, others assessed thriving through a global measure of positive outcomes in core adolescent developmental domains, such as school learning, personal development, and connection to others. For example, thriving was operationalized as a total score in multiple indicators including school success, being resilient, valuing diversity, helping others, and leadership (Leffert et al., 1998; Scales et al., 2000; Theokas et al., 2005). It can be argued that an overall thriving scale is a concise, comprehensive, and global assessment tool in evaluating program effectiveness (Ma et al., 2019).

In the present study, we used a 22-item Thriving Scale with a 6-point rating scale. The Thriving Scale encompassed those attributes commonly emphasized in different conceptualizations of thriving (Leffert et al., 1998; Scales et al., 2000), including school engagement and connection with school (loving one's school), good development (e.g., cognitive competence and spiritual values), ability to differentiate right and wrong (i.e., moral compass and moral competence) and good character, accepting and respecting people of different

backgrounds (i.e., respect for diversity), care for others and the community (particularly those

who are needy), overcoming challenges and difficulties in life (i.e., dealing with adversity in a

positive manner), leadership and few behavioral problems perceived by self and others, as well

as positive identity seen by self and others. The present Thriving Scale represents an integrated

measure of adolescent adaptive functioning in multiple domains, which can best exemplify

positive development (Warren, Wray-Lake, Rote, & Shubert, 2016).

Previous analyses based on the data collected in Shek, Siu, and Lee (2007) showed that

the Thriving Scale was able to differentiate young people aged between 12 and 18 years old with

and without developmental problems, hence supporting the criterion-related validity. Besides,

the thriving scores were positively correlated with scores based on the PYD constructs, life

satisfaction, and academic achievement while negatively correlated with scores on delinquency,

intention to engage in different problem behaviors, and substance use, which provide support to

the convergent validity and discriminant validity of the Thriving Scale.

In the present study, based on findings of the confirmatory factor analysis, three reverse-

coded items with low factor loadings (i.e., < .30) were deleted from the final analysis. The one-

factor structure of the retained 19 items fitted the data well (see Table 2). Cronbach's alpha of

the 19-item scale was higher than .92 at all waves, suggesting good internal reliability of the 19-

item scale used in this study. The average score across all items was calculated to represent the

construct of thriving.

Demographic variables. Gender, age, family economic status, and family intactness

were measured at Wave 1. For family economic status, participants who reported living on social

welfare were considered having economic disadvantage (coded as "-1") and those who reported

not living on social welfare were regarded as not having economic disadvantage (coded as "1").

For family intactness, students who reported that their parents were in the first marriage were considered living in intact families (coded as "1") and students whose parents were separated, divorced, or re-married were treated as living in non-intact families (coded as "-1").

Data Analytic Plan

Individual growth curve (IGC) was adopted in the present study as it is an advanced statistical technique that models individual change across multiple time points, determines the trajectories of the change, and explores the influence of covariates (e.g., gender and intervention group) on individual differences in the initial status and the slope of change. In the present study, IGC modeling analyses were conducted to investigate trajectories of change in thriving over time and the intervention effect on the developmental trajectories of thriving. We analyzed a 2-level hierarchical model where time (Level 1) was nested within individuals (Level 2) (Shek & Ma, 2012).

In Level-1 models, within-person changes over time including the average initial level of thriving and average change rate over time were examined without considering the effect of other between-person predictors such as age, gender, or intervention group. In other words, the Level-1 models estimated the variation within the individual over time. In Level-2 models, the effects of between-person factors (such as participation in the program versus non-participation in the project, age, and gender) were examined (i.e., effect of Level -2 predictors on the shape of the growth curve). In other words, the Level-2 models attempted to capture whether the initial level of thriving and the rate of change varied across individuals in a systematic way (i.e., variance was significantly predicted by between-person factors).

Following the suggestion of Singer and Willet (2003), several models were tested to determine the developmental trajectories of adolescent thriving. First, an unconditional mean

model (Model 1) was used to calculate the intra-class correlation (ICC) to see whether

hierarchical linear modeling was needed. This model serves as a baseline model with no

predictor to examine individual variation in the outcome (thriving in the present study). Based on

this model, ICC can be calculated to indicate the amount of variance in thriving that is

attributable to differences between individuals and whether there is a need to model the nested

data structure including Level-1 (time) and Level-2 (time invariant, age, gender, and intervention

group) predictors. A high value (i.e., .25 or above) of ICC suggests that it is necessary to use

IGC.

