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## Happy thoughts: Enhancing well-being in the classroom with a positive events diary

Paul J. Carter<sup>a</sup>, Brendan Hore<sup>a</sup>, Leona McGarrigle<sup>a</sup>, Manon Edwards<sup>b</sup>, Gavin Doeg<sup>b</sup>, Rachel Oakes<sup>a</sup>, Aisling Campion<sup>a</sup>, Grace Carey<sup>a</sup>, Katie Vickers<sup>a</sup> and John A. Parkinson<sup>a</sup> 

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### ABSTRACT

Positive psychology interventions (PPIs) are effective in increasing well-being across the population. Whilst educators are recognising the importance of well-being in the classroom and of its long-term impact on life trajectory, the transformative potential of PPIs in educational settings is yet to be fully realised. This study investigates, for the first time, the effects of a PPI in school children by means of a daily diary. Self-report questionnaires were used to measure well-being in school children aged 8–11 years. Across two studies, children kept a positive events diary, recording three experiences every day for a week. The intervention led to an increase in happiness and a decrease in depressive symptoms immediately following the intervention and at a three-month follow-up. Children who had unhappier baseline scores benefitted more from the intervention. This study demonstrates significant scope, in school settings, for targeted light-touch interventions to promote well-being in those with the greatest need.

### ARTICLE HISTORY

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### KEYWORDS

Positive psychology; positive thinking; resilience; well-being; positive psychology intervention; PPI; children; education; attribution

The benefits of positive thinking on subjective well-being are well documented in psychological research (Marshall & Brown, 2006; Scheier & Carver, 1992; Sin & Lyubomirsky, 2009). Fostering what is positive in life contributes to a person's well-being (Lyubomirsky, King, & Diener, 2005). It also protects against the occurrence of psychopathology, adding an element of resilience, or human future-proofing (Gable & Haidt, 2005). More specifically, sharing positive experiences through writing appears to be particularly effective. Burton and King (2004), for example, demonstrated that writing about positive events was associated with enhanced positive mood and reduced visits to health care centres.

Although positive psychology interventions (PPIs) have demonstrated enhanced well-being in adults (e.g. Caprara & Steca, 2006; Emmons & McCullough, 2003; Seligman, Steen, Park, & Peterson, 2005; Sheldon & Lyubomirsky, 2006), evidence of their effectiveness in children is less well documented. The current study investigates whether a positive thinking intervention improves subjective well-being in children, and whether baseline affect influences the efficacy of this intervention.

The value of positive emotions in well-being is not simply due to the immediate impact 'good feelings' have on subjective awareness, but more broadly in their adaptive effects on psychological function (e.g. Lyubomirsky et al.,

2005). For example, Fredrickson's (2004) broaden-and-build model argues they have an important role in coping and recovery. The model proposes that flexible and adaptive thinking can result from the experience of positive emotions, helping an individual cope with adversity, while also serving to relax the autonomic system and counter-act anxiety induced during stressful situations. Studies of clinical populations (Ilardi, Craighead, & Evans, 1997; as cited in Macleod & Moore, 2000) have shown that positive thinking directly affects attributional style, a major predictor of depression relapse. In the healthy population, positive thinking may alter the attributions people make, towards attributing positive events to internal, stable and global factors. Such attributions have been shown to be major predictors of high self-esteem, decreased depressive symptoms and increased happiness (Michielsen, Van Houdenhove, Leirs, Onghena, & Vandenbroeck, 2006). Attending to positive events encourages people to acknowledge that they are valued by others (Watkins, 2004) and promotes well-being-focused decision-making (Tweed & Conway, 2009).

A landmark internet study by Seligman et al. (2005) investigated the effect of five intentional positivity exercises on the happiness and depression levels of an adult sample. The findings revealed that two of the five exercises – 'Three Good Things' and 'Using Signature

Strengths' – were effective in increasing happiness and reducing depressive symptoms at post-test and six-month follow-up. A subsequent replication found support for lasting increases in happiness, but not significant changes in depression (Mongrain & Anselmo-Matthews, 2012). The diary intervention requires participants to write down three positive events that happen each day and to reflect on why these have occurred, encouraging participants to focus on the causal structure of experiences and helping to act as a buffer against low mood and stressors (Carver, Scheier, & Segerstrom, 2010).

### ***PPIs and children***

There is evidence that children as young as six years of age understand the links between thinking and emotions and can recognise the benefits of positive thinking (Bamford & Lagattuta, 2012). Recent statistics indicate the need for PPIs in children: a 2015 study by The Children's Society showed that children in England rank amongst the lowest of 16 countries for subjective well-being and life satisfaction (Pople, Rees, Main, & Bradshaw, 2015). Around 4% of children aged between 5 and 16 suffer from emotional disorders (Green, McGinnity, Meltzer, Ford, & Goodman, 2005) and so interventions that cultivate positive emotions and thoughts could be effective in both disrupting the negative trajectories in some children's mental health, and also in fostering positive development in others. The malleable nature of cognitive, emotional and social development during this period also makes it an optimum time to nurture such strengths.

