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# DOCTOR OF PHILOSOPHY

# Effecting Well-being Improvements in Educational Settings with Positive Psychology Interventions

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# Effecting Well-being Improvements in Educational Settings with **Positive Psychology Interventions**

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December 2021

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Rwy'n cadarnhau fy mod yn cyflwyno'r gwaith hwn gyda chytundeb fy Ngoruchwyliwr (Goruchwylwyr).

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Doing a PhD is hard.

That's what everyone said. I thought, how hard can it be? Very, it turns out. Little did I know how much I'd have to draw on my own subject matter to endure it. But, I have been blessed not to have to do it on my own. I must acknowledge the invaluable contribution to this project by some remarkable people. It is the culmination of a communal effort – *ubuntu*, it is called in South Africa:

"the profound sense that we are human only through the humanity of others; that if we are to accomplish anything in this world, it will in equal measure be due to the work and achievements of others"

— Nelson Mandela

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#### Thesis Abstract

Optimal mental health is a global and increasingly pressing issue. Major events in recent times, such as the effects of global warming and the Covid-19 pandemic, have had undeniable negative effects on people's well-being. The mental health of young people is of particular importance: strategies to deal with adversity are learned and developed at this stage of life. Success aids the likelihood of being a lifelong resilient and hopefully flourishing individual, whereas difficulty may leave an individual vulnerable to slipping into persistent mental ill health. Given this, there seems an obvious and necessary role for educational institutions in promoting such strategies and thus improving the wellbeing of students. Positive psychology has a valuable contribution to make in this regard, as achieving optimal mental health is perhaps its primary purpose, and positive psychology interventions (PPIs) are broad-based and cost-effective to implement when compared with more traditional clinical approaches. They are also technology friendly, meaning they may be disbursed widely. The research in this thesis explores the use of several PPIs in school and university settings with the aim of building significant and lasting well-being improvements for young people. It works to find the most effective interventions and to understand what makes them so. Finally, it seeks to create real-world value by considering how such interventions may be designed and implemented in an educational context. The thesis comprises four studies. The first study used a positive diary exercise in a sample of primary school children. The exercise resulted in a significant increase in happiness and reduction in depressive symptoms during and up to three months after the intervention. A tertile split revealed interestingly different response profiles for participants depending on baseline well-

being. A similar intervention in the second study found significant associated improvements in academic performance. The third study applied two PPIs in samples of undergraduates. The first part also used the diary exercise, which found there to be less convincing evidence of its effectiveness when compared with the first two studies. The second part used a signature strengths intervention, which resulted in marked and sustained improvements in self-esteem and life satisfaction. This study highlighted the differing outcomes that different interventions may have, particularly across age groups. It also raised questions as to why certain well-being markers improve more or last longer than others, suggesting that an individual's sense of autonomy or control may be a factor. These questions shaped the fourth study, which was more exploratory. It used a novel exercise-framed PPI to determine whether a sense of control, as measured by judgments of contingency, is linked with well-being, and whether positively manipulating such judgments might lead to improvements thereof. The complexity of the experimental paradigm meant that findings were inconclusive in this regard, but it opened the door to future work that might be able to distil more robust effects. Overall, this thesis finds that PPIs demonstrate huge promise for mental health improvements and that they are a feasible option for incorporation into an educational curriculum. However, it seems they are not universal aids and careful consideration needs to be given to the type of intervention used and who the target recipients are. Age and baseline well-being are two important factors, for example. If properly implemented, PPIs could be valuable tools to build resilience and enable young people to flourish now and through the rest of their lives.

This work investigated the effects on well-being, cognition and achievement of different positive psychology interventions (PPIs) in a variety of educational contexts. It comprises four studies, with the following basic outlines:

- Study 1 Evaluate the impact of a positive events diary intervention on the wellbeing of primary school children. [Research published.]
- Study 2 Evaluate the impact of a positive events diary intervention on the academic performance and well-being of primary school children.
- Study 3 Evaluate the impact of a positive events diary intervention and a signature strengths intervention on the well-being of higher education students.
- Study 4 Determine the role of perceived control on the well-being of higher education students.

Determining which PPIs are effective and the key factors that underlie their effects is important, as it facilitates the design of robust programmes that lead to meaningful and lasting well-being improvements in students. Such programmes could then potentially be rolled out in educational institutions, so changing the course of young people's lives for the better. The results of preliminary examples of such mass PPI applications are promising. For example, a longitudinal study on 347 Year 9 students in the US embedded a PPI in the school curriculum (Seligman et al., 2009). When compared with a control group, these students demonstrated greater enjoyment and engagement; more curiosity, love of learning and creativity; and an improvement in social skills. The work in this thesis was largely inspired by findings such as this, which suggest a new way of looking at well-being and mental health: that one could proactively improve well-being through engagement with certain mental and emotional exercises. This in contrast to the historical (medical) model of targeting interventions at the point of illness or distress.

#### Well-being

Fundamental to human nature is the search for meaning. In our lives we strive to find a purpose, and progress towards this gives us a sense of satisfaction. At the heart of this is the core belief in our own agency – the ability to effect change or to influence our environment. Whether designing an architectural masterpiece, passing a school exam or winning a sports match, it feels good to create impact and to have a sense of efficacy over the outcome. The field of positive psychology is largely devoted to helping people achieve this sense of satisfaction and happiness. This is more than just mental health, it is about functioning optimally and, better yet, thriving. But what exactly does this mean and how do we know when it has been achieved? In psychology, there are a variety of concepts used in relation to the idea of optimal function and thriving. Examples include life satisfaction, happiness, selfesteem, (the absence of) depression, flourishing and positive and negative affect. These terms are used frequently as indicators of good psychological function, and sometimes exclusively so. For the purposes of simplicity, in this work, the term wellbeing is used as an umbrella concept that describes generally a person's degree of psychological thriving, captured by the concepts identified above. At an operational level, the empirical work in this thesis used a selection of self-report tools as measures for well-being. These included metrics for happiness, satisfaction with life, and resilience, for example, which will be described in detail later. This approach acknowledges the need for multiple information sources when assessing overall psychological health. Its measure is therefore considered here to be the collective contribution of a constellation of psychological markers. (Where a particular term is intended specifically, this is made clear.) There is evidence to suggest that this understanding of well-being is justified. Over the years there has been some convergence on the key factors that underpin it: happiness, satisfaction with life and positive and negative affect (Arthaud-day et al., 2005; Diener, 1984; Lucas et al., 1996). It is therefore assumed that demonstrated improvements in measures of any of these constructs indicates an improvement in well-being.

Why is well-being important? Apart from simply 'feeling good', there is evidence that well-being has a reciprocal link with several positive life goals. Reflecting on his impressive career devoted to the subject, Seligman (2019) is unequivocal that happiness *causes* (as well as being a consequence of) many desirable outcomes. There is sound evidence to support this assertion for achieving fulfilling relationships (Diener, Heintzelman, et al., 2017; Lyubomirsky, King, et al., 2005; Oishi, 2007); a successful career (De Neve et al., 2013; Diener, Heintzelman, et al., 2017; Lyubomirsky, King, et al., 2005; Tenney et al., 2016); and good health and longevity (Danner et al., 2001; Diener, Pressman, et al., 2017; Diener & Chan, 2011; Lyubomirsky, King, et al., 2005; Pressman & Cohen, 2005). It is clear then that well-being is of fundamental importance, and that being able to improve it would be hugely beneficial.

#### Positive Psychology

Well-being is core to the field of positive psychology. Positive psychology is a relatively young branch of psychology. It has been described as the "science of positive subjective experience, positive individual traits and positive institutions" (Csikszentmihalyi & Seligman, 2000, p. 5). It is thus primarily concerned with cultivating and promoting the wholesome aspects of human nature, rather than seeking weaknesses or failings to mend. One of the most significant contributions to the positive psychology framework has been the broaden-and-build theory (Fredrickson, 2001, 2004). This theory explains the role and value of positive emotions, maintaining that they are adaptations that have evolved in order to build lasting resources (Cohn et al., 2009). As an illustration of this, a wide-ranging study showed that most people had above neutral affect but not life satisfaction (Diener et al., 2018). It has been posited that there is a degree of positive cognitive bias in such ratings (Cummins & Nistico, 2002), which acts as a sort of homeostatic protection against negative thoughts in order to maintain self-esteem, control and optimism (Cummins, 2003; Cummins & Nistico, 2002; Tomyn & Cummins, 2011). This adaptive bias is referred to as a "positivity offset" and is believed to underlie the evolutionary function of approach, or curiosity, in our environment. Positive emotions

generate unique and open thoughts and actions in situations that are not immediately threatening. In time, such experiences accumulate to become life changing. For example, curiosity may lead to expertise, and affection may lead to a lifelong relationship. Positive emotions thus broaden our thought–action repertoires (Ashby et al., 1999). By contrast, negative emotions serve to narrow attention, cognition and physiological responses in order to cope with threats (Carver, 2003; Cosmides & Tooby, 2000).

The World Health Organisation (2006, p. 1) defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". Positive psychology aligns well with this holistic approach. It stands in contrast with more traditional approaches that have prioritised the absence of mental illness, which focus on treatment as opposed to prevention of ill health (Bolier et al., 2013). It is important to note that this does not negate the role and value of therapeutic approaches. There are many people for whom such interventions are extremely valuable. But, given the definition of health above, one must question the proportion of the population who stand to benefit from such approaches. It is estimated that around one in ten people globally fit the criteria for a mental illness diagnosis (Dattani et al., 2021). In a widely-cited article on subjective well-being, it was found that across the globe most people reported being happy (Diener & Diener, 1996). But, as Biswas-Diner et al. explain, "the fact that most people tend to be moderately happy does not mean they are ecstatic" (2005, p. 205). Only a small proportion of people have flourishing mental health - fewer than 20% in the US, in fact (Keyes, 2002). Thus, up to 70% of the population can be classified as having moderate mental health or as "languishing". Fredrickson (2008, p. 451) notes that those who languish may describe themselves as being "stuck in a rut" or "yearning for more". It is this group of people that is moderately psychologically healthy or even potentially on the cusp of ill-health – by far the majority - that is of particular interest to positive psychologists.



#### Psychological resources

Figure 1. The mental health continuum. (Huppert, 2009, p. 153)

Well-being is crucial to this group. By improving their well-being not only can we help to make them feel better, we can also assist in building resources to futureproof themselves against life's challenges to their mental health i.e. build their resilience. For those at risk of slipping into mental ill health but still functional, intervening to prevent a downward trajectory or, better still, to enable flourishing, would make tremendous impact on global public health. The broad aim of positive psychologists is thus to decrease the number of people who languish and increase the number who flourish (Keyes, 2002). In so doing the mental health continuum is shifted to the right, towards better mental health for all (Figure 1). Martin Seligman, the father of positive psychology, boldly claims that 51% of the world's population will be flourishing by 2051 (Seligman, 2012).

#### Positive Psychology Interventions

Positive psychology interventions (PPIs) are the principal means by which positive psychology is actioned in the population. Sin and Lyubomirsky (2009, p. 469) define them as being "aimed at increasing positive feelings, positive behaviours, or positive cognitions as opposed to ameliorating pathology or fixing negative thoughts of maladaptive behaviour patterns". Given that the target for such interventions is a large proportion of the population (as outlined above), they are by necessity

relatively inexpensive and easier to deliver than traditional therapeutic interventions such as psychotherapy. They often take the form of simple and accessible exercises that may be self-administered, requiring little or no financial resources (Layous et al., 2014; Lyubomirsky & Layous, 2013). It is therefore a major consideration that such interventions be 'light touch', mainly to facilitate widespread dissemination and to reduce the need for skilled practitioner involvement. Such an approach knits well with modern society – the ubiquitous use of technology means that PPIs can be web-based (for example, the Happify platform (*Happify*, 2021)) or even distributed as an app (for example, ThinkUp (*ThinkUp*, 2018)).

A variety of PPIs have been developed over the years. What links them is the principle that intentional activities can improve an individual's happiness (Layous et al., 2014; Schueller & Parks, 2014; Sin & Lyubomirsky, 2009). These interventions can broadly be assigned to one of five categories, according to Schueller and Parks (2014): (1) savouring, (2) gratitude, (3) acts of kindness, (4) positive relationship processes, and (5) hope and meaning. They acknowledge a sixth category – strengths – but explain it would be included only if the intervention goes beyond simply identifying strengths, in keeping with the idea of 'intentional activity'. Savouring encourages strengthening and prolonging enjoyable experiences (Peterson, 2006). One such intervention utilises "mindful photography", an exercise in which participants are asked to spend 15 minutes taking photographs that are meaningful to them, and using these to recall pleasant aspects of their environment (Kurtz & Lyubomirsky, 2013). Gratitude interventions target the emotional response that develops from acknowledging an external force has caused something good to happen to you (Schueller & Parks, 2014). This response may be evoked through personal reflection (such as journaling) or through gratitude-motivated behaviours (such as expressing thanks). Kindness interventions encourage participants to do good things for others. For example, one intervention carried out during the Covid-19 pandemic asked people to perform five everyday acts of kindness (such as greeting a neighbour warmly or complimenting a close friend) in 24 hours (Bialobrzeska et al., 2020). Positive social process interventions promote social

behaviour, encouraging both increased social contact and improving the quality of existing relationships. Interventions for hope and meaning aim to promote meaning in life, often through a creative or expressive form. Typically, this would be a creative writing exercise, which would provide a sense of meaning through expression, or increase a sense of hope through the formulation of personal goals. Finally, strengths interventions. These are based on first identifying an individual's core character strengths from a list of 24, as conceived by Peterson and Seligman (2004), and then practising one or more of these strengths for a period of time.

It is important to point out that the practice of using PPIs to improve wellbeing has been largely atheoretical. There is little explanation for the mechanism by which well-being is improved (Schueller & Parks, 2014). This is probably due in part to the field being in relative infancy. But it is developing. Fredrickson's (2001, 2004) broaden-and-build theory, for example, provides a sound theoretical framework and justification for increasing levels of happiness and the myriad of benefits that accompany it (Fredrickson et al., 2008).

There is clear evidence that PPIs are effective. Of a number of metaanalyses to demonstrate this (see Bolier et al., 2013; Sin & Lyubomirsky, 2009), perhaps most convincing is a recent analysis by Carr et al. (2021). In a review of 347 studies, they found significant overall effects on well-being (g = 0.39), strengths (g = 0.46), quality of life (g = 0.48), depression (g = -0.39), anxiety (g = -0.62) and stress (g = -0.58). These benefits were still evident after three months.

#### Positive Psychology Interventions in Educational Settings

There are several reasons why PPIs may have particular value when applied in educational settings. From a purely practical perspective, schools and higher education institutions host a comprehensive cross-section of the young population. With a target group of around 70% of the population this suits the broad-based focus of PPIs. Such settings are also equipped for dissemination of programmes or initiatives by their very nature, so roll-out of interventions could be done as a matter of course or even integrated into existing learning programmes. There are already several examples of this. Seligman et al. (2009) tested the Strathaven Positive

Psychology Program with 347 Year 9 students, resulting in lasting improvements like greater enjoyment and engagement. Madden, Green and Grant (2011) used a strengths-based intervention in an Australian school as part of the school curriculum for Grade 5s. On follow-up, students reported increased hope and engagement. The UK Resiliency Programme trialled the Penn Resiliency Programme (Brunwasser et al., 2009) in 22 secondary schools in England, noting a small but significant reduction in depression scores (Challen et al., 2014). Another intervention using signature strengths and journaling with 527 high school students found that the experimental group had significantly higher academic expectations, efficacy, self-empowerment, extrinsic motivation and perceptions of ability at post-test (Austin, 2005). Recent and ongoing work in the UK, such as the Hummingbird Project (Platt et al., 2020), is also showing promise around the well-being benefit of PPIs in secondary school settings. And, in higher education, an online best possible self PPI with Chinese university students was found to reduce depressive symptoms and improve well-being (Auyeung & Mo, 2019).

Another compelling reason for educational-based PPIs relates to the broaden-and-build theoretical framework. Fundamental to this framework is the idea of *building*. Improving well-being leads to greater personal resources (such as creativity, resilience or openness), which in turn leads to behaviours that improve well-being (Fredrickson, 2001). Thus a positive feedback loop may be created to generate an upward spiral of positive cognitive appraisal, emotions and even life circumstances (Schueller & Parks, 2014). The broaden-and build mechanism needs therefore to be *learnt*. Given that teaching and learning is the core function of educational institutions, it is obvious that they would provide an environment well-suited to facilitating this.

The studies in this thesis build on the work cited above. PPIs were chosen for their promise in supporting (lasting) changes in well-being. As this research was exploratory in terms of applying it to an educational setting, the goal was to deliver PPIs in several different educational developmental settings to assess their efficacy. The hope was to identify whether a PPI was effective in increasing well-being in a

particular educational group and, in some cases, establishing what drove the effect. In one study, two different PPIs were tested to consider which might best serve that population. Finally, a new PPI was also piloted with a specific focus on perceptions of control and efficacy. This work has been conducted over several years and the first study was published in 2018.

# CHAPTER 2 Positive Events Diary in Schools: Impact on Wellbeing and Academic Performance

#### Abstract

In a positive psychology intervention (PPI), a positive events diary was used to explore effects on standard measures of well-being (happiness, depression, self-esteem and resilience). Having previously been shown to be effective in this regard (e.g. Carter et al., 2018) this study extended previous work to look at the effect of such PPIs on academic performance (standardised numeracy and literacy scores). Results for the psychological measures were inconclusive, possibly due to baseline differences in the sample, and high baseline depression scores; however, the intervention group showed significantly better improvement in academic scores when compared with the control group. Since this outcome did not mirror changes in well-being there was no evidence to suggest a link between well-being and academic performance; nonetheless, given the observed trends, further study in this regard is warranted.

*Keywords*: positive psychology; positive thinking; resilience; well-being; positive psychology intervention; PPI; children; education; attribution; academic performance

The well-being of children is an important global issue. Research shows that a child's emotional health is the single best predictor of adult life satisfaction (Coffey et al., 2015; Layard et al., 2014). Furthermore, well-being in adults appears to be better explained by childhood well-being and early social connections than by academic competence, for example (Layard et al., 2014; Olsson et al., 2013). Children's mental health has now become the focus of many organisational initiatives worldwide. In the UK, for example, the Children and Young Persons Act (2008) established the promotion of child well-being as a 'general duty' of the state. It was followed by the launch of the Targeting Mental Health and Well-being in Schools (TaMHS) programme between 2008 and 2011 (Department for Children & Families, 2008). This was a coordinated attempt at government level to provide an integrated and evidence-based strategy for schools to follow for mental health interventions. Schools provide an advantage over clinics for access to a captive audience as provision of basic education is compulsory, whereas clinical access is either voluntary or recommended by clinician. They also enable a preventative approach, rather than reacting to mental ill health through clinical provision, which focuses on helping those with established mental health needs.

There is convincing evidence to show that children's well-being can be improved by means of PPIs, relatively easily, both in the short term and with lasting effects (e.g. Carter et al., 2018; Green & Norrish, 2013; Parkinson et al., 2011; Seligman et al., 2009b; Waters, 2011, 2020). This makes them obvious candidates for any coordinated school-based programme, as demonstrated by successful attempts both in the US using the Penn Resilience Programme (Brunwasser et al., 2009), and recently in the UK as the UK Resilience Programme (UKRP) (Bailey & Challen, 2012; Challen et al., 2009, 2011, 2014). Furthermore, if school-based PPI interventions are successful at improving well-being and reducing depressive symptoms, it is natural to wonder whether there may be other associative or causative benefits of doing so. One such consideration is academic performance: it seems intuitive that optimal mental health would facilitate the realisation of academic potential. Initial work in this area suggested that the link was not that clear, with life

satisfaction, for example, not strongly associated with school grades (Huebner, 1991; Huebner & Alderman, 1993) – although life satisfaction itself has proven relatively immune to PPIs (Challen et al., 2011). Subsequent research, however, contradicts these earlier findings (Gilman & Huebner, 2006; Verkuyten & Thijs, 2002). Gilman & Huebner's (2006) study, for example, found that adolescents with a high life satisfaction had significantly higher GPAs than did those with low satisfaction. In a study by Quinn and Duckworth (2007), the researchers found not only a relationship between happiness and academic achievement, but went on to suggest that the relationship may actually be reciprocally causal – independent of IQ, age or previous grades. If PPIs were indeed able to simultaneously improve wellbeing and academic performance, then there would be a persuasive argument to integrate them into regular school curricula as a matter of course.

The study in this chapter set out to determine whether a PPI could enhance academic performance. Its initial aim was confirmatory: whether a 'positive events diary' intervention could improve various measures of well-being in children; and, second, it aimed to determine whether such an intervention would lead to improved academic performance. Finally, it looked to establish whether there was an association between changes in well-being markers and academic progress.

The hypothesis was that a positive thinking diary intervention would (a) positively impact well-being measures and (b) improve academic performance, and that (c) there would be a positive correlation between changes in well-being and academic progress. More specifically, it was anticipated that the positive thinking intervention would result in the following effects:

- a significant increase in self-esteem and resilience in the experimental group when compared with the control group;
- 2. an increase in the academic performance scores of the experimental group when compared with the control group; and
- a positive relationship between change in happiness scores and change in academic performance scores across the cohort.

#### Method

### Participants

Participants were 72 primary school children in Years 5 and 6, aged between 9 and 11 (M = 9.81, SD = 0.65), with an almost even gender ratio (37 male, 35 female). They were recruited from three primary schools in Gwynedd, North Wales with the assistance of an area educational psychologist.

Researchers met with the teachers to assess interest and give further information about the study (Appendix B). Teachers who agreed to facilitate the intervention distributed information sheets and consent forms to the parents of potential participants (Appendix C). Only children with informed parental consent were permitted to partake in the study.

Since similar interventions had previously shown positive effects (Carter et al., 2018) this study was considered low-risk. All researchers underwent a Criminal Records Bureau (CRB) check before working with the children. All scores were anonymised, and due care was taken to ensure confidentiality of personally identifiable information.

This study was approved by Bangor University's School of Psychology Research Ethics Committee.

#### Materials

Experimental Group: Positive Events Diary. The experimental group used booklets identical to those used in Carter et al. (2018) from Chapter 1. In addition, the booklets were bilingual (Welsh/English) to promote accessibility.

**Control Group: Any Three Things Diary**. This diary differed from the positive events diary only in that the front cover had a line drawing of a diary and the boxes printed within the booklet were labelled Thing 1, Thing 2 and Thing 3.

#### Design

A simple mixed design was used. The between-subjects variable was group (control or intervention), and the dependent variables were psychological measures of

happiness, depression, self-esteem and resilience, as well as academic performance in English and Mathematics. Repeated measures of these withinsubjects psychological factors were made at pre-intervention (baseline), postintervention and follow-up. Academic measures were taken at baseline and postintervention.

Given the expected benefit to the children of partaking in the treatment condition, a wait list comparison was used, so that all participants could experience the intervention.

#### Measures

Some measures used in this study have been previously outlined, including the Faces Scale, the adapted Oxford Happiness Questionnaire (OHQ) – Short Form, and the shortened Center for Epidemiological Studies Depression Children's Scale (CES-DC).

Burnett Self-Scale (BSS), Self-Esteem. The Global Self-Esteem subscale of this measure is an eight-item test designed to assess children's feelings of selfworth (Burnett, 1994). Participants choose, on a five-point incremental scale, the statement that they feel best describes them. For example, from "I really feel good about myself" to "I really do not feel good about myself". The sub-scale has demonstrated good reliability and validity (Burnett, 1994, 1996).

Resilience Scale. This scale is devised by Parkinson et al. (2011), and is based on the Resilience Scales for Children and Adolescents (Prince-Embury, 2008). It consists of nine self-report items, formed of three conceptually related subscales: optimism, problem-solving and emotional reactivity. Participants respond on a three-point Likert scale from "Extremely true" to "Not true at all".

Academic Performance. To monitor the children's academic performance, standardised scores of literacy and numeracy were obtained from the participating schools. Names were coded to maintain confidentiality.

#### Procedure

Researchers followed the same procedure as outlined in Chapter 1 (p. 23), with some minor differences. Children completed the questionnaires in the following order: Faces Scale, OHQ, CES-DC, BSS, and Resilience Scale. Also, follow up occurred after two months (not three).

### Results

Psychological measures of happiness, depression, self-esteem and resilience were collected at three time points: pre-intervention, post-intervention and two-month follow up for both control and experimental groups. A higher score on each scale indicates a higher level of that psychological characteristic. Descriptive statistics for each measure are given in Table 4.