Second, we tested two Level-1 models to examine the shape (e.g., linear or curvilinear) of

the developmental trajectory in adolescent thriving. Specifically, a linear growth model (Model

2) and a quadratic growth model (Model 3) were investigated. Time was coded as 0, .67, 1, 1.67,

2, 2.67, 3.67, and 4.67 for Wave 1 to Wave 8, respectively.

Finally, we tested two Level-2 models (Model 4 and Model 5) to study whether the

intervention ("group" variable: "experimental group" versus "control group") was related to the

initial status and the rate of change in thriving after controlling the effects of demographic

variable (e.g., age and gender).

The above elaborations on the 2-level hierarchical model can be illustrated as follows:

Level-1: $Y_{ij} = \beta_{0j} + \beta_{1j}(\text{Time}) + \beta_{2j}(\text{Time}^2) + r_{ij}$

Level-2: $\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{age}) + \gamma_{02}(\text{gender}) + \gamma_{03}(\text{family economic status}) + \gamma_{04}(\text{family}$

$\text{intactness}) + \gamma_{05}(\text{intervention group}) + u_{0j}$

$\beta_{1j} = \gamma_{10} + \gamma_{11}(\text{age}) + \gamma_{12}(\text{gender}) + \gamma_{13}(\text{family economic status}) + \gamma_{14}(\text{family}$

$\text{intactness}) + \gamma_{15}(\text{intervention group}) + u_{1j}$

$$\beta_{2j} = \gamma_{20} + \gamma_{21} \text{ (age)} + \gamma_{22} \text{ (gender)} + \gamma_{23} \text{ (family economic status)} + \gamma_{24} \text{ (family}$$

$$\text{intactness)} + \gamma_{25} \text{ (intervention group)} + u_{2j}$$

For the significant interaction effect of "time" (i.e., Wave 1 to Wave 8) and "group", we plotted prototypical trajectories to show the longitudinal effect of intervention on the growth rate of thriving. We employed SPSS Linear Mixed Model analyses to conduct IGC analyses through the maximum likelihood method. Detailed procedures of IGC analyses are presented in Shek and Ma (2011).

Results

Developmental Trajectory of Adolescent Thriving

Findings based on Model 1 revealed that 49.6% of the total variance in thriving was attributable to inter-individual differences (i.e., ICC = .496), suggesting the need to conduct hierarchical linear modeling analyses through IGC. For Model 2 and Model 3 which modeled linear change and quadratic change, respectively, Model 3 showed lower deviance, AIC, and BIC (see Table 3), suggesting that Model 3 fitted the data better than did Model 2. As revealed in Model 3, there was a significant linear decline ($\beta = -.225$, $p < .001$) but a quadratic increase ($\beta = .037$, $p < .001$) in adolescent thriving, suggesting a U-shaped developmental trajectory characterized by an initial decline followed by a gradual rebound.

Predictive Effects of Level-2 Factors

Based on the quadratic growth curve identified in Mode 3, demographic variables and intervention group as Level-2 factors were tested in Model 4 and Model 5, respectively. We initially used all the four measured demographic variables (i.e., age, gender, family economic status, and family intactness). However, there was a considerable amount of missing values in the latter two variables because many students did not know the financial condition of the family

and the marital status of their parents, and these two variables did not significantly predict the

rate of change in adolescent thriving. Besides, removal of these two demographic variables from

models did not change the result of the effects of other Level-2 predictors. Hence, to avoid

pairwise deletion of too many cases in the analyses due to missing values related to family

economic status and family intactness, only two demographic variables (i.e., age and gender)

were included in Model 4 and Model 5 (see Table 3).

As shown in Table 3, compared to Model 4, Model 5 showed relatively lower values of

fit statistics. Therefore, the effects of age, gender, and intervention group were interpreted based

on Model 5. For easy understanding, results of Model 5 based on the full sample are also

demonstrated in Table 4.

As shown in Table 4, adolescents' initial age was associated negatively with initial

thriving level ($\beta = -.033$, $p < .001$), positively with linear change ($\beta = .035$, $p < .001$), and

negatively with quadratic change ($\beta = -.006$, $p < .001$). It means that younger adolescents showed

a higher initial level, a faster decline, and a faster rebound in thriving over time.

For gender, girls (coded as "1") displayed a higher initial level ($\beta = .114$, $p < .001$), a

faster decline ($\beta = -.065$, $p < .001$) and a faster bounce back ($\beta = .011$, $p < .001$) in thriving than

did boys (coded as "-1") (see Model 5 based on the full sample in Table 4).