Positive psychological interventions aimed at children are limited but promising. The Penn Resiliency Program, for example, has demonstrated positive results in reducing levels of depression and anxiety (Brunwasser, Gillham, & Kim, 2009; Challen, Noden, West, & Machin, 2009; Gillham, Hamilton, Freres, Patton, & Gallop, 2006; Gillham et al., 2007). Marques, Lopez, and Pais-Ribeiro (2011) have reported increased life satisfaction and self-worth at 18-month follow-up with a hope intervention, while Owens and Patterson (2013) found thinking about best possible selves was associated with increased self-esteem. When examining a gratitude intervention, however, Owens and Patterson observed no benefits, while Froh, Kashdan, Ozimkowski, and Miller (2009) reported greater positive affect following their gratitude intervention, but only for the unhappiest children. Encouraged by these findings, and with the knowledge that positive thinking is core to all of these interventions, we sought to promote positive thinking in a child population. Participants used a diary to record daily positive events and their causes, and we examined happiness and depression at baseline, and then at one-week and three-month

follow-ups. We hypothesised that the diary intervention would increase positive thinking, leading to changes in cognitive and emotional processes. Specifically, we hypothesised that increased happiness and decreased depression would be observed following the intervention. Furthermore, we hypothesised that baseline affect would influence the effect of the intervention and that children lower in positive affect and higher in negative affect would gain greater benefits from the exercise.

## **Study 1**

### ***Method***

#### ***Participants***

Participants were 606 primary school children, aged between 9 and 11 ( $M = 9.82$ ,  $SD = 0.73$ ), with a gender ratio of approximately 1:1. They were recruited from Year 5 and 6 in 15 primary schools in Gwynedd and Anglesey, North Wales. Teachers of participating classes distributed information and consent forms to the parents of their pupils. Initially all children across all schools assented and were recruited into the study. At each testing period participants also verbally assented to take part. A total number of 616 children was recruited initially, but 10 children did not complete all sessions and their data were removed from the analysis. The study was approved by Bangor University's School of Psychology Research Ethics Committee.

#### ***Materials***

***Positive thinking diary.*** The diary consisted of an A5 booklet, with the front cover showing a line drawing of a 'smiley face', which could be coloured in and customised by the children. Space was also provided for each pupil to write their name and personalise their diary with colours and drawings. Inside the booklet, each day of the week was allocated a separate page, on which were three boxes labelled Good Thing 1, 2 and 3. Each box had space for the good thing to be written in it, as well as the causal explanation. Two working weeks were included in the booklet in case teachers, or pupils themselves, chose to continue the diary beyond the testing week. This was encouraged by the researchers, as Seligman et al. (2005) speculated that informal continuation of their exercise contributed to the lasting positive effects of the intervention in their study.

#### ***Design***

In light of previous research indicating positive outcomes of positive thinking diary interventions and the enthusiasm of participating teachers to provide a well-being intervention to all pupils taking part, it was deemed inappropriate to deny the intervention to any participant through the use

of a separate control group. The study therefore adapted a stepped-wedge cluster design (Brown & Lilford, 2006). This design is appropriate when a formal control group is not possible to implement, and allows for a control phase in order for comparison following intervention. In such a design, an intervention is rolled out sequentially to the trial participants over a number of time periods. According to Brown and Lilford (2006), stepped-wedge trial designs offer a satisfactory opportunity when modelling the effect of time on the effectiveness of an intervention. In a similar school-based intervention, Ni Mhurchu et al. (2010) provide evidence of the value and feasibility of this design in the evaluation of pragmatic public health interventions. In our case, participants received the intervention in clusters based on their school region. The order in which each cluster received the intervention was random and all clusters received the intervention by the end of the study.

Baseline scores were collected for each cluster when they began the intervention. These served as control measures against which intervention data points were compared using repeated measure ANOVAs.

### Measures

**Faces Scale.** The Faces Scale (Andrews & Withey, 1976) is a single-item, self-report measure, used to assess momentary happiness in young people. It comprises seven line drawings of faces, arranged in a horizontal line, ranging from a face with a large smile (indicating very happy) to a face with a downturned mouth (indicating very unhappy). Using this scale, participants were required to circle the face that best represented their mood at that time. The Faces Scale is particularly suitable for children, as they find it easy to recognise and label emotions when they are represented as schematic drawings (MacDonald, Kirkpatrick, & Sullivan, 1996). Furthermore, good agreement between parent reports of their children and children self-reports using the Faces Scale has been demonstrated by Holder and Coleman (2008).

**The Oxford happiness questionnaire short form.** The Oxford happiness questionnaire (OHQ) short form is an eight-item self-report measure of subjective happiness based on the 29-item OHQ (Hills & Argyle, 2002). In order to make the questionnaire more accessible to schoolchildren, the scale was adapted from a Likert-type to the earlier Oxford Happiness Inventory form style (Argyle, Martin, & Crossland, 1989), in which each item is presented in four incremental levels. Cruise, Lewis, and Mc Guckin (2006) have reported satisfactory internal consistency ( $\alpha = .62$ ) for the OHQ in adults. It has also been used with children and has demonstrated moderate internal consistency ( $\alpha = .58$ ) (Holder & Klassen, 2010).

**The centre for epidemiological studies depression children's scale (CES-DC).** The CES-DC (Weissman, Orvaschel, & Padian, 1980) is a 20-item self-report measure, the adult version of which was used in Seligman et al. (2005) original study. It assesses depressed affect, lack of positive affect, somatic symptoms and interpersonal difficulties in children using a four-point Likert scale, ranging from 'Not at all' (0) to 'A lot' (3). The CES-DC has been reported to have good internal consistency ( $\alpha = .89$ ) and reliability (Fendrich, Weissman, & Warner, 1990). In order to make this scale more suitable for pupils in the study, and due to time constraints, the scale was shortened to 10 items chosen by educational psychologists in the present study.

