Flourishing Students: The Efficacy of an Extensive Positive Education Program on Adolescents' Positive and Negative Affect

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Abstract

This study examined the efficacy of a classroom-based positive education program, Flourishing Students, on early adolescents' positive and negative affect using a cluster randomized control trial (RCT) design. In total, 140 students (aged 10–12) participated in the study: 72 students participated in 32 well-being lessons during one school year, and 68 students followed the standard curriculum. Positive and negative affect (PANAS questionnaire), and daily positive and negative affect (experience sampling method, ESM) were gathered at baseline and post-intervention. PANAS data was also gathered at a follow-up 5 months after the intervention. Student questionnaire and ESM data indicated that the intervention had a beneficial impact on students' positive affect and daily negative affect from baseline to post-intervention. No effect was seen in parental reports. Both qualitative data from focus group interviews with students and questionnaires for teachers supported the view that the students benefited from the program. Overall, these results demonstrate a positive effect of the positive education program on increasing positive affect and well-being among early adolescents.

Keywords Positive education · Intervention · Adolescence · Affect · Experience sampling method · Well-being

1 Introduction

Positive emotions are a central feature of subjective well-being and happiness. Numerous studies report that positive emotions predict or contribute to a wide range of desirable outcomes including positive self-perceptions and perceptions of others, optimism,

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sociability, creativity, optimal functioning, mental health and physical well-being (Fredrickson, 1998; Kok et al., 2013; Lyubomirsky et al., 2005). Furthermore, positive emotions are shown to predict positive school functioning, that is, school satisfaction, adaptive coping (Lewis et al., 2009), school engagement (Datu & King, 2018; Lewis et al., 2009; Reschly et al., 2008; Wang & Peck, 2013; Weber et al., 2016; Zhu et al., 2019), self-regulated learning and motivation (Mega et al., 2014; Villavicencio & Bernardo, 2013; Weber et al., 2016), and overall school achievement (Weber et al., 2016). In contrast, negative emotions are related to negative outcomes in school, for example, disengagement (Datu & King, 2018; Heffner & Antaramian, 2015; Reschly et al., 2008), withdrawal and lower sense of efficacy (Roeser et al., 2001), and lower motivation especially if depressed (Elmelid et al., 2015). Several studies indicate that negative, and even neutral emotions, narrow the scope of perception (e.g. Schmitz et al., 2009), attention, thinking and behavioral responses (Fredrickson & Branigan, 2005).

According to the broaden-and-build theory (Fredrickson, 1998, 2001, 2013a), positive emotions momentarily broaden individuals' scope of attention and cognition, which leads to altered patterns of decision-making and action. Over time, these consequential patterns of broadened thoughts and action accumulate to build long-term social, psychological, intellectual and physical resources (Cohn et al., 2009; Conway et al., 2013; Ong et al., 2006). Important in maintaining good mental health and flourishing is experiencing, within bounds, higher positivity ratios, that is, have higher ratio of positive emotions and events than negative ones (Fredrickson, 2013b).

The presence of positive emotions is an important aspect of adolescents' social-emotional well-being. Successful social-emotional development during adolescence includes understanding emotional experiences in the self and others, regulating and expressing emotions in an age-appropriate way and the ability to establish, maintain, and develop healthy relationships with peers and adults (Malti & Noam, 2016). In addition to social and emotional development, adolescence is characterized by other psychological and biological changes, and brain maturation (Sawyer et al., 2012; Steinberg, 2005). Therefore, adolescence provides an optimal time point to develop the needed skills to build resilience and positive mental health (Waters, 2011; Weare & Nind, 2011). Most mental disorders begin during childhood or adolescence, although they are usually detected and treated in later life (Kessler et al., 2007). Approximately one adolescent in five suffers from psychiatric disorders (Costello et al., 2011) and according to WHO, mental illness is globally the greatest cause of disability among young people (World Health Organization, 2017). In the light of such high prevalence rates, it is essential to build and strengthen well-being in adolescents by teaching well-being skills. Schools are excellent forums for well-being initiatives as most children and adolescents can be reached through schools; their day-to-day interactions and experiences in school are integral to their well-being and are consequently important targets for well-being programs (Seligman et al., 2009).

Meta-analyses of school-based well-being programs have reported beneficial effects on several mental health, social, emotional and educational outcomes (Durlak et al., 2011; Taylor et al., 2017; Weare & Nind, 2011). Regarding outcomes of school-based positive psychology interventions (PPIs), Waters (2011) reports improvements in student well-being, social skills and academic performance. In their meta-analysis, Weare and Nind (2011) stated that for positive mental health and youth behavior,

longer (at least 9–12 months) and more intense interventions appeared to be more effective than brief ones, preventing violence and bullying, anger and mental disorders. For instance, the one-year-long Maytiv positive psychology program in middle school in Israel using the RCT design, showed positive effects on positive emotions, peer relations, emotional and cognitive engagement in school, and grade point average scores (Shoshani et al., 2016). Results from a non-randomized control group design Personal Well-Being Lessons in the UK showed decreased negative affect and maintenance of higher satisfaction with self and friends, although no higher level of positive affect (Boniwell et al., 2015). Findings from a randomized high school, Strath Haven Positive Psychology Curriculum in the United States indicated improvements in social skills, and enjoyment and engagement in school (Seligman et al., 2009). A briefer, more widely used and researched depression prevention program, the Penn Resiliency Program (PRP), has been tested both with targeted and universal approaches. Based on meta-analyses, Brunwasser et al. (2009) indicated that PRP participants reported fewer depressive symptoms at post-intervention and follow-up assessments, whereas Ma et al. (2020) found significant results only at follow-up. Bastounis et al. (2016) included only universal, school-based PRPs and assessed the effectiveness only at post-intervention. They found no evidence for effects that concern reducing depression or anxiety and improving explanatory style.