For the intervention group (the experimental group coded as "1", the control group coded

as "-1"), while it was not related to initial thriving level ($\beta = -.007$, $p = .40$), it was significantly

associated with linear change ($\beta = .017$, $p < .01$) and quadratic change ($\beta = -.003$, $p < .01$) in

thriving (see Model 5 based on the full sample in Table 4). These findings suggest that

adolescents in the experimental and control groups had similar baseline thriving but thriving of

the experimental group students decreased slower and bounced back slower as compared to the

control group students. Such an intervention effect is also revealed in Figure 2, which shows the

plotted prototypical trajectories of thriving in the experimental and control groups based on

parameters obtained in Model 5. According to Figure 2, thriving of the control group students

bounced back a little bit faster after Wave 7. This observation was supported by additional

comparisons between the two groups at different waves (see Table 5, whole sample), which

revealed that the experimental group showed higher thriving levels at Wave 6 ($t = 2.85$, $p < .01$,

Cohen's $d = .08$) and Wave 7 ($t = 4.30$, $p < .001$, Cohen's $d = .12$), but the two groups did not

significantly differ from each other at Wave 8 ($t = 1.21$, $p = .23$).

Moderation Effect of Demographic Variables on the Intervention Effect

To examine whether age and gender moderated the effect of intervention, we further

performed age-specific and gender-specific analyses for Model 5. For age, we classified the

participants whose initial age was below the average as the "younger group" and those aged

above the average as the "older group". IGC analyses based on Mode 5 revealed a similar result

pattern for the two age groups, suggesting no moderation effect of age on the intervention effect.

This may be because the age range was not large, as the participants were at the same grade level

(i.e., Grade 7 at Wave 1).

Results of the gender-specific IGC analyses are shown in Table 4. For both boys and

girls, the experimental group and the control group did not differ significantly in initial thriving

level. For boys, the intervention group did not significantly predict linear ($\beta = .012$, $p = .14$) or

quadratic ($\beta = -.001$, $p = .62$) slopes of thriving. However, for girls, the intervention group was

significantly associated with linear ($\beta = .021$, $p < .01$) and quadratic ($\beta = -.005$, $p < .001$) slopes

of thriving. Therefore, the present significant intervention effect existed among girls only. The

plotted prototypical trajectories of thriving in the experimental group and control group by

gender are shown in Figure 3.

As the gender-specific IGC analyses revealed a significant intervention effect among

girls but not among boys, we further compared thriving levels at each wave between the

experimental and control groups, separately for girls and boys. The results are shown in Table 5.

For girls, while the two groups had comparable thriving at Wave 1 and Wave 2 (i.e., first year of

the program implementation), the experimental group showed significantly higher levels of

thriving than did the control group from Wave 3 to Wave 7 (t ranged between 2.34 and 3.73, ps

< .05, Cohen's d ranged between .09 and .15, see Table 5). However, the difference became

insignificant at the last wave. For boys, the experimental group showed higher levels of thriving

than did the control group only at Wave 7 ($t = 3.56$, $p < .001$, Cohen's $d = .14$) and Wave 8 ($t =$

1.97, $p < .05$, Cohen's $d = .08$).

Discussion and Applications to Practice

Utilizing eight waves of data collected from the experimental and control groups during

the three years of program implementation (the first 6 waves) and the two years of follow-up (the

last 2 waves), this pioneering study evaluated both short-term and long-term effects of the

"Project P.A.T.H.S." on thriving among Chinese adolescents in Hong Kong. A U-shaped

developmental trajectory of thriving was observed among adolescents. This developmental

trajectory of thriving echoes previous findings that other integrated measures of positive

development (e.g., positive functioning and "5Cs") or well-being indicators (e.g., life

satisfaction) decreased during secondary school years among some adolescents in both Western

and Chinese contexts (Goldbeck, Schmitz, Besier, Herschbach, & Henrich, 2007; Schmid et al.,

2011; Shek & Liang, 2018; Warren et al., 2016). Such a decline trend may be due to the developmental challenges that students encounter during the transitional adolescent period.

However, our results revealed that thriving declined slower among the experimental school students than did the control school students, especially during the project implementation period, with the mean thriving levels of the experimental group higher than those of the control group from the second year to the fourth year. The lack of significant difference between the two groups at the first year is reasonable because the positive program effect might take time to emerge. This observed positive program effect is consistent with the previous findings showing that the experimental group participants developed better in terms of higher PYD attributes and lower risk behavior than did the control group (Shek & Ma, 2012; Shek & Yu, 2012b).