### Procedure

Before the study began, researchers gave teachers a verbal explanation and step-by-step guide to the study in conjunction with detailed written instructions (including a teacher's script to be used when explaining the study to participants). The teacher's script included a list of prompts that could be used if the pupils found it difficult to think of good things and instructions on debriefing the pupils when the study was completed. Pre-intervention questionnaires were administered on the Friday of an allocated week in order to establish the baseline scores. All questionnaires were completed in the same sequence, beginning with the Faces Scale, followed by the OHQ and CES-DC. On the following Monday, the positive thinking diaries were issued to all participating pupils. Each day in that week participants wrote down three positive events that had happened to them that day, as well as an explanation for why they thought these had occurred. Teachers were advised to complete these diary entries with their class at the end of each day. The exercise took up to 30 min daily.

Following the final diary entry on Friday afternoon of the testing week, the post-intervention questionnaires were administered. Identical to the pre-intervention questionnaires, these served to identify any differences as a result of the intervention. Participants were allowed to keep their diaries, and only the questionnaires were collected by the researchers. The clusters completed the study in three consecutive weeks, with each cluster starting the study on a Friday. As such, Cluster 1 completed the post-intervention questionnaires on the same Friday that Cluster 2 completed the pre-intervention questionnaires, while Cluster 3 completed the pre-intervention questionnaires on the same day Cluster 2 completed the post-intervention questionnaires. Questionnaires were administered again three months after the intervention. Each cluster completed this follow-up in the same order as the first phase, across three consecutive weeks.

**Table 1.** Cluster comparison for each scale.

| N = 606              | Mean (SD)    |              |              | F             |
|----------------------|--------------|--------------|--------------|---------------|
|                      | Cluster 1    | Cluster 2    | Cluster 3    |               |
| Emotional happiness  | 5.79 (1.18)  | 5.83 (1.19)  | 5.88 (1.24)  | 0.23 (2, 613) |
| Subjective happiness | 23.09 (4.41) | 23.10 (4.10) | 23.51 (4.79) | 0.45 (2, 613) |
| Depression           | 8.11 (4.89)  | 8.99 (5.81)  | 9.51 (5.86)  | 2.82 (2, 613) |

Note: Values adjacent to *F* scores represent degrees of freedom.  
All  $p > .05$ .

## Results

A preliminary analysis was carried out to determine whether the three clusters differed in baseline scores on the three scales. A one-way independent ANOVA on happiness (Faces Scale and OHISF) and depression (CES-DC) scores showed no significant main effect of cluster, indicating that none of the clusters differed significantly in terms of baseline happiness or depression (see Table 1). There was a trend towards a small increase in depression scores over the three clusters ( $p = .06$ ) though the direction of change worked against our intervention hypothesis and so was tolerated in the subsequent analysis. Overall, the baseline analysis confirmed that there were no significant changes in pre-intervention measures across cluster over time, thus providing a measure of control for extraneous factors.

Repeated measures ANOVAs were conducted to investigate the effect of the intervention on (1) emotional happiness (Faces Scale) (2) subjective happiness (OHQ) and (3) depression (CES-DC) across pre-intervention, post-intervention and three-month follow-up scores.

A significant main effect of time was observed for emotional happiness  $F(2, 1230) = 9.54, p < .01$  (see Figure 1). Planned contrasts revealed that there was a significant increase in mean scores of emotional happiness from pre-intervention to post-intervention  $F(1, 615) = 12.74, p < .01, \eta^2 = .02$ , and from pre-intervention to follow-up  $F(1, 615) = 14.50, p < .01, \eta^2 = .02$ .

A significant (Greenhouse-Geisser corrected) main effect of time on subjective happiness was also observed

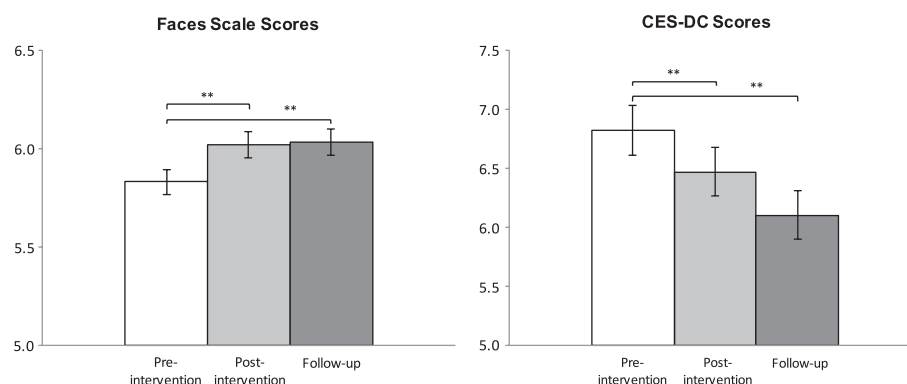
$F(1.95, 1197.16) = 9.65, p < .01$ , with planned contrasts showing a significant increase in mean scores of general happiness from pre-intervention to post-intervention  $F(1, 615) = 5.18, p < .05, \eta^2 = .01$  and from pre-intervention to follow-up  $F(1, 615) = 16.61, p < .01, \eta^2 = .03$ .

Similar results were evidenced in the depression scores, which differed significantly across all three measure periods (with Greenhouse-Geisser correction). The analysis demonstrated a significant effect of time  $F(1.95, 1197.16) = 17.65, p < .01$  (see Figure 1). Post hoc planned contrasts showed that the intervention significantly decreased depression scores from pre-intervention to post-intervention  $F(1, 615) = 24.69, p < .01, \eta^2 = .04$  and from pre-intervention to follow-up  $F(1, 615) = 26.72, p < .01, \eta^2 = .04$ .