Numeracy and literacy scores were collected at two time points across the academic year, with the intervention planned so as to fall within this time window. Data for the control group were drawn from two different schools, one for numeracy and the other for literacy, due to the practicalities of working around the schools' timings. It is important to note that the literacy scores for the control group were provided in a different format from all others and, although standardised, used a different scaling. Between groups comparison of literacy scores thus needed to be treated with caution.

All baseline measures for both groups were compared using independent *t*tests to check similarity of means (see Table 4). Results indicated similar baseline scores for control and experimental groups for all psychological measures except the Resilience Scale, for which the control group scored significantly higher.

### Table 4

N = 72		Mean (SD)		t
N = 72		Control	Experimental	
Emotional Happiness	Baseline	2.00 (1.09)	1.58 (0.67)	-1.89 (69)
(races scale)	Post	1.77 (0.96)	1.84 (1.24)	
	Follow up	1.87 (0.92)	1.67 (0.88)	
Subjective Happiness	Baseline	24.51 (3.44)	25.25 (3.53)	0.87 (67)
	Post	25.18 (6.50)	25.37 (3.88)	
	Follow up	24.03 (3.94)	25.92 (2.69)	
Depression	Baseline	21.87 (5.87)	23.37 (4.60)	1.15 (67)
(CES-DC)	Post	22.78 (6.38)	24.23 (3.88)	
	Follow up	23.87 (5.14)	23.69 (3.84)	
Self-esteem	Baseline	15.44 (4.46)	14.87 (6.16)	-0.46 (69)
(653)	Post	15.18 (5.62)	12.90 (5.20)	
	Follow up	15.11 (4.99)	11.19 (2.50)	
Resilience	Baseline	22.29 (4.71)	19.47 (5.41)	-2.34* (69)
(Resilience Scale)	Post	23.01 (5.53)	18.57 (4.94)	
	Follow up	21.64 (6.23)	18.69 (4.52)	
Numeracy	Baseline	23.41 (5.24)	28.93 (6.50)	2.99** (45)
(Mathematics)	Post	24.41 (5.97)	39.03 (8.58)	
Literacy	Baseline	98.38 (14.37)	44.32 (3.51)	-20.08*** (47)†
(⊏ngiisn)	Post	99.00 (14.49)	48.23 (4.05)	

#### Descriptive statistics and comparison of baseline scores for each group

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

†Equal variances not assumed. \*p < .05 \*\*p < .01 \*\*\*p < .001

For the academic scores, as expected, baseline literacy scores were extremely different. Numeracy scores also exhibited a significant baseline difference. Baseline

score was thus included as a covariate for resilience results and academic performance data in subsequent analysis.<sup>1</sup>

Figure 4 to Figure 10 illustrate the descriptive statistics from Table 4, including confidence intervals (SEM).

Preliminary analysis focused on testing for outliers and normality. Several outliers ( $\geq 1.5 \times IQR$  from the edge of the box on a boxplot) were identified but were not deemed sufficiently different to be excluded from the analysis (see Appendix E). Tests of normality suggested deviation to some extent for all psychological measures (see Appendix F). Because these tests can be overly sensitive (Field, 2009), Q–Q plots were used for visual confirmation (see Appendix G). These plots indicated that the data sufficiently followed a normal distribution, so parametric analysis was pursued. Further tests were performed on the resilience data to determine suitability for mixed ANCOVA. The covariate (baseline score) exhibited a linear relationship with the dependent variable (resilience score) at each level of the independent variables (time and group), as determined by grouped scatterplots with lines of best fit (see Appendix H). However, the assumption of homogeneity of regression slopes was violated, as the interaction term (group × baseline scores) was significant [*F*(1, 53) = 5.05,  $\rho < .05$ ,  $\eta_p^2 = .052$ ]. Thus, analysis of resilience scores was discontinued.

Results for each of the other psychological measures were subjected to a  $2 \times 3$  mixed ANOVA, with group (experimental or control) as the between subjects variable and time (baseline, post-intervention and follow-up) as the within subjects variable.

<sup>&</sup>lt;sup>1</sup> Broadly, two different statistical methods may be used to adjust for baseline data differences. (Other methods discount the differences.) One of these analyses results with reference to baseline, in other words, difference scores (known as 'change-score' analysis). The second method includes baseline scores as a covariate (ANCOVA). Opinions are divided as to the best approach (Oakes & Feldman, 2001), but it appears that the change-score method is most problematic (e.g. Cronbach & Furby, 1970), mainly because it is susceptible to regression to the mean – the tendency for lower scores to improve more over time than higher ones (Vickers & Altman, 2001). It does not, therefore, control for baseline differences. The ANCOVA method, on the other hand, adjusts each follow-up score for the corresponding baseline score and is not susceptible to baseline differences or regression to the mean. The ANCOVA method is thus adopted in this study.



*Figure 4.* Mean Faces Scale (emotional happiness) scores for each group across the three measure stages. (Error bars represent the standard error of the mean, *SEM*.)







*Figure 6.* Mean CES-DC (depression) scores for each group across the three measure stages. (Error bars represent the standard error of the mean, *SEM*.)



*Figure 7.* Mean Burnett Scale (self-esteem) scores for each group across the three measure stages. (Error bars represent the standard error of the mean, *SEM.*)


*Figure 8.* Mean Resilience Scale scores for each group across the three measure stages. (Error bars represent the standard error of the mean, *SEM.*)

Self-esteem demonstrated a significant, but weak, (Huynh–Feldt corrected) group × time interaction effect [*F*(1.77, 107.77) = 3.34,  $\rho$  < .05,  $\eta_p^2$  = .052]. Repeated measures ANOVAs revealed a significant simple effect of time for the experimental group, with self-esteem decreasing across the study. Post-hoc comparisons showed this decrease was between baseline and post-test [*F*(1, 25) = 5.22,  $\rho$  = .031,  $\eta_p^2$  = .173] and between baseline and follow-up [*F*(1, 25) = 5.62,  $\rho$  = .026,  $\eta_p^2$  = .183] (see Figure 7). This was against the direction hypothesised. In contrast there were no significant differences in the control group (*F* < 1). One-way ANOVAs for group revealed a significant difference between groups at follow-up, with the experimental group scoring lower than the control group (*M* = -3.91, *SE* = 1.06,  $\rho$  < .001). However, Box's test of equality of covariant matrices indicated that covariances were not homogenous ( $\rho$  < .001), so between groups differences should be interpreted with caution.

None of the other psychological measures exhibited significant group  $\times$  time interaction effects.

A main effect of group was evident for the OHQ scores [F(1, 57) = 4.02, p = .05,  $\eta_p^2 = .066$ ] (see Figure 5). Pairwise comparison revealed a marginally significant higher mean for the experimental group (M = 1.56, SE = .78, p = .05).

There was no main effect of time for any of the measures, but several trends were noted.

- Happiness scores on both the Faces Scale and the OHQ were higher than baseline at both post-intervention and follow up for the experimental group (see Figure 4 and Figure 5). This trend was in the direction hypothesised. By contrast, scores decreased from baseline to follow-up for the control group.
- A Spearman's rank correlation analysis of the Faces Scale and OHQ data confirmed a positive relationship between the two measures [r(199) = .313, p < .001].</li>
- Unexpectedly, depression scores increased from baseline for both control and experimental groups. Whilst the scores returned to approximately baseline levels for the experimental group, the control group showed a further increase (see Figure 6).
- Resilience scores remained relatively stable for both groups, though there was a small decrease from baseline to follow-up (see Figure 8).

For the academic data, both groups showed an improvement in academic results (as would be expected for the normal course of a school year, see Figure 9 and Figure 10). The experimental group exhibited a significantly greater improvement in both cases.



*Figure 9.* Standardised numeracy scores for each group across pre- and post-test. (Error bars represent the standard error of the mean, *SEM*.)



*Figure 10.* Standardised literacy scores for each group across pre- and post-test. (Error bars represent the standard error of the mean, *SEM*.)

Preliminary tests on the suitability of the academic data showed linear relationships between the covariate (baseline scores) and the dependent variable (final scores) at each level of the independent variable (group) for both literacy and numeracy, as determined by grouped scatterplots with lines of best fit (see Appendix H). The measures also demonstrated homogeneity of regression. The academic performance data were thus subjected to a one-way ANCOVA, with group (experimental or control) as the between subjects variable and baseline score as the covariate. Results showed that scores for the experimental group were significantly higher than control for both numeracy (M = 9.71, SE = 1.72, p < .001) and literacy (M = 18.26, SE = 8.03, p < .05), even when controlling for baseline score scores. Furthermore, Bonferroni-corrected paired samples *F*tests for each group showed a significant increase in scores over time for the experimental group only, in both numeracy [t(46) = 7.16, p < .001] and literacy [t(29) = 4.74, p < .001].

Finally, correlational analysis of change in OHQ scores and change in numeracy scores was not significant, indicating no obvious relationship between the two.

#### Discussion

A positive events diary intervention for primary school children yielded mixed results. Measures of both emotional and subjective happiness trended upwards in the hypothesised direction for the experimental group at both post-intervention and two-month follow-up. This was in contrast with the control group, which exhibited a marginal drop on both scales overall.

Results from the depression measure showed a similar pattern. Scores increased for both the experimental group (against the direction hypothesised) and the control group between baseline and follow-up, but more so for the control group. In other words, children appeared to show greater negative symptomology over the course of the study, but those in the experimental group tended to fare better. Taken together, these results suggest that the PPI was effective in supporting well-being in

school children in what appears to have been a challenging period of the school year.

For the data gathered on academic performance, a highly significant improvement in literacy and numeracy scores was detected in the experimental group. The control group did not exhibit a significant improvement. This suggests that academic performance has tracked the higher well-being measures of the experimental group in comparison with the control group, in line with what was hypothesised.

At first sight it seems that PPIs applied in a school population may not only aid well-being, they may also lead to improved academic performance. However, there are some considerations to be mindful of. First, all of the well-being changes were trends and not significant findings. This may be due, in part, to a relatively small final sample size, which would have affected the study's power. Furthermore, both groups showed an overall drop in several of the well-being measures over the course of the study (resilience, self-esteem and depression). Given that both groups were affected, it is possible that an environmental factor negatively impacted the happiness of the whole cohort. For example, the timing of the study may have influenced the results. Demands on schoolchildren change over the course of the academic year (for example, the difference between normal school timetable and exam periods), which likely causes fluctuating levels of stress. Seasonal changes may also have played a role. Such stressors could have diluted the effectiveness of the intervention. If this were the case, the intervention appears to have at least ameliorated harm.

An interesting feature is the different response profile for the happiness measures when compared with the other measures of well-being. It seems this may not be atypical. For example, it has previously been shown that depression may be less responsive to PPIs then happiness (Mongrain & Anselmo-Matthews, 2012). But evidence is mixed, as other studies have found both to be responsive (e.g. M. L. Peters et al., 2017). With reference to depression, the sample in this study had broadly elevated scores on the CES-DC (all  $\bar{X} > 20$ ), well above the cut-off of 15 for

"a case of depression" (Weissman et al., 1980, p. 739). Since, broadly speaking, PPIs are intended to be light-touch preventative interventions for non-clinical populations, the sample characteristics in this study may thus have diluted the effectiveness of the PPI. For happiness, a concept that is more state-like in nature, it is perhaps more responsive to PPIs. This state/trait distinction may also apply to the outcome for resilience. The children's resilience scores appeared relatively immune to the intervention, and overall. Though PPIs have previously been demonstrated to improve resilience (Han & Cho, 2017), it is possible that the PPI in this study was not powerful enough to drive a change in resilience. Given that resilience is more traitlike, it is possible that a light-touch PPI may only have transient effects on resilience and more obvious changes would only be obtained from a sustained intervention.

Another surprising result was the drop in self-esteem for the whole cohort. This may, in part, be explained by the argument above, but it is notable that the drop was significantly more pronounced in the experimental group. A contributing factor may be one raised by Carter et al. (2018), with reference to an unexpected drop in well-being measures for a subset of the participants. In that study, a tertile split revealed a markedly different profile of responses to a positive events diary PPI depending on baseline measures. Those participants whose scores fell at the higher end for happiness scores benefitted least from the intervention and, moreover, exhibited a *decrease* in well-being markers. One reason for this may be that the positive events diary requires a replay and cognitive interpretation of previous experiences, meaning that events must be relived (Lyubomirsky et al., 2011). This may lead some individuals to question the validity of their response or to become overly vigilant of their mental state, and hence experience a reduced positive affect. Thus, it may be that individual baseline well-being scores played a role in the efficacy of this PPI, leading to mixed results across the cohort. In particular, the potentially negative effect on some children suggests that a universal approach may not be appropriate and that interventions should be employed in a more targeted manner, depending on baseline scores (see Carter et al., 2018). In this study, though there was little difference between groups at baseline on psychological

measures, the differences *within* groups may have led to an interaction effect that moderated the effect of the intervention. Due to the size of the group, it was not split for further analysis because of the associated reduction in power. As a possible follow-up to this study, it would be valuable to perform a baseline split (provided the sample size is large enough) so that differences in response to the intervention *within* the experimental group may be separated out and evidence gathered for the efficacy of targeted PPIs.

Another within-group consideration was raised in an unpublished study by Isherwood (2019). In that study, it was suggested that null effects may be driven by individual differences in cognitive self-regulation strategies. Clifton and colleagues (Clifton et al., 2016) maintain that there is a collection of identifiable strategies or 'strengths' that people utilise to regulate negative emotions, and that there are individual preferences for particular strengths ('Signature Strengths'). Interfering with the preferred strategy may have negative consequences, such as a deterioration in performance and heightened anxiety (Norem & Illingworth, 2004; Sanna et al., 2006). It has also been shown that neglecting Signature Strengths in the regulation of negative emotions is associated with social anxiety disorder and obsessivecompulsive disorder (Freidlin et al., 2017). It is conceivable, therefore, that the benefits gained by those participants whose cognitive strategies align with the PPI are statistically balanced by the losses of participants who struggle with a strategy that does not. If this indeed were a factor here, then there is added reason for selective application of PPIs based on baseline measures and individual profiling.

Overall, because interpretation of the psychological measures needs some consideration, attributing the significantly improved academic performance by the experimental group to the PPI in this study needs to be done with caution. Additionally, there was no significant linear relationship between numeracy and happiness scores, suggesting that although the two may be related, the relationship is not immediately apparent in these results. It may well be that there is an additional unknown factor driving the scores. One further complication is the significant difference between academic scores at baseline. Even though this was accounted

for as a covariate, any extraneous variables that led to this difference may also have impacted the intervention. There may have been a difference in education provision, for example. However, the notable improvement in academic results is encouraging and this study does appear to support the contention that PPIs can assist academic improvement in a real-life school context. Evidence continues to grow in support of strategies that improve well-being to benefit academic performance (MacIntyre et al., 2019). A recent study involving Chilean school children, for example, found a clear link between increased positive emotions and better academic performance (Carmona-Halty et al., 2021). White and Kern (2018) noted strong correlations between a variety of well-being measures and academic performance in primary and high school students in Australia, but point out that directional links between the two require further investigation.

Overall, while the effects of the positive thinking diary exercise in this study have been somewhat inconclusive, there remains promise for its utility and good reason to pursue its efficacy – particularly given a possible link with improved academic performance. For future studies, where sample sizes permit, it is recommended that further investigation is undertaken to explore response differentiation against baseline well-being measures. This will enable more targeted interventions, and likely more robust findings.

# CHAPTER 3 Positive Events Diary and Utilising Signature Strengths for Well-being in Undergraduates

#### Abstract

Positive psychology interventions (PPIs) have demonstrated impact on improving well-being. In educational settings, well-being is increasingly seen as integral to a holistic and healthy educational experience. In this two-part study, two PPIs were tested in an undergraduate population. The first – a gratitude diary exercise in the style of Three Good Things (Seligman et al., 2005) – led to improvements in well-being markers, but these were not unequivocal. It was posited that a more targeted intervention might have more robust effects, one which encouraged participants to become more invested. The second study thus trialled utilising individuals' signature strengths (Peterson et al., 2005). This intervention resulted in broad improvement across the cohort, but was particularly marked for self-esteem and life satisfaction. This demonstrates that targeted PPIs may be more effective for higher education students than other non-specific interventions.

*Keywords*: positive psychology; positive thinking; resilience; well-being; positive psychology intervention; PPI; higher education; life satisfaction; signature strengths Like schools, institutions of higher education capture a large proportion of the younger population. There were over two million people enrolled in higher education institutions in the UK in 2018–19 (HESA, 2020). This group of people is of particular importance for mental well-being. Literature suggests that approximately 75% of all lifetime mental illness are present by the age of 25 (Kessler, Amminger, et al., 2007), and that the average age of university students coincides with the "peak onset for mental and substance use disorders" (Reavley & Jorm, 2010, p. 132). Even though the World Health Organisation recommends public mental health interventions as early as possible (Kessler, Angermeyer, et al., 2007), there appear to be few studies of preventative psychology interventions in tertiary education populations and, moreover, limited evidence of their efficacy (Reavley & Jorm, 2010).

Higher education institutions are increasingly aware of the need to adopt a holistic approach to the services they offer. Mental health provision emphasis has pivoted recently from a traditional treatment-focused reactive approach (such as provision of counselling) towards a more prevention-focused resilience building approach (such as mindfulness and PPIs). Universities UK recently provided a strategic framework for a "whole university approach to mental health and well-being" (de Pury & Dicks, 2020). Entitled 'Stepchange', it is a call to action to adopt the prevention agenda at higher education level. This is a welcome development in the global drive to make higher education more accessible. The traditional higher education student demographic has changed significantly, and universities are having to adapt to a more diverse intake: differently abled, multinational, multicultural and from a range of socioeconomic backgrounds and with a panoply of identities.

Universities are already starting to acknowledge the effect (if not drive) of mental health on academic performance. By providing a more supportive learning environment, the student learning experience improves. This move towards a more student-centred approach is evidenced in the rise to prominence of national metrics and ratings, such as the annual National Students Survey (NSS) in the UK. Thus

there is an increasing awareness that a student's academic potential can no longer be fully realised without being sensitive to their unique context.

Perhaps one of the most important factors to consider is an individual's wellbeing. Someone preoccupied with personal issues is unlikely to be able to concentrate on their academic demands. Mental health problems have been shown to result in a lower GPA (Eisenberg et al., 2009). So, if an institution can pre-empt such issues, say with a light-touch PPI, then it ought to be of broad benefit. This study explores the benefit of such an intervention by testing the effect of two positive thinking exercises on the well-being of undergraduates.

There are a variety of well-known PPIs with demonstrated success. Some focus on appreciation of positive events, such as counting your blessings (Emmons & McCullough, 2003), recording good things (Carter et al., 2018) or expressing gratitude (Sheldon & Lyubomirsky, 2006). Others emphasise practising forgiveness (McCullough et al., 2000) or engaging in enjoyable activities – known as behavioural activation (Mazzucchelli et al., 2010).

The work of Carter et al. (2018) using a diary to record positive events was effective in improving the well-being of children. Other evidence shows the same intervention to be effective in the general population (Park et al., 2004). But it seems this intervention has not been tested specifically with an undergraduate population. Given the novel environment that undergraduates find themselves in after their schooling, there is reason to believe there are many opportunities to experience positive events. This is yet to be empirically tested, so the first part of this study trials the positive events diary in a sample of undergraduates.

It is hypothesised that the positive events diary will result in the following effects:

- significant increases in positive affect, self-esteem and satisfaction with life in the experimental group when compared with the control group;
- 2. significant decreases in depression and negative affect in the experimental group when compared with the control group;

3. lasting effects to 16 weeks after the intervention for the experimental group.

## Study 1

Study 1 investigates the impact of using a positive events journaling exercise on participants' levels of depression, positive affect, negative affect, self-esteem and life satisfaction. In keeping with the operational definition of well-being used in this work, the measures of affect and life satisfaction were included as components of well-being to explore their response to PPIs. Previous research has implicated their contribution (Arthaud-day et al., 2005; Diener, 1984; Lucas et al., 1996).

### Method

#### Participants

Participants were 39 undergraduate Psychology students at Bangor University, aged between 18 and 24, with an almost even gender ratio (49% , 51%, 1. They predominantly identified as British (72%), with the majority reporting English as their first language (85%). Ten of the participants (26%) were excluded due to incomplete data, leaving a sample size of 29.

Recruitment was carried out by advertisement using the university SONA Participant Panel (see Appendix I). Each participant received course credits on completion of the study.

Each participant was randomly allocated to either the experimental condition (N = 21) or the control condition (N = 18).

#### Materials

The experimental group used a 'Three Good Things Exercise Sheet' (Appendix J) to record three positive events that happened daily. An example sheet was provided to illustrate how to carry out the exercise, which had samples of how daily positive experiences could be recorded (Appendix K). The control group performed a similar diary exercise, which differed from the experimental group only in that they were asked to record any three things that happened to them daily, not necessarily good things.

#### Design

A between-subjects, repeated measures design was employed to allow for comparison between each group of participants over time. The study was longitudinal, consisting of pre-intervention, post-intervention and 16-week follow-up measures. The independent variable was condition (whether the participant performed the positive events diary exercise or not) and the dependent variables were measures of depression, satisfaction with life, positive affect and negative affect.

### Measures

Center for Epidemiological Studies Depression Scale (CES-D). The CES-D (Radloff, 1977) was used to measure participant levels of depression in the week prior to assessment (see Appendix L). The CES-D is a self-report measure consisting of 20 items assessing loss of appetite, feelings of hopelessness and worthlessness, sleep disturbance and depressed mood. Each question addresses the past week and is scored on a four-point Likert scale. The scale ranges from 0 to 3, reflecting the frequency of each symptom, thus giving a total score between 0 and 60. Four items are worded in a positive direction and are therefore reverse scored. The CES-D has satisfactory test-retest reliability (r = .57) and strong internal consistency (a = .85) within the general population (Radloff, 1977).

Satisfaction with Life Scale (SWLS). The SWLS (Diener et al., 1985) was used to assess the participants' global life satisfaction (see Appendix M). It is intended to measure a person's overall judgment of satisfaction with their life (Diener et al., 1985). The SWLS is a five-item questionnaire for which participants respond to statements using a Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree), thus giving an overall score between 5 (low satisfaction) and 35 (high satisfaction). The SWLS has strong internal consistency (a = .87) and good test-retest reliability (r = .82) (Diener et al., 1985). The SWLS has been shown to be a reliable and valid measure of life satisfaction (Pavot et al., 1991).

Scale of Positive and Negative Experience (SPANE). The SPANE (Diener et al., 2010) was used to determine participant subjective feelings of well-being (see Appendix N). It is a twelve-item questionnaire designed to assess both positive and negative affect within the past week. Participants respond to each item using a Likert scale ranging from 1 (very rarely or never) to 5 (very often or always). There are six items each for both positive and negative affect, thus producing two scores in the range 6 to 30. The SPANE has demonstrated robust psychometric value (Diener et al., 2010), with internal consistency coefficients ranging from a = .81 to .90 (Silva & Caetano, 2013).

State Self-esteem Scale (SSES). Devised by Heatherton & Polivy (1991), the SSES is a 20-item self-report assessment that evaluates state self-esteem by probing thought patterns across three correlated sub-scales (performance, social and appearance self-esteem) (see Appendix O). Participants respond to statements using a five-point Likert scale ranging from 1 (not at all) to 5 (extremely), giving a total score of between 20 and 100. There is reverse scoring on 13 items; a higher score corresponds with higher self-esteem. The instrument has high internal consistency (a = .92) (Crocker et al., 1993; Hobza et al., 2007) and has shown sensitivity to interventions designed to alter momentary self-esteem (Heatherton & Polivy, 1991).

## Procedure

The study consisted of two one-hour sessions, separated by a week, and a 16-week follow-up.

In the first session, participants were given an information sheet to read (see Appendix P) and offered an opportunity to ask any questions before reading and signing the consent form (see Appendix Q). They were then given the preintervention questionnaires to obtain demographic data and baseline psychological measures of depression, satisfaction with life and positive and negative affect. Researchers then gave participants guidance on how to identify and express three positive events that had happened to them the previous day, attributing a cause to each positive experience. Participants then completed their first positive events

exercise during this session and were asked to do so again daily for a week, either on paper or electronically as they preferred. Text message reminders were sent to participants daily for the following week to encourage completion of the exercise.

Participants returned for the second session a week later, during which posttest psychological measures were made and a debrief form completed.

At 16 weeks post intervention participants returned for final follow-up measures.

# Results

Initial analysis indicated no significant differences between conditions at baseline for any of the measures, as shown in Table 5.

Figure 11 to Figure 15 illustrate the descriptive measure data from Table 5, including confidence intervals (SEM).