The intervention effect was not big considering the small effect sizes (Cohen's $d < .20$) of the differences in the mean thriving levels between the two groups. Previous studies also observed similar small effect sizes of classroom-based interventions focusing on social skills training (January, Casey, & Paulson, 2011). Researchers suggested that students may receive more benefits from such PYD programs in childhood or even in preschool period (January et al., 2011). Nevertheless, the present intervention effect still existed one year after the program completion. However, the program effect faded at the last wave of data collection as the two groups did not significantly differ from each other in thriving level. On the one hand, these findings suggest that the positive impacts of a PYD program may be sustainable only within a certain period and booster programs are needed. This may also help to explain the inconclusive findings regarding the long-term effects of different PYD programs (Ciocanel et al., 2017; Taylor et al., 2017). On the other hand, as thriving includes one's interactions with socialization agencies (e.g., parents, teachers, and school), this might be easily affected by contextual factors

after the completion of the program. Thus, efforts should be devoted to consolidating the intervention effect after program completion.

Interestingly, girls benefited more from the "Project P.A.T.H.S." than did boys. While most previous studies did not observe gender-specific intervention impacts (Ciocanel et al., 2017; January et al., 2011; Taylor et al., 2017), some studies reported more benefits for girls on their emotional well-being and overall adjustment whereas greater improvement among boys regarding empathy (Castillo, Salguero, Fernández-Berrocal, & Balluerka, 2013; García-Poole et al., 2019; Krysinska, Batterham, & Christensen, 2017). The gender-specific effects may be due to the specific development patterns of each gender (Castillo et al., 2013). This explanation is applicable in the present study as thriving of girls appeared to decline faster than that of boys, which may imply that girls were more affected by transitional challenges. As a result, girls received more benefits from the project than did boys. Besides, it can be argued that it may take more time for boys to benefit from PYD programs as shown by the present observation that the experimental group did better than the control group at Wave 7 and Wave 8 among adolescent boys.

Overall speaking, the present findings obtained in a Chinese community are in line with those reported in the international context (e.g., Taylor et al., 2017). There are several important implications of the present findings. First, with joint efforts from universities and secondary schools, curricula-based interventions focusing on intrapersonal and interpersonal development of adolescents can be built into routine educational practices that can be effectively delivered by well-trained professionals, such as teachers and school social workers. In fact, with the positive evaluation findings in Hong Kong, the "Project P.A.T.H.S." was transplanted to China by the Tin Ka Ping Foundation. Empirically, there is support for the effectiveness of the "Tin Ka Ping

P.A.T.H.S. Project" in China mainland (Shek, Zhu, Leung, Lee, & Wu, 2019; Zhu & Shek, 2020).

Second, the impact of PYD programs may differ for participants with different background characteristics, such as gender. Hence, more studies should be conducted to further explore this issue and educators, as well as youth workers, should pay specific attention to gender differences in developmental needs when designing and implementing intervention programs. Third, more studies should be conducted to examine the long-term effects of PYD programs.

Although this is the first known study showing the positive long-term effect of a PYD program on thriving in Chinese contexts, there are several limitations. Primarily, apart from adolescent responses, it would be illuminating to collect data from significant others of the program participants. Second, although the overall thriving scale used in the present study was developed based on an integration of different conceptions of thriving, it would also be important to examine how PYD programs influence different elements of thriving in future. Third, as we only considered students in one cohort, future studies will benefit from recruiting students from more cohorts with a wider age range. Besides, as only age and gender were included as demographic variables in final analyses, future studies should consider the impact of the program in different adolescent populations. Finally, although we demonstrated the relationship between a well-designed PYD program and thriving through a longitudinal experimental study, it would be theoretically meaningful to examine the relationship between PYD attributes and thriving together with potential mediators (e.g., life satisfaction) over time. For example, Sun and Shek (2012) showed that PYD attributes influenced problem behavior through the mediating effect of

life satisfaction. Hence, it would be interesting to ask whether PYD attributes affect thriving

through life satisfaction.

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Table 1
Demographic characteristics and baseline thriving