In order to investigate the role of baseline affect, a tertile split was performed on baseline happiness and depression scores. A mixed measures ANOVA (with Greenhouse-Geisser corrections) was conducted to investigate the effects of time and baseline score groupings. A significant interaction was observed for all three scales: emotional happiness  $[F(3.90, 1148.11) = 47.68, p < .001, \eta^2 = .14]$ , subjective happiness  $[F(3.95, 1162.88) = 14.21, p < .001, \eta^2 = .05]$  and depression  $[F(3.91, 1152.76) = 13.43, p < .001, \eta^2 = .04]$  (this is not surprising, largely due to the selection of tertile groups based on baseline scores that are subsequently used in the analysis).

As a follow-up, a post hoc analysis using one-way ANOVAs was carried out to investigate which of the tertiles contributed to the overall significance of the intervention (see Table 2). All three quartiles demonstrated significant changes in scores over time for both measures of happiness, and depression. Partial eta-squared results indicate a larger practical significance of the intervention for the first and third tertiles.

In order to investigate at which time periods significant changes occurred, post hoc analyses using pairwise comparisons (with Bonferroni corrections) were carried out for each tertile (see Table 3).



**Figure 1.** Faces Scale and depression scores across the three measure stages (error bars represent the standard error of the mean, SEM).



**Table 2.** One-way ANOVAs.

| Group     | Construct           | df     | <i>F</i> | $\eta^2$ |
|-----------|---------------------|--------|----------|----------|
| Tertile 1 | Emotional happiness | 2, 400 | 84.38*** | .297     |
|           | General happiness   | 2, 426 | 59.05*** | .217     |
|           | Depression          | 2, 440 | 45.67*** | .172     |
| Tertile 2 | Emotional happiness | 2, 396 | 4.58**   | .023     |
|           | General happiness   | 2, 416 | 4.33*    | .020     |
|           | Depression          | 2, 382 | 5.20**   | .027     |
| Tertile 3 | Emotional happiness | 2, 430 | 48.35*** | .184     |
|           | General happiness   | 2, 384 | 24.51*** | .113     |
|           | Depression          | 2, 404 | 14.31*** | .066     |

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

**Table 3.** Pairwise comparisons between time points for each tertile.

| Group                   | Construct            | (I) time | (J) time | Mean difference (J – I) |
|-------------------------|----------------------|----------|----------|-------------------------|
| Tertile 1 (least happy) | Emotional happiness  | 1        | 2        | 1.01***                 |
|                         |                      |          | 3        | 1.24***                 |
|                         | Subjective happiness | 1        | 2        | 2.04***                 |
|                         |                      |          | 3        | 3.01***                 |
|                         | Depression           | 1        | 2        | –2.95***                |
|                         |                      |          | 3        | –3.87***                |
| Tertile 2               | Emotional happiness  | 1        | 2        | 0.20**                  |
|                         |                      |          | 3        | 0.09                    |
|                         | Subjective happiness | 1        | 2        | 0.22                    |
|                         |                      |          | 3        | 0.68*                   |
|                         | Depression           | 1        | 2        | –0.88*                  |
|                         |                      |          | 3        | –1.03*                  |
| Tertile 3 (most happy)  | Emotional happiness  | 1        | 2        | –0.58***                |
|                         |                      |          | 3        | –0.65***                |
|                         | Subjective happiness | 1        | 2        | –1.38***                |
|                         |                      |          | 3        | –1.80***                |
|                         | Depression           | 1        | 2        | 0.98**                  |
|                         |                      |          | 3        | 1.51***                 |

Notes: Negative mean differences indicate a decrease in scores. Time period: (1) = pre-intervention; (2) = post-intervention; (3) = follow-up.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

Results indicate that for tertile 1 the intervention increased happiness and reduced depression at post-testing period, with lasting effects to three-month follow-up. The tertile 2 group demonstrated a similar trend to tertile 1, but the effects were less pronounced. Surprisingly, children in tertile 3 demonstrated decreased happiness scores and increased depression scores at both post-test and follow-up (see Figure 2).

