

Can a multicomponent positive psychological intervention promote well-being in parents of young children? A randomized controlled trial study in Hong Kong

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Abstract

The present research examined the effects of an Early Advancement in Social–Emotional Health and Positivity (EASP) multicomponent positive psychological intervention on parents' well-being in Hong Kong. Participants were parents of young children ($N = 120$; $M_{\text{age}} = 37.19$ years, $SD = 4.71$, range = 24–53; female = 95.00%) who participated in the one-month randomized control trial. Participants were randomly assigned into the intervention ($n = 50$) and waitlist control groups ($n = 70$). Parents in the intervention group received two online workshops and an evidence-based smartphone application that targeted four positive psychological skills: (1) mindful parenting, (2) hope, (3) positive reappraisal, and (4) growth mindset. The results of the multivariate regression analysis revealed that the intervention significantly improved various dimensions of participants' positive psychological skills, subjective well-being, and psychological well-being immediately at the conclusion of the program. The findings of this study underscore the importance of the well-being payoffs linked to cultivating positive psychological skills among parents of young children.

KEY WORDS

coping strategies, COVID-19, mHealth, positive psychological skills, randomized control trial, well-being

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INTRODUCTION

Being a parent is considered one of the most demanding and stressful life roles (Kabat-Zinn & Kabat-Zinn, 2014). Parents bear the responsibility of not only providing a home for their child but also protecting and supporting their child's academic and social–emotional development. Given such multiple responsibilities, parents reported greater depression, stress, and ill-being in recent studies (Cheung et al., 2021; Nomaguchi & Milkie, 2020). Parents' ill-being (e.g., depressive symptoms and stress) derails family functioning and children's development by inflating children's externalizing behaviors and adverse childhood experiences (Cheung et al., 2021; Gunlicks & Weissman, 2008; Nomaguchi & Milkie, 2020). Surprisingly, scientists have paid less attention to parents' well-being, even if studies have shown a significant decline in parents' well-being during unprecedented times such as the COVID-19 pandemic (Gassman-Pines et al., 2020; Huebener et al., 2021; Patrick et al., 2020). Hence, the mental health and well-being hazards faced by parents of young children underpin the importance of developing evidence-based interventions to promote their positive psychological skills and well-being. Against this backdrop of literature on parental mental health issues, our research examined the effects of an Early Advancement in Social–Emotional Health and Positivity (EASP) multicomponent positive psychological intervention guided by the engine model of well-being (Jayawickreme et al., 2012) on positive psychological resources and well-being among parents of young children in Hong Kong. The EASP is a program aiming to support preschool children's social–emotional development by improving early years teachers' and parents' well-being in Hong Kong.

The engine model of well-being

The engine model of well-being (Jayawickreme et al., 2012) is a comprehensive and dynamic framework that explains how three interrelated psychological elements—input, process, and outcome—contribute to an individual's well-being. Input variables refer to endogenous traits (e.g., personality traits and character strengths) and exogenous resources (e.g., education, income, and environments) that influence well-being. Process variables can be defined as internal psychological states (e.g., cognitive evaluation and emotions) that affect choices and behaviors related to the pursuit of well-being outcomes. Outcome variables encompass intrinsically voluntary behaviors (e.g., autonomous behavior, positive relationships, personal accomplishment, and engagement in meaningful activity) that contribute to well-being.

Guided by the basic tenets of the engine of well-being (Jayawickreme et al., 2012), the present study examined the effects of a multicomponent psychological intervention that bolsters psychological inputs (i.e., mindful parenting and hope) and processes (i.e., positive reappraisal and growth mindset), on well-being outcomes (i.e., psychological and subjective well-being) among Hong Kong parents of young children (see Figure 1). Well-being outcomes were conceptualized using two conventional perspectives: subjective well-being (Diener, 2009b; Diener et al., 1999), and psychological well-being (Ryff, 1989, 2014; Ryff &

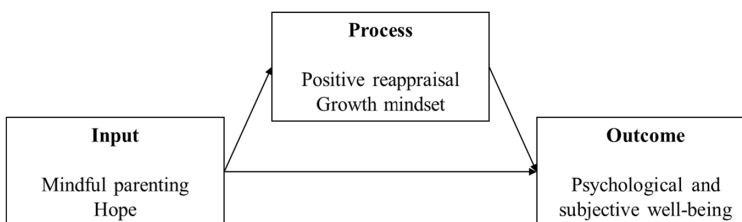


FIGURE 1 Proposed engine model of well-being.

Keyes, 1995). On the one hand, subjective well-being refers to the degree to which “the person subjectively believes his or her life is desirable, pleasant, and good” (Diener, 2009a, p. 1). It involves frequently experiencing positive emotions, lower negative emotions, and general satisfaction with life. On the other hand, psychological well-being refers to one's optimal psychological functioning encompassing six dimensions: autonomy, environmental mastery, personal growth, positive relationship, purpose, and self-acceptance (Ryff, 1989, 2014).

Positive psychological skills and mental health

The critical roles that specific positive psychological skills—such as mindful parenting, hope, growth mindset, and positive reappraisal—play in an individual's subjective and psychological well-being have been well documented (Datu, Lee, et al., 2022; Lee, Datu, et al., 2023; Snyder et al., 2020; Yeager et al., 2019). Based on the engine model of well-being (Jayawickreme et al., 2012), input-level interventions may promote trait-like psychological resources; hence, we concentrated on facilitating parents' mindful parenting and hope in the current study. Mindful parenting involves paying attention to the child's needs, having nonjudgmental acceptance and emotional awareness of the self and the child, and feeling compassion for one's self and the child (Duncan et al., 2009; Kabat-Zinn & Kabat-Zinn, 2014). Studies have shown that parents who practice mindful parenting reported higher well-being outcomes (Duncan et al., 2009; Kabat-Zinn & Kabat-Zinn, 2014). Mindful parenting interventions have also been effective in reducing parental stress in both clinical and non-clinical settings (Potharst et al., 2021). Second, hope was included as an intervention component because it is considered one of the most salient character strengths in predicting well-being (Chan, 2009; Park et al., 2004). Snyder (2002, p. 249) defined hope as the “perceived capability to derive pathways to desired goals and motivate oneself via agency thinking to use those paths.” Specifically, hope enables individuals to generate different routes to achieve their future goals and maintain their motivation even when they encounter setbacks (Snyder et al., 2020). Individuals with higher hope appear to have better physical health, psychological adjustment, and interpersonal relationships than those with a lower level of hope (Snyder et al., 2020). Despite the cultural nuances of the benefits of mindfulness and hope, there is a paucity of research on the effects of mindful parenting and hope interventions for Hong Kong parents (Cheung et al., 2022). The present study filled the research gap by considering the long working hours conditions in Hong Kong. For instance, a government report (Census and Statistics Department, 2023) shows that the median weekly working hours for men and women in Hong Kong were 43.3 and 42.0, respectively, placing Hong Kong among the cities and countries with the highest working hours worldwide (OECD, 2023). The long working hours have key ramifications for implementing well-being interventions to promote the mental health of workers, particularly those with other equally important life roles, such as working parents, who are at higher risk of experiencing intense occupational stress and burnout and subsequent to the strain in workers' lifestyle.