Increasing the success of positive education programs could be facilitated by adopting a whole-school approach, where positive education is taught both explicitly and implicitly (Norrish et al., 2013; Waters, 2011; White & Kern, 2018). One of the leaders in the whole-school approach to positive education, Geelong Grammar School (GGS) in Australia, has been implementing positive education since 2008 (Norrish et al., 2013; Seligman et al., 2009). Although their Positive Education Program lacks RCT research, an evaluation supports the efficacy of their program in enhancing positive emotion, engagement, relationships, meaning, accomplishment and health (Vella-Brodick et al., 2014). Another survey revealed that the social and emotional well-being scores of GGS students were significantly above national averages (Norrish & O'Connor, 2015, p. 277).

However, prior evidence concerning early adolescents is mostly based on non-randomized designs, and quantitative assessments rely primarily on questionnaires. This issue can cause problems in reliability, highlighting the value of multiple evaluation methods including momentary assessments, and the use of different informants. The current study aims at overcoming some of these limitations, by using a mixed-method, multi-informant and randomized control trial design to study the outcomes of a 1-year-long PPI in schools.

1.1 The Current Study

We examined the efficacy of the positive education program Flourishing Students on positive affect (PA) and negative affect (NA) of students aged 10–12. The program uses methods of positive psychology that aim to strengthen early adolescents' psychological well-being. The program consists of five well-being themes focusing on mental resources, social and emotional competence and resilience. The current article focuses on affect. Results concerning other domains of well-being will be reported in other articles. We hypothesized that we would observe an increase in PA and a decrease in

NA after the intervention compared to baseline. We also hypothesized that the benefits would be sustained at a follow-up 5 months after the intervention. We complemented the assessments with both focus group interviews with students and questionnaires for teachers and classroom assistants. In line with the broaden-and-build theory, we expected that the increase in PA and decrease in NA would lead to broadened awareness and development of new behavioral responses. This in turn would open new possibilities to integrate these new thought-action repertoires into daily life and enhance own well-being and well-being in others (Cohn & Fredrickson, 2010).

2 Methods

2.1 Participants and Study Design

The participants were 140 students attending their 5th or 6th grade (age 10–12, $M = 10.44$, $SD = 0.55$) in five Swedish-speaking public schools (six units) in Finland. School selection was based on a school's location (situated in the metropolitan area and western Finland), and its interest in participating and implementing a school-year long positive education program. The schools did not have other projects or educational programs in this field. Of these six school units, seven classes were randomly assigned to either the intervention ($n = 4$) or control ($n = 3$) groups. Of the 168 students approached, 83.3% were willing to participate in the study. The intervention group comprised 72 students (45.8% boys) and the control group 68 students (41.2% boys). Within one school year, the intervention classes participated in a set of 32 well-being lessons (45 min/lesson), while the control classes followed their standard curriculum.

The majority of the students were in the 5th grade and 7.9% in the 6th grade (a combined class of two grades). The native language of most participants (85.0%) was Swedish, 12.9% Finnish and 2.1% other. Participants lived mostly in two-parent families (77.9%), the rest belonged to divorced families, living in turn with mother and father (16.4%), or only with the mother (5.7%). The participants' parent or guardian ($N = 108$, 82.4% mothers) provided information on their socioeconomic status (educational level). More than half (57.4%) of the parents reported high SES (at least Master's degree from a university), 29.6% medium SES (Bachelor's degree from a university or a university of applied sciences), and 13.0% low SES (an occupational course, on-the-job training or vocational qualification).

2.2 Procedure

The study was approved by the University of Helsinki Ethical Review Board in the Humanities and Social and Behavioral Sciences; participating cities (Helsinki, Espoo and Vaasa) provided their research approvals. All contacted schools agreed to participate in the study. The research group visited all seven classes and informed about the study. Parents were informed about the study through a letter and during a parent evening. All students and their parents signed an informed consent to participate in the study. Participation in the study was voluntary, and participants were free to leave the study at any time. Since the intervention program was implemented as part of the curriculum, participation in the actual well-being lessons was mandatory.

The baseline and post-intervention data were collected at the end of the school year, in May 2016 and May 2017. In order to ensure better comparability, the baseline measurements were carried out in May (in Finland, the school year is from the middle of August to the end of May). The intervention took place from August 2016 to May 2017. A five-month follow-up was conducted in October–November 2017 by using a web-based questionnaire for students. After accounting for available resources, the follow-up measurement was implemented on a narrower scope than during baseline and post-intervention.

In total, 140 students answered the web-based questionnaire at baseline, 133 at post-intervention and 124 at a follow-up 5 months after the intervention. From the post-intervention data, two questionnaires were removed before analysis due to identifiable response patterns (selection of all 3 s or 5 s). Therefore, a total of 131 students were included in the data analysis. Web-based questionnaires from 118 students (67 intervention, 51 control) were available from all three time points.

Of the 140 participants, 122 completed ESM assessments at baseline and 121 after the intervention. ESM assessments of 107 students (61 intervention, 46 control) were available from both baseline and post-intervention measure points. At baseline, students completed 2758 entries in total. Of these, 259 assessments (9.4%) were excluded as invalid as participants had either answered for more than 6 days, response time was more than 15 min due to technical problems, or responses were inconsistent (e.g. feeling extremely positive and negative at the same time). Therefore, 2499 entries were retained for baseline data analysis. At post-intervention, students completed 1971 entries in total. Of these, 126 (6.4%) were excluded as invalid because participant had either answered for more than 6 days or responses were inconsistent. Therefore, the final post-intervention data included 1845 entries.

The parental questionnaire about SES and child's well-being was answered by 108 parents at baseline and by 105 parents at post-intervention. Ninety-two parents answered both baseline and post-intervention questionnaires.