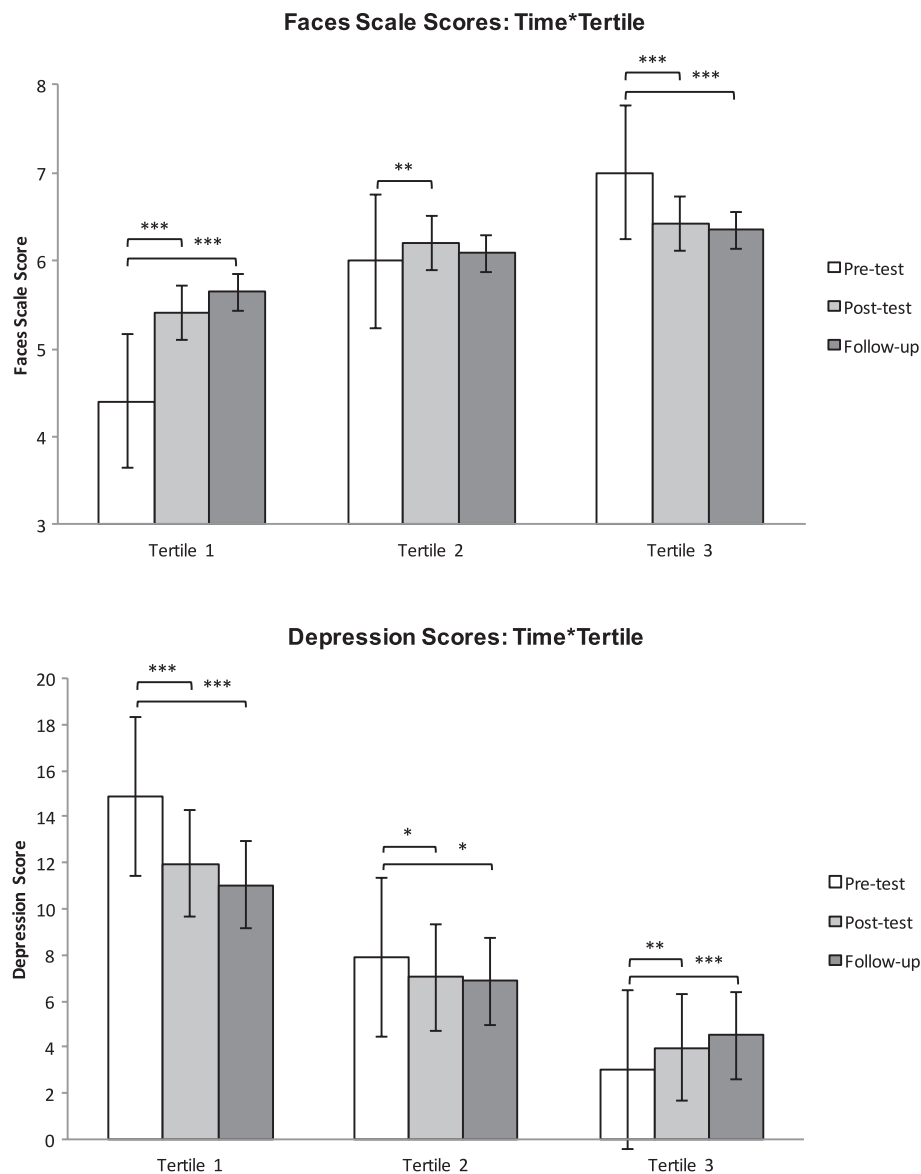
The tertile analysis of the three measures produced a final question for our analysis. To what extent were we studying the same group of children that made up the tertiles for different measures i.e. was an unhappy child also a depressed child? Pearson correlation of the pre-intervention baseline data showed that there was a strong relationship between the three measures: emotional happiness and subjective happiness ( $r = 0.55, p < .001$ ); emotional happiness and depression ( $r = -0.47, p < 0.001$ ); and subjective happiness and depression ( $r = -0.56, p < 0.001$ ). Broadly speaking, unhappy children were also those showing the most depressive symptoms.

## Discussion

The use of a positive events diary in a large cohort of primary school children resulted in significant increases in self-reported happiness and decreases in depressive symptoms. The impact of the intervention remained at three-month follow-up. Given the large group size, it was possible to make a tertile split of the children based on their baseline scores in order to assess whether the intervention had differential effects depending upon initial well-being. Perhaps not surprisingly, the least happy children benefitted most from the diary. However, the tertile with the greatest well-being actually demonstrated a reduction in happiness scores following the intervention, questioning the universal value of this diary exercise.

One limitation in the current study is that it used a form of stepped-wedge design rather than including an independent control group. As the intervention had been shown to effectively increase well-being, it was deemed appropriate that all children should be given access to the intervention. The design is similar to using a 'waiting list' control and the phased introduction of the positive thinking diary exercise across three large cohorts enabled control comparisons to be made over time and affords confidence to the significant effects observed in the study. Nevertheless, the inclusion of a control group would lend greater weight to the results. Therefore, we conducted a second study, though on a much smaller cohort, in order to directly compare our intervention with a control condition, and also made several amendments to the methodology. In the initial study, two measures of happiness were used: a non-verbal face scale (modified Faces Scale, Andrews & Withey, 1976) and a version of the OHQ (Hills & Argyle, 2002), and these yielded ostensibly identical results. As the OHQ has been criticised for its inability to distinguish between components of happiness and its unsuitability for varied populations, (Kashdan, 2004) we chose to include only the Faces Scale in Study 2. Secondly, in the initial study we observed that whilst almost all children took part in the study, there were differences in the compliance rate – that is the extent to which children completed the diary each day and identified a total of three events for each day. Such differences could be a reason for variance in results and so in the second study the experimenters checked each diary for 'completeness' and omitted those below a preset threshold (see Results).

Finally, one explanation for the lasting impact of diary interventions is that the focus on a causal explanation for the positive episodes changes the attributional style of the individual (Hollon, 1990; Seligman et al., 1988). Cognitive Behavioural Therapy involves attributional training, which works by asking a participant to consider alternate causal explanations for past (usually anxiogenic) events. Over



**Figure 2.** Effect of Faces Scale and depression scores by tertile and time point (error bars represent SEM).

time the individual develops a more balanced attributional style, reflecting an increase in attributing positive events internally (and externalising negatives). To test this hypothesis, the second study also incorporated the revised Children's Attributional Style Questionnaire (CASQ-R) (Kaslow & Nolen-Hoeksema, 1991) with the expectation that changes in well-being would be associated with changes in attributional style.

## Study 2

### Method

#### Participants

Participants were 92 primary school children, aged between 8 and 11. They were recruited from Year 5 and

6 in three primary schools in Gwynedd, North Wales. Information was distributed to schools inviting them to take part, along with consent forms for parents to sign. Participants were required to be over 6 years of age and to have English as their first language. Four school classes were identified and all children in those classes took part. After exclusion of incomplete data, the mean age of the remaining 72 participants was 9.60 years ( $SD = 0.94$ ), 35 of whom were male. The study was approved by Bangor University's School of Psychology Research Ethics Committee.