For the process aspect of our intervention, Jayawickreme et al. (2012) have emphasized the need to boost positive psychological processes such as positive cognitive evaluation and emotions. This study incorporated positive reappraisal and growth mindset as intervention components. Positive reappraisal is a prominent and influential positive psychological skill that boosts one's well-being (Riepenhausen et al., 2022). In particular, positive reappraisal refers to the skills to cognitively reframe negative events and experiences as positive and the process of finding some personally relevant positive meaning from those negative events (Haga et al., 2009; Lazarus & Folkman, 1984; Riepenhausen et al., 2022). Studies have underpinned the effectiveness of adopting positive reappraisal in reducing stress and inducing positive emotions (Haga et al., 2009; Riepenhausen et al., 2022). To further facilitate parents' process level of well-being, the promotion of a growth mindset was included. Individuals with a growth mindset view challenges and

setbacks as opportunities to grow and consider that intellectual ability can be developed over time (Dweck & Yeager, 2019; Yeager et al., 2019). Previous positive psychological intervention studies have also targeted promoting a growth mindset with a view to cultivating well-being (Datu et al., 2023; Datu, Lee, et al., 2022; Lee, Datu, et al., 2023). Limited studies (Fabrizio et al., 2015; Sun et al., 2022) are available to examine what and how process-level interventions are likely to be leveraged to boost parents' well-being in Asian societies.

The present study

The objective of the present study was to evaluate the effectiveness of an EASP multi-component positive psychological intervention on well-being outcomes among parents of young children in Hong Kong, which has adopted strict social distancing policies since the COVID-19 pandemic's beginning (January 2020). Kindergartens and primary schools were yet to resume full-day classes during our research period (July 2022 to August 2022). Parents needed to take care of their children for a prolonged period while balancing their careers. Research suggested that the closure of schools had negative effects on parents' well-being, especially for parents with children under 11 years of age (Adams-Prassl et al., 2020; Gassman-Pines et al., 2020; Huebener et al., 2021). Thus, the current study would significantly promote young children's parent well-being during difficult times. Based on the engine model of well-being (Jayawickreme et al., 2012), well-being literature (Diener, 2009a; Ryff, 2014), and previous positive psychological intervention studies (Datu, Lee, et al., 2022; Koydemir et al., 2021; Lee, Datu, et al., 2023), we expected that parents from the intervention group would have significant improvement in positive psychological skills: mindful parenting, hope, positive reappraisal, and growth mindset, psychological: autonomy, environmental mastery, personal growth, positive relationship, purpose, and self-acceptance and subjective well-being: positive affect, negative affect, and life satisfaction compared to their counterparts in the control group after the intervention.

METHOD

Participants

Ethical approval was obtained from The Education University of Hong Kong [Reference No. 2019-2020-0407]. Invitations to the study were posted on social media (i.e., Facebook and Instagram). Parents were eligible for inclusion in the study if they were parents of K1–P3 children (ages 2 years 8 months to 10 years). A statistical power analysis specifying a power level of 80%, an alpha level of 0.05, and a medium-to-large effect size of 0.33 (Datu, Lee, et al., 2022) indicated that a minimum sample size of 75 participants was needed to find effects in repeated-measure MANOVA (Faul et al., 2007). Assuming an attrition rate of 10%, we determined that at least 90 participants were needed to be recruited for the study. Finally, 120 parents ($M_{\text{age}} = 37.19$ years, $SD = 4.71$, range = 24–53; female = 95.00%) signed the informed consent and agreed to participate in the present research. Most participants ($n = 109$; 90.83%) were married, and 69 participants (57.98%) had one child. For educational level, 87 participants (72.50%) obtained a bachelor's degree or higher.

Procedure

The present study was a one-month randomized wait-list control trial with two waves of data collection conducted between July 2022 and August 2022. All participants provided informed

consent and were then invited to complete the baseline questionnaire. Participants were randomly assigned into the intervention ($n=50$) and waitlist control groups ($n=70$) by an independent research assistant on a computer ballot. Participants from the intervention group received two 2.5-hour online workshops over 3 weeks. At the end of the first workshop, the first author provided a 10-min brief introduction to our smartphone app. The links and procedures for downloading and using the app were also sent to the participants in the intervention group. Then, after the second workshop, the intervention group was asked to complete the posttest questionnaire immediately. The waitlist control group only received the two online workshops and the smartphone app after completing the posttest assessments. [Figure 2](#) displays the participant flow diagram.