Given the focus of the current article, reporting concerns only qualitative data related to the program's emotion unit. This qualitative data from the intervention group students, class teachers and classroom assistants were collected in November–December 2016; 70 students answered the focus group questionnaire and participated in the interview. Three class teachers (out of four) and two classroom assistants answered an open-ended questionnaire.

2.3 The Flourishing Students Intervention Program

The Flourishing Students program comprises 30 scripted well-being lesson plans during one school year. Core themes within the program include positive self, positive emotions, positive relationships, positive engagement, mindset and hope, and resilience. The lessons involve an introduction to the concepts, open discussions, role-plays, different kinds of hands-on activities and exercises done with the whole class, in small groups or individually, handouts and home-work activities involving parents and anchoring the themes into their daily lives. Students are provided with strengths cards and notebooks where all material and exercises are gathered. Development of this new program involves applying several research-based and proven interventions and frameworks in positive psychology and in positive education (including e.g. Boniwell & Ryan, 2012; Dweck, 2006; Fox Eades, 2008; Fredrickson, 1998, 2001, 2013a, b; Lopez, 2014; Niemiec, 2014; Peterson & Seligman, 2004; Raknes, 2009; Rath & Clifton, 2009; Reivich & Shatté, 2002; Seligman et al., 2005;

Seligman, 2011; Stallard, 2002, 2005). The current study implemented 26 lesson plans during 32 lessons (45 min/lesson). Six lesson plans were divided into two lessons in order to suit the needs of the individual classes. Table 1 provides a summary of the implemented lesson plans and references.

Table 1 Outline of the Flourishing Students program curriculum

Unit	References
Unit 1 positive self	
1. Introduction to the flourishing students program	Lesson 1. Boniwell and Ryan (2012); The PERMA-model, Seligman (2011)
2. Strengths part 1	Lessons 2.–4. Boniwell and Ryan (2012), Fox Eades (2008); Geelong Grammar School, 2016; Niemiec (2014), Peterson and Seligman (2004)
3. Strengths part 2	
4. Strengths part 3	
5. An invisible bucket	Lessons 5.–7. McCloud, 2016; Rath and Clifton (2009)
6. Bucket filling	
7. Bucket dipping	
Unit 2 positive emotions	
1. Understanding emotions part 1	Lessons 1.–6. Boniwell and Ryan (2012), Fredrickson (1998), (2001), (2013a), (b); Geelong Grammar School, 2016
2. Understanding emotions part 2	
3. Positive emotions broaden and build	
4. Positive emotions in practice	
5. Enhancing our positive emotions	
6. Savouring our positive emotions	
Unit 3 positive relationships	
1. A good friendship	Lessons 1.–6. Boniwell and Ryan (2012), Fox Eades (2008), Gable et al. (2004); Geelong Grammar School, 2016; Lyubomirsky (2007), Seligman et al. (2005)
2. Toxic friendship	
3. Forgiveness	
4. Listening and empathy	
5. Kindness	
6. Gratitude	
Unit 4 hope and engagement	
1. Mindset	Lesson 1. Boniwell and Ryan (2012), Dweck (2006)
2. Hope part 1	Lessons 2.–3. Boniwell and Ryan (2012), Lopez (2014), Rand and Cheavens (2011), Snyder et al. (2002)
3. Hope part 2	
Unit 5 positive health	
1. Resilience, tolerance when something goes wrong	Lessons 1.–2. Raknes (2009), Reivich and Shatté (2003), Stallard (2002), (2005)
2. Resilience, helping hand	
Closure	
1. Unique me part 1	Lessons 1.–2. Boniwell and Ryan (2012)
2. Unique me part 2	

Note. The list of references is not exhaustive. In addition, we have used various film clips, websites, and adapted plays, games and drama exercises

To ensure successful implementation, class teachers, classroom assistants and student welfare staff participated in a total of 2 days of training (1 day prior to the intervention and 1 day in the middle of the intervention). Teachers were provided with detailed lesson plans and related subject material prior to lesson, and each lesson plan was discussed with the teacher. The lessons were carried out in close collaboration with the class teachers. Teachers had the opportunity to be involved in lesson delivery (e.g. instructing exercises and role-plays) as much as possible. Other school staff (e.g. welfare staff) were invited to attend the lessons. Each school decided how to incorporate the program into the curriculum. Lessons were mainly implemented during visual arts, environmental studies, or Swedish lessons. Parents were informed about the intervention themes through e-mails.

2.4 Data Collection

Quantitative data collection consisted of web-based questionnaires and momentary assessments (ESM). Teachers administered web-based questionnaires to students during school hours. Qualitative data was collected during the intervention. Intervention classes attended focus group interviews and class teachers completed an open-ended questionnaire.

2.5 Positive and Negative Affect Questionnaires

The Positive and Negative Affect Schedule for Children (PANAS–C, Laurent et al., 1999) is a 27-item self-report measure comprising 12 PA and 15 NA adjectives. Students were asked to rate the extent to which they had experienced each emotion during the past 2 weeks on a 5-point Likert scale, ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). Cronbach's α ranged from 0.80 to 0.91. To compute a positivity ratio score, the mean score for PA was divided by the mean score for NA (Orkibi et al., 2018). A higher ratio indicated a greater quantity of PA than NA (Fredrickson, 2013). PANAS–C is widely used and its psychometric properties have varied between good (Casuso et al., 2016; Laurent et al., 1999), adequate and moderate (Hughes, 2009).

Parents completed a web-questionnaire assessing their child's PA and NA by using *the Positive and Negative Affect Schedule for Children–Parent Version* (PANAS-C-P, Ebesutani et al., 2011). PANAS-C-P contains the same 27 items as in the child version. Parents rated the extent to which their child had experienced each particular emotion during the past 2 weeks on the same 5-point Likert scale, ranging from 1 to 5. Cronbach's α was above 0.83.