#### Design

The study was similar in format to Study 1, except a control group was included. Two classes each were allocated to experimental or control.

## Materials

The experimental group completed the same positive thinking diary as outlined in Study 1. The control group completed an identical daily diary except they noted any three things that occurred that day along with their causal explanation. The events noted could be positive, negative or neutral. The diary was identical in design to that of the experimental group except the front cover consisted of a picture of a diary. On completion of the study, the control group was given the positive thinking diary intervention.

## Measures

The Faces Scale was used to measure subjective happiness and the CES-DC was used to measure depressive symptomatology, as in Study 1.

In Study 2, the Children's Attributional Style Questionnaire (CASQ-R; Kaslow & Nolen-Hoeksema, 1991) was also used. This is a revised version of the Seligman et al. (1984) scale of measuring attributional style in children aged 8–13 and measures overall attributional style as well as locus, global and stable subcomponents (Fernández-Ballesteros, 2002). The CASQ-R has been shown to be reliable with appropriate internal consistency and test–retest stability over time and valid, strong associations existing with indicators of mental health status (Abela, 2001; Seligman et al., 1984). Two scores were calculated per individual by combining internal, global and stable measurements for positive and negative attributions respectively.

## Procedures

The procedures used were the same as in Study 1.

## Results

A preliminary analysis of 'completeness' for the diaries revealed that not all participants had fully complied with instructions. Each diary was scored on a scale of 0–5 as a measure of completion (5 = fully complete, 0 = not

completed at all) for the five days of intervention. We set a score of 3 (fully completing the diary for at least 3 days) as a cut-off and 20 children failed to reach this criterion. As such, their data were omitted from the study resulting in a final group of 72 children, with 37 in the experimental group. A comparison of the demographic data for those that were omitted in this way revealed no gross differences between those included and those not. Due to illness, some children did not complete all measurements and these cases were omitted from statistical analyses.

An assessment of baseline measures using independent *t*-tests indicated that there was no difference in happiness or depression scores between the experimental and control groups. There was a small difference in negative attributional style, with the experimental group showing a higher score (see Table 4).

Initially, each of the four measures was subjected to a mixed ANOVA to identify time  $\times$  group interactions. These results showed that only the happiness measure yielded a significant interaction [ $F(5.88, 83.88) = 4.19, p < .05, \eta^2 = .07$ ] (see Figure 3). Whilst there was a trend in the right direction for the depression scores, there was no significant effect for it, or either of the attribution measures ( $F < 2$ ). A main effect of time was evident for happiness [ $F(1.52, 83.88) = 4.68, p < .5, \eta^2 = .08$ ], reflecting an increase as the study progressed, and of group for negative attributional style [ $F(1, 52) = 8.75, p < .01, \eta^2 = .14$ ], reflecting a higher negative style for the experimental group. No other main effects were significant ( $F < 2$ ).

For the significant time  $\times$  group interaction with the happiness measure follow-up, analyses were conducted to identify the specific nature of this effect. Firstly, pairwise group comparisons revealed no difference at each time point ( $F < 2$ ) perhaps reflecting the small *n* in the study. Secondly, repeated measures ANOVA was used to assess the significance of differences over time for the two groups separately (addressing our specific hypothesis that the intervention should improve well-being, but no change should

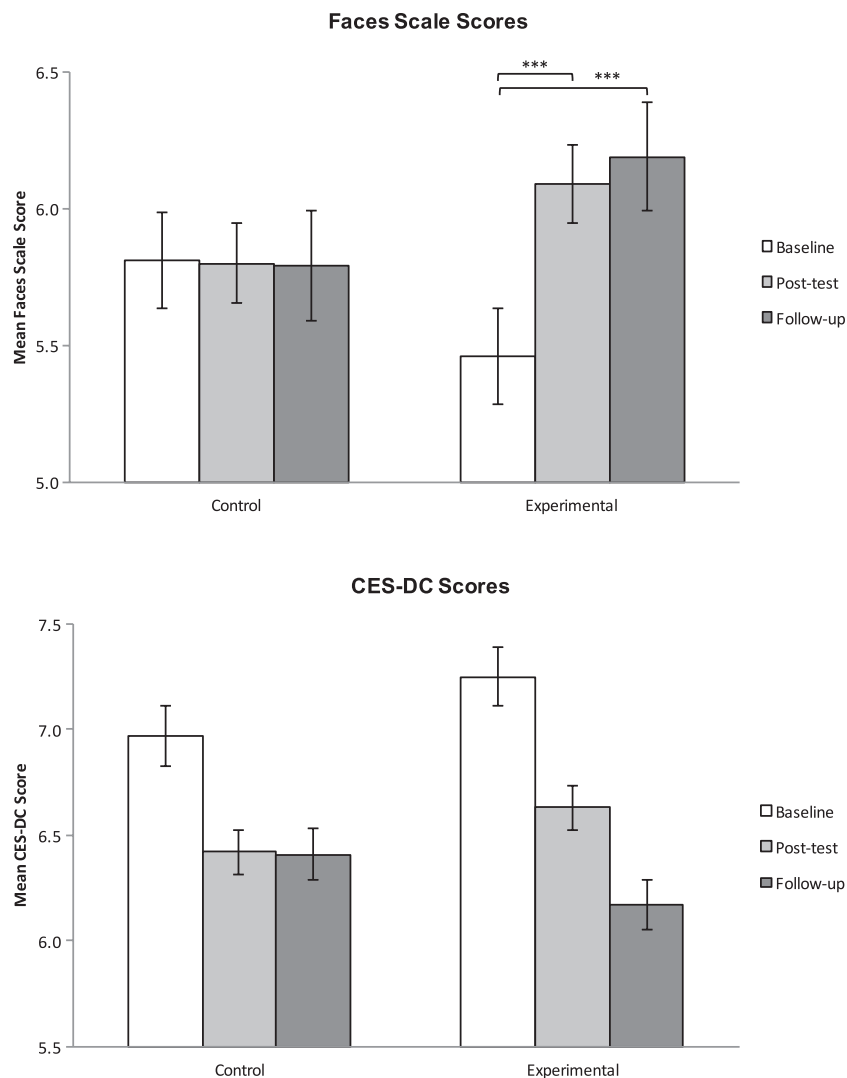
**Table 4.** Descriptive statistics and comparison of baseline scores for each group.