Intervention design

The present intervention consisted of two key components: two online intervention workshops and a theory-driven smartphone app. The intervention materials were developed based

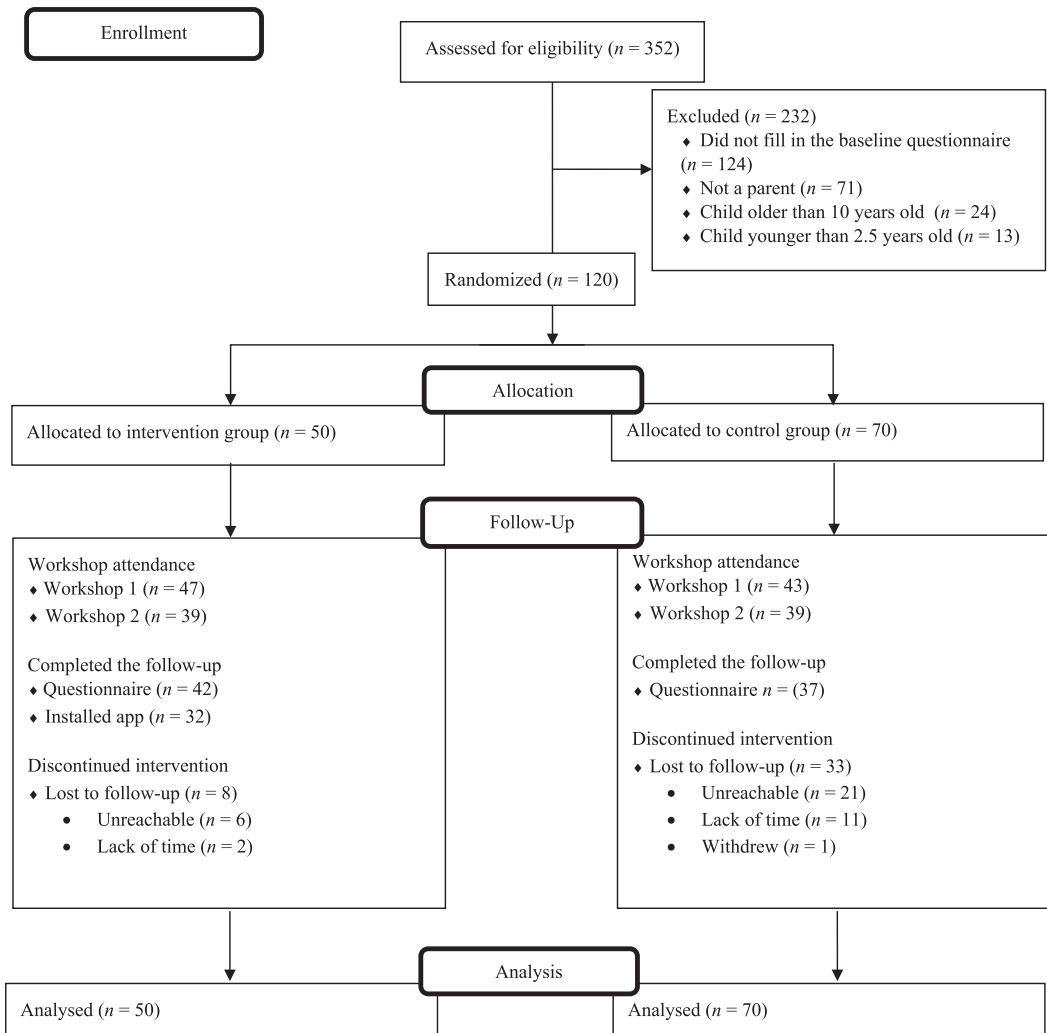


FIGURE 2 CONSORT flow diagram.

on the previous positive psychological literature (Las Hayas et al., 2019; Li et al., 2017; Liu et al., 2020). The research team, which has conducted four recent positive psychological interventions (Datu et al., 2023; Datu et al., 2022; Lee et al., 2023; Lee et al., 2024), comprises six experts in positive psychology and early childhood education. The current intervention aimed at promoting four positive psychological skills: (1) growth mindset (Dweck & Yeager, 2019); (2) positive reappraisal (Lazarus & Folkman, 1984); (3) hope (Snyder, 1994); and (4) mindful parenting (Duncan & Bardacke, 2010). In particular, the first workshop focused on cultivating a growth mindset (e.g., the introduction of different mindsets and their corresponding effects on our development) (Dweck & Yeager, 2019) and mindful parenting (e.g., practicing mindfulness) (Duncan & Bardacke, 2010). The second workshop focused on promoting positive reappraisal (e.g., the introduction of emotion regulation) (Lazarus & Folkman, 1984) and hope (e.g., discussion of the effects of being hopeful) (Snyder, 1994). The online intervention workshops were delivered by an educational psychologist with extensive teaching experience in positive psychology modules in universities, government-funded projects, and nonprofit organizations.

The smartphone app “EASP” comprised one lesson each for the four positive psychological skills. The smartphone app was used as a supportive measure of the online workshops for participants to access knowledge of skills (Authors et al., 2022). Each lesson consisted of multiple-choice questions, short questions, a gratitude diary, online workshop materials (i.e., PowerPoint slides), a short article, and a hypothetical scenario. Multiple choice questions (e.g., “According to the growth mindset, which of the following leads to one’s success” and “Which of the following is the example of mindful parenting”) and short questions (e.g., “Based on the hope theory, how do you avoid learned helplessness? Please illustrate with one or two examples” and “How do you deal with stress? Please illustrate with one or two examples”) were used to consolidate participants’ knowledge. For the gratitude diary, participants were encouraged to record one to two things they were grateful for daily. Studies have suggested practicing simple gratitude-enhancing activities such as keeping a gratitude diary (Witvliet et al., 2019) and counting blessings (Datu, Valdez, et al., 2022) would cultivate hope by increasing mindful attentiveness (McCullough, 2002). The PowerPoint slides were uploaded to the smartphone app so that participants could revisit the materials at any time. The short articles, similar to a newspaper column, were written by the workshop coordinator to further illustrate the positive psychological skills introduced in the workshops. The hypothetical scenarios and self-reflection were situations that young children’s parents may have encountered (e.g., your children did not receive any prize in school, and there are conflicts between grandparents and parents in parenting). After watching the scenario, participants were prompted to self-reflect on what they would feel, how they would handle their feelings, or what they would do to solve the problems if they were in the scenario. On the next page, suggestions were provided based on positive psychological theories and skills (e.g., growth mindset, positive reappraisal, hope theory, and mindful parenting). Detailed intervention materials are presented in Table 1.