2.6 ESM Questionnaire

Students' daily PA and NA affect were assessed with an ESM application, the PsyMate app (www.psymate.eu). For this study, the PsyMate app was programmed to emit 8 beeps a day at semi-random chosen times during 90-min intervals between 07:30 a.m. and 07:30 p.m. for six consecutive days. Each beep was a prompt to fill out a short questionnaire about momentary affective states, context and behavior. Completing the questionnaire took one to 2 min. Students installed the PsyMate app on their own

smartphones or received a smartphone for this purpose. During a briefing session, the ESM procedure was explained, students logged in to the app and a demo beep was performed. Students were advised to keep the phone with them at all times, pause their activity immediately after they received a beep and fill out the questionnaire. The questionnaire was no longer available after 15 min.

Students rated their current emotions by completing the sentence ‘Right now I feel...’, on a Likert-scale ranging from 1 (*not at all*) to 7 (*extremely*). The ESM PA factor included items ‘joyful’, ‘calm’ and, ‘content’, whereas ESM NA included the items ‘annoyed/angry’, ‘worried/anxious’, ‘sad’, ‘lonely’, and ‘nervous’. For ESM PA Cronbach’s α ranged from 0.72 to 0.75 and for ESM NA it was 0.79. Other items in the ESM questionnaire assessed social context, location and activities. All used items were guided in part by findings of previous ESM studies (Komulainen et al., 2014; Vella-Brodrick et al., 2014); the items measuring PA and NA were also partly guided by the PANAS-C (Laurent et al., 1999).

2.7 Qualitative Data

The intervention program was divided into five different units according to well-being themes. The units lasted from 2 to 9 weeks. After each intervention unit, students in the intervention group attended focus group interviews. Before dividing students into small groups of four to six participants, students were given time to write their self-reflections on the focus group questions. In Unit 2 Positive Emotions, the students’ questionnaire contained open-ended questions concerning the benefit of the intervention (‘How has learning about emotions been helpful to you?’), transformation (‘Since we have started the Flourishing Students lessons, how do you feel more?’; ‘And how do you feel less?’; ‘What do you think has changed in class, with friends or at home since we started the Flourishing Students lessons?’), and development of the program (‘What can we do to make the lessons even better?’). In total, 14 interviews were conducted by the research team members, class teachers and classroom assistants at the end of 2016. The discussions were kept anonymous, audio-recorded and lasted approximately 4–13 min. Class teachers and other school staff (classroom assistants and school social workers) who had been attending the positive education lessons were asked to complete a web-based questionnaire about their thoughts and experiences of the present unit and the positive education program in general (‘What did you think of the Positive Emotions lessons?’; ‘Do you feel that the class has benefited from the emotion lessons and in what way?’; ‘Do you feel that something has changed in the class due to the emotion lessons?’; ‘How has what you have learnt about emotions been helpful to you?’; ‘Do you have suggestions on what can we do to make the lessons even better?’).

2.8 Overview of Data Analysis

We analyzed the quantitative data with IBM SPSS software (version 25.0) and adopted a 5% significance level. Conducting principal component factor analysis with Varimax with Kaiser Normalization on the person-mean centered ESM scores confirmed that the reduction of single emotion items into two factors was justified. Evaluation of the applicability of the factor analysis model used the Kaiser-Mayer-Olkin (KMO) measure and Bartlett’s sphericity test, accepting values over 0.70 and $p < .05$ (Field, 2013,

Chapter 17). Conducting a t-test on all baseline PA and NA affect measures allowed examination of the differences between intervention and control groups. We used linear mixed model analyses (Field, 2013, Chapter 20) to study the long-term effect of the positive education program on PA and NA. The models included as fixed effect the following factors: time, group, gender and district (the metropolitan area vs. western Finland) and the interaction between time and group. Estimation of all models used the restricted maximum likelihood (REML) estimation method. When an interaction effect occurred, multiple comparisons were performed to compare groups at separate times and to compare moments for each group. The same analysis was run on web-based questionnaires and ESM measures of affects. Further analysis of the ESM PA and NA was based on context. The intervention effect sizes were calculated using Cohen's *d* (Cohen, 1988; Cumming, 2013; Feingold, 2015). According to Cohen (1988) 0.2 is considered a small effect size, 0.5 medium and 0.8 large. However, when interpreting effect sizes according to prior educational research in similar outcomes, effect sizes approx. 0.20–0.40 can be considered significant improvement (Hedges & Hedberg, 2007; Payton et al., 2008; Shoshani et al., 2016).

Evaluation of student qualitative data used the phenomenographic approach (Limberg, 2000; Marton, 1981). The phenomenographic approach aims to discover qualitatively different ways in which people perceive, experience, interpret or conceptualize various phenomena or aspects of reality (Marton, 1981). Identifying and describing people's various conceptions of the phenomenon in a limited number of categories is the purpose of the analysis (Limberg, 2000). The analysis included several steps (see e.g. Stenfors-Hayes et al., 2013). The first step involved becoming familiar with the material: listening to the focus group interviews and reading the corresponding questionnaires. The second step involved listening to the interviews a second time, after which research questions were designed according to the kinds of answers the respondents gave. The third step was to transcribe the essential parts of the interviews. During the fourth step, that is the fourth time of listening, focus was placed on the neutral or negative results given by the respondents. The answers were color-coded and compared regarding similarities and differences. Similar answers were grouped together. After categorization, the fifth step was to capture the essential meaning of different categories and label them. During the last step, the categories were compared to ensure that each category was described in terms of their unique meaning. Quotes were selected both from the interview and questionnaire data. Percentages were calculated from the questionnaire data. The sixth author (CK) conducted the main analysis. The first author (ML) listened to the interviews, read the questionnaires and calculated percentages. All results were discussed with the second author (ÅF).