|                                |                             | Mean (SD)   |              | <i>t</i>                   |
|--------------------------------|-----------------------------|-------------|--------------|----------------------------|
|                                |                             | Control     | Experimental |                            |
| <i>N</i> = 72                  |                             |             |              |                            |
|                                | Emotional happiness (faces) |             |              |                            |
|                                | Baseline                    | 5.81 (1.05) | 5.46 (1.50)  | −1.08 (66)                 |
|                                | Post                        | 5.80 (1.22) | 6.09 (1.04)  |                            |
|                                | Follow up                   | 5.79 (1.10) | 6.19 (0.92)  |                            |
| Depression (CES-DC)            | Baseline                    | 6.97 (2.50) | 7.25 (5.30)  | 0.285 (51.05) <sup>a</sup> |
|                                | Post                        | 6.42 (4.21) | 6.63 (4.91)  |                            |
|                                | Follow up                   | 6.41 (4.02) | 6.17 (4.42)  |                            |
| +ve attribution style (CASQ-R) | Baseline                    | 2.96 (1.38) | 2.65 (1.16)  | −1.05 (67)                 |
|                                | Post                        | 3.32 (1.25) | 2.94 (1.12)  |                            |
|                                | Follow up                   | 2.79 (0.99) | 3.00 (1.31)  |                            |
| −ve attribution style (CASQ-R) | Baseline                    | 1.63 (1.01) | 2.43 (1.39)  | 2.73** (67)                |
|                                | Post                        | 1.81 (1.12) | 2.36 (1.22)  |                            |
|                                | Follow up                   | 1.48 (0.96) | 2.20 (1.28)  |                            |

Note: Values adjacent to *t* scores represent degrees of freedom.

<sup>a</sup>Equal variances not assumed. \*\* $p > .01$ .





**Figure 3.** Faces Scale and depression scores across the three stages for both groups (error bars represent *SEM*).

be observed in controls). There was a significant increase in happiness in the experimental group across the study: between baseline and post-test [ $F(1, 31) = 10.54, p = .003$ ] and between baseline and follow-up [ $F(1, 31) = 9.27, p = .005$ ]. In contrast, there were no significant differences in the control group ( $F < 2$ ). (see Figure 3.)

### General discussion

The present studies sought to implement a positive thinking diary for the first time as a viable light-touch exercise in a primary school setting (8–11 year olds). Across the two studies, the results were broadly consistent and demonstrated that the diary intervention was successful in increasing subjective reports of happiness and reducing depressive symptoms in children. The findings confirm that children are receptive to PPIs, and that using the diary intervention to replay positive experiences does boost well-being (Diener, 2000; Lyubomirsky, Sousa, &

Dickerhoof, 2006; Sin, Della Porta, & Lyubomirsky, 2011). Whilst 'happiness' effect sizes were small, means continued to increase from post-intervention to three-month follow up. Progressive improvements in the depression measure were seen across both studies but were only significant in the larger cohort study. These findings are consistent with previous work in adults demonstrating that PPIs have a small but significant effect on well-being. For example, two recent meta-analyses examining the effects of PPIs in adults report reliable significant effects, with increases in happiness ranging from small to moderate effect size, and decreases in depression from small to large (Bolier et al., 2013; Sin & Lyubomirsky, 2009). Due to the small group size in Study 2, we were unable to split the sample into tertiles as we had in Study 1. Furthermore, the higher baseline negative attributional style may have masked any significant impact of the intervention on depression scores, though Mongrain and Anselmo-Matthews (2012) also report impact of a PPI on happiness but not on depression.

### ***The impact of baseline scores***

In the larger cohort Study 1, a secondary analysis considered the trajectory of individuals at different points along the well-being continuum (Keyes, 2002). For both happiness and depression scores, the group was split into tertiles and their responses were compared to post-intervention scores. In line with our hypotheses, the lowest tertile made significant improvements. This was true both for increases in happiness and decreases in depressive symptomology. In one of the few studies examining the differential effect of PPIs with children, a similar pattern of results was observed with a gratitude intervention (Froh et al., 2009). The authors reported greater positive affect at post-treatment and two-month follow-up only for those youths with lower positive affect prior to the intervention.