N - 30		Mear	4	
N - 50		Control	Experimental	ι
	Baseline	13.56 (7.16)	12.46 (7.21)	-0.41 (27)
(CE3-D)	Post	12.06 (7.82)	7.69 (7.71)	
	Follow up	14.19 (8.19)	7.69 (5.36)	
Satisfaction with Life	Baseline	24.69 (4.67)	20.46 (6.80)	-1.98 (27)
(SWLS)	Post	24.63 (4.60)	24.38 (3.84)	
	Follow up	25.50 (4.83)	25.31 (5.78)	
Positive Affect (SPANE)	Baseline	22.19 (3.33)	24.15 (3.26)	1.60 (27)
	Post	23.44 (2.76)	26.08 (2.69)	
	Follow up	22.75 (3.94)	24.77 (3.47)	
Negative Affect (SPANE)	Baseline	13.31 (3.22)	14.69 (3.73)	1.07 (27)
	Post	12.75 (2.74)	11.54 (3.71)	
	Follow up	12.00 (3.10)	11.69 (4.57)	
Self-esteem (SSES)	Baseline	70.81 (3.49)	71.46 (3.40)	0.13 (27)
	Post	73.56 (3.30)	78.92 (2.59)	
	Follow up	67.56 (3.47)	73.38 (4.12)	

# Table 5

Descriptive statistics and comparison of baseline scores for each group

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



*Figure 11.* Mean CES-D (depression) scores for each group across the three measure stages. (Error bars represent the standard error of the mean, *SEM.*)



*Figure 12.* Mean SWLS (life satisfaction) scores for each group across the three measure stages. (Error bars represent the standard error of the mean, *SEM.*)



*Figure 13.* Mean positive SPANE (affect) scores for each group across the three measure stages. (Error bars represent the standard error of the mean, *SEM*.)



*Figure 14.* Mean negative SPANE (affect) scores for each group across the three measure stages. (Error bars represent the standard error of the mean, *SEM.*)



*Figure 15.* Mean SSES (self-esteem) scores for each group across the three measure stages. (Error bars represent the standard error of the mean, *SEM*.)

Results from each of the psychological measures were subjected to a  $2 \times 3$  mixed ANOVA, with group (experimental or control) as the between subjects variable and time (baseline, post-intervention and follow-up) as the within subjects variable. Table 6 summarises the omnibus ANOVA results.

# Table 6

#### **Omnibus ANOVA results**

Source -	Depression (CES-D)‡			Life Satisfaction (SWLS)†			Positive Affect (SPANE)					
	df	F	p	$\eta_p^2$	df	F	р	$\eta_p^2$	df	F	р	$\eta_p^2$
Time	(1.29, 34.76)	2.64	.105	.089	(2, 54)	5.22**	.008	.162	(2, 54)	3.75*	.030	.122
Group	(1, 27)	3.21	.084	.106	(1, 27)	0.93	.344	.033	(1, 27)	4.67*	.040	.147
Time × Group	(1.29, 34.76)	1.92	.173	.066	(2, 54)	3.43*	.043	.110	(2, 54)	0.20	.816	.008
Source -	Negative Affect (SPANE)			Self-esteem (SSES)§								
	df	F	p	$\eta_p^2$	df	F	p	$\eta_p^2$				
Time	(2, 54)	4.53*	.015	.144	(1.16, 31.33)	2.24	.142	.077				
Group	(1, 27)	0.00	.961	.000	(1, 27)	1.29	.267	.045				
Time × Group	(2, 54)	1.43	.247	.050	(1.16, 31.33)	0.460	.531	.017				

Note.  $\dagger$ Box's test of equality of covariance matrices violated (p = .001): interaction term should be interpreted with caution.  $\ddagger$ Greenhouse-Geisser corrected due to violation of sphericity ( $\epsilon = .64$ ). §Greenhouse-Geisser corrected due to violation of sphericity ( $\epsilon = .58$ ).

Life satisfaction scores exhibited a significant group × time interaction. Repeated measures ANOVAs revealed a significant simple effect of time for the experimental group [F(2, 24) = 4.31, p = .025,  $\eta_p^2 = .264$ ], with life satisfaction increasing across the study (see Figure 12). This was in line with the hypothesis. Bonferroni-corrected pairwise comparisons did not detect significant differences between life satisfaction scores for the experimental group over the three time stages. There were no significant differences detected for the simple effect of group at any of the time points.

No other significant interactions were observed for any of the remaining measures.

Both positive and negative affect demonstrated a significant main effect of time [F(2, 54) = 3.75, p = .030,  $\eta_p^2 = .122$  and F(2, 54) = 4.53, p = .015,  $\eta_p^2 = .144$  respectively]. On average, from baseline, positive affect increased and negative affect decreased for the cohort as a whole. Bonferroni-corrected comparisons showed a significant increase in positive affect (M = 1.59, SE = 0.48, p = .008) and a marginally significant decrease in negative affect (M = -1.86, SE = 0.73, p = .051) from baseline to post-intervention. There was also a significant decrease in negative affect from post-intervention to follow-up (M = -2.16, SE = 0.72, p = .017). Furthermore, there was a significant main effect of group for positive affect, with the experimental group having a significantly higher average score (M = 2.21, SE = 1.02, p = .040).

#### Discussion

The use of a positive events diary in a sample of undergraduates yielded promising results. All the well-being measures reflected trends in the direction hypothesised – the experimental group displayed increased levels of positive affect, self-esteem and life satisfaction and reduced levels of negative affect and depression. This was true for both post-intervention and follow-up. Specifically, life satisfaction scores improved significantly for the experimental group through the course of the study but not to a degree sufficient to statistically distinguish them from the control group's

improvement. Positive and negative affect scores demonstrated significant improvement over the study when collapsed across groups, but again differences between the groups were not conclusive.

In summary, it seems evident that using a positive events diary (and perhaps even just a regular journal) can have a positive effect on well-being in university students. Although the differences detected in this study were broadly insufficient to confidently reject the null hypotheses, they do provide a clear indication that there is potential in interventions of this kind. In a future iteration of this study, it may be valuable to include a qualitative aspect in order to enrich the quantitative analysis. Journals from a sub-set of the sample could be selected for thematic analysis, or focus groups or individual interviews could be used to gain added insight.

The equivocal outcome may point to a critical limitation in this study: participant attrition. Although it is a given that not all participants are likely to complete any longitudinal study, in this case the rate was unusually high (26%). This will have eroded the power and made smaller effects difficult to detect.

On a related note, a further explanation for the indistinct differences between the groups may lie in each individual's attitude to and engagement with the intervention. Perhaps part of the reason that positive thinking diary interventions have been so successful in children is that children are less likely to question the task – after all, children are assigned tasks by their teachers every day; they believe and trust in the benevolence of authority figures. An undergraduate population may be less receptive to an imposed task and even hostile to a positive psychology intervention if they do not believe in its potential value. A study by Lyubomirsky et al. (2011) revealed two significant moderators in the efficacy of a PPI: will and effort. In a gratitude exercise PPI with undergraduates, those participants who demonstrated motivation to become happier and who sustained their application to the exercise benefitted significantly more from it than those who did not.

A follow-up study was thus undertaken, with some changes in approach: a more collaborative intervention was chosen, which was more individually tailored and which encouraged participants to become more invested in it. The intervention

was designed to be more intentional for the participants and to require more active engagement through cognitive demand. Such an adaptation aligns with previous work in a younger population, where it was found that a light-touch positive events diary, whilst significantly and lastingly impacting happiness, did not appear to change children's cognitive schema (Carter et al., 2018). So it would seem that an intervention which allows for a more intentional engagement, and with greater autonomy and freedom of choice around how to implement it, may lead to long-term sustainable improvements in well-being.

#### Study 2

This study investigated whether tailoring PPIs to individual characteristics impacts efficacy. This is a more proactive approach, which leverages an individual's positive traits, or character strengths. Character strengths are defined as "positive traits reflected in thoughts, feelings, and behaviours" (Park et al., 2004, p. 603). Because each strength is considered innate, utilising it is considered to be effective because it is in alignment with the way an individual *already* operates. Thus it is "authentic and energising" (Linley, 2008, p. 9).

Strengths-based psychology rose to prominence in the early 2000s through the work of Peterson and Seligman (2004). Since then, the approach has rapidly gained popularity in positive psychology and business coaching, and many alternative spin-offs have been developed, such as the Clifton Strengthfinder (Clifton et al., 2016). The strengths-based approach has had demonstrable success in improving well-being (e.g. Govindji & Linley, 2007; Proyer et al., 2015; Schutte & Malouff, 2019) and the approach appears to be well generalisable. Duan (2016) found that using strengths on a daily basis increased well-being and decreased psychopathological issues in heterogeneous groups from countries in both the East and West.

There is strong support for strength-based interventions in an educational setting, where they have been linked with positive outcomes in the classroom and improved classroom social interaction (Niemiec, 2020). Louis & Schreiner (2012) noted that developing strengths in students could facilitate thriving and allow them to maximise the benefits of their university experience. A more recent study found that signature strengths were not only beneficial for alleviating symptoms in higher education students seeking counselling, they were also predictors of improved treatment outcome (Uliaszek et al., 2021). Coppley and Niemiec (2021) argue for a strengths-based approach in education as a matter of course, as part of a pedagogical shift towards 'positive education'. But there does not appear to be much in the literature about the effects of strengths interventions in students on well-being specifically. This gap seemed an obvious and promising avenue to pursue.

This follow-up study investigated the effects on well-being markers of identifying participants' signature strengths and using these strengths in new ways. The markers for well-being were levels of depression, positive affect, negative affect, self-esteem and life satisfaction.

It is hypothesised that the intervention will result in significant increases in positive affect, self-esteem and life satisfaction and decreases in depression and negative affect. These changes are expected to still be evident after twelve weeks.

#### Method

#### Participants

Participants were 54 undergraduate Psychology students at Bangor University, aged between 18 and 38 (M = 22). Seven (13%) were excluded due to incomplete data, leaving a sample size of 47 (15 male, 32 female). Recruitment followed the same process as in Study 1, with an adjusted advertisement (see Appendix R).

Participants predominantly identified as British, with the majority reporting English as their first language.

Each participant was randomly allocated to either the experimental condition (N = 29) or the control condition (N = 18). Those in the control group acted as waitlist controls and were offered the study intervention once the active research was complete.

This study was approved by Bangor University's School of Psychology Research Ethics Committee (reference 2012-7882-A10243).

#### Materials

A list of character strengths and their descriptions was used throughout the study to assess each participant's subjective strengths (see Appendix S). Based on classification by Peterson and Seligman (2004), the list of strengths consists of 24 individual character strengths, including items such as gratitude, love of learning, kindness and leadership. Each participant also received a 'Using Signature Strengths in a New Way' form (see Appendix T). The form was pre-populated with a list of the five key character strengths identified for each participant. The form had space for participants to choose one signature strength per week for the duration of the study and to write how they would use the strength in a new way each day. Participants were also given an example sheet (see Appendix U), which showed one example of a new way to use each of the 24 signature strengths, taken from '340 ways to use VIA character strengths' (Rashid & Anjum, 2005). Although the VIA Institute on Character offers a free online character strengths assessment (VIA Institute on Character, 2022), this option was not pursued for this study as access to the raw data is not granted.

#### Apparatus

A dictaphone was used to record the qualitative interviews in order to facilitate transcription and then assessment of each participant's top five character strengths.

#### Design

A mixed (between-subjects, repeated measures) design was employed with preintervention, post-intervention and twelve-week follow-up measures. The independent variable was condition (intervention or control). The dependent variables were measures of depression, life satisfaction, positive and negative affect, and self-esteem.

#### Measures

The psychological instruments used in Study 1 were also employed here: CES-D, SWLS, SPANE and SSES.

Signature Strengths. In addition, participants' personal signature strengths were assessed using a qualitative, semi-structured interview consisting of 23 questions (see Appendix V). The questions cover a range of relevant areas of life, including education, work, leisure, social and family. In the interview, participants

are encouraged to speak openly about each of the areas, giving researchers insight into the strengths that participants already possess.

Interview data from dictaphone recordings was analysed to determine the top five signature strengths for each individual. A triple analysis was used: three researchers compared their independent observations to reach consensus on the character strengths for each participant.

#### Procedure

**Intervention group.** For the intervention group, the study consisted of four one-hour sessions, with one week between each, and a twelve-week follow-up.

In the first session, participants were given an information sheet to read (see Appendix W) and offered an opportunity to ask any questions before reading and signing the consent form (see Appendix X). Participants were then given the preintervention questionnaires to complete to obtain demographics and to measure levels of depression, satisfaction with life, affect, and self-esteem. On completion of the questionnaires the semi-structured interview began. After the session, the researchers analysed the interview recordings to determine the participant's top five signature strengths for use in the remainder of the study.

In the second session, each participant was given their five signature strengths and a description of each one. The participants were given the opportunity to discuss their top strengths. They were then asked to choose one of their five strengths to focus on for the next week and, with the help of the 'Using Signature Strengths in a New Way' example sheet, each participant generated ideas for using this strength in a new way each day for the following week. The participant documented this on the 'Using Signature Strengths in a New Way' form, which they took away as a reminder of their chosen strength and how to use it in a new way each day.

In session three, participants reviewed with the researcher their progress from the previous week. The participants were then presented with their list of top five strengths once again and asked to choose a different strength from the remaining four. Once selected, participants generated ideas for using this strength

in a new way each day for the coming week. The participant also documented this on the 'Using Signature Strengths in a New Way' form, which they took away from the session.

In session four of the study, participants reviewed their week with the researcher before revisiting the five strengths and descriptions for a final time. They then completed the psychological measures for a second time. Finally, each participant was debriefed verbally and given the opportunity to ask any questions.

After twelve weeks, participants were sent a follow-up link via email to access an online version of the questionnaires to complete for a third time.

**Control group.** Control group participants completed the questionnaires in week one and week four and again by email link after twelve weeks. They did not participate in the recorded interview or receive feedback on their strengths.

#### Results

Preliminary analysis indicated no significant difference between the two groups at baseline for any of the measures (see Table 7).

N - 47		Mean (S	SD)	4	
<i>N</i> – 47		Control	Experimental	l	
Depression (CES-DS)	Baseline	19.06 (9.35)	21.14 (10.56)	-0.69 (45)	
	Post	17.11 (10.13)	12.31 (9.40)		
	Follow up	16.17 (9.30)	13.76 (12.53)		
Satisfaction with Life	Baseline	24.06 (4.80)	22.10 (5.51)	1.24 (45)	
(30013)	Post	24.22 (5.16)	25.69 (5.81)		
	Follow up	25.72 (4.60)	25.34 (6.69)		
Positive Affect (SPANE)	Baseline	21.22 (4.57)	20.86 (3.80)	0.12 (45)	
	Post	22.17 (4.06)	23.64 (3.84)		
	Follow up	20.72 (4.74)	22.96 (5.76)		
Negative Affect	Baseline	15.56 (4.09)	15.68 (4.69)	-0.08 (45)	
(SFANE)	Post	14.61 (3.78)	12.11 (4.55)		
	Follow up	13.56 (3.68)	13.29 (5.54)		
Self-esteem	Baseline	67.22 (14.01)	60.14 (16.15)	1.54 (45)	
(SSES)	Post	67.72 (11.69)	71.31 (12.51)		
	Follow up	70.33 (12.41)	67.69 (16.86)		

# Table 7

Descriptive statistics and comparison of baseline scores for each group

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

Figure 16 to Figure 20 illustrate the descriptive statistics from Table 7, including confidence intervals (SEM). Preliminary analysis focused on testing for outliers and normality. No anomalies were found. Results from each of the psychological measures were subjected to a 2 × 3 mixed ANOVA, with group (experimental or control) as the between subjects variable and time (baseline, post-intervention and follow-up) as the within subjects variable.







*Figure 17.* Mean SWLS (life satisfaction) scores for each group across the three measure stages. (Error bars represent the standard error of the mean, *SEM*.)



*Figure 18.* Mean positive SPANE (affect) scores for each group across the three measure stages. (Error bars represent the standard error of the mean, *SEM.*)



*Figure 19.* Mean negative SPANE (affect) scores for each group across the three measure stages. (Error bars represent the standard error of the mean, *SEM*.)



*Figure 20.* Mean SSES (self-esteem) scores for each group across the three measure stages. (Error bars represent the standard error of the mean, *SEM*.)

Table 8 summarises the results of the mixed ANOVAs.

# Table 8

Omnibus ANOVA results (p < .05 only)

Source	Depression (CES-D)			Self-esteem+								
	df	F	p	$\eta_p^2$	df	F	p	$\eta_p^2$				
Time	(2, 90)	8.17***	< .001	.154	(1.76, 79.05)	5.53**	.008	.110				
Group												
Time × Group					(1.76, 79.05)	3.80*	.032	.078				
Source	Negative Affect			Positive Affect			SWL					
	df	F	p	$\eta_p^2$	df	F	р	$\eta_p^2$	df	F	p	$\eta_p^2$
Time	(2, 90)	7.01***	.001	.135	(2, 90)	4.00*	.022	.082	(2, 90)	7.85***	< .001	.149
Group												
Time × Group									(2, 90)	3.49*	.035	.072

*Note*.  $\neq$ Huynh-Feldt corrected due to violation of sphericity ( $\epsilon$  = .83).

A main effect of time was found for all measures, but no main effect of group. Interaction effects were found for self-esteem and satisfaction with life data.

Self-esteem demonstrated a significant (Huynh–Feldt corrected) group × time interaction effect [F(1.76, 79.05) = 3.80, p = .032,  $\eta_p^2 = .078$ ]. Repeated measures ANOVAs revealed a significant simple effect of time for only the experimental group. Post-hoc (Bonferroni-corrected) comparisons showed this increase was significant between baseline and post-test (M = 11.17, SE = 1.82, p < .001) and between baseline and follow-up (M = 7.55, SE = 2.91, p = .045). Oneway ANOVAs for group revealed no significant differences between the groups at any of the three timepoints.

Life satisfaction also demonstrated a significant group × time interaction effect [F(2, 90) = 3.49, p = .035,  $\eta_p^2 = .072$ ]. Repeated measures ANOVAs revealed a significant simple effect of time for both groups, but (Bonferroni-corrected) posthoc comparisons showed an increase between baseline and post-test (M = 3.59, SE = 0.83, p < .001) and between baseline and follow-up (M = 3.24, SE = 0.98, p = .008) for the experimental group only. One-way ANOVAs for group revealed no significant differences between the groups at any of the three timepoints.

For the main effect of time, post-hoc comparisons (repeated measures ANOVAs) and subsequent (Bonferroni-corrected) pairwise contrasts revealed significant improvements between baseline and post-intervention scores for the other measures: depression (M = -5.39, SE = 1.30, p < .001), positive affect (M = 1.87, SE = 0.61, p = .012) and negative affect (M = -2.15, SE = 0.61, p = .003). Similar results were found between baseline and follow-up scores for depression (M = -5.13, SE = 1.49, p = .004) and negative affect (M = -2.29, SE = 0.72, p = .008).

#### Discussion

A signature strengths intervention with an undergraduate cohort produced encouraging improvements in well-being according to multiple measures. Across the entire cohort (both control and experimental groups) there were significant
increases in self-esteem, positive affect and satisfaction with life and decreases in depression and negative affect. These changes persisted for depression and negative affect at twelve-week follow-up, therefore providing broad support for the positive effects of strengths interventions. The control and experimental group could be distinguished by the measures of self-esteem and life satisfaction, with only the experimental group showing significant improvements in both measures from baseline to post-test, as well as baseline to follow-up. More specifically, it appears that the strengths intervention had marked and lasting positive impact on self-esteem and life satisfaction.

There is robust empirical evidence that strengths-based interventions are successful at improving well-being. For example, in a school intervention with 9–12-year-old students, it was found that strengths-based exercises benefitted classroom relationships and elevated well-being (Quinlan et al., 2015). A growing number of systematic reviews also lend their support. A literature synthesis of a variety of PPIs (including strengths interventions) by Bolier et al. (2013) found that across 39 studies there was a mean effect size of 0.34 on subjective well-being, 0.20 on psychological well-being and 0.23 on depression. Another systematic review of PPIs in clinical populations found effect sizes of 0.24 on well-being and 0.23 on depression (Chakhssi et al., 2018). Yan et al. (2020) demonstrated that strengths-based interventions are effective in people suffering from chronic illness, based on a systematic review of eight studies involving 692 patients. This study therefore adds to the body of evidence supporting the positive impact of strengths-based interventions on mental health.

The heterogeneous effects on well-being measures are interesting in this study, but not unexpected. In a recent meta-analysis across 14 studies (Schutte & Malouff, 2019), it was found that signature strengths interventions were effective in increasing positive affect, happiness, life satisfaction, and reducing depression (g = 0.21). But the strongest effect appeared to be on life satisfaction (g = 0.42). Thus, it seems that certain markers are more susceptible to change and its persistence. Here, the results appear to support the proposal that a more intentional

and cognitive intervention *does* impact trait-like characteristics such as life satisfaction and self-esteem. One explanation for this may be that strengths-based interventions leverage skills that are in alignment with relatively immutable characteristics that an individual already has. Thus, thinking and acting in harmony with such characteristics may be more likely to impact relatively stable factors such as life satisfaction and self-esteem. State-like factors such as happiness and affect may be positively impacted in the short-term by such interventions but may be susceptible to more subtle ups and downs of everyday life.

A second consideration may relate to an individual's intrinsic motivation. Where signature strengths are in alignment with a person's actions it is likely that this engenders internalised motivation and facilitates autonomy. There is some evidence for this. In a study of strengths in the workplace, it was found that strengths were a significant mediator between intrinsic motivation and employee task performance, as rated by a supervisor (Kong & Ho, 2016).

A third – and perhaps most important – consideration concerning temporal effects is one specifically related to the nature of strengths interventions. In a review of the Clifton StrengthsFinder and its use on students, Louis (2012) emphasised (particularly for undergraduates) the evolving aspect of strengths-based work. In other words, such interventions require active and ongoing engagement for the associated benefits to persist. Without such upkeep, there is a risk of developing "a fixed mindset and the cultivation of a performance goal orientation" (Louis, 2012, p. 11). In the present cohort, after the four-week intervention there was no further interaction between the participants and the experimenters until follow-up; it is likely that few of the participants continued to actively work with their signature strengths (for example, picking a new strength each week). Future work in this area would benefit from offering a more long-term programme for participants, even if lighttouch. This would further add weight to the intention of such interventions to encourage participant buy-in, hence becoming more invested and promoting a growth mindset. A valuable addition to work in this area would be to track changes in mindset over an extended period.

Given the close link between strengths and motivation, it would also be interesting to determine whether there is a longitudinal evolution of an individual's motivational profile due to strengths-based work. The connection with self-determination theory (SDT) here further suggests that a wider exploration of autonomy and control is warranted. Indeed, another interesting aspect of Louis' review of strengths-based initiatives has to do with the concept of control. Louis' own work in this regard (2008, 2011) found that strengths-based approaches led to increased levels of perceived academic control, which in turn is a predictor of improved academic performance (Hall et al., 2006; Perry et al., 2001). Perceptions of control, and a sense of agency, are important factors in mental well-being (Hojman & Miranda, 2018; Li et al., 2021; Smith et al., 2000). Often depression is associated with a sense of reduced control and withdrawal (Beck, 1993; Chung et al., 2016) and, in contrast, self-esteem and optimism are associated with increased perceptions of control (Judge et al., 2002; Judge & Bono, 2001).

Though the results from this study are in alignment with previous findings, several of the measures did not clearly distinguish between the control and experimental group. Discrimination would have been strengthened with greater power, so a larger sample would probably have been particularly beneficial in this case. Since it appears that the success of strengths-based interventions depends on active engagement, effects may have been amplified if the experimental group had been specifically asked to continue with the strengths exercise after follow-up (even if this was not monitored). Another possibility is that the outcome was influenced by a placebo effect – simply partaking in a study about improving psychological well-being could have been sufficient to generate a positive response in the control group. Seligman et al. (2005) note similar findings in their research, attributing the cause similarly.

In summary, this study confirms the value of a strengths-based PPI, specifically in a higher education setting. All participants demonstrated improvement in well-being measures of affect, self-esteem, life satisfaction and depression, but self-esteem and life satisfaction improved significantly compared

with controls. This effect persisted at 16 weeks. Overall there is evidence that implementing such PPIs in a university setting would be broadly beneficial for students.