The qualitative data from the teachers and classroom assistants was evaluated using the thematic approach (Freeman & Sullivan, 2019, pp. 161–184). Thematic analysis is a theoretically flexible approach and can be used to analyze a broad range of material including focus groups, online data, diaries and qualitative surveys. The main idea is to analyze and report recurring patterns in the data that have meaning or significance in relation to the aims of the research. In the current study we were interested in participants' opinions and experiences. The analysis began by reading and getting familiar with the data. Under each question/theme, the answers were color-coded regarding similarities and differences in the answers. The major and minor themes were reviewed three times by re-reading the coded data and the full data to ensure that

no relevant data was missed. This analysis was conducted by the first author (ML) and the results were discussed with the second author (ÅF). We followed the guidelines of reporting qualitative research by O'Brien et al. (2014) and Tong et al. (2007).

3 Results

Presented in Table 2 are the descriptive statistics for the study variables. The amount of missing data was low. The PANAS data contained no missing data, because answering all items was mandatory in order to proceed in the questionnaire. The ESM baseline data had 5 missing responses in PA and 14 in NA, and the post-intervention data had 3 missing responses in PA and 12 in NA. Based on ESM data, factor analysis indicated two factors having 75.8% of the variance explained. The KMO measure and Bartlett's sphericity test verified the sampling adequacy ($KMO = 0.811$, $p < 0.001$). The factors were labelled as ESM PA factor and ESM NA factor. Final scores of the ESM PA and ESM NA factors were calculated as mean values of respective adjectives. T-tests indicated no significant differences between the groups at baseline (PA $p = 0.740$; NA $p = 0.411$; ESM PA $p = 0.710$ and ESM NA $p = 0.796$; PANAS-C-P PA $p = 0.219$; PANAS-C-P NA $p = 0.419$).

3.1 The Effect of Intervention on Positive and Negative Affect Measured with PANAS

3.1.1 From Baseline to Post-Intervention

Presented in Table 3 are the results of the mixed model analyses. A significant interaction effect occurred for PA between the group and time factors ($p = .048$). Multiple comparisons revealed an increase in PA ($p = .051$, $d = 0.24$) in the intervention group; in contrast, the control group experienced a slight decrease ($p = .377$, $d = -0.12$).

Table 2 Descriptive statistics from the students for the PANAS-C variables of the baseline, post-intervention and 5-month follow-up, and for the ESM PA and ESM NA variables of the baseline and post-intervention

	Baseline				Post-intervention				5-month follow-up			
	Intervention		Control		Intervention		Control		Intervention		Control	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Positive affect	3.59	0.53	3.56	0.63	3.73	0.56	3.51	0.52	3.67	0.47	3.46	0.64
Negative affect	1.95	0.58	2.03	0.57	1.84	0.47	2.00	0.57	1.92	0.61	2.24	0.65
Positivity ratio	2.00	0.62	1.90	0.70	2.20	0.81	1.91	0.62	2.11	0.73	1.70	0.65
ESM Pos. affect	5.27	1.29	5.35	1.38	5.29	1.19	5.06	1.21				
ESM Neg. affect	1.72	0.94	1.73	0.97	1.71	0.97	2.01	1.06				

Notes: *M* Mean, *SD* Standard deviation, PANAS-C scale 1–5, Positivity ratio score range 0–5, ESM affect variables scale 1–7

Table 3 Baseline- to post-intervention and 5-month follow-up change in self-reported positive and negative affect, F-values and significance values for mixed model analyses (PA, NA and Positivity Ratio $N=140$, ESM PA and NA $n=136$)

	Baseline, post-intervention					Baseline, post-intervention, 5-month follow-up				
	Time	Group	Gender	District	Time *group	Time	Group	Gender	District	Time *group
	F (p)	F (p)	F (p)	F (p)	F (p)	F (p)	F (p)	F (p)	F (p)	F (p)
PA	0.49 (0.487)	2.08 (0.152)	1.26 (0.264)	3.56 (0.062)	3.97 (0.048)	0.40 (0.673)	3.85 (0.052)	1.64 (0.202)	8.22 (0.005)	2.28 (0.107)
NA	1.44 (0.233)	2.29 (0.132)	0.28 (0.598)	2.04 (0.155)	0.76 (0.384)	4.19 (0.017)	5.91 (0.016)	0.68 (0.411)	2.67 (0.105)	1.79 (0.172)
Pos. ratio	2.63 (0.107)	3.27 (0.073)	1.08 (0.302)	4.49 (0.036)	4.03 (0.047)	3.00 (0.053)	7.25 (0.008)	1.17 (0.282)	5.36 (0.022)	3.81 (0.025)
ESM PA	11.18 (0.001)	0.03 (0.863)	11.71 (0.001)	22.48 (0.000)	8.79 (0.003)					
ESM NA	21.61 (0.000)	1.84 (0.178)	8.53 (0.004)	14.60 (0.000)	24.14 (0.000)					

Notes: PA Positive affect, NA Negative affect; Pos. ratio Positivity ratio, ESM PA ESM Positive affect, ESM NA ESM Negative affect. Statistically significant changes are bolded

Additionally, significant differences in PA occurred between the intervention and control groups at post-intervention ($p = .023$, $d = 0.37$).

No significant interaction or main effects occurred for NA. A slight drop in NA ($p = .133$, $d = -0.20$) occurred in the intervention group, while the control group experienced no change. The group difference in NA was approaching significance at post-intervention ($p = .072$, $d = -0.27$).

The positivity ratio experienced a significant interaction effect ($p = .047$) and main effect for district ($p = .036$). Multiple comparisons showed that the increase over time was significant in the intervention group ($p = .009$, $d = 0.32$), whereas no change occurred in the control group. The post-intervention revealed significant differences in positivity ratio between the intervention and control groups ($p = .017$, $d = 0.43$).