	Final working sample (N = 7,181)		Dropouts (N = 794)		Comparison		Experimental group (N= 3,607)		Control group (N = 3,574)		Comparison	
	n	%	*n*	%			*n*	%	*n*	%		
Gender												
Male	3,932	54.76	491	61.84	$\chi^2_{(1)} = 41.22$,		2,006	55.61	1,926	53.89	$\chi^2_{(1)} = 2.12$,	
Female	3,244	45.17	240	30.23	$p < .001$, $\varphi = .07$		1,599	44.33	1,645	46.03	$p = .15$	
Did not report	5	.07	63	7.93			2	.06	3	.08		
Family economic disadvantage												
Yes	1,040	14.48	124	15.62	$\chi^2_{(1)} = 1.02$,		501	13.89	539	15.08	$\chi^2_{(1)} = .55$,	
No	5,813	80.95	624	78.59	$p = .17$		2,873	79.65	2,904	81.25	$p = .24$	
Did not report	328	4.57	46	5.79			233	6.46	131	3.67		
Family intactness												
Yes	5,477	76.27	551	69.40	$\chi^2_{(1)} = 10.29$,		2,771	76.82	2,706	75.71	$\chi^2_{(1)} = 1.03$,	
No	1,164	16.21	159	20.03	$p < .01$, $\varphi = .04$		608	16.86	556	15.56	$p = .16$	
Did not report	540	7.52	84	10.58			228	6.32	312	8.73		
	Mean	*SD*	*Mean*	*SD*	*t*	Cohen's *d*	*Mean*	*SD*	*Mean*	*SD*	*t*	Cohen's *d*
Age	12.25	.91	12.52	1.30	5.50***	.24	12.20	.90	12.31	.91	4.72***	.11
Baseline thriving	4.64	.69	4.52	.81	4.99***	.16	4.65	.68	4.63	.71	.21	.01

*** $p < .001$.

Table 2
Factor loadings and model fit in confirmatory factor analyses for thriving across waves

	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8
Factor loadings								
Item 1	.61	.64	.68	.67	.69	.70	.66	.66
Item 2	.64	.66	.70	.71	.70	.73	.70	.68
Item 3	.66	.67	.71	.70	.71	.71	.66	.65
Item 4	.61	.63	.70	.69	.68	.69	.67	.65
Item 5	.61	.63	.67	.66	.67	.68	.65	.65
Item 6	.65	.66	.70	.69	.71	.72	.68	.66
Item 7	.58	.60	.67	.65	.67	.66	.60	.59
Item 8	.67	.68	.74	.73	.73	.74	.72	.71
Item 9	.69	.71	.73	.73	.74	.72	.71	.72
Item 10	.76	.75	.78	.78	.77	.75	.74	.73
Item 11	.67	.71	.71	.69	.71	.69	.63	.63
Item 12	.67	.68	.70	.70	.71	.71	.66	.64
Item 13	.54	.56	.59	.58	.58	.58	.53	.53
Item 14	.54	.56	.60	.56	.54	.55	.50	.50
Item 15	.65	.63	.66	.61	.62	.58	.59	.53
Item 16	.52	.53	.57	.55	.57	.58	.57	.53
Item 17	.63	.65	.69	.67	.70	.68	.67	.64
Item 18	.52	.53	.56	.53	.54	.53	.50	.48
Item 19	.60	.59	.61	.59	.62	.59	.60	.56
Model fit								
CFI	.918	.914	.914	.907	.909	.904	.915	.906
TLI	.896	.891	.890	.881	.884	.878	.888	.877
IFI	.918	.915	.914	.907	.909	.904	.915	.906
RMSEA	.067	.070	.072	.071	.071	.072	.064	.063

Note. All factor loadings are significant ($p < .001$)

Table 3

Results of IGC models (Models 1−5) for adolescent thriving

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Estimate/β	SE	Estimate/β	SE	Estimate/β	SE	Estimate/β	SE	Estimate/β	SE
Fixed effects										
Intercept										
Intercept	4.410***	.0058	4.514***	.0071	4.614***	.0078	4.641***	.0081	4.641***	.0081
Initial age							-.033***	.0090	-.033***	.0090
Gender [a]							.114***	.0078	.114***	.0078
Group [b]									-.007	.0078
Linear slope										
Intercept			-.061***	.0018	-.225***	.0056	-.246***	.0057	-.245***	.0057
Initial age							.034***	.0065	.035***	.0065
Gender [a]							-.065***	.0056	-.065***	.0056
Group [b]									.017**	.0056
Quadratic slope										
Intercept					.037***	.0011	.040***	.0011	.040***	.0011
Initial age							-.006***	.0013	-.006***	.0013
Gender [a]							.011***	.0011	.011***	.0011
Group [b]									-.003**	.0011
Random effects										
Level 1(within)										
Residual	.206***	.0015	.179***	.0014	.160***		.157***	.0013	.157***	.0014
Level 2 (between)										
Intercept	.203***	.0041	.285***	.0061	.326***		.301***	.0072	.303***	.0072
Time			.008***	.0004	.080***		.070***	.0038	.069***	.0038
Time^2					.002***		.002***	.0001	.002***	.0001
Fit statistics										
Deviance	72580.59		69883.46		67682.18		63200.15		63187.45	
AIC	72586.59		69895.46		67702.18		63232.15		63225.45	
BIC	72612.84		69947.97		67789.69		63371.36		63390.76	
df	3		6		10		16		19	
ICC	.496									

Note. Model 1 to Model 3 are Level-1 models focusing on within-person changes in thriving over time; Model 4 and Model 5 are Level-2 models focusing on the effects of between-person factors. Model 1: unconditional mean model (without predictors); Model 2: linear growth curve model (time as Level-1 predictor); Model 3: quadratic growth curve model (time as Level-1 predictor); Model 4: quadratic growth curve model with demographic variables as Level-2 predictors; Model 5: quadratic growth curve model with demographic variables and intervention group as Level-2 predictors; Initial age was grand-mean centered. [a] Male = -1, Female = 1; [b] Control group= -1, Experimental Group= 1; ** $p < .01$; *** $p < .001$.