Given the current cultural change in higher education towards a more holistic approach, the results of this study offer some valuable opportunities. First, in comparison with other PPIs, leveraging signature strengths appears to positively impact trait-like characteristics, meaning that their effects can be lasting, and therefore life changing; contrasting with other PPIs that often provide transient improvements. What appears to make the difference here is that individuals use tools that are in keeping with their 'natural' way of working, which is particularly important for students, who may resent an imposed one-size-fits-all PPI framework. Thus 'buy-in' is a critical factor. Although somewhat more difficult to broadly implement than light-touch PPIs (due to the need to identify signature strengths through interview), technological advances open the possibility for an electronic rollout of a strengths-based intervention, either via an institution's local network or via smartphone. This could also resolve one of the issues in this study, namely a persistent application - continued engagement could be encouraged by means of (automated) reminders, or even a gamified user experience. Furthermore, strength finding practice is forward looking and more intentional than most other PPIs: not only does it engage intrinsic motivation, it simultaneously supports the psychological need for autonomy and achievement.

Higher education institutions would also stand to gain from a more 'successful' student population – both in terms of wellness, but also academic success. Thus, the benefits are bidirectional.

CHAPTER 4 Exercise with Control – Learning to Feel Good: Contingency and Control in Exercise Scenarios

### Abstract

The aim of this research was to develop a new type of PPI that engages people in a more action-oriented way. Contingency learning is a process fundamental to adaptive goal-directed behaviour. By repeatedly observing actions and outcomes we derive over time an estimate of their causal relationship, or contingency. By interacting with our environment and observing the outcomes we can similarly determine our own contingency in situations, and hence gain a sense of control. Studies have shown that our perceived contingency depends not only on the statistical relationship between action and outcome, but also on the frequency of action: those individuals who respond more report a greater sense of control (Alloy & Abramson, 1979). In addition, a greater sense of control has been shown to positively correlate with feelings of well-being (Lachman & Weaver, 1998). Using a novel stimuli set with an exercise theme (laying foundations for the practical application of the outcomes in exercise uptake) this research has (1) attempted to replicate previous findings on the relationship between perceived contingency and response rate and (2) used novel methods, such as nudge techniques, to increase response rate. Models link depression with disengagement and learned helplessness due to perceived lack of control (Alloy & Seligman, 1979). Exercise itself has been shown to have a positive effect on depression (Hassmén et al., 2000), but is often an impractical intervention. So, there is an advantage to developing a simple PPI that mimics the positive feedback about actions and consequences derived from physical activity.

Success thus far has been limited, due to a number of complicating factors in the experimental design.

*Keywords*: exercise, contingency learning, perception of control, well-being, PPI

Self-determination theory (Deci et al., 1991; Deci & Ryan, 1985, 2000) posits the essential role of autonomy in human well-being. Defining autonomy is difficult, but for the sake of clarity it is taken here to be "motivated agency" (Luck & d'Inverno, 1995, p. 258), thus a goal-directed capacity for effecting change. One of the ways in which we establish our capacity to effect change is through contingency learning. According to Schmidt (2012, p. 1455), human contingency learning is the "acquisition of implicit or explicit knowledge of statistical correlations between stimuli and/or responses". Thus it is about determining the nature of relationships in the world and to what extent individual actions can impact on consequences and outcomes.

Contingency, as a concept, is fundamental to a variety of theories of learning (Alloy & Abramson, 1979; Purkis & Lipp, 2001; Taber, 2011). This type of learning occurs rapidly, requiring as little as a single repeat trial in order to form a relationship (Lewicki, 1985).

Contingency is commonly calculated using the  $\Delta P$  index (Allan, 1980; Jenkins & Ward, 1965) as follows.

 $\Delta P$  = Proportion of successful outcomes with response

Proportion of successful outcomes without response
This may be expressed in equation form:

$$\Delta P = P(O|R) - P(O|\neg R)$$
$$= \frac{a}{a+b} - \frac{c}{c+d}$$

where a = successful outcomes with a response;

*b* = unsuccessful outcomes with a response;

c = successful outcomes without a response; and

d = unsuccessful outcomes without a response.

Essentially this is a calculation of whether an outcome occurs as a direct consequence of making (or not making) a particular response. Much work has gone into determining *how* humans form contingency judgements, with evidence showing

that they are more complex than simply a conscious, rational statistical calculation (Wasserman et al., 1993). Though such a mathematical approach is likely involved in part, as far as the level of awareness we have of the contingency judgments we make, researchers argue for a distinction between implicit and explicit contingency learning, and emphasise that both are used (K. R. Peters & Gawronski, 2011). It has been shown, for example, that accurate contingency judgments can be made even when people are subjectively unaware that such contingencies exist (Schmidt et al., 2007). However, there is also evidence that we can, at times, be poor at judging contingency (Matute et al., 2019). Some neuropsychological tests are based on this premise – the Iowa Gambling Task (Bechara et al., 1997), for example – and these are used to support theories of modular brain function. In particular, there appear to be differentiated systems involved in the complex processes of memory and learning (Hong et al., 2019; Squire, 2004; Tulving, 1984).

### Contingency and Control

Intimately linked with contingency is the concept of control; for when we establish rules of contingency between two events we are in a position to utilise the relationship. If, for example, a long-distance runner notices that training more frequently improves their 10 km race time, and makes a contingency judgement about the positive impact of training on race time, then they gain a sense of control over their performance in future races. A high degree of control has been shown to correlate with greater well-being in a variety of contexts. For example, in sportspeople (Kerr & Gross, 1997), in the workplace (Holman, 2002; Love & Edwards, 2005), and among the elderly (Schulz, 1976). Greater autonomy is linked to improved academic performance (Vansteenkiste et al., 2004) and greater well-being (Van Ryzin et al., 2009) in school children. And because there are many studies that report biases in contingency judgments, people often have an illusion of control (for instrumental contingency) or an illusion of causation (for Pavlovian contingency).

Likewise, the negative psychological impact of a loss in agency is well known. For example, in an educational setting, it was found that teachers had a significantly lower perception of control than non-teachers and a significantly lower well-being (Grenville-Cleave & Boniwell, 2012). If a favourable outcome (reward) is not contingent on response, then the result is usually apathy. Worse, if an aversive outcome is not contingent on a response then the result can be learned helplessness (Maier & Seligman, 1976), where motivation to resolve problems diminishes.

There is thus a clear and important relationship between an individual's sense of control and their well-being. Given that a fundamental aim of positive psychology is to improve well-being, then if an intervention could be designed to elevate a person's perception of control (irrespective of whether such a perception was accurate or not) then it should be possible to improve their well-being. In this study, such an intervention is explored. It sets out to determine whether it is possible to manipulate people's judgement of contingency in order to increase their sense of control, and whether this increase leads to improved well-being. The study is modelled after landmark research (Alloy & Abramson, 1979), which led to a burgeoning interest in contingency learning in psychology. The current study develops a novel exercise-based stimulus set to provide a contemporary real-world application. Additionally, it incorporates several behaviour change techniques, or 'nudges', aimed at increasing perceived contingency.

Developed by Thaler and Sunstein (2009), nudges are small positive interventions intended to influence people's behaviour or decision making. This study used three such nudges: reappraisal, priming and praise. Cognitive reappraisal is an emotion regulation strategy in which the meaning of a situation is re-evaluated to change a person's response to it. For example, participants that reappraised junk food stimuli were found to have reduced cravings for such food (Giuliani et al., 2013). In this study, participants were asked to reframe unsuccessful outcomes in a positive way. A priming nudge exposes people to certain sensory information as a way of unconsciously 'priming' them towards a particular behaviour. For example, asking participants to make a sentence from scrambled words related to exercise and health made them more likely to choose using stairs over lifts

(Wryobeck & Chen, 2003). In this study, participants were asked to read an inspiring passage about overcoming adversity prior to completing the task. Finally, praising an action is a form of positive social reinforcement that encourages a particular behaviour. For example, praising children for a healthy food choice made them more likely to make the same choice subsequently (Grubliauskiene et al., 2012). In this study, participants were praised for successful outcomes. The inclusion of three unrelated 'nudges' was exploratory and attempted to identify an effective approach to improving engagement as per the hypotheses below.

It is hypothesised that participants in the 'nudge' intervention conditions will:

- 1. exhibit a higher response rate than controls;
- overestimate the experienced contingency in comparison with the control group; and
- 3. score higher on measures of well-being after the intervention than controls.

# Study 1

Study 1 used a zero-contingency scenario. In theory this meant that participants had no control over the outcome – it was entirely random.

# Method

# Participants

A total of 106 participants (80 female, 75.4%) were recruited using Bangor University's SONA participant recruitment scheme. Participants were randomly allocated to one of three conditions: control (N = 31, 23 female), reappraisal (N = 39, 29 female), or priming (N = 36, 28 female). The praise condition was ultimately not tested due to software issues and to ensure there were sufficient participants in the other conditions. There were two exclusion criteria: (1) over- or under-responding (on average more than 9 or fewer than 3 responses per block of 12 trials across the entire experiment) and (2) a 100% response or non-response in any one block. Overall, 29 participants were excluded, leaving valid samples as follows: control, N = 25; reappraisal, N = 28; and priming, N = 24.

This study was approved by Bangor University's School of Psychology Research Ethics Committee.

### Materials

Six stylised images of jogging scenarios were created using illustration software (Appendix Y). These were then duplicated and slightly modified (for variety) to create 12 scenarios in total for the stimuli set. One set featured a male avatar and a second featured a female (to avoid gender bias). Presentation and handling of the stimuli set was made using PsychoPy software (Peirce, 2007) running on Windows XP.

# Design

A mixed design was used, with condition as the between groups factor (Control, Reappraisal, Priming) and block (1, 2, 3, 4) as the within groups factor. Contingency

rating and response frequency were the dependent variables.

The reappraisal condition differed from the control group in that participants were asked before the experiment to choose and write down their top three reasons or motivations for exercising. They were then asked to recall these three reasons at the start of each block. On 50% of their *unsuccessful* trials, participants were shown the text "Focus on the positive, even if you didn't achieve the outcome."

The priming condition differed from the control group in that participants were asked to read a short story before the experiment about overcoming adversity (Appendix Z). They were asked to answer two comprehension questions to ensure engagement with the text. The experiment was otherwise the same as for the control group.

### Measures

A variety of measures were used in order to enrich the behavioural data.

**Demographic questionnaire**. Basic demographic data were gathered, as well as participants' exercise habits. Participants were also asked about their current emotional state. (See Appendix AA.)

Mental Health Continuum Short Form (MHC-SF). Also known as the 'flourishing scale', this 14-item test gathers data about participants' well-being across three categories: emotional, psychological, and social (Keyes, 2002). With a self-report score between 0 (never) and 5 (every day) for each item, the overall score is out of 70. This score is used to determine whether respondents are in flourishing, moderate, or languishing mental health. (See Appendix BB.) There is substantial evidence to support its reliability, validity and utility (Hone et al., 2014). An alternative consideration, the more recent PERMA profiler (Butler & Kern, 2016), has since been widely adopted as a measure of flourishing, but was not yet available at the time of this study.

Paulhus' Spheres of Control (SOC). This 30-item questionnaire gathers data on three sub-scales of control: personal, interpersonal and socio-political. (See Appendix CC.)

Participants respond to each of the items using a Likert scale ranging from 1 (agree) to 7 (disagree). The score is calculated by adding the response to each question (reversing the scoring of negatively directed questions) to give a total out of 30, 10 for each domain.

This measure has demonstrated good convergent and discriminant validity for each of the sub-scales, as well as test-retest reliability (r = .74; Paulhus, 1983).

# Procedure

Participants were introduced to the study as follows: "This study is exploring ways in which people make judgements about the effect of their actions on outcomes." They were given an information sheet to read (Appendix DD) and asked to sign a consent form (Appendix EE). Measure questionnaires were then completed before starting the computer-based task.

Instructions for the computer-based task were then given, and participants were asked to respond (by pressing the space bar of the keyboard) at least some of the time and not to respond at least some of the time.

There were three practice trials and four blocks of 12 trials. The scenario image and text were presented for 5 s. The response window opened after 3 s, for 2 s. With an intertrial interval of 1 s, this gave a trial duration of 6 s. Half of the outcomes were 'successes'. This meant that the outcomes were fixed – regardless of whether the participant chose to respond or not – giving an expected contingency of 0. (The actual contingency could vary depending on each participant's unique response profile.)

Every scenario was accompanied by a desired outcome, written as "Anticipated outcome: [unique outcome, e.g. overtake the runner ahead of you]" above the scene and standard text "Will you choose to make an extra effort?" below it. The outcome screen was standard, with either "You achieved the outcome." with a green smiley face for a successful outcome, or "You did not achieve the outcome." if unsuccessful.

At the end of each block participants were asked to rate their sense of contingency, as a percentage, using a sliding scale on screen.

### Results

# Descriptives

Table 9 shows descriptive statistics for each condition across the four blocks.

# Table 9

Descriptive statistics for the contingency rating and number of responses per block

N. 400	Condition —	Contingency Rating	Response Frequency	
/v = 106		Mean	N	
Block 1	Control	43.65 (19.67)	8.61 (2.28)	31
	Priming	46.83 (25.41)	8.75 (1.89)	36
	Reappraisal	52.79 (21.26)	8.59 (1.76)	39
	Overall	48.09 (22.45)	8.65 (1.95)	106
Block 2	Control	40.71 (18.60)	8.45 (2.63)	31
	Priming	41.25 (23.08)	8.25 (2.76)	36
	Reappraisal	42.26 (22.14)	8.10 (2.62)	39
	Overall	41.46 (21.31)	8.25 (2.65)	106
Block 3	Control	39.06 (20.90)	8.87 (1.77)	31
	Priming	41.92 (24.15)	8.81 (2.82)	36
	Reappraisal	39.31 (23.23)	8.15 (2.74)	39
	Overall	40.12 (22.72)	8.58 (2.52)	106
Block 4	Control	41.35 (21.74)	8.52 (1.95)	31
	Priming	38.69 (23.21)	8.53 (2.65)	36
	Reappraisal	39.64 (25.22)	8.31 (3.01)	39
	Overall	39.82 (23.37)	8.44 (2.59)	106

Table 9 shows that participants gave, on average, contingency ratings of between 39% and 53%.

### Main Effects and Interactions

A mixed MANOVA was conducted to investigate the effect of condition (Control, Priming, Reappraisal) and block (1, 2, 3, 4) on contingency rating and response rate.

Results showed no significant interaction effects between condition and block (F < 1) for either contingency rating or response rate.

Furthermore, no significant differences were detected for the main effect of condition (F < 1) for either dependent variable (see Figure 21 and Figure 22). However, both experimental conditions on average exhibited higher contingency ratings (as hypothesised) and lower response frequency (contrary to hypothesis).



# **Contingency Ratings**

*Figure 21.* Mean contingency rating for each condition across the four blocks, and overall means. 'Combined' is the mean across all three conditions. (Error bars represent the standard error of the mean, *SEM.*)



### **Response Rate**



On average, contingency ratings dropped over the course of the experiment (Figure 21). The MANOVA results showed significant differences for the main effect of block for contingency rating [F(2.69, 276.71) = 4.733, p < .01,  $\eta_p^2 = .044$ )], but not for response rate. (Contingency results were Greenhouse-Geisser corrected due to violation of sphericity,  $\varepsilon = .81$ .) Bonferroni-corrected contrasts showed that there was a significant difference in contingency ratings between Block 1 and Blocks 3 (M = -7.66, p = .015) and 4 (M = -7.86, p = .019) (see Figure 21).

Based on the results shown in Figure 21, Block 1 responses exhibit a markedly different contingency rating from the other blocks. A *post hoc* analysis was thus carried out to explore the differences between Block 1 (Early) and the mean of Blocks 2, 3 and 4 (Late). A  $3 \times 2$  mixed ANOVA was carried out, with group (Control, Priming and Reappraisal) as the between-subjects variable and time (Early and Late) as the within-subjects variable. No significant interaction effect was found between condition and time (F < 1). The main effect of time was significant

 $[F(1, 74) = 6.03, p = .016, \eta_p^2 = .075]$ , with the later contingency ratings notably lower than those for the first block (M = -6.35, SE = 2.59, p = .016). The main effect of group was not significant (F < 1). Thus, regardless of condition, contingency was rated on average higher in the first block than in the other three. Interestingly, it appears that contingency ratings in the first block were more accurate than in the subsequent blocks. Scaling contingency (-1 to 1) to the response scale of 0–100 (i.e. -1 to 0, 0 to 50 and 1 to 100), the mean overall percentage error between actual contingency and estimated contingency in the first block was 11.3% but in blocks 2, 3 and 4 it was 19.7%, which is almost twice as large. This suggests that participants' estimation of contingency got *worse* over time.

A similar analysis was performed on the response rate data. No significant interaction effect was found between condition and time (F < 1). Neither were there significant main effects of either time or group.

# Response Rate, Perceived Contingency and Actual Contingency

Table 10 shows measured correlations between actual contingency, perceived contingency and response frequency across each of the four blocks.

# Table 10

Correlation matrix of actual contingency, perceived contingency and response frequency for each block

		Actual Contingency	Estimated Contingency	Response Rate
Block 1				
Actual Contingency	Pearson Correlation		.154	.262*
	Sig. (2-tailed)		.188	.023
	Ν		75	75
Estimated	Pearson Correlation	.154		.085
Contingency	Sig. (2-tailed)	.188		.462
	Ν	75		77
Response Rate	Pearson Correlation	.262*	.085	
	Sig. (2-tailed)	.023	.462	
	Ν	75	77	
Block 2				
Actual Contingency	Pearson Correlation		.264*	069
	Sig. (2-tailed)		.021	.554
	Ν		76	76
Estimated	Pearson Correlation	.264*		.016
Contingency	Sig. (2-tailed)	.021		.889
	Ν	76		77
Response Rate	Pearson Correlation	069	.016	
	Sig. (2-tailed)	.554	.889	
	Ν	76	77	
Block 3				
Actual Contingency	Pearson Correlation		.298**	.085
	Sig. (2-tailed)		.009	.461
	Ν		77	77

### Table 10

Correlation matrix of actual contingency, perceived contingency and response frequency for each block	Correlation matrix of actual contingenc	y, perceived contingency	and response frequence	cy for each block
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		Actual Contingency	Estimated Contingency	Response Rate
Estimated Contingency	Pearson Correlation	.298**		.062
	Sig. (2-tailed)	.009		.590
	Ν	77		77
Response Rate	Pearson Correlation	.085	.062	
	Sig. (2-tailed)	.461	.590	
	Ν	77	77	
Block 4				
Actual Contingency	Pearson Correlation		.102	.309**
	Sig. (2-tailed)		.378	.006
	Ν		77	77
Estimated Contingency	Pearson Correlation	.102		.128
	Sig. (2-tailed)	.378		.268
	Ν	77		77
Response Rate	Pearson Correlation	.309**	.128	
	Sig. (2-tailed)	.006	.268	
	Ν	77	77	

*Note*. \*p < .05 \*\*p < .01 (two-tailed)

The correlation matrix suggests no systematic correlation between response frequency and perceived contingency: a higher response frequency does not imply a raised perception of contingency. In addition, participants appear to be poor judges of contingency, as there is no demonstrable correlation between contingency rating and actual contingency.

Given the significant difference in contingency ratings between Block 1 and the remaining blocks, a further correlational analysis was carried out on the average values across Blocks 2, 3 and 4. No significant correlation was found between contingency estimate and response rate.

Psychological Measures, Response Rate and Perceived Contingency. Based on the preceding results, a general correlational analysis was carried out on the psychological measures and their possible relationship with contingency and response rate. Each measure was correlated with every participant's estimated contingency and response rate, averaged across all four blocks. The correlation matrix revealed no significant correlations with either of the behavioural dependent measures.

# Discussion

In a PPI using nudge techniques to affect perceived contingency in exercise-based scenarios, the two experimental conditions displayed higher contingency ratings on average than the control group. This finding was as hypothesised, but the difference was not statistically significant with no significant difference in response rates between experimental and control conditions being noted. The bias in contingency judgments is in keeping with previous research that shows people can overestimate null contingencies (Matute et al., 2019). In one study, it was found that overestimations in non-zero contingency scenarios were higher when the probability of the (successful) outcome increased from 0.125 to 0.5 to 0.875 (Shanks, 1987). Other research supports this (Alloy & Abramson, 1979; Dickinson et al., 1984; Shanks, 1985). The results in this study, with an outcome probability of 0.5, therefore add to these findings.

Given that the nudge techniques did not strongly separate the experimental and control conditions, well-being measures were compared across the whole cohort against contingency rating and response rate (i.e. collapsed across condition). There did not appear to be any significant relationships between the well-being measures and contingency rating or response rate. Thus, higher response rates or higher contingency ratings did not appear to correlate with greater well-being.

An interesting and unexpected effect arose in the pattern of participant contingency ratings over time. Significant differences between Block 1 and the other three blocks suggest that contingency judgments may have a temporal dependence. Research has shown that contingency learning can happen very guickly (Lewicki, 1985). This may explain why the ratings in Block 1 were, on average, more accurate than those in subsequent blocks. From an evolutionary perspective, survival is predicated on the ability of an individual to make rapid contingency judgments. Thus, it may be that a determination of contingency is made within the first block, and the degradation in accuracy may be as a result of loss of engagement through boredom or a drop off in concentration. Since the synthetic contingency was zero in this study (essentially random) this meant that responding did not 'matter'. Participants might have become more explicitly aware of the lack of association between their actions and outcomes as the experiment progressed and they may have lost interest in trying to continue to track the relationship, instead responding 'randomly'. Another possibility is that there may be two distinguishable means by which contingency learning takes place, differentiated by the neural systems involved. Such a dual approach does have supporting evidence (Kahneman, 2012). It may be that early contingencies are established by associative processes, and that these are rapid, unconscious and effortless (Matute et al., 2019). More effortful processes, involving more conscious reasoning, may then become dominant as time passes. If this is indeed the case, a self-reported measure of contingency may not be the optimum instrument to measure early implicit judgments. A behavioural measure may be more accurate, similar to the implicit association test (IAT) for testing implicit biases (Greenwald et al., 1998).

The outcomes here raise a number of interesting possibilities for follow up. The promising results suggest that with some refinements to the protocol, the observed differences may be increased. One aspect to consider is the contingency scale used for ratings. Participants gave, on average, contingency ratings of between 39% and 53% for a synthetic contingency of 0. It may be that participants interpreted a rating of 50% as the equivalent of a zero contingency. Though this

would not have quantitatively affected the results, it may have led to participant confusion in not understanding how the scale worked. Added complexity arises when participants experience an actual contingency that is negative. Even though the synthetic contingency target was 0, participants' unique response profiles led to variation around this target. Furthermore, there were large standard deviations associated with participant ratings, suggesting that a percentage scale may be too granular. A scale of -10 to +10 may solve these issues. Previous research using a similar paradigm (Wasserman et al., 1983) demonstrated marked success, with researchers using a scale from -100 to +100. In addition, participants were able to estimate equally well negative, zero and positive contingencies.

Another aspect was the high overall response rate, which was 70% on average i.e. participants on average responded more than 8 times (out of 12) in each block. With such a high baseline, a ceiling effect makes it problematic to really determine the effect of response rate on perceived contingency. Related to this is the high proportion of exclusions due to over- or under-responding. This would have impacted the discriminatory power of the study.

Finally, the synthetic contingency of 0 may be problematic not just for the negative actual contingency scenario, but also because a zero value is essentially 'random'. It may be harder for participants to rate, or engage meaningfully with, a zero contingency. If the synthetic contingency was raised by adjusting the outcome density, then participants may rate contingency more accurately. Moving forward it seemed wise to focus on ensuring the validity of the base task, so the idea of nudging responses was set aside to enable this.

### Study 2

Study 2 was similar in design to Study 1, but with the purpose of investigating two non-zero positive contingency scenarios by contrast. It is hypothesised that participants who exhibit higher response rates will overestimate the contingency experienced for both contingency levels. In line with previous research (Alloy & Abramson, 1979; Dickinson et al., 1984; Shanks, 1985, 1987) it is further hypothesised that, on average, the higher contingency condition will be overestimated to a greater degree than the lower one.

### Method

### Participants

A total of 58 undergraduate students (11 male, 19.0%) were recruited from Bangor University's SONA participant recruitment scheme. Ages ranged from 19 to 37 (M = 20.9, SD = 3.0). Participants received one course credit in return for participating.

This study was approved by Bangor University's School of Psychology Research Ethics Committee.

# Materials

The same set of stimuli and presentation methods for Study 1 were used in this study.

### Design

A within-subjects AB test design was employed. The computer-based task used in the study was similar to Study 1 in structure, but differed in three respects. First, in Study 2, no positive psychology messaging was presented. Second, the desired synthetic (expected) contingencies for the two trial blocks were set to 0.3 and 0.64 respectively. This was achieved by recoding the stimulus presentation to adapt to the participants' responses, adjusting accordingly to maintain the desired level of contingency<sup>2</sup>. The order in which the two blocks were presented was randomised to counterbalance any carryover effects. Finally, since the main aim of the study was to determine a robust method for manipulating perceptions of contingency, the effects on well-being were not investigated.