To evaluate the intervention’s fidelity, five strategies were implemented. First, to ensure that intervention materials aligned with our research objectives and positive psychological theories, the intervention materials (i.e., workshops and the smartphone app) were reviewed by the research team and the workshop coordinator. Second, the first author attended online workshops, ensuring the workshop coordinator delivered the assigned intervention materials. Third, two independent research members were invited to perform a fidelity check on the intervention workshops using a 31-item checklist. The two members rated the items (e.g., “The workshop can illustrate the growth mindset clearly” and “The purpose of mindfulness-related activities is clear”) on a five-point Likert scale from 1 (*Strongly disagree*) to 5 (*Strongly agree*). The average scores of the fidelity checklist for growth mindset, positive reappraisal, hope, and mindfulness were 4.08 (SD = 0.48), 4.14 (SD = 0.83), 4.30 (SD = 0.50), and 4.33 (SD = 0.74) out of 5, respectively. Two members shared the same scores on 22 items, yielding a percentage agreement rate of 70.97%. Fourth, in the posttest survey

TABLE 1 Multi-component positive psychological intervention materials.

Dimensions	Intervention workshops	Smartphone application (EASP)
Mindful parenting	Workshop 1: Introduction of mindfulness	Lesson 4: MCQ—Mindfulness
	Workshop 1: Introduction of mindful parenting	Lesson 4: MCQ—Mindful parenting
	Workshop 1: Activities (i.e., practicing mindfulness)	Lesson 4: SQ—Application of mindful parenting
Hope	Workshop 1: Short article—Being mindful of yours and child's emotions	Lesson 4: Short article—Being mindful of yours and child's emotions
	Workshop 1: Scenarios (Your child broke an expansive vase at home)—Mindful parenting	Lesson 4: Scenarios (Your child broke an expansive vase at home)—Mindful parenting
	Workshop 2: Discussion of Snyder (1994)'s hope theory	Lesson 3: MCQ—Hope
	Workshop 2: Discussion of learned helplessness	Lesson 3: MCQ—Gratitude
Positive reappraisal	Workshop 2: Introduction of SMART goals	Lesson 3: MCQ—SMART goals
	Workshop 2: Introduction of gratitude	Lesson 3: SQ—Application of hope theory
	Workshop 2: Introduction of emotion regulation (i.e., positive reappraisal)	Lesson 3: Gratitude diary
	Workshop 2: Discussion of types of positive reappraisal (e.g., process, outcome, and emotion)	Lesson 3: Short article—Purpose and hope
Growth mindset	Workshop 2: Scenarios (Your child is willing to share toys with others)—Gratitude and hope	Lesson 3: Scenarios (Your child is willing to share toys with others)—Gratitude and hope
	Workshop 2: Introduction of emotion regulation (i.e., positive reappraisal)	Lesson 2: MCQ—Stress-management
	Workshop 2: Discussion of types of positive reappraisal (e.g., process, outcome, and emotion)	Lesson 2: MCQ—Positive reappraisal
	Workshop 2: Introduction of SMART goals	Lesson 2: SQ—Application of positive reappraisal
Growth mindset	Workshop 1: Introduction of Growth mindset	Lesson 2: Short article—Being Resilient and the application of positive reappraisal
	Workshop 1: Discussion of learned helplessness	Lesson 2: Scenarios (There are conflicts between grandparents and parents in parenting)—Positive reappraisal
	Workshop 1: Cultivating a growth mindset using the STEP approach (i.e., strategy, time, experience, and practice)	Lesson 1: MCQ—Growth mindset
	Workshop 1: Cultivating a growth mindset using the STEP approach (i.e., strategy, time, experience, and practice)	Lesson 1: MCQ—Fixed mindset
Growth mindset	Workshop 1: Introduction of Growth mindset	Lesson 1: SQ—Daily examples of cultivating a growth mindset
	Workshop 1: Discussion of learned helplessness	Lesson 1: Short article—Growth mindset and how to cultivate it
	Workshop 1: Cultivating a growth mindset using the STEP approach (i.e., strategy, time, experience, and practice)	Lesson 1: Scenarios (Your child did not receive any prize)—Growth mindset and STEP approach
	Workshop 1: Cultivating a growth mindset using the STEP approach (i.e., strategy, time, experience, and practice)	Lesson 1: Scenarios (Your child did not receive any prize)—Growth mindset and STEP approach

Abbreviations: MCQ, multiple choice question; SQ, short question.

for the intervention group, we included 8 items to measure participants' responsiveness to the smartphone app (e.g., “Have you installed the EASP on your smartphone?” and “How much time have you spent on the EASP”) and the workshops (e.g., “On a scale of 1 = *Never* to 5 = *Always*, how often did you adopt positive psychological skills that you learned from the workshop in the past week”). The results suggested that 32 out of 50 (65.00%) participants installed the smartphone app. On average, they spent 13.66 (SD = 7.51) minutes on the smartphone app. The mean scores for the frequency of implementing the first and second workshops' positive psychological skills were 3.70 (SD = 0.79) and 3.39 (SD = 0.95) out of 5, respectively. Fifth, at the end of the study, participants were asked to complete a 12-item satisfaction survey (e.g., “Workshops contents were clear and precise,” “workshop coordinator was well-prepared,” and “The arrangement of the workshops were appropriate”) on a 4-point Likert scale (1 = *Strongly disagree* to 4 = *Strongly agree*). On average, participants rated 3.27 (SD = 0.52) out of 4 on the satisfactory survey items. Two open-ended questions (e.g., “What do you think needs to be improved in the workshops?” and “Any other comment

for us”) were also asked to gather participants' feedback. In general, the feedback given was positive, such as “The workshop coordinator was nice, and the contents of the workshop were fruitful,” and “The workshop coordinator was interactive with the participants, and I appreciate the coordinator of the workshop adopted some scenes from TV series to elaborate and consolidate the concepts and skills.” On the other hand, some participants recommended having “one more workshop,” “longer discussion session,” “longer question and answer time for the workshop,” and “more practical examples in real-life situations.”