Table 4
Results of IGC Model 5 based on full sample and by gender for adolescent thriving

	Model 5 (full sample)		Model 5-Male		Model 5-Female	
	Estimate/β	SE	Estimate/β	SE	Estimate/β	SE
Fixed effects						
Intercept						
Intercept	4.641***	.0081	4.523***	.0114	4.753***	.0111
Initial age	-.033***	.0090	-.042**	.0121	-.033**	.0126
Gender [a]	.114***	.0078				
Group [b]	-.007	.0078	-.012	.0109	.004	.0109
Linear slope						
Intercept	-.245***	.0057	-.177***	.0085	-.307***	.0075
Initial age	.035***	.0065	.047***	.0093	.028**	.0086
Gender [a]	-.065***	.0056				
Group [b]	.017**	.0056	.012	.0082	**.021****	**.0074**
Quadratic slope						
Intercept	.040***	.0011	.029***	.0017	.050***	.0014
Initial age	-.006***	.0013	-.008***	.0019	-.004**	.0016
Gender [a]	.011***	.0011				
Group [b]	-.003**	.0011	-.001	.0016	**-.005****	**.0014**
Random effects						
Level 1(within)						
Residual	.157***	.0014	.195***	.0023	.115***	.0015
Level 2(between)						
Intercept	.303***	.0072	.317***	.0106	.297***	.0096
Time	.069***	.0038	.077***	.0061	.068***	.0045
Time^2	.002***	.0001	.002***	.0002	.002***	.0002
Fit statistics						
Deviance	63187.45		40083.53		24038.82	
AIC	63225.45		40115.53		24070.82	
BIC	63390.76		40245.33		24198.09	
df	19		16		16	

Note. Initial age was grand-mean centered; [a] Male = -1, Female = 1; [b] Control group = -1, Experimental Group = 1; ** $p < .01$; *** $p < .001$.

Table 5

Comparisons of thriving between the experimental and control groups at each wave

Wave	Group	Whole sample				Male sample				Female sample			
		Mean	SD	t	Cohen's d	Mean	SD	t	Cohen's d	Mean	SD	t	Cohen's d
Wave 1	Experimental group	4.65	.68	.96	.02	4.54	.69	-.03	.00	4.79	.64	.24	.01
	Control group	4.63	.71			4.54	.72			4.78	.66		
Wave 2	Experimental group	4.49	.68	-.16	.00	4.41	.70	-1.31	-.04	4.59	.63	.20	.01
	Control group	4.49	.69			4.44	.69			4.59	.64		
Wave 3	Experimental group	4.35	.65	1.10	.03	4.31	.71	-.11	.00	4.40	.55	2.60**	.10
	Control group	4.33	.65			4.31	.70			4.35	.57		
Wave 4	Experimental group	4.35	.62	2.35*	.06	4.33	.68	1.68	.06	4.39	.53	2.34*	.09
	Control group	4.32	.62			4.29	.67			4.34	.53		
Wave 5	Experimental group	4.35	.58	1.27	.03	4.30	.63	-.40	-.02	4.40	.50	2.52*	.10
	Control group	4.33	.62			4.31	.68			4.35	.52		
Wave 6	Experimental group	4.38	.62	2.85**	.08	4.33	.69	1.26	.05	4.43	.50	3.73***	.15
	Control group	4.33	.57			4.30	.62			4.35	.49		
Wave 7	Experimental group	4.38	.55	4.30***	.12	4.35	.62	3.56***	.14	4.43	.44	3.22**	.14
	Control group	4.32	.54			4.26	.59			4.37	.45		
Wave 8	Experimental group	4.36	.50	1.21	.04	4.34	.55	1.97*	.08	4.37	.45	-.59	-.03
	Control group	4.34	.52			4.29	.56			4.38	.44		