At the end of each block, participants were asked to rate their perceived contingency on a scale from -10 to +10, on screen. Participants' response rate (number of responses in a block) and response times (how long a participant took to respond to each scenario, if at all) were collected. The actual contingency experienced by each participant was calculated using the  $\Delta P$  index formula. This may differ from the synthetic contingency due to individual response patterns.

### Measures

A bespoke computer-based task based on that used in Study 1 was employed.

# Procedure

The procedure used was very similar to Study 1, except that each participant experienced two contingency conditions: 'high' (0.64) and 'low' (0.3). Each condition followed the same structure as Study 1, with three practice trials and four blocks of twelve experimental trials. Participants were only asked to give a contingency rating at the end of all four blocks in each condition (as opposed to at the end of each block in Study 1) as the actual contingency would vary across the blocks. This is due to the adaptive nature of the presentation software. Participants were explicitly asked to rate across all four blocks.

### Results

Participant contingency rating scores were divided by 10 to bring them in line with the standardised scale of contingency, which ranges from -1 to +1.

<sup>&</sup>lt;sup>2</sup> Because of the unpredictability of participants' responses, the intended contingency could not always exactly be achieved. This was especially true where participants had a low or high response rate, resulting in inflexible parameters for the adaptive presentation.

# Descriptives

Table 11 summarises the overall actual contingency for each block.

### Table 11

Descriptive group statistics

	Synthetic	Actual Contingency	Contingency Rating	Response Rate
Contingency	Mean (SD)	Mean (SD)	Mean (SD)	
Condition A ( <i>N</i> = 42)	0.30	0.35 (0.20)	0.02 (0.48)	9.26 (2.09)
Condition B ( <i>N</i> = 40)	0.64	0.71 (0.17)	0.55 (0.34)	9.72 (1.76)

Results indicate that the computer-based task on average simulated the desired contingency levels with reasonable accuracy (+17% for 0.3 and +11% for 0.64). Results were skewed upwards because of the participants who responded on every trial, which elevated their actual contingency (there being no values for *c* and *d* in the  $\Delta P$  formula). These cases were *not* excluded (as in Study 1), as each participant's *actual* contingency was used in the analysis. Participants appeared to recognise that the contingency in condition A was lower than in condition B, but on average they underrated the level of contingency for both. This was greater for condition A (which was estimated at approximately 6% of actual contingency, whereas it was 77% for condition B).

## Scatterplots and Correlations

The scatterplots in Figure 23 and Figure 24 compare actual (experienced) contingency (averaged across the four blocks) with participant contingency scale rating, for each participant, for both conditions.



*Figure 23.* Scatterplot of participants' contingency scale responses vs. actual average contingency across the four blocks of condition A (theoretical contingency = 0.3).



*Figure 24.* Scatterplot of participants' contingency scale responses vs. actual average contingency across the four blocks of condition B (theoretical contingency = 0.64).

Pearson correlation coefficients (Table 12) indicate no significant correlation between contingency scale rating and average actual contingency for either condition. Neither is there a significant correlation between contingency scale rating and response frequency.

A highly significant relationship between response frequency and average actual contingency occurs for both condition A [r(57) = .963, p < .001] and condition B [r(56) = .932, p < .001]. This is to be expected, as responding more frequently (i.e. increasing the values of *a* and *b* and reducing the values of *c* and *d* in the  $\Delta P$  formula) will mathematically drive the experienced contingency upwards.

# Table 12

Correlation matrix of average actual contingency, contingency rating and response frequency for each condition

		Average Actual Contingency	Contingency Rating	Response Frequency
Condition A (0.3) Average Actual	Pearson Correlation		.097	.963***
Contingency	Sig. (2-tailed)		.473	< .001
	Ν		57	57
Contingency Rating	Pearson Correlation	.097		.058
	Sig. (2-tailed)	.473		.670
	Ν	57		57
Response	Pearson Correlation	.963***	.058	
Frequency	Sig. (2-tailed)	< .001	.670	
	Ν	57	57	
Condition B (0.64)				
Average Contingency	Pearson Correlation		.194	.932***
0 7	Sig. (2-tailed)		.151	< .001
	Ν		56	56
Contingency Rating	Pearson Correlation	.194		.105
	Sig. (2-tailed)	.151		.443
	Ν	56		56
Response Frequency	Pearson Correlation	.932***	.105	
	Sig. (2-tailed)	< .001	.443	
	Ν	56	56	

*Note*. \*\*\**p* < .001 (2-tailed)

Based on the outcome of Study 1, in which there was a significant difference in the contingency rating between first and subsequent blocks, a further correlational analysis was performed on each participant's contingency rating and their actual contingency in Block 1. This was also performed for Block 4, in case participants were influenced by the recency effect or other temporal factors. In both cases, although the correlations were positive, they did not achieve the threshold of significance.

A paired-samples *t*-test was performed to determine whether the observed difference in accuracy of estimation between the two conditions was significant. The difference between participants' rating and actual contingency was higher in condition A (M = -0.33, SD = 0.50) than in condition B (M = -0.15, SD = 0.34), and this difference was determined to be significant [t(54) = 2.59, p = .012]. Thus participants made a poorer estimation of the lower contingency condition than the higher one, on average.

### Discussion

In this study, the accuracy of judgements of contingency in a hypothetical exercise scenario were tested for two levels of contingency, high (0.64) and low (0.3). Revisions to the experimental paradigm from the previous study broadly improved the quality of data collected. For example, no participant data was excluded. The results, however, were mixed. There was found to be no significant linear correlation between estimates of contingency and actual contingency experienced. This suggests that participants were poor at estimating the strength of the relationship between their actions and the outcome. Although previous research has shown that contingency judgements are subject to bias (Matute et al., 2019), it is generally accepted that our estimations of contingency are by and large quite accurate (Baker et al., 1993; Shanks & Dickinson, 1988; Wasserman, 1990; Wasserman et al., 1983).

In both low and high conditions participants *underestimated* the contingency experienced. This goes against the effect hypothesised, and against previous research that has found an overestimation of contingency in positive contingency scenarios (Alloy & Abramson, 1979; Dickinson et al., 1984; Shanks, 1985, 1987). However, it was found that estimations in the high condition were significantly higher in comparison to the actual contingency than they were in the low condition. This

appears to lend support to the hypothesis that higher contingency scenarios will lead to higher overestimation. In this study, though the contingency was underestimated in both cases, in the high-contingency condition participants were significantly more generous in their estimations than in the low-contingency condition.

A third hypothesis in this study was that participants who responded more frequently would give higher contingency ratings. This was not evidenced despite, ironically, the fact that a high response frequency *did* mathematically manipulate the experienced contingency upwards. However, analysis in this respect may have been problematic due to the high overall average response rate and ceiling effect of a twelve-trial protocol, meaning response rate data was negatively skewed.

Worth exploring in more detail are the potential time-dependent aspects of contingency learning. In the previous study, it was found that estimations of contingency in the first block were more accurate than those in subsequent blocks. A possible explanation was that this was due to an implicit, unconscious and rapid mechanism of learning - one of the systems in the dual system approach, well outlined by Kahneman (2012). After this early assessment of contingency, there was a deterioration in judgement, perhaps due to attentional factors. So, what drives the dominance of early and more accurate contingency judgements? One possibility is emotional valence. The nudge techniques of priming and reappraisal may have increased the vigilance of participants, thus 'priming' the implicit learning system. The average contingency ratings of the two nudge condition groups were closer to the actual contingency than the control group in Block 1 (though these were not statistically significant). In other studies, it seems that the explicit system dominates the contingency learning process. In such cases, what appears to be a more rational and calculated approach leads to judgements getting *better* over time, rather than worse. For example, in one particular study (see Figure 25), for three different levels of contingency (-0.75, 0 and +0.75), it was found that contingency ratings got more accurate over time in a roughly exponential manner, over approximately four minutes (Shanks & Dickinson, 1988).



*Figure 25.* Average judgments of contingency over time (in seconds) for three levels of contingency (Shanks & Dickinson, 1988).

In the current study, a total time of around 288s for task completion would seem to align with the ideal time for an accurate rating using the explicit system. There are a number of reasons why that may not have happened here. One suggestion is to do with the variation in the *actual* contingency experienced by each participant. As outlined above, biases in contingency judgements are dependent on the actual contingency, with a tendency towards increased bias at higher contingencies. Therefore, a linear relationship (correlational analysis) may not be the most appropriate model in this case. Related to this, it would be interesting to track contingency judgments over the course of the experiment to see how they change with time. In this respect, asking for a contingency rating after each block, as in the previous study, may be more useful for exploring the temporal aspects in more detail.

### Conclusions

The work in this chapter raises several considerations for the design of a contingency learning protocol. Based on previous research, which demonstrated

robust effects, it is clear from the studies here that these effects are the result of a complex combination of factors that need to be controlled and monitored carefully. For example, the apparent time dependency of contingency judgments suggests that contingency ratings should be sampled more frequently – preferably continuously – so that a more accurate profile may be obtained. For example, participants could be allowed to adjust their estimation of contingency freely. Another possible direction for this work would be to enrich the data by adding exploration of the neural aspects of the contingency learning process, say by combining the behavioural element with magnetic resonance imaging (MRI). Doing so will enable further work on the manipulation of contingency judgments and their impact on sense of control and well-being.

# CONCLUSIONS

This thesis makes a valuable contribution to extending our understanding of positive psychology interventions (PPIs) and how they may best be designed for maximal impact, particularly in educational settings. Mental health is a global concern, not least because estimates show that as few as one in four people are considered to be flourishing (Keyes, 2002). Most people thus stand to benefit from improved mental health.

The research in this thesis set out to identify PPIs that could be used to make robust improvements to well-being in young people, and whether educational settings would be appropriate for the delivery of such interventions. Two existing PPIs were tested – a journaling exercise about good things (Seligman et al., 2005) and identifying and utilising signature strengths (Peterson et al., 2005). Further work was also carried out, in the form of a newly designed PPI, to investigate the role of perception of control in well-being. It was found that the PPIs used herein broadly increased levels of well-being, operationally defined as the sum contribution of a variety of measures, including self-esteem, happiness, reduction in depressive symptoms, life satisfaction and affect.<sup>3</sup> The diary intervention led to an increase in happiness and decrease in depressive symptoms in primary school children - both post-intervention and at three-month follow-up (Chapter 1) - as well as significantly improved academic scores (Chapter 2). Similar results were found when the intervention was used with undergraduates, albeit less strongly. A signature strengths intervention showed more promise for this group, with marked improvements in self-esteem and life satisfaction (Chapter 3). Overall, the results add to a sizeable body of literature that endorses the effectiveness and value of PPIs, and they support ongoing work. The exploratory work creating a novel exercise-framed PPI was less successful and will require further work to understand better how to implement such a contingency-based intervention.

<sup>&</sup>lt;sup>3</sup> The studies in Chapters1–3 measured depression. Anxiety might also have been a useful dimension to measure. However, it was felt that depression scores were more useful and there were concerns about overburdening participants (particularly primary school children) with too many metrics.

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In overview, perhaps the most important finding across this thesis is the varying profile of well-being outcomes, both within cohorts and across studies. What became increasingly evident as the work progressed, was that no single intervention could realistically be effective for everyone of a particular age, or across the full age range from primary school to higher education. The appeal of such a panacean intervention is easy to understand – positive psychology targets most of the population, so being able to use a single proven intervention reduces complexity and facilitates mass delivery. Indeed, the 'first wave' of positive psychology claimed that PPIs were universal aids for promoting well-being across the population (Linley et al., 2006). However, results in this thesis indicate this approach is neither realistic nor feasible and, in some cases, has the potential for negative consequences. For example, Chapter 1 demonstrated that baseline well-being was an important factor to consider. A tertile split showed that those children who were least happy at the start benefited most from the intervention, whilst the well-being of the happiest actually dropped. The sample in Chapter 2 scored highly on the measure of depression on average, and it was found that the benefits from the PPI were inconclusive, even though academic scores improved significantly for the experimental group in comparison with the control group. Baseline scores appear to have been a factor in this study too. In Chapter 3, it was found that the same diary intervention improved well-being in undergraduates, but that this improvement was not lasting. A signature strengths intervention, however, produced significant and sustained changes in self-esteem and life satisfaction. Indications are, therefore, that different PPIs impact well-being differently and that each one differs in its effectiveness across age groups. This means that a one-size-fits-all approach is not appropriate when implementing them: PPIs need to be targeted and selectively applied. Evidence in this thesis suggests that the following items need to be considered when utilising PPIs: (1) the type of intervention to be used, (2) whether the effects are intended to be lasting or of immediate 'in-the-moment' impact and (3) the well-being profile of participants at the outset. Failure to do so will likely reduce the effectiveness of the intervention and, in some cases, may actually do harm.

Furthermore, work in the first chapter also attempted to identify the underlying psychological mechanism driving PPI effects. Little work to date has asked this sort of question and will undoubtedly be important in mapping appropriate PPIs to target groups in future.

### Type of Intervention

It was found in the current research that a good things diary exercise was effective for primary school children, with robust and persistent effects. This is an important finding because the intervention is relatively simple and easy to implement, with good ecological validity for a non-laboratory setting. With a view to rolling out a wellbeing programme widely in primary schools, this intervention would be a good candidate. It could easily be distributed as a smartphone or tablet 'app', for example.

For older students, however, journaling appears moderately effective but not lasting. This suggests that the impact of a particular PPI may be age dependent. Age as a factor in effectiveness has been noted in previous research: in a metaanalysis of PPIs, for example, it was found that age played a significant role in PPI effectiveness for adults, with older people benefitting more (Sin & Lyubomirsky, 2009).

In the undergraduate group, it appears that the signature strengths intervention is better at boosting well-being. It is hypothesised here that this is due to the active engagement component of the intervention – participants received a unique strengths profile based on an interview and they were asked to co-create the intervention by utilising signature strengths of their choosing. In so doing they likely gained a greater sense of agency or control over the outcome. It is this thinking that led to the design of the research in Chapter 4, which explored the role of contingency judgements on well-being. Though not as easy to implement as the diary intervention, strengths work is certainly more suitable for dissemination when compared with individual therapy, for example. If integrated into the curriculum – say hosted on a university's intranet – then it becomes feasible as a broad institutional programme. Such an initiative would support the drive to shift

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educational institutions towards providing 'positive education': the application of positive psychology in education (Oades et al., 2011).

On a related note, each chapter in this thesis explored the efficacy of one PPI at a time. Given that no one PPI appears to be singularly effective, there is an argument that utilising multiple PPIs simultaneously might be more impactful. Since it is now broadly accepted that PPIs tend to cause small but robust improvements in well-being, using several different interventions in one programme – known as multicomponent PPIs, or MPPIs – may collectively prove to be of more benefit than a single intervention. Although this approach has been shown to work (Chilver & Gatt, 2022), evidence thus far does not appear to indicate that it is patently preferable. A meta-analysis by Hendriks et al. (2020), for example, revealed only small to moderate effects of MPPIs on well-being, depression, anxiety and stress – insufficient to distinguish such interventions from single PPIs.

### Lasting Effects

The results in this thesis revealed some variation in the persistence of well-being improvements produced by the implemented PPIs. This variation appeared to be both age related and dependent on the specific intervention (as mentioned above). In addition, though, certain well-being measures appeared more or less susceptible to lasting change than others. For example, improvement in depressive symptoms and increases in happiness were compelling in primary students (Chapter 1) and these improvements were sustained over several months. Undergraduates did not benefit from such lasting effects in the diary intervention (Chapter 3), but the measures of self-esteem and life satisfaction showed significant improvements later. Interestingly, the two PPIs used in this thesis – the positive events diary and using signature strengths – have been shown to be the most effective at producing lasting effects (Seligman et al., 2005). Critically, though, that finding did not account for the age of the participants.

It is important to emphasise that, for many positive psychologists, lasting effects are a cornerstone of what defines a PPI (Bolier et al., 2013; Parks & Biswas-
Diener, 2013; Schueller & Parks, 2014; Sin & Lyubomirsky, 2009), though this comes back to the question of the aim or goal of the intervention in the first place. Whether lasting effects could be achieved used to be a key debate in positive psychology (for a review, see Lyubomirsky, Sheldon, et al., 2005). Critics argued that we exist on a 'hedonic treadmill' (Brickman & Campbell, 1971) and have a relatively stable level of happiness. Therefore, although events may temporarily improve someone's happiness, people adapt quickly to their circumstances and inevitably revert back to their baseline level (Brickman & Campbell, 1971; Kahneman, 1999; Lykken & Tellegen, 1996). As an illustration, studies have shown that people who win the lottery are no happier after their win than they were previously (Brickman et al., 1978; Kuhn et al., 2011; Lutter, 2007; Sherman et al., 2020). In this view, making long-term changes to happiness was seen to be a Sisyphean task.

Now, subsequent work has shown that sustained improvements in well-being are indeed possible (Boehm & Lyubomirsky, 2009; Diener et al., 2009; Seligman et al., 2005; Skarin & Wästlund, 2020). It has been convincingly found that the best way to effect such persistence is to align one's behaviour with that of those who are happy (Lyubomirsky, 2001). Therefore, there appears to be an element of 'action' required to generate lasting change (at least in adults). According to Lyubomirsky and colleagues (2005), intentional activities may account for 40% of our happiness, our genetic set point accounts for 50%, and circumstances for approximately 10%. Thus, they argue, since we cannot change our genetics and people rapidly adapt to circumstances, it is intentional activities that provide the best opportunity to produce lasting increases in well-being. There is a wide body of research that supports the influence of personal activation on PPI results. People who self-select for PPIs demonstrate greater gains from them, for example (Sin & Lyubomirsky, 2009). PPIs are also found to work best when people make an effort to engage in the activity (Layous, Lee, et al., 2013; Lyubomirsky et al., 2011), are motivated to improve their happiness (Lyubomirsky et al., 2011; Ryan & Deci, 2000) and have faith that their effort will be worthwhile (Ajzen, 1991; Layous, Nelson, et al., 2013). In an example of an educational setting, a study on undergraduates found that the best predictors of

sustained success for a PPI were intrinsic motivation and expectancy (Skarin & Wästlund, 2020).

This purposeful action raises questions about the role of autonomy and sense of control in PPIs, as was investigated in Chapter 4. After all, it is the very means by which we determine contingency – an approach mindset that leads to interaction with our environment, enabling us to make judgements about the relationship between actions and outcomes. The strengths intervention may have been effective for undergraduates because it had more valency for them: it was codesigned, and it utilised existing cognitive schema. Thus, trait-like variables like selfesteem and life satisfaction are sustainably affected – the changes are meaningful and congruent and therefore lasting. This idea underpins the relatively new positive therapy approaches such as cognitive behavioural therapy (CBT) and acceptance and commitment therapy (ACT), where changes need to be incorporated into our thought-action repertoire to achieve lasting benefits. Overall, it seems - certainly for adults - lasting positive changes in well-being are challenging to achieve and require intentional and mindful practice. This is one reason why it has been suggested in this thesis that PPIs be incorporated into educational curricula. Educational institutions can facilitate regular engagement with positive exercises and help to build lasting routines.

For children, perhaps the 'active' component is less important, as they do not yet have fixed cognitive and behavioural schema or metacognitive abilities that need to be overcome. Hence, more 'hedonic' interventions, such as a good things diary, are both effective and lasting for them. In order for the results of such lighttouch interventions to be more persistent in adults, there is at the very least a suggestion that they need to be implemented for a reasonably long period in order to better habituate the behaviours and shift the hedonic dial more permanently. Two meta-analyses of PPIs have found that the length of an intervention is a significant moderator of its effectiveness (Carr et al., 2021; Sin & Lyubomirsky, 2009). Related to this is adherence to the PPI. In the studies carried out herein, one difficulty experienced was that of monitoring adherence to the interventions. With the

assistance of technology – if disseminated via an app, say – then a regular reminder, especially if gamified, could encourage both longer engagement with and better adherence to a PPI. Research by Seligman et al. (2005) found that both adherence to and continued practice of a PPI increased the chances of lasting effects (at least up to six months). In a study on undergraduates, those who continued PPI exercises of their own volition for a further six months demonstrated significantly greater and more robust improvements in well-being than those who quit at the end of the intervention (Skarin & Wästlund, 2020).

Together, these findings support a sustained and whole-institution approach to PPIs in order to effect meaningful and lasting change: positive education, in short. There are few examples of such programmes, probably due to their ambitious scope, but one attempt at a school in Australia is notable. Carried out by Seligman and associates (2009) at Geelong Grammar over the course of a full academic year, the intervention aimed to embed positive psychology in the curriculum across the entire school. Though there is scarce scientific evidence of the programme's effectiveness, the school continues to use the positive education model and feedback has been favourable by all accounts (Norrish & Seligman, 2015). On a practical note however, few institutions would have sufficient resources to implement such a programme. Perhaps, in time, a leaner best practice model may be developed that can be rolled out more cost-effectively.

### **Baseline Measures**

Positive psychology's focus is on a broad sector of society. It targets the approximately 70% of the population who are languishing or who have moderate mental health. The work in this thesis has shown that a one-size-fits-all approach is unfeasible. It has already shown that there are different response characteristics depending on age and type of intervention. What was also evident is that PPIs appear to have differing effects depending on where people are situated on the mental health continuum. Results show that there is value in at least making a broad distinction between languishing, moderate mental health and flourishing. Those individuals who languish appear to benefit most from PPIs. This was evidenced in

the tertile split utilised in Chapter 1 – those children who scored lowest on well-being measured appeared to benefit the most from the intervention and those in the middle tertile (assumed to be of moderate mental health) less so. The most surprising finding was an apparent regression by those in the top tertile, likely to include flourishing individuals. It is not inconceivable, therefore, that PPIs may actually cause *harm* in certain circumstances. A possible reason for this that asking children to revisit events may lead to a questioning of the accuracy of prior positive judgments and a re-evaluation and 'downgrading' thereof. For young children this may be the early stages of metacognition, and drawing explicit attention of the happiest individuals to inner state variables awakens self-awareness of emotion and subjective state. Froh et al. (2009) believe this phenomenon may be due to a ceiling affect: children who already have a high positive emotional state have reduced capacity for well-being improvements.

There is thus an argument to target PPIs only at those most at risk of falling into mental ill health – in other words, those who languish. Indeed this is exactly the finding in the final report on the UK Resilience Programme in schools. The authors stress that those "who had worse initial symptoms of depression or anxiety … were more likely to experience a larger measured impact … on their depression and anxiety scores" (Challen et al., 2011, p. 4). Lyubomirsky and Layous (2013) also note that an individual's baseline affective state is a predictor of the degree of benefit from a PPI. As an example, adolescents with low positive affect were found to benefit more from a gratitude intervention (Froh et al., 2009).

## Impact

In summary, the impact of the overall findings in this research should not be underestimated. It has implications for the distribution of PPIs at large scale – for example the very ones that have been advocated herein in educational settings. It is self-evident that such programmes need to be administered with caution and due consideration, taking into account the age and baseline state of participants as well as the nature of the intervention. Several recommendations are made:

- Interventions are best targeted at those who meet the criteria for languishing. They may also be applied to individuals with moderate mental health, but are not necessarily recommended for those who are flourishing.
- 2. In educational settings, amongst young children it appears that affective interventions (such as a positive events diary) are highly beneficial. In young adults, such interventions seem less effective. Exercises that require effortful engagement and which are more individually tailored (such as using signature strengths) are more promising.
- 3. PPIs should be designed to produce lasting well-being improvements. Several factors contribute to facilitating this. First, adherence to the intervention is crucial. Second, regular and habitual practice increase the chances of making a sustained improvement. So, the longer an intervention is used the more likely it is to be beneficial. Finally, whilst 'feeling good' is undoubtedly desirable, indications are that such a hedonic interpretation of well-being is not compatible with lasting change. Such change is likely to come from driving shifts in more stable characteristics such as self-esteem and life satisfaction, which are underpinned by cognitive and behavioural schema and habits. This may be more difficult to achieve, and take longer, but is likely to result in tangible benefits for mental health in youngsters.