Measures

Positive psychological skills

Participants' mindful parenting, hope, positive reappraisal, and growth mindset were measured. We used the 15-item Bangor Mindful Parenting Scale (BMPS; Jones et al., 2014) to measure participants' disposition to engage in mindful parenting practices. Items (e.g., “In difficult situations with my child, I can pause without reacting straight away”) were rated on a 4-point Likert scale (1 = *Never true* to 4 = *Always true*). The Chinese version of the scale was adopted by Hong Kong parents, showing acceptable reliability (i.e., $\alpha=0.70$; Cheung et al., 2021). The 3-item hope subscale from the Global Assessment of Character Strengths (GASC; McGrath, 2019) was used to assess participants' hope. Participants rated the items (e.g., “It is natural and effortless for me to express my hope strength”) on a seven-point Likert scale from 1 (*Very strongly disagree*) to 7 (*Very strongly agree*). The Chinese version of the scale displayed acceptable reliability (i.e., $\alpha=0.87$) in a previous study (Datu, Lee, et al., 2022). For positive reappraisal, we used the 6-item positive reappraisal subscale from the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). Participants rated the items (e.g., “I control my emotions by changing the way I think about the situation I'm in”) on a 7-point Likert scale (1 = *Strongly disagree* to 7 = *Strongly agree*). The measure had been validated in a Chinese sample (Li & Wu, 2020), with acceptable internal consistency (i.e., $\alpha=0.85$). Growth mindset was measured with 2 items adopted from previous studies (Chan et al., 2020; Dweck et al., 1995). A sample question was, “You can substantially change how intelligent you are.” Participants' responses were provided on a 7-point Likert scale, from 1 (*strongly disagree*) to 7 (*strongly agree*). The Chinese version of the scale has been adopted in Hong Kong and has shown acceptable reliability (i.e., $\alpha=0.78$; Chan et al., 2020). In this study, the four scales showed good internal consistency at baseline (i.e., $\alpha=0.76$ to 0.90) and posttest (i.e., $\alpha=0.71$ to 0.89).

Psychological well-being

We measured participants' psychological well-being using the 24-item brief version of Ryff's Scales of Psychological Well-being (PWBS; Chan et al., 2019; Ryff, 1989; Ryff & Keyes, 1995). The scale consisted of six subscales: autonomy (4 items; e.g., “Not afraid to voice opinions”), environmental mastery (4 items; e.g., “Can manage the living situation”), personal growth (4 items; e.g., “Consider new experiences important”), positive relationship (4 items; e.g., “Seen as loving and affectionate person”), purpose (4 items; e.g., “Have direction and purpose in life”), and self-acceptance (4 items; e.g., “Confident and positive self-views”). Participants rated the items on a 5-point Likert scale from 1 (*Least like me*) to 5 (*Most like me*). The brief version of the PWBS was developed and validated in the Hong Kong population (Chan et al., 2019). The scale showed good internal consistency (i.e., $\alpha=0.77$ to 0.88) in the validation study (Chan

et al., 2019). In the present study, the Cronbach's alpha coefficients of the subscales at baseline ($\alpha=0.81$ to 0.87) and posttest ($\alpha=0.83$ to 0.95) were acceptable.

Subjective well-being

We adopted the 20-item Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) and the 5-item Satisfaction with Life Scale (SWLS; Diener et al., 1985) to measure participants' subjective well-being. For the PANAS, participants rated the extent to which they experienced positive (10 items; e.g., "Interested", "Determined") or negative (10 items; e.g., "Distressed," "Nervous") feelings over the past week on a 5-point scale ranging from 1 (*Not at all*) to 5 (*Extremely*). The Chinese version of the scale has been used extensively in the Hong Kong population (Datu, Lee, et al., 2022; Lee, Fung, et al., 2022; Lee, Sun, & Chung, 2022), and it displayed acceptable reliability (i.e., positive affect: $\alpha=0.87$; negative affect: $\alpha=0.90$) in local research (Lee, Fung, et al., 2022). For the SWLS, items (e.g., "In most ways my life is close to my ideal") were rated on a 7-point Likert scale (1 = *Strongly disagree* to 7 = *Strongly agree*). The Chinese version of the scale was reported to have acceptable reliability (i.e., $\alpha=0.96$) in recent local research (Chang et al., 2019). In the present study, the Cronbach's alpha coefficients of the PANAS and SWLS at baseline ($\alpha=0.86$ to 0.92) and posttest ($\alpha=0.86$ to 0.92) were acceptable.

Data analyses

Descriptive statistics were computed, including correlation, skewness, kurtosis, and reliability coefficients of the study variables. An independent sample t-test was conducted to determine if there were any significant differences between the participants who completed ($n=79$) and those without ($n=41$) in the posttest survey referring to demographic information (i.e., gender, age, marital status, number of children, and educational level) and study variables (i.e., positive psychological skills, psychological and subjective well-being). Before examining the intervention effects, we examined whether relevant statistical assumptions of conducting multivariate regression were met (e.g., multivariate normality, absence of outlier, homogeneity of variance). A multivariate regression model was conducted to examine the intervention effects. In multivariate regression, the posttest scores were included as dependent variables, and baseline scores were entered as predictors adjusting for intervention conditions, gender, and age. Our original proposal calculated the required sample size based on MANOVA. Yet, Huang (2020) pointed out that the conventional MANOVA and then univariate ANOVAs approach could not account for residual variances, especially when conducting post hoc comparisons, which can result in biased parameter estimates. Multivariate regression, on the other hand, can examine each effect on each outcome individually while also considering the residual correlation, which would address the shortcomings of MANOVA. Hence, we adopted multivariate regression instead of MANOVA in the present research. With a sample size of 120 participants, we were able to detect a large effect size with a power of >0.99 and a medium effect size with a power of >0.88 ($\alpha=0.05$) for the multivariate regression analysis.

In regard to the missing data, 8 and 33 participants from the intervention and control groups were lost to follow-up, yielding a retention rate of 66.83%, which is consistent with typical longitudinal study retention ranges (Gustavson et al., 2012). Little missing completely at random (MCAR; Little & Rubin, 2019) test showed no clear pattern in the missing data: $\chi^2=117.89$, $df=106$, $p=0.20$. Given the missing data pattern and the attrition rate, we used the full information maximum likelihood estimation (FIML) as it has been considered an ideal strategy to handle datasets with comparable missing data patterns (Shin et al., 2017). Descriptive analyses were conducted via

the Statistical Package for the Social Sciences Version 26 (IBM Corp, 2019). Mplus version 8.4 (Muthén & Muthén, 2017) was adopted to conduct the multivariate regression.