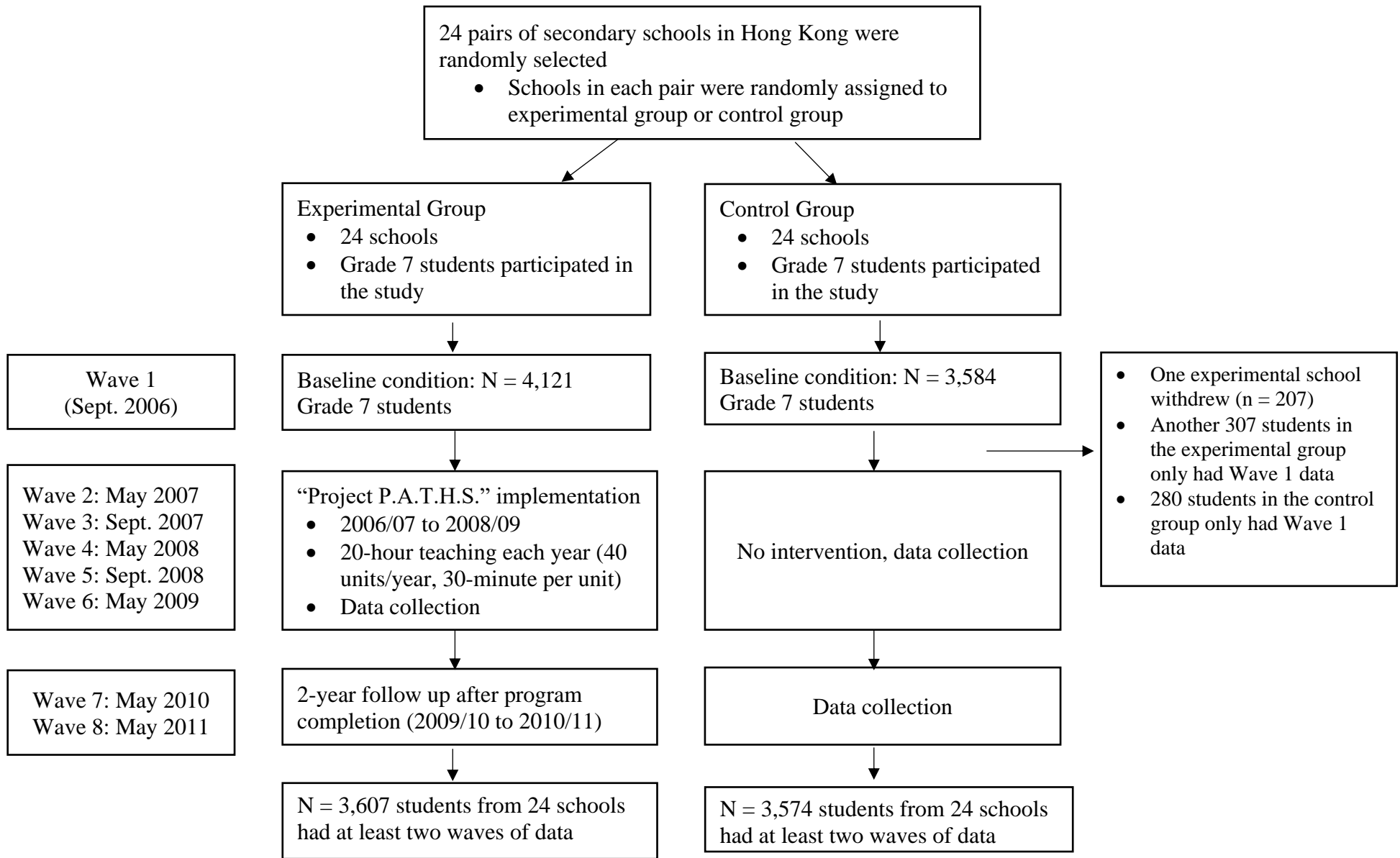*$p < .0.5$; ** $p < .01$; *** $p < .001$