- Abdel-Khalek, A. M. (2006). Measuring happiness with a single-item scale. *Social Behavior and Personality: An International Journal*, *34*(2), 139–150. https://doi.org/10/czfkbk
- Abela, J. R. Z. (2001). The Hopelessness Theory of Depression: A Test of the Diathesis–Stress and Causal Mediation Components in Third and Seventh Grade Children. *Journal of Abnormal Child Psychology*, *29*(3), 241–254. https://doi.org/10.1023/A:1010333815728
- Adi, Y., Kiloran, A., Janmohamed, K., & Stewart-Brown, S. (2007). *Systematic review* of the effectiveness of interventions to promote mental wellbeing in primary schools Report 1: Universal approaches which do not focus on violence or bullying. https://www.nice.org.uk/nicemedia/live/11948/43911/43911.pdf
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/10/cc3
- Allan, L. G. (1980). A note on measurement of contingency between two binary variables in judgment tasks. *Bulletin of the Psychonomic Society*, *15*(3), 147– 149. https://doi.org/10/ggxttc
- Alloy, L. B., & Abramson, L. Y. (1979). Judgment of contingency in depressed and nondepressed students: Sadder but wiser? *Journal of Experimental Psychology: General*, *108*(4), 441.
- Alloy, L. B., & Seligman, M. E. P. (1979). On the Cognitive Component of Learned Helplessness and Depression. In G. H. Bower (Ed.), *Psychology of Learning and Motivation* (Vol. 13, pp. 219–276). Academic Press. https://doi.org/10.1016/S0079-7421 (08)60084-5
- Andrews, F. M., & Crandall, R. (1976). The validity of measures of self-reported wellbeing. *Social Indicators Research*, *3*(1), 1–19.
- Argyle, M., Martin, M., & Crossland, J. (1989). Happiness as a function of personality and social encounters. In J. P. Forgas & J. M. Innes (Eds.),
   *Recent advances in social psychology: An international perspective* (pp.

189–203). Elsevier.

http://www1.eur.nl/fsw/happiness/hap\_bib/src\_pubs.php?mode=1&Subject= 1809

- Arthaud-day, M. L., Rode, J. C., Mooney, C. H., & Near, J. P. (2005). The Subjective Well-being Construct: A Test of its Convergent, Discriminant, and Factorial Validity. *Social Indicators Research*, *74*(3), 445–476. https://doi.org/10/c72bsk
- Ashby, F. G., Isen, A. M., & Turken, U. (1999). A neuropsychological theory of positive affect and its influence on cognition. *Psychological Review*, *106*(3), 529. https://doi.org/10/csb4rm
- Austin, D. B. (2005). *The effects of a strengths development intervention program upon the self-perceptions of students' academic abilities*. Azusa Pacific University.
- Auyeung, L., & Mo, P. K. H. (2019). The efficacy and mechanism of online positive psychological intervention (PPI) on improving well-being among Chinese university students: A pilot study of the best possible self (BPS) intervention.
   *Journal of Happiness Studies*, 20(8), 2525–2550. https://doi.org/10/gnsjcb
- Bailey, L., & Challen, A. (2012). The UK Penn Resilience Programme: A summary of research and implementation. *The Psychology of Education Review*, *36*(2), 32–39.
- Baker, A. G., Mercier, P., Vallée-Tourangeau, F., Frank, R., & Pan, M. (1993).
  Selective associations and causality judgments: Presence of a strong causal factor may reduce judgments of a weaker one. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 19*(2), 414.
  https://doi.org/10/cg3d74
- Bamford, C., & Lagattuta, K. H. (2012). Looking on the bright side: Children's knowledge about the benefits of positive versus negative thinking. *Child Development*, *83*(2), 667–682.

- Bechara, A., Damasio, H., Tranel, D., & Damasio, A. R. (1997). Deciding advantageously before knowing the advantageous strategy. *Science*, *275*(5304), 1293–1295. https://doi.org/10/dv2gn9
- Beck, C. T. (1993). Teetering on the edge: A substantive theory of postpartum depression. *Nursing Research*. https://doi.org/10/d4vxgq
- Bialobrzeska, O., Baba, J., Bedyńska, S., Cichocka, A., Cislak, A., Formanowicz, M., Goclowska, G., Jakubik, Z., & Kozakiewicz, K. (2020). *Keep kind and carry* on. Everyday kindness enhances well-being and prosocial behavior in the time of COVID-19. https://doi.org/10/gnrxj4
- Biswas-Diener, R., Vittersø, J., & Diener, E. (2005). Most people are pretty happy,
  but there is cultural variation: The Inughuit, the Amish, and the Maasai. *Journal of Happiness Studies*, 6(3), 205–226. https://doi.org/10/fdt7bn
- Boehm, J. K., & Lyubomirsky, S. (2009). The promise of sustainable happiness. In S.J. Lopez (Ed.), *Handbook of Positive Psychology* (2nd ed., pp. 667–677).Oxford University Press.
- Bolier, L., Haverman, M., Westerhof, G. J., Riper, H., Smit, F., & Bohlmeijer, E.
  (2013). Positive psychology interventions: A meta-analysis of randomized controlled studies. *BMC Public Health*, *13*(1), 1–20. https://doi.org/10/gbcxtd
- Brickman, P., & Campbell, D. T. (1971). Hedonic relativism and planning the good society. In M. Appley (Ed.), *Adaptation Level Theory* (pp. 287–302). New York: Academic Press.
- Brickman, P., Coates, D., & Janoff-Bulman, R. (1978). Lottery winners and accident victims: Is happiness relative? *Journal of Personality and Social Psychology*, *36*(8), 917. https://doi.org/10/cwszmd
- Brown, C. A., & Lilford, R. J. (2006). The stepped wedge trial design: A systematic review. *BMC Medical Research Methodology*, *6*(1), 54.
- Brunwasser, S. M., Gillham, J. E., & Kim, E. S. (2009). A meta-analytic review of the Penn Resiliency Program's effect on depressive symptoms. *Journal of Consulting and Clinical Psychology*, 77(6), 1042.

- Burnett, P. C. (1994). Self-concept and self-esteem in elementary school children. *Psychology in the Schools*, *31*(2), 164–171. https://doi.org/10/ddbzxx
- Burnett, P. C. (1996). An investigation of the social learning and symbolic interaction models for the development of self-concepts and self-esteem. *Journal of Family Studies*, 2(1), 57–64. https://doi.org/10/d72x9j
- Burton, C. M., & King, L. A. (2004). The health benefits of writing about intensely positive experiences. *Journal of Research in Personality*, *38*(2), 150–163.
- Butler, J., & Kern, M. L. (2016). The PERMA-Profiler: A brief multidimensional measure of flourishing. *International Journal of Wellbeing*, *6*(3), Article 3. https://doi.org/10.5502/ijw.v6i3.526
- Caprara, G. V., & Steca, P. (2006). The contribution of self–regulatory efficacy beliefs in managing affect and family relationships to positive thinking and hedonic balance. *Journal of Social and Clinical Psychology*, *25*(6), 603–627.
- Carmona-Halty, M., Salanova, M., Llorens, S., & Schaufeli, W. B. (2021). Linking positive emotions and academic performance: The mediated role of academic psychological capital and academic engagement. *Current Psychology*, 40(6), 2938–2947. https://doi.org/10/gm7h9j
- Carr, A., Cullen, K., Keeney, C., Canning, C., Mooney, O., Chinseallaigh, E., &
   O'Dowd, A. (2021). Effectiveness of positive psychology interventions: A systematic review and meta-analysis. *The Journal of Positive Psychology*, *16*(6), 749–769. https://doi.org/10/ghk85f
- Carter, P. J., Hore, B., McGarrigle, L., Edwards, M., Doeg, G., Oakes, R., Campion, A., Carey, G., Vickers, K., & Parkinson, J. A. (2018). Happy thoughts:
  Enhancing well-being in the classroom with a positive events diary. *The Journal of Positive Psychology*, *13*(2), 110–121. https://doi.org/10/ggbm79
- Carver, C. S. (2003). Pleasure as a sign you can attend to something else: Placing positive feelings within a general model of affect. *Cognition and Emotion*, *17*(2), 241–261. https://doi.org/10/fvjfbw

- Carver, C. S., Scheier, M. F., & Segerstrom, S. C. (2010). Optimism. *Clinical Psychology Review*, *30*(7), 879–889.
- Chakhssi, F., Kraiss, J. T., Sommers-Spijkerman, M., & Bohlmeijer, E. T. (2018). The effect of positive psychology interventions on well-being and distress in clinical samples with psychiatric or somatic disorders: A systematic review and meta-analysis. *BMC Psychiatry*, *18*(1), 1–17. https://doi.org/10/gdt8vt
- Challen, A., Machin, S. J., & Gillham, J. E. (2014). The UK Resilience Programme: A school-based universal nonrandomized pragmatic controlled trial. *Journal of Consulting and Clinical Psychology*, 82(1), 75. https://doi.org/10/f5rvkp
- Challen, A., Noden, P., West, A., & Machin, S. (2009). UK resilience programme evaluation: Interim report. *RR094. Department for Children, Schools and Families*.
- Challen, A., Noden, P., West, A., & Machin, S. (2011). *UK resilience programme evaluation*.

Children and Young Persons Act, (2008). https://www.legislation.gov.uk/ukpga/2008/23/contents

Chilver, M. R., & Gatt, J. M. (2022). Six-Week Online Multi-component Positive Psychology Intervention Improves Subjective Wellbeing in Young Adults. *Journal of Happiness Studies, 23*(3), 1267–1288.

https://doi.org/10.1007/s10902-021-00449-3

- Chung, M. L., Bakas, T., Plue, L. D., & Williams, L. S. (2016). Effects of Self-Esteem, Optimism, and Perceived Control on Depressive Symptoms in Stroke Survivor-Spouse Dyads. *The Journal of Cardiovascular Nursing*, *31*(2), E8– E16. https://doi.org/10/f8bst3
- Clifton, D. O., Anderson, E. C., & Schreiner, L. A. (2016). *Strengths Quest: Discover and Develop Your Strengths in Academics, Career, and Beyond* (2nd ed. edition). Gallup Press.
- Coffey, J. K., Warren, M. T., & Gottfried, A. W. (2015). Does Infant Happiness Forecast Adult Life Satisfaction? Examining Subjective Well-Being in the First

Quarter Century of Life. *Journal of Happiness Studies*, *16*(6), 1401–1421. https://doi.org/10/f72dxn

- Cohn, M. A., Fredrickson, B. L., Brown, S. L., Mikels, J. A., & Conway, A. M. (2009).
   Happiness unpacked: Positive emotions increase life satisfaction by building resilience. *Emotion*, *9*(3), 361. https://doi.org/10/cg97cx
- Coppley, J., & Niemiec, R. M. (2021). Character Strengths Interventions in Education Systems. In *The Palgrave Handbook of Positive Education* (pp. 395–420). Palgrave Macmillan, Cham.
- Cosmides, L., & Tooby, J. (2000). Evolutionary psychology and the emotions. *Handbook of Emotions*, *2*(2), 91–115.
- Crocker, J., Cornwell, B., & Major, B. (1993). The stigma of overweight: Affective consequences of attributional ambiguity. *Journal of Personality and Social Psychology*, 64(1), 60. https://doi.org/10/bhrbgv
- Cronbach, L. J., & Furby, L. (1970). How we should measure 'change': Or should we? *Psychological Bulletin*, *74*(1), 68–80. https://doi.org/10/dqv3cq
- Cruise, S. M., Lewis, C. A., & McGuckin, C. (2006). Internal consistency, reliability, and temporal stability of the Oxford happiness questionnaire short-form:
   Test-retest data over two weeks. *Social Behavior and Personality: An International Journal*, *34*(2), 123–126. https://doi.org/10/fpw2mr
- Csikszentmihalyi, M., & Seligman, M. E. P. (2000). Positive psychology. *American Psychologist*, *55*(1), 5–14. https://doi.org/10/dt4zs8
- Cummins, R. A. (2003). Normative life satisfaction: Measurement issues and a homeostatic model. *Social Indicators Research*, *64*(2), 225–256.
- Cummins, R. A., & Nistico, H. (2002). Maintaining life satisfaction: The role of positive cognitive bias. *Journal of Happiness Studies*, *3*(1), 37–69. https://doi.org/10/cvg5jd
- Dalgleish, T., & Werner-Seidler, A. (2014). Disruptions in autobiographical memory processing in depression and the emergence of memory therapeutics.
   *Trends in Cognitive Sciences*, *18*(11), 596–604.

- Danner, D. D., Snowdon, D. A., & Friesen, W. V. (2001). Positive emotions in early life and longevity: Findings from the nun study. *Journal of Personality and Social Psychology*, *80*(5), 804. https://doi.org/10/fngqz5
- Dattani, S., Ritchie, H., & Roser, M. (2021). Mental Health. *Our World in Data*. https://ourworldindata.org/mental-health
- De Neve, J.-E., Diener, E., Tay, L., & Xuereb, C. (2013). The objective benefits of subjective well-being. *World Happiness Report*.
- de Pury, J., & Dicks, A. (2020, May 18). *Stepchange: Mentally healthy universities*. Universities UK. https://www.universitiesuk.ac.uk/what-we-do/policy-and-research/publications/stepchange-mentally-healthy-universities
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic Motivation and Self-Determination in Human Behavior*. Springer US. https://doi.org/10.1007/978-1-4899-2271-7
- Deci, E. L., & Ryan, R. M. (2000). The 'What' and 'Why' of Goal Pursuits: Human Needs and the Self-Determination of Behavior. *Psychological Inquiry*, *11*(4), 227–268. https://doi.org/10/bfn2hn
- Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and Education: The Self-Determination Perspective. *Educational Psychologist*, 26(3–4), 325–346. https://doi.org/10/dk7ttj
- Department for Children, S. & Families. (2008). *Targeted mental health in schools* project: Using the evidence to inform your approach: A practical guide for headteachers and commissioners. DCSF London.
- Dickinson, A., Shanks, D., & Evenden, J. (1984). Judgement of act-outcome contingency: The role of selective attribution. *The Quarterly Journal of Experimental Psychology Section A*, *36*(1), 29–50. https://doi.org/10/bdrxt2
- Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, 95(3), 542–575.
- Diener, E. (2000). Subjective well-being: The science of happiness and a proposal for a national index. *American Psychologist*, *55*(1), 34–43. https://doi.org/10.1037/0003-066X.55.1.34

- Diener, E., & Chan, M. Y. (2011). Happy people live longer: Subjective well-being contributes to health and longevity. *Applied Psychology: Health and Well-Being*, 3(1), 1–43. https://doi.org/10/ckbjqs
- Diener, E., & Diener, C. (1996). Most people are happy. *Psychological Science*, *7*(3), 181–185. https://doi.org/10/b2hm5f
- Diener, E., Diener, C., Choi, H., & Oishi, S. (2018). Revisiting "Most People Are Happy"—And Discovering When They Are Not. *Perspectives on Psychological Science*, *13*(2), 166–170. https://doi.org/10/gddfzv
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, *49*(1), 71–75.
- Diener, E., Heintzelman, S. J., Kushlev, K., Tay, L., Wirtz, D., Lutes, L. D., & Oishi, S. (2017). Findings all psychologists should know from the new science on subjective well-being. *Canadian Psychology/Psychologie Canadienne*, *58*(2), 87. https://doi.org/10/gd3w4t
- Diener, E., Lucas, R. E., & Scollon, C. N. (2009). Beyond the hedonic treadmill: Revising the adaptation theory of well-being. In *The science of well-being* (pp. 103–118). Springer.
- Diener, E., Pressman, S. D., Hunter, J., & Delgadillo-Chase, D. (2017). If, why, and when subjective well-being influences health, and future needed research. *Applied Psychology: Health and Well-Being*, 9(2), 133–167. https://doi.org/10/gbpm7f
- Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D., Oishi, S., & Biswas-Diener, R. (2010). New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Social Indicators Research*, *97*(2), 143–156. https://doi.org/10/dd87vp
- Duan, W. (2016). The benefits of personal strengths in mental health of stressed students: A longitudinal investigation. *Quality of Life Research*, 25(11), 2879–2888. https://doi.org/10.1007/s11136-016-1320-8

- Eisenberg, D., Golberstein, E., & Hunt, J. B. (2009). Mental Health and Academic Success in College. *The B.E. Journal of Economic Analysis & Policy*, 9(1). https://doi.org/10.2202/1935-1682.2191
- Emmons, R. A., & McCullough, M. E. (2003). Counting blessings versus burdens: An experimental investigation of gratitude and subjective well-being in daily life. *Journal of Personality and Social Psychology*, 84(2), 377–389.
- Fendrich, M., Weissman, M. M., & Warner, V. (1990). Screening for depressive disorder in children and adolescents: Validating the Center for Epidemiologic Studies Depression Scale for Children. *American Journal of Epidemiology*, *131*(3), 538–551.

Fernández-Ballesteros, R. (2002). *Encyclopedia of psychological assessment*. Sage.

https://books.google.co.uk/books?hl=en&lr=&id=UDzXIxE6jEwC&oi=fnd&pg =PP1&dq=Encyclopedia+of+Psychological+Assessment&ots=\_F5g\_IOtia&si g=d3xCpnUQpZXI97cTAcEKBzxXTRY

- Field, A. (2009). *Discovering Statistics Using SPSS* (3rd edition). SAGE Publications Ltd.
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, 56(3), 218.
- Fredrickson, B. L. (2004). The broaden-and-build theory of positive emotions. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 359(1449), 1367.
- Fredrickson, B. L. (2008). Promoting positive affect. *The Science of Subjective Well-Being*, 449–468.
- Fredrickson, B. L., Cohn, M. A., Coffey, K. A., Pek, J., & Finkel, S. M. (2008). Open hearts build lives: Positive emotions, induced through loving-kindness meditation, build consequential personal resources. *Journal of Personality* and Social Psychology, 95(5), 1045. https://doi.org/10/djjz8j

- Freidlin, P., Littman-Ovadia, H., & Niemiec, R. M. (2017). Positive psychopathology: Social anxiety via character strengths underuse and overuse. *Personality* and Individual Differences, 108, 50–54. https://doi.org/10/gmzkr6
- Froh, J. J., Kashdan, T. B., Ozimkowski, K. M., & Miller, N. (2009). Who benefits the most from a gratitude intervention in children and adolescents? Examining positive affect as a moderator. *The Journal of Positive Psychology*, 4(5), 408–422.
- Gable, S. L., & Haidt, J. (2005). What (and why) is positive psychology? *Review of General Psychology*, *9*(2), 103–110.
- Gillham, J. E., Hamilton, J., Freres, D. R., Patton, K., & Gallop, R. (2006). Preventing depression among early adolescents in the primary care setting: A randomized controlled study of the Penn Resiliency Program. *Journal of Abnormal Child Psychology*, *34*(2), 195–211.
- Gillham, J. E., Reivich, K. J., Freres, D. R., Chaplin, T. M., Shatté, A. J., Samuels, B.,
  Elkon, A. G., Litzinger, S., Lascher, M., Gallop, R., & others. (2007). Schoolbased prevention of depressive symptoms: A randomized controlled study of
  the effectiveness and specificity of the Penn Resiliency Program. *Journal of Consulting and Clinical Psychology*, *75*(1), 9.
- Gilman, R., & Huebner, E. S. (2006). Characteristics of adolescents who report very high life satisfaction. *Journal of Youth and Adolescence*, *35*(3), 293–301. https://doi.org/10/fr8fqp

Giuliani, N. R., Calcott, R. D., & Berkman, E. T. (2013). Piece of cake. Cognitive reappraisal of food craving. *Appetite*, *64*, 56–61. https://doi.org/10/f4t55g

Gottman, J. M. (2014). *What predicts divorce?: The relationship between marital processes and marital outcomes.* Psychology Press. https://books.google.co.uk/books?hl=en&lr=&id=ziABAwAAQBAJ&oi=fnd&pg=PP1&dq=gottman&ots=NV7wtY0dBl&sig=HnSHZwnf1XMrpZq2BTHMr9ZeZVQ

- Govindji, R., & Linley, P. A. (2007). Strengths use, self-concordance and well-being: Implications for strengths coaching and coaching psychologists.
   *International Coaching Psychology Review*, 2(2), 143–153.
- Green, H., McGinnity, Á., Meltzer, H., Ford, T., & Goodman, R. (2005). Mental health of children and young people in Great Britain, 2004. Palgrave Macmillan. http://www.esds.ac.uk/doc/5269/mrdoc/pdf/5269technicalreport.pdf
- Green, L. S., & Norrish, J. M. (2013). Enhancing well-being in adolescents: Positive psychology and coaching psychology interventions in schools. In C. Proctor & P. A. Linley (Eds.), *Research, Applications, and Interventions for Children and Adolescents: A Positive Psychology Perspective* (pp. 211–222).
  Springer.
- Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology*, 74(6), 1464.
- Grenville-Cleave, B., & Boniwell, I. (2012). Surviving or thriving? Do teachers have lower perceived control and well-being than other professions? *Management in Education*, *26*(1), 3–5. https://doi.org/10/fxvznp
- Gruber, J., Mauss, I. B., & Tamir, M. (2011). A dark side of happiness? How, when, and why happiness is not always good. *Perspectives on Psychological Science*, 6(3), 222–233.
- Grubliauskiene, A., Verhoeven, M., & Dewitte, S. (2012). The joint effect of tangible and non-tangible rewards on healthy food choices in children. *Appetite*, *59*(2), 403–408. https://doi.org/10/f36m29
- Haase, C. M., Poulin, M. J., & Heckhausen, J. (2012). Happiness as a motivator positive affect predicts primary control striving for career and educational goals. *Personality and Social Psychology Bulletin*, 38(8), 1093–1104.
- Hall, N. C., Perry, R. P., Ruthig, J. C., Hladkyj, S., & Chipperfield, J. G. (2006). Primary and Secondary Control in Achievement Settings: A Longitudinal

Field Study of Academic Motivation, Emotions, and Performance 1. *Journal* of *Applied Social Psychology*, *36*(6), 1430–1470. https://doi.org/10/dx7nk7

 Han, S. M., & Cho, Y. R. (2017). The Effects of Positive Psychology Intervention on Psychological Health and Posttraumatic Growth in Trauma-Exposed University Students. *Korean Journal of Clinical Psychology*, *36*(2), 223–241.

*Happify: Science-Based Activities and Games*. (2021). Happify.Com. https://happify.com/

- Hassmén, P., Koivula, N., & Uutela, A. (2000). Physical Exercise and Psychological
  Well-Being: A Population Study in Finland. *Preventive Medicine*, *30*(1), 17–
  25. https://doi.org/10.1006/pmed.1999.0597
- Heatherton, T. F., & Polivy, J. (1991). Development and validation of a scale for measuring state self-esteem. *Journal of Personality and Social Psychology*, *60*(6), 895. https://doi.org/10/fvd4pb
- Hendriks, T., Schotanus-Dijkstra, M., Hassankhan, A., de Jong, J., & Bohlmeijer, E.
  (2020). The Efficacy of Multi-component Positive Psychology Interventions: A Systematic Review and Meta-analysis of Randomized Controlled Trials. *Journal of Happiness Studies*, *21*(1), 357–390.

https://doi.org/10.1007/s10902-019-00082-1

- HESA. (2020, January). *Higher Education Student Statistics: UK, 2018/19 | HESA.* https://www.hesa.ac.uk/news/16-01-2020/sb255-higher-education-studentstatistics
- Hills, P., & Argyle, M. (2002). The Oxford Happiness Questionnaire: A compact scale for the measurement of psychological well-being. *Personality and Individual Differences*, 33(7), 1073–1082.
- Hobza, C. L., Walker, K. E., Yakushko, O., & Peugh, J. L. (2007). What about men?
  Social comparison and the effects of media images on body and selfesteem. *Psychology of Men & Masculinity*, *8*(3), 161.
  https://doi.org/10/dmgqj9

- Hojman, D. A., & Miranda, Á. (2018). Agency, human dignity, and subjective wellbeing. *World Development*, *101*, 1–15. https://doi.org/10/gnsvc7
- Holder, M. D., & Coleman, B. (2008). The contribution of temperament, popularity, and physical appearance to children's happiness. *Journal of Happiness Studies*, *9*(2), 279–302.
- Holder, M. D., & Klassen, A. (2010). Temperament and happiness in children. *Journal of Happiness Studies*, *11*(4), 419–439.
- Hollon, S. D. (1990). Cognitive therapy and pharmacotherapy for depression. *Psychiatric Annals*. http://psycnet.apa.org/psycinfo/1990-26034-001
- Holman, D. (2002). Employee wellbeing in call centres. *Human Resource Management Journal*, *12*(4), 35–50.
- Hom Jr., H. L., & Arbuckle, B. (1988). Mood induction effects upon goal setting and performance in young children. *Motivation and Emotion*, *12*(2), 113–122.
- Hone, L. C., Jarden, A., Schofield, G. M., & Duncan, S. (2014). Measuring flourishing: The impact of operational definitions on the prevalence of high levels of wellbeing. *International Journal of Wellbeing*, *4*(1), 62–90. https://doi.org/10.5502/ijw.v4i1.4
- Hong, J.-Y., Gallanter, E., Müller-Oehring, E. M., & Schulte, T. (2019). Phases of procedural learning and memory: Characterisation with perceptual-motor sequence tasks. *Journal of Cognitive Psychology*, *31*(5–6), 543–558. https://doi.org/10/gnmkmw
- Huebner, E. S. (1991). Correlates of life satisfaction in children. *School Psychology Quarterly*, *6*(2), 103. https://doi.org/10/c27mks
- Huebner, E. S., & Alderman, G. L. (1993). Convergent and discriminant validation of a children's life satisfaction scale: Its relationship to self-and teacherreported psychological problems and school functioning. *Social Indicators Research*, *30*(1), 71–82. https://doi.org/10/fm94rj

- Huppert, F. A. (2009). Psychological Well-being: Evidence Regarding its Causes and Consequences†. *Applied Psychology: Health and Well-Being*, *1*(2), 137–164.
- Ilardi, S. S., Craighead, W. E., & Evans, D. D. (1997). Modeling relapse in unipolar depression: The effects of dysfunctional cognitions and personality disorders. *Journal of Consulting and Clinical Psychology*, 65(3), 381.
- Isherwood, K. (2019). Examining the effect of Positive Psychology Interventions to improve psychological wellbeing, workplace motivation and re-employment prospects in North Wales.

https://research.bangor.ac.uk/portal/en/theses/examining-the-effect-ofpositive-psychology-interventions-to-improve-psychological-wellbeingworkplace-motivation-and-reemployment-prospects-in-northwales(878a9cba-1f9d-4011-8118-769dce48fe90).html

- Jenkins, H. M., & Ward, W. C. (1965). Judgment of contingency between responses and outcomes. *Psychological Monographs: General and Applied*, *79*(1), 1.
- Judge, T. A., & Bono, J. E. (2001). *A rose by any other name: Are self-esteem, generalized self-efficacy, neuroticism, and locus of control indicators of a common construct?* https://doi.org/10/ch72mh
- Judge, T. A., Erez, A., Bono, J. E., & Thoresen, C. J. (2002). Are measures of selfesteem, neuroticism, locus of control, and generalized self-efficacy indicators of a common core construct? *Journal of Personality and Social Psychology*, *83*(3), 693. https://doi.org/10/b2s7xt
- Kahneman, D. (1999). Objective happiness. *Well-Being: The Foundations of Hedonic Psychology*, *3*(25), 1–23.