RESULTS

Preliminary analysis

Descriptive statistics of the explanatory and outcome variables (i.e., mindful parenting, hope, positive reappraisal, growth mindset, autonomy, environmental mastery, positive relationship, personal growth, purpose, self-acceptance, positive affect, negative affect, and life satisfaction) at baseline and posttest are presented in Tables 2 and 3, respectively. Regarding the dropout analyses, we found no significant difference between the participants who completed ($n = 79$) and those who did not complete ($n = 41$) the posttest survey in terms of demographic information (i.e., gender, age, marital status, number of children, and educational level) or the study variables at baseline, $t(118) = -1.54$ to 1.30 , $p = 0.13$ to 0.90 , except for the intervention condition ($t(118) = -3.72$, $p = 0.01$). The waitlist control group had significantly more dropouts than the intervention group. We believe the high attrition rate is because participants of the waitlist control group were asked to complete the survey (or study questionnaires) twice in 3 weeks before receiving the intervention. The arrangement of the waitlist control group could affect their commitment to staying in the study. The results of Levene's tests of equality of variance suggested that there were equal variances between the intervention and control groups, $p = 0.05$ to 0.97 . The correlations between study variables at baseline were smaller than 0.80 , so it is less likely that multicollinearity might affect the findings of this study.

Intervention effects

Positive psychological skills

The results of multivariate regression suggested that the intervention had significant effects on mindful parenting ($\beta = 0.24$, 95% CI [0.10, 0.38], $p = 0.01$), hope ($\beta = 0.27$, 95% CI [0.15, 0.38], $p < 0.001$), positive reappraisal ($\beta = 0.20$, 95% CI [0.07, 0.33], $p = 0.01$), and growth mindset ($\beta = 0.24$, 95% CI [0.10, 0.38], $p = 0.01$), immediately following the second workshop participation, see Table 4.

Psychological well-being

In the multivariate regression, the intervention had significant effects on personal growth ($\beta = 0.18$, 95% CI [0.04, 0.33], $p = 0.03$), relationship ($\beta = 0.36$, 95% CI [0.23, 0.48], $p < 0.001$), purpose ($\beta = 0.20$, 95% CI [0.08, 0.32], $p = 0.01$), and self-acceptance ($\beta = 0.20$, 95% CI [0.08, 0.32], $p = 0.01$), immediately at the conclusion of the second workshop. Conversely, no significant effects were found in autonomy ($\beta = 0.11$, 95% CI [-0.05, 0.26], $p = 0.24$) and environmental mastery ($\beta = 0.13$, 95% CI [-0.01, 0.27], $p = 0.13$), see Table 4.

Subjective well-being

Significant multivariate effects were found from group condition on positive affect ($\beta = 0.28$, 95% CI [0.13, 0.42], $p = 0.01$) and life satisfaction ($\beta = 0.15$, 95% CI [0.04, 0.26], $p = 0.02$), immediately at the completion of the second workshop. However, the intervention had no significant

TABLE 2 Descriptive statistics of the study variables at baseline ($N = 120$).

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
Baseline													
1. Growth mindset	1												
2. Positive reappraisal	0.09	1											
3. Hope	0.16	0.40**	1										
4. Mindful parenting	0.19*	0.34**	0.25**	1									
5. PWB-Autonomy	0.32**	0.30**	0.36**	0.45**	1								
6. PWB-Environmental mastery	0.37**	0.30**	0.31**	0.47**	0.63**	1							
7. PWB-Personal growth	0.37**	0.42**	0.40**	0.46**	0.56**	0.64**	1						
8. PWB-Positive relationship	0.24**	0.39**	0.43**	0.51**	0.46**	0.50**	0.63**	1					
9. PWB-Purpose	0.46**	0.34**	0.37**	0.49**	0.69**	0.74**	0.70**	0.52**	1				
10. PWB-Self-acceptance	0.36**	0.38**	0.48**	0.48**	0.58**	0.66**	0.68**	0.57**	0.77**	1			
11. SWB-Positive affect	0.40**	0.35**	0.46**	0.47**	0.51**	0.55**	0.51**	0.44**	0.58**	0.59**	1		
12. SWB-Negative affect	0.03	-0.18	-0.08	-0.28**	-0.24**	-0.28**	-0.11	-0.11**	-0.11**	-0.16	-0.20*	1	
13. SWB-Life satisfaction	0.34**	0.27**	0.39**	0.31**	0.39**	0.47**	0.48**	0.36**	0.52**	0.57**	0.47**	-0.18	1
Mean	3.69	4.89	4.89	2.77	3.24	3.50	3.67	3.83	3.50	3.50	3.19	2.77	4.28
SD	1.26	0.88	1.12	0.35	0.72	0.68	0.63	0.70	0.77	0.70	0.55	0.73	1.16
Alpha	0.90	0.89	0.84	0.76	0.81	0.86	0.84	0.87	0.87	0.84	0.86	0.91	0.92
Skewness	0.04	-0.07	-0.35	0.53	-0.30	-0.61	-0.35	-0.15	-0.26	-0.07	0.18	0.02	-0.18
Kurtosis	-0.39	-0.03	0.16	0.03	0.45	-0.17	-0.01	-0.52	-0.31	-0.21	0.09	-0.52	-0.29

Abbreviations: PWB, psychological well-being; SWB, subjective well-being.

* $p < 0.05$; ** $p < 0.01$.

TABLE 3 Descriptive statistics of the study variables at posttest ($N=120$).