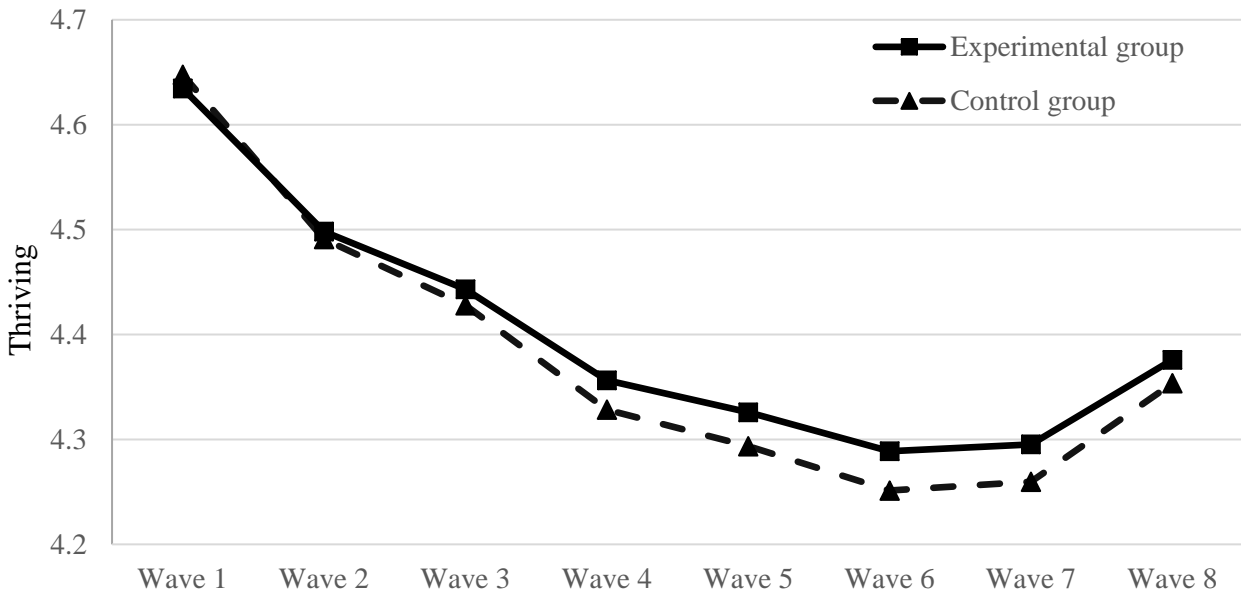**Figure 1.** A flowchart showing the procedures of the present study

Figure 2. Growth trajectories of thriving among participants in the experimental and control groups based on full sample.
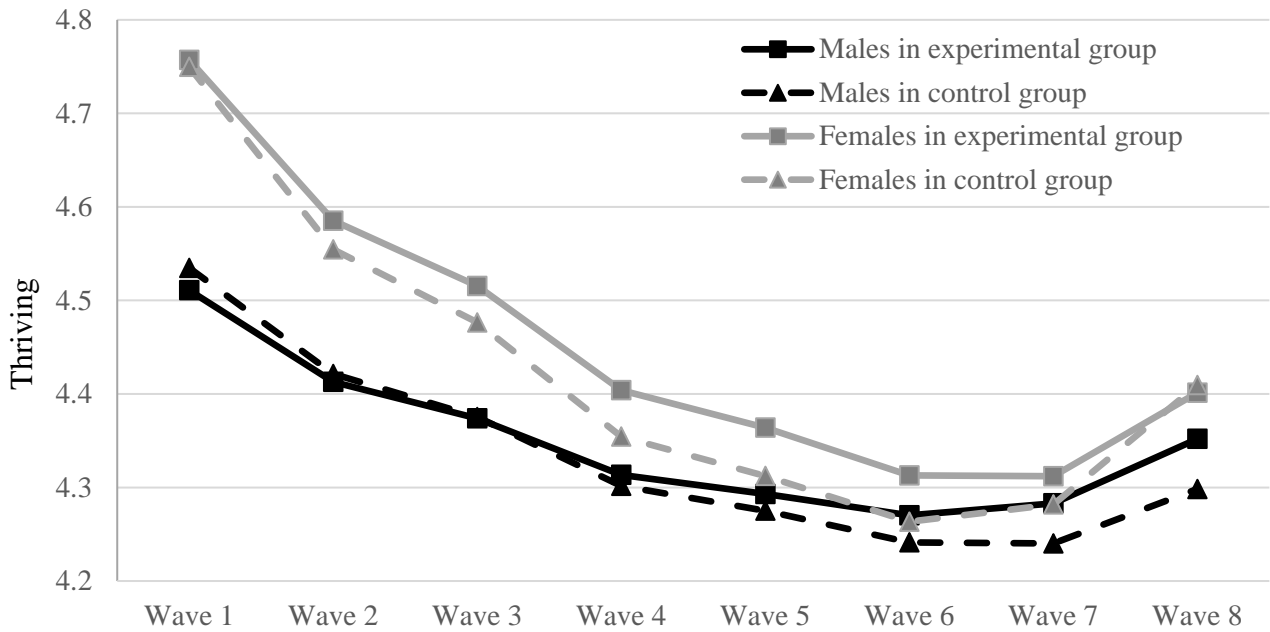

Figure 3. Growth trajectories of thriving among participants in the experimental and control groups by gender.