Kahneman, D. (2012). *Thinking, fast and slow*. Penguin.

Kashdan, T. B. (2004). The assessment of subjective well-being (issues raised by the Oxford Happiness Questionnaire). *Personality and Individual Differences*, *36*(5), 1225–1232. https://doi.org/10.1016/S0191-8869(03)00213-7

- Kaslow, N. J., & Nolen-Hoeksema, S. (1991). *Children's Attributional Style Questionnaire—Revised* [Unpublished manuscript].
- Kerr, G. A., & Gross, J. D. (1997). Personal control in elite gymnasts: The relationships between locus of control, self-esteem, and trait anxiety. *Journal* of Sport Behavior, 20(1), 69.

Kessler, R. C., Amminger, G. P., Aguilar-Gaxiola, S., Alonso, J., Lee, S., & Ustun, T. (2007). Age of onset of mental disorders: A review of recent literature. *Current Opinion in Psychiatry*, *20*(4), 359.
https://doi.org/10.1097/YCO.0b013e32816ebc8c

Kessler, R. C., Angermeyer, M., Anthony, J. C., DE Graaf, R., Demyttenaere, K., Gasquet, I., DE Girolamo, G., Gluzman, S., Gureje, O., Haro, J. M., Kawakami, N., Karam, A., Levinson, D., Medina Mora, M. E., Oakley Browne, M., Posada-Villa, J., Stein, D. J., Adley Tsang, C. H., Aguilar-Gaxiola, S., ... Ustün, T. B. (2007). Lifetime prevalence and age-of-onset distributions of mental disorders in the World Health Organization's World Mental Health Survey Initiative. *World Psychiatry: Official Journal of the World Psychiatric Association (WPA), 6*(3), 168–176.

- Keyes, C. L. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Behavior*, *43*(2), 207–222.
- Kleinman, K. E., Asselin, C., Henriques, G., & others. (2014). Positive
  Consequences: The Impact of an Undergraduate Course on Positive
  Psychology. *Psychology*, *5*(18), 2033.
- Kong, D. T., & Ho, V. T. (2016). A self-determination perspective of strengths use at work: Examining its determinant and performance implications. *The Journal* of Positive Psychology, 11(1), 15–25. https://doi.org/10/gnf7th
- Kuhn, P., Kooreman, P., Soetevent, A., & Kapteyn, A. (2011). The effects of lottery prizes on winners and their neighbors: Evidence from the Dutch postcode lottery. *American Economic Review*, *101*(5), 2226–2247. https://doi.org/10/cs98nq

- Kurtz, J. L., & Lyubomirsky, S. (2013). Happiness promotion: Using mindful photography to increase positive emotion and appreciation. https://doi.org/10/gnr2t9
- Lachman, M. E., & Weaver, S. L. (1998). The sense of control as a moderator of social class differences in health and well-being. *Journal of Personality and Social Psychology*, *74*(3), 763–773. https://doi.org/10.1037/0022-3514.74.3.763
- Layard, R., Clark, A. E., Cornaglia, F., Powdthavee, N., & Vernoit, J. (2014). What Predicts a Successful Life? A Life-Course Model of Well-Being. *The Economic Journal, 124*(580), F720–F738. https://doi.org/10/gftrxh
- Layous, K., Chancellor, J., & Lyubomirsky, S. (2014). Positive activities as protective factors against mental health conditions. *Journal of Abnormal Psychology*, *123*(1), 3. https://doi.org/10/f5wc5p
- Layous, K., Lee, H., Choi, I., & Lyubomirsky, S. (2013). Culture matters when designing a successful happiness-increasing activity: A comparison of the United States and South Korea. *Journal of Cross-Cultural Psychology*, *44*(8), 1294–1303. https://doi.org/10/f5cctb
- Layous, K., Nelson, S. K., & Lyubomirsky, S. (2013). What is the optimal way to deliver a positive activity intervention? The case of writing about one's best possible selves. *Journal of Happiness Studies*, *14*(2), 635–654. https://doi.org/10/35w
- Lewicki, P. (1985). Nonconscious biasing effects of single instances on subsequent judgments. *Journal of Personality and Social Psychology*, *48*(3), 563.
- Li, Q., Xiang, G., Song, S., Xiao, M., Huang, X., & Chen, H. (2021). The Association of Sense of Power with Well-Being Outcomes: The Mediating Role of Hope-Agency. *The Journal of Psychology*, *155*(7), 624–640. https://doi.org/10/gnsvdf
- Linley, P. A. (2008). Average to A+: Realising Strengths in Yourself and Others. CAPP Press.

- Linley, P. A., Joseph, S., Harrington, S., & Wood, A. M. (2006). Positive psychology: Past, present, and (possible) future. *The Journal of Positive Psychology*, *1*(1), 3–16.
- Louis, M. C. (2008). A comparative analysis of the effectiveness of strengths-based curricula in promoting first-year college student success. Azusa Pacific University Azusa, CA.
- Louis, M. C. (2011). Strengths interventions in higher education: The effect of identification versus development approaches on implicit self-theory. *The Journal of Positive Psychology*, *6*(3), 204–215. https://doi.org/10/drmsgv
- Louis, M. C. (2012). The Clifton StrengthsFinder and student strengths development. *Omaha NE: The Gallup Organization.*
- Louis, M. C., & Schreiner, L. A. (2012). Helping students thrive: A strengths development model. *Thriving in Transitions: A Research-Based Approach to College Student Success*, 19–40.
- Love, P. E., & Edwards, D. J. (2005). Taking the pulse of UK construction project managers' health: Influence of job demands, job control and social support on psychological wellbeing. *Engineering, Construction and Architectural Management, 12*(1), 88–101.
- Lucas, R. E., Diener, E., & Suh, E. (1996). Discriminant validity of well-being measures. *Journal of Personality and Social Psychology*, *71*(3), 616. https://doi.org/10/ccpxtg
- Luck, M., & d'Inverno, M. (1995). A Formal Framework for Agency and Autonomy. *ICMAS*, *95*, 254–260.
- Lutter, M. (2007). Book Review: Winning a lottery brings no happiness! *Journal of Happiness Studies*, 8(1), 155–160. https://doi.org/10/bfwvpj
- Lykken, D., & Tellegen, A. (1996). Happiness is a stochastic phenomenon. *Psychological Science*, *7*(3), 186–189. https://doi.org/10/chz4pk

- Lyubomirsky, S. (2001). Why are some people happier than others? The role of cognitive and motivational processes in well-being. *American Psychologist*, *56*(3), 239–249.
- Lyubomirsky, S., Dickerhoof, R., Boehm, J. K., & Sheldon, K. M. (2011). Becoming happier takes both a will and a proper way: An experimental longitudinal intervention to boost well-being. *Emotion*, *11*(2), 391–402.
- Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success? *Psychological Bulletin*, *131*(6), 803.
- Lyubomirsky, S., & Layous, K. (2013). How Do Simple Positive Activities Increase Well-Being? *Current Directions in Psychological Science*, *22*(1), 57–62. https://doi.org/10.1177/0963721412469809
- Lyubomirsky, S., Sheldon, K. M., & Schkade, D. (2005). Pursuing happiness: The architecture of sustainable change. *Review of General Psychology*, *9*(2), 111–131.
- Lyubomirsky, S., Sousa, L., & Dickerhoof, R. (2006). The costs and benefits of writing, talking, and thinking about life's triumphs and defeats. *Journal of Personality and Social Psychology*, *90*(4), 692–708.

https://doi.org/10.1037/0022-3514.90.4.692

- MacDonald, P. M., Kirkpatrick, S. W., & Sullivan, L. A. (1996). Schematic drawings of facial expressions for emotion recognition and interpretation by preschoolaged children. *Genetic, Social, and General Psychology Monographs*, *122*(4), 373–388.
- MacIntyre, P. D., Gregersen, T., & Mercer, S. (2019). Setting an agenda for positive psychology in SLA: Theory, practice, and research. *The Modern Language Journal*, *103*(1), 262–274. https://doi.org/10/ggwr27
- Macleod, A. K., & Moore, R. (2000). Positive thinking revisited: Positive cognitions, well-being and mental health. *Clinical Psychology & Psychotherapy*, *7*(1), 1– 10.

- Madden, W., Green, S., & Grant, A. M. (2011). A pilot study evaluating strengthsbased coaching for primary school students: Enhancing engagement and hope. *International Coaching Psychology Review*, *6*(1), 71–83.
- Maier, S. F., & Seligman, M. E. P. (1976). Learned helplessness: Theory and evidence. *Journal of Experimental Psychology: General*, *105*(1), 3–46. https://doi.org/10/cspn68
- Marques, S. C., Lopez, S. J., & Pais-Ribeiro, J. L. (2011). "Building hope for the future": A program to foster strengths in middle-school students. *Journal of Happiness Studies*, *12*(1), 139–152.
- Marshall, M., & Brown, J. (2006). Emotional reactions to achievement outcomes: Is it really best to expect the worst? *Cognition & Emotion*, *20*(1), 43–63.
- Matute, H., Blanco, F., & Díaz-Lago, M. (2019). Learning mechanisms underlying accurate and biased contingency judgments. *Journal of Experimental Psychology: Animal Learning and Cognition*, *45*(4), 373–389.
   https://doi.org/10/gnjvs7
- Mazzucchelli, T. G., Kane, R. T., & Rees, C. S. (2010). Behavioral activation interventions for well-being: A meta-analysis. *The Journal of Positive Psychology*, *5*(2), 105–121. https://doi.org/10.1080/17439760903569154
- McCullough, M. E., Pargament, K. I., & Thoresen, C. E. (2000). *Forgiveness: Theory, research, and practice*. Guilford Press.
- McGonigal, J. (2015). *SuperBetter: A Revolutionary Approach to Getting Stronger, Happier, Braver and More Resilient*. Penguin.
- Michielsen, H. J., Van Houdenhove, B., Leirs, I., Onghena, P., & Vandenbroeck, A. (2006). Depression, attribution style and self-esteem in chronic fatigue syndrome and fibromyalgia patients: Is there a link? *Clinical Rheumatology*, 25(2), 183–188.
- Mongrain, M., & Anselmo-Matthews, T. (2012). Do positive psychology exercises work? A replication of Seligman et al. (2005). *Journal of Clinical Psychology*, *68*(4), 382.

- Natvig, G. K., Albrektsen, G., & Qvarnstrøm, U. (2003). Associations between psychosocial factors and happiness among school adolescents. *International Journal of Nursing Practice*, *9*(3), 166–175.
- Ni Mhurchu, C., Turley, M., Gorton, D., Jiang, Y., Michie, J., Maddison, R., & Hattie, J. (2010). Effects of a free school breakfast programme on school attendance, achievement, psychosocial function, and nutrition: A stepped wedge cluster randomised trial. *BMC Public Health*, *10*, 738.
- Niemiec, R. M. (2020). Six Functions of Character Strengths for Thriving at Times of Adversity and Opportunity: A Theoretical Perspective. *Applied Research in Quality of Life*, *15*(2), 551–572. https://doi.org/10.1007/s11482-018-9692-2
- Norem, J. K., & Illingworth, K. S. (2004). Mood and performance among defensive pessimists and strategic optimists. *Journal of Research in Personality*, *38*(4), 351–366. https://doi.org/10.1016/j.jrp.2003.07.002
- Norrish, J. M., & Seligman, M. E. P. (2015). *Positive Education: The Geelong Grammar School Journey*. Oxford University Press.
- Oades, L. G., Robinson, P., & Green, S. (2011). Positive education: Creating flourishing students, staff and schools. *InPsych: The Bulletin of the Australian Psychological Society Ltd*, 33(2), 16.
- Oakes, J. M., & Feldman, H. A. (2001). Statistical Power for Nonequivalent Pretest-Posttest Designs: The Impact of Change-Score versus ANCOVA Models. *Evaluation Review*, *25*(1), 3–28. https://doi.org/10/c7v7xg
- Oishi, S. (2007). The application of structural equation modeling and item response theory to cross-cultural positive psychology research. *Oxford Handbook of Methods in Positive Psychology*, 126–138.

Olsson, C. A., McGee, R., Nada-Raja, S., & Williams, S. M. (2013). A 32-Year
Longitudinal Study of Child and Adolescent Pathways to Well-Being in
Adulthood. *Journal of Happiness Studies*, *14*(3), 1069–1083.
https://doi.org/10/gg8rzn

- Owens, R. L., & Patterson, M. M. (2013). Positive psychological interventions for children: A comparison of gratitude and best possible selves approaches. *The Journal of Genetic Psychology*, *174*(4), 403–428.
- Park, N., Peterson, C., & Seligman, M. E. P. (2004). Strengths of character and wellbeing. *Journal of Social and Clinical Psychology*, *23*(5), 603–619.
- Parkinson, J. A., McGarrigle, L., & Hore, B. (2011). *An examination of the impact of a positive thinking intervention on the psychological and emotional well-being of children* [Masters manuscript].
- Parks, A. C., & Biswas-Diener, R. (2013). Positive interventions: Past, present and future. *Mindfulness, Acceptance, and Positive Psychology: The Seven Foundations of Well-Being*, 140–165.
- Pavot, W., Diener, E. D., Colvin, C. R., & Sandvik, E. (1991). Further validation of the Satisfaction with Life Scale: Evidence for the cross-method convergence of well-being measures. *Journal of Personality Assessment*, *57*(1), 149–161. https://doi.org/10/dxn6dj
- Peirce, J. W. (2007). PsychoPy—Psychophysics software in Python. *Journal of Neuroscience Methods*, *162*(1), 8–13.
- Perry, R. P., Hladkyj, S., Pekrun, R. H., & Pelletier, S. T. (2001). Academic control and action control in the achievement of college students: A longitudinal field study. *Journal of Educational Psychology*, *93*(4), 776. https://doi.org/10/c965sc
- Peters, K. R., & Gawronski, B. (2011). Are We Puppets on a String? Comparing the Impact of Contingency and Validity on Implicit and Explicit Evaluations.
   *Personality and Social Psychology Bulletin*, *37*(4), 557–569.
   https://doi.org/10/btk2pc
- Peters, M. L., Smeets, E., Feijge, M., van Breukelen, G., Andersson, G., Buhrman,
  M., & Linton, S. J. (2017). Happy Despite Pain. *The Clinical Journal of Pain*, *33*(11), 962–975. https://doi.org/10/f99k2t
- Peterson, C. (2006). A primer in positive psychology. Oxford university press.

- Peterson, C., Park, N., & Seligman, M. E. P. (2005). Assessment of character strengths. *Psychologists' Desk Reference*, *2*, 93–98.
- Peterson, C., & Seligman, M. E. P. (2004). *Character strengths and virtues: A handbook and classification* (Vol. 1). Oxford University Press.
- Platt, I., Kannangara, C., Tytherleigh, M., & Carson, J. (2020). The Hummingbird Project: A Positive Psychology Intervention for Secondary School Students. *Frontiers in Psychology*, *11*, 2012. https://doi.org/10/gnsh9m
- Pople, L., Rees, G., Main, G., & Bradshaw, J. (2015). *The Good Childhood Report* 2015. The Children's Society. http://www.childrenssociety.org.uk/what-wedo/resources-and-publications/the-good-childhood-report-2015
- Pressman, S. D., & Cohen, S. (2005). Does positive affect influence health? *Psychological Bulletin*, *131*(6), 925. https://doi.org/10/cdv9f3
- Prince-Embury, S. (2008). The resiliency scales for children and adolescents, psychological symptoms, and clinical status in adolescents. *Canadian Journal of School Psychology*, *23*(1), 41–56. https://doi.org/10/dwxxd2
- Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2015). Strengths-based positive psychology interventions: A randomized placebo-controlled online trial on long-term effects for a signature strengths- vs. a lesser strengthsintervention. *Frontiers in Psychology*, *6*. https://doi.org/10.3389/fpsyg.2015.00456
- Purkis, H. M., & Lipp, O. V. (2001). Does Affective Learning Exist in the Absence of Contingency Awareness? *Learning and Motivation*, *32*(1), 84–99. https://doi.org/10/ck99w5
- Quinlan, D. M., Swain, N., Cameron, C., & Vella-Brodrick, D. A. (2015). How 'other people matter'in a classroom-based strengths intervention: Exploring interpersonal strategies and classroom outcomes. *The Journal of Positive Psychology*, *10*(1), 77–89. https://doi.org/10/gnf7nz
- Quinn, P. D., & Duckworth, A. L. (2007). Happiness and academic achievement: Evidence for reciprocal causality. *The Annual Meeting of the American Psychological Society*, *24*(27.5), 2007.

- Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1(3), 385– 401. https://doi.org/10/b4z
- Reavley, N., & Jorm, A. F. (2010). Prevention and early intervention to improve mental health in higher education students: A review. *Early Intervention in Psychiatry*, 4(2), 132–142. https://doi.org/10.1111/j.1751-7893.2010.00167.x
- Rego, A., Sousa, F., Marques, C., & Cunha, M. P. e. (2012). Optimism predicting employees' creativity: The mediating role of positive affect and the positivity ratio. *European Journal of Work and Organizational Psychology*, *21*(2), 244– 270.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68.
- Sanna, L. J., Chang, E. C., Carter, S. E., & Small, E. M. (2006). The future is now: Prospective temporal self-appraisals among defensive pessimists and optimists. *Personality and Social Psychology Bulletin*, *32*(6), 727–739. https://doi.org/10.1177/0146167205285896
- Scheier, M. F., & Carver, C. S. (1992). Effects of optimism on psychological and physical well-being: Theoretical overview and empirical update. *Cognitive Therapy and Research*, *16*(2), 201–228.
- Schmidt, J. R. (2012). Human contingency learning. In *Encyclopedia of the sciences* of learning (pp. 1455–1456). Springer. http://link.springer.com/10.1007/978-1-4419-1428-6\_646
- Schmidt, J. R., Crump, M. J., Cheesman, J., & Besner, D. (2007). Contingency learning without awareness: Evidence for implicit control. *Consciousness* and Cognition, 16(2), 421–435.
- Schueller, S. M., & Parks, A. C. (2014). The science of self-help: Translating positive psychology research into increased individual happiness. *European Psychologist*, *19*(2), 145–155. https://doi.org/10/gnrtzf

- Schulz, R. (1976). Effects of control and predictability on the physical and psychological well-being of the institutionalized aged. *Journal of Personality and Social Psychology*, *33*(5), 563–573. https://doi.org/10/dd6x42
- Schutte, N. S., & Malouff, J. M. (2019). The Impact of Signature Character Strengths Interventions: A Meta-analysis. *Journal of Happiness Studies*, *20*(4), 1179– 1196. https://doi.org/10.1007/s10902-018-9990-2
- Schwartz, R. M., Reynolds III, C. F., Thase, M. E., Frank, E., Fasiczka, A. L., &
  Haaga, D. A. (2002). Optimal and normal affect balance in psychotherapy of
  major depression: Evaluation of the balanced states of mind model. *Behavioural and Cognitive Psychotherapy*, *30*(04), 439–450.
- Seligman, M. E. P. (2012). *Flourish: A visionary new understanding of happiness and well-being*. Simon and Schuster.
- Seligman, M. E. P. (2019). Positive psychology: A personal history. *Annual Review of Clinical Psychology*, *15*, 1–23. https://doi.org/10/ggfnnk
- Seligman, M. E. P., Castellon, C., Cacciola, J., Schulman, P., Luborsky, L., Ollove,
  M., & Downing, R. (1988). Explanatory style change during cognitive therapy
  for unipolar depression. *Journal of Abnormal Psychology*, *97*(1), 13–18.
- Seligman, M. E. P., Ernst, R. M., Gillham, J., Reivich, K., & Linkins, M. (2009).
   Positive education: Positive psychology and classroom interventions. *Oxford Review of Education*, *35*(3), 293–311. https://doi.org/10/dpx3z7
- Seligman, M. E. P., Kaslow, N. J., Alloy, L. B., Peterson, C., Tanenbaum, R. L., & Abramson, L. Y. (1984). Attributional style and depressive symptoms among children. *Journal of Abnormal Psychology*, *93*(2), 235.
- Seligman, M. E. P., Steen, T. A., Park, N., & Peterson, C. (2005). Positive psychology progress: Empirical validation of interventions. *American Psychologist*, 60(5), 410–421.
- Shanks, D. R. (1985). Continuous monitoring of human contingency judgment across trials. *Memory & Cognition*, *13*(2), 158–167. https://doi.org/10/bkjqpt

- Shanks, D. R. (1987). Acquisition functions in contingency judgment. *Learning and Motivation*, *18*(2), 147–166. https://doi.org/10/bh4x45
- Shanks, D. R., & Dickinson, A. (1988). Associative accounts of causality judgment. In *Psychology of learning and motivation* (Vol. 21, pp. 229–261). Elsevier.
- Sheldon, K. M., & Lyubomirsky, S. (2006). How to increase and sustain positive emotion: The effects of expressing gratitude and visualizing best possible selves. *The Journal of Positive Psychology*, 1(2), 73–82.
- Sherman, A., Shavit, T., & Barokas, G. (2020). A Dynamic Model on Happiness and Exogenous Wealth Shock: The Case of Lottery Winners. *Journal of Happiness Studies*, *21*(1), 117–137. https://doi.org/10/gnvtrj
- Shoshani, A., & Steinmetz, S. (2014). Positive Psychology at School: A School-Based Intervention to Promote Adolescents' Mental Health and Well-Being. *Journal of Happiness Studies*, *15*(6), 1289–1311. https://doi.org/10.1007/s10902-013-9476-1
- Silva, A. J., & Caetano, A. (2013). Validation of the flourishing scale and scale of positive and negative experience in Portugal. *Social Indicators Research*, *110*(2), 469–478. https://doi.org/10/d5fc77
- Sin, N. L., Della Porta, M. D., & Lyubomirsky, S. (2011). Tailoring positive psychology interventions to treat depressed individuals. *Applied Positive Psychology: Improving Everyday Life, Health, Schools, Work, and Society*, 79–96.
- Sin, N. L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practicefriendly meta-analysis. *Journal of Clinical Psychology*, 65(5), 467–487.
- Skarin, F., & Wästlund, E. (2020). Increasing Students' Long-Term Well-Being by Mandatory Intervention – A Positive Psychology Field Study. *Frontiers in Psychology*, *11*, 2567. https://doi.org/10/gh8nwx
- Smith, G. C., Kohn, S. J., Savage-Stevens, S. E., Finch, J. J., Ingate, R., & Lim, Y.-O. (2000). The effects of interpersonal and personal agency on perceived

control and psychological well-being in adulthood. *The Gerontologist*, *40*(4), 458–468. https://doi.org/10/cpbr5x