Parental assessment of their child's PA and NA had no significant interaction effect for either PA ($p = .520$) or NA ($p = .690$). Multiple comparisons revealed no statistically significant differences between the intervention and control groups at baseline or post-intervention.

3.1.2 From Baseline to 5-Month Follow-up

Inclusion of all three measure points resulted in the model having a non-significant interaction effect ($p = .107$). District had a significant main effect ($p = .005$) and group approached significance ($p = .052$). Both groups experienced a slight drop in PA after post-intervention. The effect sizes from baseline to five-month follow-up were small for both groups (intervention group $d = 0.15$; control group $d = -0.17$). When exploring the data by district, the trend over time was parallel in the control group, meaning that the control group reported decreased PA both in the municipal area and in western Finland. In contrast, an opposite trend over time occurred in the intervention group. Students in the municipal area reported a decrease in PA after post-intervention, which is contrary to students in western Finland, who experienced an increase in PA after post-intervention. Multiple comparisons revealed statistically significant differences in PA between the intervention and control groups at five-month follow-up ($p = .042$, $d = 0.26$). Figure 1 illustrates the interaction effect between time and group for PA.

For NA, there was no significant interaction effect but there were significant main effects for time ($p = .017$) and group ($p = .016$). NA increased in both groups after post-intervention; in the control group, the increase in NA was significant ($p = .017$). From baseline to follow-up, the effect size was medium ($d = 0.37$, $p = 0.75$) in the control group, while no effect existed in the intervention group. A statistically significant difference between the groups occurred at five-month follow-up ($p = .006$, $d = -0.51$). Figure 2 displays the interaction effect between time and group for NA.

For the positivity ratio, there was a significant interaction effect between group and time ($p = .025$) and a main effect for district ($p = .022$). Multiple comparisons showed a statistically significant difference between the groups at five-month follow-up ($p = .001$, $d = 0.54$). The intervention group scored slightly higher at baseline, and higher at both post-intervention and 5-month follow-up than the control group. The effect size from baseline to five-month follow-up was 0.20 for the intervention group and -0.32 for the control group.

Fig. 1 Interaction between time and group in predicting positive affect and results of the multiple comparisons (* $p < 0.05$)

Fig. 2 Interaction between time and group in predicting negative affect and results of the multiple comparisons (** $p < 0.01$; + $p < 0.10$)

3.2 The Effect of the Intervention on Daily Positive and Negative Affect Measured with ESM

Both significant interaction between time and group ($p = .003$) and main effects for gender and district existed for the ESM PA. Multiple comparisons revealed a slight decrease in PA ($p < .000$, $d = -0.24$) in the control group, whereas no change occurred in the intervention group (Table 4). No statistically significant differences occurred between the intervention and control groups either at baseline ($d = -0.12$) or post-intervention ($d = 0.14$). Likewise, both significant interaction effect ($p < .000$) and main effect for district existed for the ESM NA. Based on multiple comparisons, there was a slight increase in NA ($p < .000$, $d = 0.42$) in the control group, whereas the intervention group had no change (Table 4). Significant difference between the groups was found at post-intervention ($p = .017$, $d = -0.35$).

Analysis of the ESM PA and NA based on the context (in class, at school breaks, homework and leisure time) (Table 4), revealed a significant interaction between time and group during leisure time for PA ($p = .002$) and for NA ($p < .000$). Multiple comparisons indicated that over time, the control group students had slightly lower scores in PA ($p = .001$) and slightly higher scores in NA ($p < .000$), whereas the intervention group students had slightly higher scores in PA and slightly lower scores in NA. At post-intervention, a significant difference between the groups was found for NA ($p = .017$). For NA, an interaction effect was also found at school breaks ($p = .004$). Multiple comparisons revealed that control group had slightly higher scores over time ($p = .002$), whereas no change occurred in the intervention group. Post-intervention revealed a significant difference between the groups ($p = .002$).

3.3 Focus Group with Students

The results from the focus group questionnaire and interviews were categorized according to three themes: benefit from the intervention, change on a personal and

Table 4 Descriptive statistics for the ESM PA and NA, and mixed model analysis results for the interaction time*group, where significance $< .05$, $n = 136$

	Baseline				Post-intervention				Mixed model analysis
	Intervention		Control		Intervention		Control		Time*group
	M	SE	M	SE	M	SE	M	SE	F (p)
PA	5.27	0.09	5.41***	0.10	5.26	0.09	5.16***	0.10	8.79 (0.003)
NA	1.71	0.07	1.71***	0.08	1.70	0.08	1.98***	0.08	24.14 (0.000)
Context: school breaks									
NA	1.74	0.10	1.77**	0.11	1.66	0.11	2.20**	0.13	8.44 (0.004)
Context: leisure time									
PA	5.28	0.10	5.51**	0.10	5.35	0.10	5.26**	0.11	9.98 (0.002)
NA	1.72	0.08	1.61***	0.08	1.63	0.08	1.91***	0.09	25.22 (0.000)

Notes: *M* Estimated marginal mean, *SE* Standard Error, ESM affect variables scale 1–7; Significant within group changes are marked with *** $< .001$; ** $< .01$

social level, and suggestions on how to develop the program. The results ($n = 65$) from the question ‘How has learning about emotions been helpful to you?’ showed that 78.5% of the students clearly benefited from the emotion lessons, 13.8% felt they did not benefit and 7.7% had no opinion. Data from the questionnaires and interviews demonstrated two categories: learning something about oneself that has been helpful to him-/herself, and learning about emotions has helped to understand others.

Students mentioned that they learnt new vocabulary and a range of different emotions, and learnt to recognize and be aware of their emotions. They had also learnt to recognize the benefits of experiencing positive emotions.