Perhaps the most intriguing finding of Study 1 is that the happiest group of children displayed significantly reduced levels of happiness and higher levels of depression following the intervention. The effect size was small, but should not be discounted. One possible explanation is that these children were at an emotional ceiling and thus not motivated to focus on, nor actively engage with, practices designed to promote well-being (Lyubomirsky, Dickerhoof, Boehm, & Sheldon, 2011). However, this does not readily account for a significant drop in happiness scores. Replaying previous positive experiences involves organisation, integration and analysis, forcing the individual to review and re-experience the event (Lyubomirsky et al., 2006). This 'affective' explanation might lead some children to question the validity of the experience (e.g. 'Do I deserve this?') leading to reduction of pleasure associated with the it. Unchecked happiness is not a good thing (nor extremely positive attributional styles) and can lead to poor outcomes for the individual (Gruber, Mauss, & Tamir, 2011) but the negative impact of the intervention on some children raises an important question for the scope and universal implementation of PPIs.

### ***Underlying psychological mechanisms***

Whilst we do not know the precise mechanism through which the diary intervention improves subjective well-being in unhappy children, in Study 2 we did explore the hypothesis that changes in attributional style may be responsible. However, the significant increases in happiness scores were not accompanied by increases in positive attributional style, nor decreases in negative style. In this context at least, it appears that changes in cognitive schema relating to causal inferences about events does not underlie the positive impact of the diary. An alternative explanation is that the practised effort of searching memory for positive events produces a lasting search bias such that positive episodes become activated more readily

(Xu et al., 2015). Consistent with this, in clinical depression, there is evidence that a negative memory bias exists which predisposes individuals with depression to recall more negative life events, even when controlling for frequency of occurrence of both negative and positive episodes. Recent work by Dalglish and Werner-Seidler (2014) has shown that memory specificity training, which helps depressed individuals enrich the specificity and detail of autobiographical episodes, is effective in reducing depressive symptoms. In a similar way, the diary exercise may entrain an enriched memory search process for positive events, which then accounts for the longer lasting effects of the short diary intervention.

If not cognitive, then an emotional bias may be involved. McGonigal (2015) draws attention to the ratio of positive to negative emotions experienced by an individual (pp. 166–170). Evidence demonstrates that a ratio of 2:1 or higher has significant correlations with, for example, thriving marriages (Gottman, 2014), more effective work performance (Rego, Sousa, Marques, & Cunha, 2012) and successful depression treatment (Schwartz et al., 2002). Thus, it may be that simply increasing the proportion of positive emotions for unhappy children using the diary exercise produces the lasting effects observed.

Future research could fruitfully focus on both mnemonic and affective mechanisms underlying the impact of the positive events diary. In the former case, a relationship between self-reported happiness and a positive emotional memory bias would be predicted. In the latter case, positive:negative emotion ratios should mediate the impact of the diary intervention. Finally, the diaries themselves likely contain insight into how the intervention produces its effects. Therefore, a qualitative analysis of diary entries using, say, thematic analysis would provide a rich addendum to the quantitative effects observed in the current studies. Notwithstanding the underlying mechanisms, it would also be of value to explore ways to further optimise the diary intervention, perhaps by providing a directive steer as to the types of event to record, particularly in relation to different 'happiness' segments of the population.

### ***Educational implications***

This paper adds to the positive psychology literature in a number of ways. It is the first to adapt and implement the positive thinking diary with a primary school population, and the first to examine baseline well-being as a moderating factor when investigating the efficacy of the diary with children. The first study also included a large sample size, recruited from a range of schools across North Wales, instilling confidence that the results from the sample are representative and generalisable. A smaller cohort with a matched control group provided a replication of

the positive well-being effect of the diary. Furthermore, the intervention had good ecological validity due to the methods used: the diaries were easy to produce and very simple to follow; teachers were given instruction and administered the diary study during school hours, so that no extra input from the researchers was necessary; and the diary intervention was conducted in a classroom teaching setting as part of the usual teaching schedule. Crucially, the current study supports the wisdom that PPIs are not universally applicable and that interventions tailored to the well-being needs of specific children will be more effective.

A number of recent publications have documented longer term curricular-based programmes of positive psychology and their impact on well-being (Kleinman, Asselin, Henriques, & Others, 2014; Seligman, Ernst, Gillham, Reivich, & Linkins, 2009; Shoshani & Steinmetz, 2014). These have demonstrated lasting positive effects of such interventions on children's well-being. The current study can be distinguished from these with respect to the focus on a light-touch short-term initiative that nevertheless produces lasting impact. Schools are under pressure to include increasing elements into their curricula, and the potential value of the current work is in the nature and impact of this small-scale cost-effective teacher-led intervention.

Previous research has shown that positive emotions contribute to educational outcomes. For example, children in happy moods are more likely to invest effort in assigned tasks and overcome obstacles to achieve academic goals (Haase, Poulin, & Heckhausen, 2012; Hom & Arbuckle, 1988), to engage more in classroom activities (Terjesen, Jacofsky, Froh, & DiGiuseppe, 2004) and be less stressed at school (Natvig, Albrektsen, & Qvarnström, 2003). More broadly, Adi, Killoran, Schrader McMillan, and Stewart-Brown (2007) reported the long-term impact of positive mental health in childhood in relation to educational achievements and occupational successes. The link between well-being and performance requires further study and it has yet to be shown whether a light-touch PPI such as this diary intervention can produce a sustained impact upon student motivation and learning outcomes.

## Conclusions

The positive thinking diary exercise is an effective intervention in enhancing subjective well-being in typically developing children. Furthermore, the finding that it may reduce happiness for the top-scoring children suggests it should only be used as a targeted intervention for those with lower baseline well-being scores. The exercise will have broad appeal to innovators in mass education because of its ease of implementation: an agile, light-touch

intervention, foreseeably delivered via smartphone-enabled technology as an 'app'. Further work is required to determine how the diary intervention works at a psychological level and to what extent it can be used as a tool to promote resilience during a formative period in a child's life.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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