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
Post-test													
1. Growth mindset	1												
2. Positive reappraisal	0.28*	1											
3. Hope	0.29*	0.57**	1										
4. Mindful parenting	0.16	0.40*	0.36**	1									
5. PWB-Autonomy	0.18	0.38**	0.50**	0.46**	1								
6. PWB-Environmental mastery	0.25	0.39**	0.49**	0.46**	0.70**	1							
7. PWB-Personal growth	0.36**	0.44*	0.52*	0.42**	0.55**	0.79**	1						
8. PWB-Positive relationship	0.26	0.40**	0.46**	0.36**	0.31*	0.57**	0.60**	1					
9. PWB-Purpose	0.35*	0.42*	0.55**	0.43**	0.59**	0.72**	0.75**	0.50**	1				
10. PWB-Self-acceptance	0.37**	0.46**	0.62**	0.50**	0.60**	0.74**	0.71**	0.51**	0.81**	1			
11. SWB-Positive affect	0.52**	0.44**	0.54**	0.33**	0.57**	0.51**	0.60**	0.40**	0.56**	0.59**	1		
12. SWB-Negative affect	0.03	0.06	-0.15	-0.21	-0.27*	-0.23*	-0.22	-0.22*	-0.27*	-0.21	-0.10	1	
13. SWB-Life satisfaction	0.32*	0.52**	0.51**	0.38*	0.49**	0.59**	0.51**	0.46**	0.64**	0.70**	0.52**	-0.21*	1
Mean	4.30	5.00	5.17	2.81	3.41	3.56	3.65	3.90	3.55	3.51	3.33	2.53	4.53
SD	1.32	0.83	1.05	0.32	0.74	0.72	0.73	0.61	0.83	0.80	0.51	0.73	1.18
Alpha	0.85	0.88	0.89	0.71	0.83	0.90	0.92	0.84	0.93	0.95	0.86	0.92	0.92
Skewness	-0.31	-0.08	-0.43	0.38	-0.21	-0.28	-0.23	-0.05	-0.36	-0.24	-0.57	0.01	-0.21
Kurtosis	-0.41	-0.29	-0.12	-0.60	-0.24	-0.51	-0.32	-0.88	-0.21	-0.54	0.08	-0.71	-0.55

Abbreviations: PWB, psychological well-being; SWB, subjective well-being.

* $p < 0.05$; ** $p < 0.01$.

TABLE 4 Multivariate analysis adjusted for gender and age.

Post-test variables	Pretest level of variables			Intervention conditions ^a		
	β	95% CI	<i>p</i>	β	95% CI	<i>p</i>
Positive psychological skills						
Mindful parenting	0.71	[0.61, 0.81]	<0.001	0.16	[0.05, 0.28]	0.02
Hope	0.52	[0.39, 0.65]	<0.001	0.27	[0.15, 0.38]	<0.001
Positive reappraisal	0.46	[0.29, 0.63]	<0.001	0.20	[0.07, 0.33]	0.02
Growth mindset	0.53	[0.39, 0.67]	<0.001	0.24	[0.10, 0.38]	0.01
Psychological well-being						
Autonomy	0.15	[-0.06, 0.35]	0.23	0.11	[-0.05, 0.26]	0.24
Environmental mastery	0.42	[0.18, 0.65]	0.01	0.13	[-0.01, 0.27]	0.13
Personal growth	0.37	[0.16, 0.57]	0.01	0.18	[0.04, 0.33]	0.03
Positive relationship	0.74	[0.62, 0.86]	<0.001	0.36	[0.23, 0.48]	<0.001
Purpose	0.57	[0.34, 0.80]	<0.001	0.20	[0.08, 0.32]	0.01
Self-acceptance	0.22	[0.04, 0.40]	0.04	0.20	[0.08, 0.32]	0.01
Subjective well-being						
Positive affect	0.45	[0.33, 0.58]	<0.001	0.28	[0.13, 0.42]	0.01
Negative affect	0.67	[0.65, 0.75]	<0.001	0.02	[-0.10, 0.14]	0.77
Life satisfaction	0.54	[0.43, 0.65]	<0.001	0.15	[0.04, 0.26]	0.02

^aIntervention conditions were coded as 1=intervention group, 0=control group.

effect on negative affect ($\beta=0.02$, 95% CI [-0.10, 0.14], $p=0.77$), according to the results of multivariate analyses, see [Table 4](#).

A sensitivity analysis for missing data was conducted to examine whether the missing data significantly impacts the intervention effects. Using the listwise deletion of data, the patterns of intervention effects were identical to the results of the one with FIML. Specifically, the intervention yielded significant effects on all the positive psychological skills ($\beta=0.17$ to 0.25, $p=0.00$ to 0.02), four psychological well-being domains (i.e., personal growth, positive relationship, purpose, and self-acceptance; $\beta=0.21$ to 0.39, $p=0.00$ to 0.02) and two subjective well-being domains (i.e., positive affect and life satisfaction; $\beta=0.16$ to 0.27, $p=0.00$ to 0.02). Therefore, the main findings of our intervention (i.e., multivariate regression) was shown to be robust against patterns of missing data.

DISCUSSION

The current research investigated the effectiveness of an EASP multicomponent positive psychological intervention on psychological skills and well-being among parents of young children in Hong Kong. These results corroborate our study's conjectures regarding the benefits of cultivating psychological resources in parents of young children—a unique group of people at greater risk of experiencing excessive stress due to the COVID-19 pandemic.

This study showed that our multicomponent positive psychology intervention significantly improved parents' self-reported growth mindset, hope, positive reappraisal, and mindful parenting. As with prior studies that emphasize the psychological benefits of cultivating incremental beliefs about intelligence (Justice et al., 2020; Rwe & Leech, 2019), mindful parenting (Duncan et al., 2009; Kabat-Zinn & Kabat-Zinn, 2014; Liu et al., 2023), positive reappraisal strategies (Haga et al., 2009; Riepenhausen et al., 2022), and hopeful thinking (Munoz et al., 2019)

cultivating such psychological skills can boost parental mental health functioning by increasing their capacity to deal with the stressors and demands associated with parental responsibilities—encompassing competence needs satisfaction in the context of parenting. Further, given that our multicomponent intervention enhanced parents' key positive psychological skills, it is plausible that they may associate parenthood with joy and pleasure rather than misery—a condition that facilitates greater well-being in parents (Nelson et al., 2014). However, future research is necessary to tease out the precise mechanisms underlying the mental health benefits linked to implementing EASP multicomponent positive psychological interventions.