I've learnt about many different kinds of emotions, which earlier, I didn't even know exist. (questionnaire, student 35, girl)

I'm more conscious of my emotions. For example, if I feel angry, I can also feel disappointed and irritated at the same time. (interview)

I have started to think about how I feel. (questionnaire, student 13, girl)

I have noticed that you do things better when you are in a happy mood. (questionnaire, student 4, boy)

I become less angry. (questionnaire, student 5, boy)

Students also learnt new strategies for savoring and enhancing positive emotions in their everyday life.

If I'm sulking I'll become even more grumpy, nowadays I try to boost my positive thinking instead. (interview)

I've learnt to recall positive emotions. (questionnaire, student 53, girl)

I've learnt to appreciate the present moment. (questionnaire, student 66, girl)

I have been able to increase positive emotions. (questionnaire, student 18, boy)

It's possible to increase the amount of positive emotions by listening to music or playing the guitar... (interview)

Have courage to show and manage different kinds of emotions a person has. For example, if I'm feeling irritated, I can handle my irritation better and not take it out on others. (interview)

In addition to learning things about oneself, students were able to improve the quality of their relationships and to understand others better. In other words, they increased their awareness of emotions in others and became better at reflecting on emotions and showing compassion towards others.

I've learnt to see others' emotions and that way, have learnt to know other people better. (interview)

I can help my friend. Even if s/he says that everything is fine, after these emotion lessons I know that everything is not fine and I can ask additional questions and help my friend. (interview)

I have started to think about fun things and it has got me into a better mood and I have started to think more about what I say to others so that they don't get sad. (questionnaire, student 14, girl)

To know how to help someone else get into a good mood, and it also helps others as well as oneself. (questionnaire, student 65, girl)

I've learnt to perceive how others feel. (questionnaire, student 51, boy)

Changes that students experienced, were categorized into personal transformations and social transformations. The results ($n = 70$) concerning the question, 'Since we have started the Flourishing Students lessons, how do you feel more?', revealed that 90.0% experienced positive changes, 8.6% did not experience changes and one had no opinion. Students experienced more positive emotions, such as feeling happier, more lively, self-confident, curious and thoughtful.

More joyful and calm. I know now how to calm myself down. (interview)

More courageous by having more courage to speak. (interview)

More aware of my emotions, knowing more about emotions and also having more variety in my emotions. (interview)

I feel more like myself. (questionnaire, student 22, girl)

The results ($n = 66$) of the question 'Since we have started the Flourishing Students lessons, how do you feel less?', revealed that 69.7% experienced less negative emotions, such as feeling less stressed, sad, afraid, shy and lonely, 22.7% did not experience changes and 7.6% had no opinion.

The results ($n = 68$) concerning the social transformations question, 'What do you think has changed in class, with friends or at home since we started the Flourishing Students lessons?' pointed out that 80.9% experienced positive changes, 14.7% did not experience changes and 4.4% had no opinion. Students mentioned that classroom atmosphere and co-operation changed for the better.

Everyone in the class has become nicer and co-operates better. (questionnaire, student 23, boy)

Everyone has become thoughtful. (questionnaire, student 25, girl)

Everyone is more positive towards new things. (questionnaire, student 18, boy)

It has become calmer. (questionnaire, student 6, boy)

The spirit in our class has improved. (questionnaire, student 19, boy)

You think more about what is said and done. (questionnaire, student 68, girl)

Changes at home were related to better atmosphere.

It is easier at home. (questionnaire, student 60, girl)

We talk friendlier to each other at home. (questionnaire, student 44, girl)

I have been kinder to my brother. (questionnaire, student 2, boy)

Many of the students (58.0%) also had suggestions on how to make the lessons even better. Among the most popular ideas were more acting, play and group work. Some of the students felt that there could be fewer notebook activities, and lessons could be held outside the classroom. Around one third (30.4%) of the students considered the emotion lessons good or very good, and did not have any suggestions for developing them further. Seven students did not have an opinion.

3.4 Questionnaire for Teachers and Classroom Assistants

Three class teachers and two classroom assistants answered the web-based questionnaire concerning their thoughts and experiences of the emotion unit and the positive education program in general. The teachers and classroom assistants were satisfied with the lessons, describing them as interesting, rewarding, and relatively profound, having good content. Four respondents mentioned that the class benefited from the emotion lessons. This beneficial effect could be seen in learning new vocabulary, recognizing different kinds of emotions, taking others into consideration more often and gaining new insights. Respondents found that students had consequently become more thoughtful, and had improved in self-expression. Respondents also experienced personal benefit from the emotion lessons. They found it useful to learn techniques for enhancing positive emotions, to adopt a broader way of thinking, and to see more good than negative things. Suggestions regarding what could be done differently included spending more time on understanding differences between various kinds of emotions, discussing more about negative emotions, and having more drama activities. One respondent stated that the lessons on emotions already contained a good mixture of facts, discussions, exercises and hands-on activities.

4 Discussion

The current study explored the impact of the Flourishing Students intervention on early adolescents' PA and NA using various methods and multi-informants. As predicted, a significant interaction effect between time and group was seen in PA when measured with self-reported questionnaire and ESM. In self-report questionnaires, students who participated in the intervention reported increased PA compared to students in the control group. No change in daily PA occurred in the intervention group, whereas the control group students experiences a slight decrease in PA. The effect was not seen in parental reports.

However, the change over time in PA could only be seen from baseline to post-intervention. After the post-intervention measurements, the drop in PA in the intervention group was deeper than expected, albeit not reaching baseline level. As Weare and Nind (2011) have stated, the diminution of intervention effects is often as little as 6 months. Despite this drop, unlike previous studies (Boniwell et al., 2015; Proctor et al., 2011), the current research provides valuable evidence for the efficacy of the positive education program on students' PA and stresses the importance of positive education as a continuous part of a school curriculum and not only as an intervention.

As expected, students in the intervention group reported less NA compared to the control group; however, the increase in NA in the intervention group was steeper than expected between post-intervention and five-month follow-up. Nevertheless, the results showed a promising decrease in NA in the intervention group from baseline to post-intervention, and the increase in NA after the intervention was weaker in the intervention group compared to the control group. No effects in NA were seen in parental reports. Daily NA slightly increased in the control group, whereas no change occurred in the intervention group. The same trend concerned daily NA during school breaks and leisure time. Consequently, the intervention possibly showed a buffering effect on the typical decline in well-being among adolescents (Boniwell et al., 2015; Proctor et al., 2011). The enhanced positivity ratio in the intervention group supported this

interpretation, due to the statistically significant differences between the groups at post-intervention and the five-month follow-up. Intervention group students were able to experience a higher ratio of PA to NA than control group students.

Prior research shows a negative effect of transition to middle school on adolescent well-being (Barber & Olsen, 2004; Shoshani & Slone, 2013). Therefore, the drop in PA after the intervention in the intervention group was possibly partly due to re-arrangements in transition to upper level comprehensive school in the municipal area. The intervention classes in the municipal area moved to upper level comprehensive school straight after the intervention, whereas intervention classes in western Finland remained in the same school environment. Changes in the municipal area, therefore, involved changes in the school environment, reorganization of classes in the new school, and inability of teachers who were part of the intervention to continue the work on positive education. Continuity is important to sustain learned skills and new resources.

Qualitative data highlighted that the majority of the students liked, and in many ways benefited from, the well-being lessons in their everyday lives. Students were able to increase their level of positive emotions and learnt to recognize, treasure and savor different kinds of emotions. Students also accomplished better self-awareness and awareness of others. Additionally, students enhanced their relationship skills, learnt more constructive ways to settle disagreements and to listen more mindfully. A positive atmosphere and an improved sense of solidarity in the classroom helped students to concentrate better. In the majority of the cases, new subject-related knowledge and skills accomplished during the emotion unit positively impacted students' behavior and well-being both on a personal and a social level. Feedback from the intervention class teachers and classroom assistants supported these findings. Qualitative and quantitative results complemented each other by highlighting the positive impact of the Flourishing Students program on adolescents' positive and negative affect, and social-emotional well-being in general. Besides increased PA and enhanced positivity ratio in self-report measures, qualitative data showed evidence of decreases in negative emotions among the majority (70%) of the intervention group students not evident in the quantitative data.

Our study is a valuable addition to the field of PPIs by broadening the use of assessment methods compared to, for example, the Maytiv positive psychology school program (Shoshani et al., 2016), Personal Well-Being Lessons (Boniwell et al., 2015), Geelong Grammar School Positive Education Program (Norrish & O'Connor, 2015; Vella-Brodrick et al., 2014) and Strath Haven Positive Psychology Curriculum (Seligman et al., 2009). To the best of our knowledge, the current study represents the first to explore the efficacy of a PPI on daily PA and NA measured by ESM and is also the first in this age group to involve parents in the assessment of a child's PA and NA. Furthermore, only Boniwell et al. (2015) complemented quantitative research with qualitative data. Although the Penn Resiliency Program has yielded good results in diverse samples (e.g. meta-analysis by Brunwasser et al., 2009; Ma et al., 2020), we wanted to develop a broader program in order to teach various skills and techniques within the domains of psychological resources, social and emotional competence and resilience.

4.1 Strengths and Limitations

The most important strength of the present study is the use of multi-methods and multi-informants in order to achieve a more complete understanding of the topic and to

complement different kinds of methods. Contrary to questionnaires, using ESM allowed assessment of affect in real time in daily life and examination of the interaction between affect and contextual features (Myin-Germeys et al., 2009). Qualitative results provided additional information regarding the beneficial impact and implementation of the intervention. Other strengths include the RCT-study design and the duration and content of the intervention. Meta-analytic studies have reported that longer and more intense interventions seem more effective than short-term interventions (e.g. Weare & Nind, 2011). Furthermore, an approach involving individuals practicing multiple and different positive activities is claimed more effective than a single focus approach (e.g. Seligman et al., 2005; Sin & Lyubomirsky, 2009). In the present study, teachers were actively engaged in the intervention prior to and during the intervention. Such engagement has also been indicated to improve the effectiveness of the interventions (e.g. Paulus et al., 2016; Weare & Nind, 2011).

Despite these strengths, the present study also has limitations. First, the findings were limited by the relatively small sample size. The decision on sample size was based on discussions with the study statistician and available resources. The clear lack of long-term PPIs with RCT-design leads us to believe the current study constitutes an important contribution to the field. Future replication in larger and more diverse samples from different countries is needed. Furthermore, the content of the program needs adaptation to present circumstances (Ciarrochi et al., 2016; White & Kern, 2018). Second, contrary to the expectation, the intervention effect decreased after post-intervention. Central to achieving long-lasting results is the involvement of all school staff and parents and the anchoring of positive psychology practices into a school's human resource policies and practices (Shoshani & Steinmetz, 2014; Waters, 2011). Thus, important in the future is to adopt a whole-school approach instead of implementing an intervention within selected classrooms. Future studies could also examine the impact of booster sessions on maintaining beneficial intervention effects (Weare & Nind, 2011).

Taken together, our data illustrated that students participating in the intervention showed increases in PA from baseline to post-intervention and were able to experience a higher ratio of PA than NA. In line with the broaden-and-build theory of positive emotions, this broadened awareness might have helped them to integrate these new thought-action repertoires acquired during the well-being lessons into their everyday lives (Cohn & Fredrickson, 2010), which in turn gives an opportunity to build long-term resources and resilience (Fredrickson, 1998, 2001). This study supports the beneficial effect of the Flourishing Students program on students' PA and NA, which in turn, comprises an essential part of their well-being.

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