Further, this research showed that the intervention improved parents' socially balanced outcomes such as positive relationships and purpose, which dovetailed with past studies on the effects of positive psychological interventions on relational or social well-being during the pandemic outbreak (Datu, Lee, et al., 2022). Because our intervention also taps into parents' sense of appreciation towards the blessings they received from others, they are likely to fulfill their basic psychological needs for relatedness—a condition that facilitates happiness and optimal psychological functioning (Ryan & Deci, 2017). In general, our results indirectly corroborate prior literature on how building parents' psychological strengths can serve as protective resources against the demanding nature of parenthood (Nelson et al., 2014). However, as we did not measure relatedness needs satisfaction, future studies can assess this construct and examine how it mediates the impacts of multicomponent positive psychological interventions on parental social well-being.

Also, there was a significant intervention effect on parents' self-reported self-acceptance. Given that this study incorporated an intervention component that aims to boost hope—a trait that facilitates desire and pathways to achieve goals (Snyder, 1994, 2002; Snyder et al., 2020), it is plausible that parents may realize the critical roles of goal-related motivation and strategies in pinpointing personal strengths and weaknesses. In turn, parents are likely to appreciate both the positive and negative aspects of their selves, which can forge greater self-appreciation. To the best of our knowledge, this is the first research to demonstrate the benefits of a multicomponent positive psychological intervention on this dimension of eudaimonic well-being in Hong Kong parents.

Moreover, our intervention yielded increases in parents' subjective well-being dimensions, namely life satisfaction and positive affect, immediately following the intervention. These findings cohere with previous studies on the effects of multicomponent psychological interventions on parents' well-being during the COVID-19 pandemic outbreak (Halliday et al., 2022; Sengupta et al., 2021). It is possible that one's growth mindset, hope, mindful parenting, and positive reappraisal may increase happiness by improving parents' ability to cope with the physical, social, and psychological demands associated with child rearing and other parental responsibilities. In other words, such psychological resources (e.g., mindful parenting and growth mindset) operate as engines that promote positive psychological processes and well-being outcomes. This conjecture, however, remains speculative, given that we did not assess how parental self-efficacy mediates the beneficial effects of the multicomponent psychological intervention (Lee, Fung, & Chung, 2023).

However, our intervention did not show a significant effect on parents' negative emotions and selected dimensions of psychological well-being (i.e., environmental mastery, autonomy, and personal growth). The nonsignificant intervention effects might be explained by the relatively short duration of workshops that aim to boost such positive psychological skills. In addition, there may be more proximal psychological processes that possibly account for the beneficial impacts of our intervention on different well-being outcomes. Future studies are recommended to strengthen the features and duration of our multicomponent positive psychological intervention.

Taken together, this study partly aligns with the basic tenets of the engine model of well-being (Jayawickreme et al., 2012) by offering preliminary evidence on the benefits of a

multicomponent positive psychological intervention on several dimensions of subjective and psychological well-being. Our findings suggest that cultivating intrinsic input variables—such as hope, growth mindset, mindfulness, and gratitude—may improve most dimensions of hedonic and eudaimonic well-being. We speculate that more proximal mechanisms such as parental self-efficacy and outcome expectancy beliefs might serve as critical psychological processes that account for the beneficial impacts of our multicomponent positive psychological intervention (Lee, Fung, & Chung, 2023). More investigations are needed to understand how and why this intervention facilitates optimal psychological functioning.

Limitations and future research directions

This study has several limitations that are worthy of note. Using self-report measures of input, process, and outcome variables could increase the likelihood of social desirability bias. Future research may consider using more objective approaches (e.g., peer-report survey format and job struggle diary with personal development or narrative as an indication of personal growth) to assess one's psychological well-being. Given that this study focused on online workshops and a smartphone app to implement the multicomponent positive psychological intervention, perhaps a few participants showed passive engagement in performing intervention activities. Future studies may be worth examining whether using technology-based interventions, e.g., web-based platforms and mobile devices, improves parents' mental health compared to face-to-face interventions. Further, the timing of assessment between the pre- and post-test measures might influence the short- and long-term impacts of the parents' well-being participating in the EASP multicomponent positive psychological intervention. Future studies may examine how this intervention may be built in multiple testing points across 3, 6, and 12 months to investigate more robust and long-lasting effects on parents' well-being. Furthermore, the present study did not intend to assess the extent to which individual intervention component influences the proximal processes and outcomes of psychological well-being; the findings of this study cannot provide more precise insights into the underlying mechanisms of the processes and outcomes. Using the multiphase optimization strategy (MOST) approach (Collins et al., 2005) to examine how intervention components individually and jointly facilitate positive psychological processes and well-being outcomes may be studied in the future. Also, although our study's attrition rate was relatively high (i.e., 33.17%), this rate appeared to be much lower than the typical attrition rate in face-to-face mental health interventions as suggested by a study—which can go as high as 60% (de Haan et al., 2013). However, caution should be practiced when evaluating the validity of the findings. Future investigations may consider using multiple ways and strategies to engage and motivate parents, including tangible and non-tangible incentives, providing regular reminders, and increasing flexibility (e.g., recurring workshops and recordings of the workshops) to improve the retention rate of intervention for participating parents. As the smartphone app—designed to consolidate and review the concepts and activities learned from the workshops—served as a supportive and voluntary feature of our positive psychological intervention, future studies should test whether including the app as part of the intervention component of the EASP intervention may show better results in improving parental well-being outcomes than without the app. Future studies perhaps consider making the app part of the intervention components to test the effects of individual intervention components (Collins et al., 2014; Datu et al., 2023). As our study had a relatively small sample size involving parents from the Chinese cultural context in Hong Kong, the findings may have limited generalizability for parents from other cultures and societies. It would be valuable to explore the effects of the EASP multicomponent positive psychological interventions across diverse cultural and societal contexts. This line of

research not only holds potential for enhancing parent well-being but also provides insights into the cross-cultural generalizability of the EASP intervention. This study showed that an EASP multicomponent positive psychological intervention bolstered the well-being of parents; however, potential issues regarding its sustainability, scalability, and long-term impacts may be addressed. Future research is, therefore, necessary to provide more robust evidence on how such multicomponent positive psychological interventions may enhance the well-being of parents of children with additional needs and learners with exceptionalities across different cultures and societies.

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