- Squire, L. R. (2004). Memory systems of the brain: A brief history and current perspective. *Neurobiology of Learning and Memory*, *82*(3), 171–177. https://doi.org/10/d3rnqf
- Taber, K. (2011). Constructivism as educational theory: Contingency in learning, and optimally guided instruction. *Educational Theory*, 39–61.
- Tenney, E. R., Poole, J. M., & Diener, E. (2016). Does positivity enhance work performance?: Why, when, and what we don't know. *Research in Organizational Behavior*, *36*, 27–46. https://doi.org/10/ggf797
- Terjesen, M. D., Jacofsky, M., Froh, J., & DiGiuseppe, R. (2004). Integrating positive psychology into schools: Implications for practice. *Psychology in the Schools*, *41*(1), 163–172.
- Thaler, R. H., & Sunstein, C. R. (2009). *Nudge: Improving Decisions About Health, Wealth, and Happiness* (Revised&Expanded edition). Penguin Books.
- *ThinkUp.* (2018). Precise Wellness LLC. https://apps.apple.com/us/app/thinkupdaily-affirmations/id906660772
- Tomyn, A. J., & Cummins, R. A. (2011). Subjective wellbeing and homeostatically protected mood: Theory validation with adolescents. *Journal of Happiness Studies*, *12*(5), 897–914. https://doi.org/10/brzwd8
- Tulving, E. (1984). Multiple learning and memory systems. In *Advances in Psychology* (Vol. 18, pp. 163–184). Elsevier.
- Tweed, R. G., & Conway III, L. G. C. (2009). Personal resilience in the midst of crisis: Empirical findings from positive psychology. *LCC Liberal Arts Studies*, *2*, 25– 43.
- Uliaszek, A. A., Rashid, T., & Zarowsky, Z. (2021). The Role of Signature Strengths in Treatment Outcome: Initial Results from a Large and Diverse University Sample. *Journal of Contemporary Psychotherapy*. https://doi.org/10/gnf6js
- Van Ryzin, M. J., Gravely, A. A., & Roseth, C. J. (2009). Autonomy, Belongingness, and Engagement in School as Contributors to Adolescent Psychological

Well-Being. *Journal of Youth and Adolescence*, *38*(1), 1–12. https://doi.org/10/b3wpsj

- Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. M., & Deci, E. L. (2004).
  Motivating Learning, Performance, and Persistence: The Synergistic Effects of Intrinsic Goal Contents and Autonomy-Supportive Contexts. *Journal of Personality and Social Psychology*, *87*(2), 246–260.
  https://doi.org/10/dgw7h2
- Verkuyten, M., & Thijs, J. (2002). School satisfaction of elementary school children:
   The role of performance, peer relations, ethnicity and gender. *Social Indicators Research*, *59*(2), 203–228. https://doi.org/10/dhv23t
- VIA Institute on Character. (2022). VIA Character Strengths Survey & Character Reports. https://www.viacharacter.org/
- Vickers, A. J., & Altman, D. G. (2001). Statistics Notes: Analysing controlled trials with baseline and follow up measurements. *BMJ*, *323*(7321), 1123–1124. https://doi.org/10/fm9gxk
- Wasserman, E. A. (1990). Detecting response-outcome relations: Toward an understanding of the causal texture of the environment. *The Psychology of Learning and Motivation*, *26*, 27–82.
- Wasserman, E. A., Chatlosh, D. L., & Neunaber, D. J. (1983). Perception of causal relations in humans: Factors affecting judgments of response-outcome contingencies under free-operant procedures. *Learning and Motivation*, 14(4), 406–432.
- Wasserman, E. A., Elek, S. M., Chatlosh, Dl., & Baker, A. G. (1993). Rating causal relations: Role of probability in judgments of response-outcome contingency. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 19(1), 174. https://doi.org/10/d3swm2
- Waters, L. (2011). A Review of School-Based Positive Psychology Interventions. *The Educational and Developmental Psychologist*, *28*(2), 75–90.
   https://doi.org/10.1375/aedp.28.2.75

- Waters, L. (2020). Using positive psychology interventions to strengthen family happiness: A family systems approach. *The Journal of Positive Psychology*, *15*(5), 645–652. https://doi.org/10/gj2bxc
- Watkins, P. C. (2004). Gratitude and subjective well-being. In R. A. Emmons & M. E. McCullough (Eds.), *The Psychology of Gratitude* (pp. 145–166). Oxford University Press.
  https://books.google.co.uk/books?hl=en&lr=&id=lvU\_olFhkTgC&oi=fnd&pg= PA167&dq=Gratitude+and+subjective+well-being&ots=kjgD4XIgbY&sig=r7INAYr7EC\_D2KtjRkk6pxC67dI
- Weissman, M. M., Orvaschel, H., & Padian, N. (1980). Children's symptom and social functioning self-report scales: Comparison of mothers' and children's reports. *Journal of Nervous and Mental Disease*, *168*(12), 736–740. https://doi.org/10.1097/00005053-198012000-00005
- White, M., & Kern, M. (2018). *Positive education: Learning and teaching for wellbeing and academic mastery*. https://doi.org/10/gm7jbs
- World Health Organization (WHO). (2006). *Constitution of the World Health Organization*. Supplement.

https://www.who.int/governance/eb/who\_constitution\_en.pdf

- Wryobeck, J., & Chen, Y. (2003). Using priming techniques to facilitate health behaviours. *Clinical Psychologist*, *7*(2), 105–108. https://doi.org/10/cg6nj2
- Xu, Y., Yu, Y., Xie, Y., Peng, L., Liu, B., Xie, J., Bian, C., & Li, M. (2015). Positive affect promotes well-being and alleviates depression: The mediating effect of attentional bias. *Psychiatry Research*.

http://www.sciencedirect.com/science/article/pii/S016517811500356X

Yan, T., Chan, C. W., Chow, K. M., Zheng, W., & Sun, M. (2020). A systematic review of the effects of character strengths-based intervention on the psychological well-being of patients suffering from chronic illnesses. *Journal of Advanced Nursing*, *76*(7), 1567–1580. https://doi.org/10/gnf7n7

# APPENDICES

Appendix A Center for Epidemiological Studies Depression Scale for Children (CES-DC)

Center for Epidemiological Studies Depression Scale for Children (CES-DC)				
INSTRUCTIONS Below is a list of the ways you might have felt or acted. Please	check how much y	ou have felt this	way during the	past week.
DURING THE PAST WEEK	Not At All	A Little	Some	A Lot
1. I was bothered by things that usually don't bother me.				
2. I did not feel like eating, I wasn't very hungry.				
<ol> <li>I wasn't able to feel happy, even when my family or friends tried to help me feel better.</li> </ol>				
4. I felt like I was just as good as other kids.				
5. I felt like I couldn't pay attention to what I was doing.				
DURING THE PAST WEEK	Not At All	A Little	Some	A Lot
6. I felt down and unhappy.				
7. I felt like I was too tired to do things.				
8. I felt like something good was going to happen.				
9. I felt like things I did before didn't work out right.				
10. I felt scared.				
DURING THE PAST WEEK	Not At All	A Little	Some	A Lot
11. I didn't sleep as well as I usually sleep.				
12. I was happy.				
13. I was more quiet than usual.				
14. I felt lonely, like I didn't have any friends.				
15. I felt like kids I know were not friendly or that they didn't want to be with me.				
DURING THE PAST WEEK	Not At All	A Little	Some	A Lot
16. I had a good time.				
17. I felt like crying.				
18. I felt sad.				
19. I felt people didn't like me.				
20. It was hard to get started doing things.				





This study, therefore aims to promote more positive thinking and increase well-being in school children through the "Three Good Things" intervention, devised by Seligman (2001). This intervention involves writing down three things that went well that day and reflecting on why they went well. The intended outcomes of the study are to increase overall happiness and wellbeing, decrease depressive symptoms, increase resilience and class room engagement and demonstrate a relationship between well-being and academic performance.

**Child participation in the study:** All children who wish to participate in the study must have signed consent forms from their parents. Verbal consent will not be accepted. Children who did not receive consent will not be able to participate in the study.

#### The measures and the intervention

On the first day of testing two masters researchers will visit the school to administer four questionnaires to all participating classes. These questionnaires are child friendly self report measures that will measure both positive and negative feelings and thoughts of the children. These questionnaires should take no more than 30 minutes in total for all the children to complete.

We will then ask you to administer the "three good things" diary task each day for a week. This will involve you asking the children to think about three positive things that happened to them that day and to write what those positive things were and how they achieved them and / or contributed to these things happening. You can prompt the children if they are experiencing difficulty by focusing their attentions towards situations where they tried their best, overcame a difficulty, helped a peer in a certain way, or did well in class. If the children need further prompting in order to complete the section on how they achieved and / or contributed to the "3 good things" you can again help them by asking them to think about what they actually did and how they did it in each situation which made things go well.

After a week of administering the diary task and a subsequent three month follow-up, the same researchers will visit the school again and administer the same four questionnaires, which will determine differences in positive and negative emotions and thoughts after the intervention.

What will happen to the results of this study? The children's answers will tell us whether programmes that focus thinking on positive things in life increase well-being. Results from the study will form the basis of a thesis to be submitted in September 2013. These results might also be published in academic journals and presented at academic conferences. However, at no point will any individuals or schools be identified.

Are there any benefits in participating? Previous evidence has shown that the "three good things" intervention has been successful in improving positive thinking which increases happiness and well-being, while decreasing depressive symptoms (Seligman, 2001). Additional benefits of increasing positive thinking are believed to be linked with improved resilience against stressors




### Appendix C Information Sheet and Consent Form for Parents

the same questionnaires again in order to measure any changes in positive thinking. We will also compare well-being measures with children's academic performance in order to assess whether there is an association between well-being and academic ability. Every effort will be made to make this process pleasant and relaxed for the child. Children will be assured that this is not a test of them as an individual, but that the researcher is trying to learn about how children of their age think.

What will happen to the results of this study? The children's answers will tell us whether programmes that focus thinking on positive things in life increase wellbeing. Results from the study will form the basis of a thesis to be submitted in September 2013. These results might also be published in academic journals and presented at academic conferences. However, at no point will any individuals or schools be identified.

**Confidentiality:** Neither the name of the school nor any of the children's names will be noted in the written report from the study. Children's answers to the questions will be noted, but no identifiable information will be recorded. The list of names of children with parental consent will not be linked in any way with the children's answers, and will be used to ensure that only children with signed permission are invited to participate on the day. Children will only be asked to give their age and gender.

**Voluntary Participation:** It is entirely up to you and your child to decide whether she/he is going to take part or not. Only children for whom consent forms have been signed and received will be invited to take part, and those children will have the right not to take part if they do not wish to. They will be informed of this on the day. You are able to withdraw your child from the study at any point should you wish. If you should decide after testing that you do not want your child to be included, you can contact the researchers and ask for the data to be withdrawn.

What happens if I do not let my child take part? They will remain with the rest of the class throughout the period, but will not complete the diary or any questionnaires. There should be no negative effects for your child.

Are there any benefits in participating? The study aims to increase children's positive thinking and emotion, therefore, participation in the study may result in increased levels of happiness and engagement in school. No rewards will be offered for participation, but your child might enjoy the task as it will be made as untaxing as

possible and offers some novelty. They will be reminded that it is not a test, but that they are contributing to our understanding of children's well-being.

Are there any risks involved? Every effort will be made to make this process as relaxed as possible for every child. This study will follow full ethical procedures, and confidentiality for both schools and individual children is assured. It will also take place under the supervision of the teacher in a familiar environment.

Please note that researchers have received Criminal Records Bureau (CRB) approval.

*Further Information:* If you require any assistance or have any questions about the research study, please feel free to contact any of the researchers (details above).

If you encounter complaints please contact Hefin Francis, School Manager, School of Psychology, Bangor University at h.francis@bangor.ac.uk

Thank you very much for taking the time to read this letter.

SCHOOL						
Dear Parent,						
	<u>'Positivity in Schools' Research Project</u>					
Our school is always looking to improve practice and ensure the best possible conditions for our pupils' success. In this respect, the school is taking part in a research project in collaboration with the School of Psychology at the University of Bangor, Gwynedd Council's Education Department, and Cynnal.						
The aim of the re positive psycholo performance.	esearch is to find out whether or not an activity from the field of ogy has a positive impact on children's happiness and academic					
We intend to cor classroom activit	iduct the research with all Year <mark>5 and 6</mark> pupils as a natural part of cy for a week. For each pupil, it will mean:					
<ul> <li>Recording '3 good things" in their day, in the form of a simple diary for 10 minutes at the end of every school day for a week.</li> </ul>						
<ul> <li>Completing a</li> </ul>	few simple questionnaires.					
Please note that research.	no information about individual children will be used in the					
Please also note should you wish.	that you can withdraw your child from the study at any point,					
If you have any c	complaints please contact the head teacher of the school.					
Please complete any further ques	the permission slip below and return by <mark>22/2/2013</mark> . If you have tions, please feel free to contact me.					
Thank you						
	'Positivity in Schools' Research Project					
l give / do not g	give (please delete) permission for my child					
to take part in t	he 'Positivity in Schools' Research Project'					
I have understo information wil	od what the research involves and understand that <u>no</u> personal I be used.					
Signed	Date					

Appendix D Teacher Script



- How did you do that?
- What did you do exactly?
- How did you manage to do that?
- How did you make that happen?
- What did you do to make that happen?

Pupils can either list all 3 good things first and then complete the explanatory section or complete 1 good thing followed by explanation and repeat twice more.

If there is time, after the children have written their three good things and their explanations in their diaries, they can talk about one of the good things that happened to them with a peer. This will hopefully encourage the children to focus on why the good thing that happened and reinforce positive thinking.

#### **Debriefing the pupils**

Upon completion of the "Three Good Things" diary exercise we will ask you to inform your class about the nature of the study. Explain to the children that by reflecting upon three good things that happen to them each day, it is hoped that they may be encouraged to focus on more positive aspects of their lives. Engagement in more positive thinking is hoped to promote happiness and general well-being.

Appendix E Boxplots





APPENDICES



APPENDICES





APPENDICES



## Appendix F Tests of Normality

### Tests of Normality

		Kolmogorov-Smirnov <sup>a</sup>		IOV <sup>a</sup>	Shapiro-Wilk		
	group	Statistic	df	Sig.	Statistic	df	Sig.
faces pre score	experimental	.335	22	.000	.742	22	.000
	control	.270	29	.000	.809	29	.000
faces scale post score	experimental	.296	22	.000	.696	22	.000
	control	.286	29	.000	.740	29	.000
faces scale follow up score	experimental	.323	22	.000	.759	22	.000
	control	.279	29	.000	.810	29	.000
happiness scale overall pre	experimental	.156	22	.178	.929	22	.115
score	control	.134	29	.197	.953	29	.215
happiness scale overall post score	experimental	.124	22	.200*	.964	22	.574
	control	.089	29	.200*	.984	29	.931
happiness scale overall follow up score	experimental	.182	22	.057	.937	22	.169
	control	.217	29	.001	.894	29	.007
esdcs overall pre score	experimental	.218	22	.008	.869	22	.008
	control	.192	29	.008	.876	29	.003
esdcs overall post score	experimental	.138	22	.200*	.955	22	.402
	control	.258	29	.000	.778	29	.000
esdcs overall follow up score	experimental	.242	22	.002	.844	22	.003
	control	.153	29	.081	.876	29	.003
burnett overall pre score	experimental	.167	22	.110	.801	22	.001
	control	.139	29	.158	.943	29	.117
burnett overall post score	experimental	.247	22	.001	.830	22	.002
	control	.180	29	.017	.898	29	.009
burnett overall follow up	experimental	.189	22	.040	.915	22	.059
score	control	.108	29	.200*	.962	29	.370
resiliance overall pre score	experimental	.110	22	.200*	.977	22	.868
	control	.184	29	.014	.906	29	.013
resiliance overall score	experimental	.170	22	.097	.926	22	.102
post	control	.120	29	.200*	.959	29	.308
resiliance overall follow up	experimental	.145	22	.200*	.939	22	.186
score	control	.087	29	.200*	.981	29	.860

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Appendix G Q–Q Plots



Normal Q-Q Plot of faces pre score



Normal Q-Q Plot of faces pre score



Normal Q-Q Plot of faces scale post score



Normal Q-Q Plot of faces scale post score



Normal Q-Q Plot of faces scale follow up score



Normal Q-Q Plot of faces scale follow up score



Normal Q-Q Plot of happiness scale overall follow up score



Normal Q-Q Plot of esdcs overall pre score



# Normal Q-Q Plot of esdcs overall pre score



Normal Q-Q Plot of esdcs overall post score



Normal Q-Q Plot of esdcs overall post score



Normal Q-Q Plot of esdcs overall follow up score



Normal Q-Q Plot of esdcs overall follow up score



# Normal Q-Q Plot of burnett overall pre score



Normal Q-Q Plot of burnett overall pre score



Normal Q-Q Plot of burnett overall post score



Normal Q-Q Plot of burnett overall post score



Normal Q-Q Plot of resiliance overall pre score

Appendix H Grouped Scatterplots








### Appendix I SONA advert – Three Good Things

Participants will be asked to complete baseline, demographics and follow-up questionnaires. This study is looking into Positive Psychology and will require participants to complete some written exercises in the session and also between sessions; this will take no longer than 10 minutes a day. You will be given training in completion of the exercises; this will be done by showing you examples of the tasks and taking you through them stage by stage. One of the exercises requires a semi structured interview with the experimenter using a Dictaphone. This study is designed to get you to focus on, write down and evaluate positive aspects in your life rather than negatives.

If you decide to take part you will be asked to complete some questionnaires and demographic questionnaire. This should take no longer than 30 -40 minutes. You will then be given training into how to complete the positive psychology exercise using examples. At the end of session 1 you will be given sheets to take away with you and be asked to complete the exercise for 5 consecutive days throughout the following week. You will be given sheets to take away with you for the week in-between. We ask that bring those sheets back with you when you attend the next session. You will then be given a debrief form at the end of the intervention phase. The experimenter will contact you again at 3/6 months and ask you to complete the questionnaires again in order to assess the lasting effects of the Positive Psychology exercises.

You will be asked to provide a mobile number at the start of the study, you will also be given the mobile number of the experimenter should you need to contact them. The experimenter will send you reminder texts of session times and also reminders to complete the exercises between sessions.

Exclusion criteria: you must not currently be receiving treatment for a mental health condition.

# 

### Appendix J Exercise Sheet – Three Good Things

_	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day
	I met up with	Day 2	Days	Day 4	Days		
Good	a friend that I						
Thing 1	haven't seen						
	in a long						
	time.						
	This was a						
	good thing						
	for me as it						
	was nice to		1				
	spend time		1				
	friend: it was						
	lovely to hear						
	her new and						1
	what she is	1					
	up to now. It						
	is nice to						
	know that our						
	friendship is						
	not effected						
	by how often						
	we see each						
	Loooked						
GOOD	myself a nice						1
rang 2	roast dinner.						
	Toust uniners						
	This was						
	good for me						
	as I haven't						
	cooked					1	
	properly in a						
	while, I also						
	love roast						
	dinners and it						
	reminds me		1				
	of the meal		1				1
	we had every						
	Sunday with						
	Sunday with						
	ranniy.						

Appendix K Example Sheet – Three Good Things

Ĩ	I went to a			
g 3	party.			
	This was a			
	good thing			
	for me as it		1	
	was nice to			
	have some	1 1		
	chill out time.		1	
	It was nice to			
	catch up with			
	friends and			
	put worries			
	and stressors			
	aside for the			
	night.			

# Appendix L Center for Epidemiologic Studies Depression Scale (CES-D)

#### Center for Epidemiologic Studies Depression Scale (CES-D), NIMH

Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.

	Week	Duri	ing the Past	
	Rarely or none of the time (less than 1 day )	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
1. I was bothered by things that usually				
2. I did not feel like eating; my appetite				
3. I felt that I could not shake off the blues even with help from my family or friends				
4. I felt I was just as good as other				
5. I had trouble keeping my mind on what I was doing				
6. I felt depressed. 7. I felt that everything I did was an				
<ol> <li>I felt hopeful about the future.</li> <li>I thought my life had been a failure.</li> </ol>				
10. I felt fearful.				
11. My sleep was restless.				
13. I talked less than usual.				
14. I felt lonely.				
<ol> <li>People were unfriendly.</li> <li>Lenioved life</li> </ol>	$\square$			
17. I had crying spells.				
18. I felt sad.		$\Box$		Ō
<ol> <li>19. I telt that people dislike me.</li> <li>20. I could not get "going."</li> </ol>				

SCORING: zero for answers in the first column, 1 for answers in the second column, 2 for answers in the third column, 3 for answers in the fourth column. The scoring of positive items is reversed. Possible range of scores is zero to 60, with the higher scores indicating the presence of more symptomatology.

# Appendix M Satisfaction With Life Scale (SWLS)

<i>Instructions:</i> Below are five statements that you may agree or disagree with. Using the 1 - 7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding.
<ul> <li>7 - Strongly agree</li> <li>6 - Agree</li> <li>5 - Slightly agree</li> <li>4 - Neither agree nor disagree</li> <li>3 - Slightly disagree</li> <li>2 - Disagree</li> <li>1 - Strongly disagree</li> </ul>
In most ways my life is close to my ideal.
The conditions of my life are excellent.
I am satisfied with my life.
So far I have gotten the important things I want in life.
If I could live my life over, I would change almost nothing.

### Appendix N Scale of Positive and Negative Experience (SPANE)

### Scale of Positive and Negative Experience (SPANE)

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Please think about what you have been doing and experiencing during the past four weeks. Then report how much you experienced each of the following feelings, using the scale below. For each item, select a number from 1 to 5, and indicate that number on your response sheet.

- 1. Very Rarely or Never
- 2. Rarely
- 3. Sometimes
- 4. Often
- 5. Very Often or Always

Positive Negative Good Bad Pleasant Unpleasant Happy Sad Afraid Joyful Angry Contented

# Appendix O State Self-esteem Scale (SSES)

Current TI This is a qu course, no r this momen	houghts Scale (Heatherton & Polivy, 1991) – A measure of state s sestionnaire designed to measure what you are thinking at this mon right answer for any statement. The best answer is what you feel is it. Be sure to answer all of the items, even if you are not certain of	elf-esteem nent. There is, of s true of yourself at the best answer.
Again, answ	wer these questions as they are true for you RIGHT NOW.	
Using the fo what is true	ollowing scale, place a number in the box to the right of the statem e for you at this moment:	ent that indicates
1 = not at a	11	
2 = a little b	pit	
3 = somewn 4 = verv mn	nat Joh	
5 = extreme	ely	
1 I feel	I confident about my abilities	Пр
2.* I am	worried about whether I am regarded as a success or failure.	
3. I feel	l satisfied with the way my body looks right now.	
4.* I feel	l frustrated or rattled about my performance.	□ P
5.* I feel	l that I am having trouble understanding things that I read.	□ P
6. I feel	l that others respect and admire me.	A
7.* I am	dissatisfied with my weight.	A
8.* I feel	l self-conscious.	S
9. I feel	l as smart as others.	□ P
10.* I feel	l displeased with myself.	
11. I feel	l good about myself.	□ A
12. I am	pleased with my appearance right now.	□ A
13.* I am	worried about what other people think of me.	
14. I feel	l confident that I understand things.	P
15.* I feel	l inferior to others at this moment.	L S
16.* I feel	l unattractive.	L A
17.* I feel	l concerned about the impression I am making.	
18.* I feel	I that I have less scholastic ability right now than others.	
19.* I feel	l like I'm not doing well.	
20.* I am	worried about looking foolish.	



### Appendix P Information Sheet – Three Good Things

Student Counselling Service Second Floor Neuadd Rathbone College Road Bangor University Bangor LL57 2DF

01248 388520 or e-mail counselling@bangor.ac.uk for appointments for support sessions and assessments.

### What are the possible benefits of taking part?

Positive psychology exercises have been shown to improve well-being, increase levels of happiness and decrease levels of depression for up to 6 months.

#### Will I be paid for taking part in the study?

You will receive printer credits and course credits for your participation.

#### What if something goes wrong?

If you are unhappy or dissatisfied about any aspect of your participation, we would like you to tell us about this in the first instance, so that we can try to address your concerns and find a solution. You can talk to the researcher (see contact details below) or to Dr John Parkinson (School of Psychology, Bangor University, Bangor, Gwynedd LL57 2AS. Tel: 01248 388340. E-mail j.parkinson@bangor.ac.uk.

If you are not satisfied with our response you can make a complaint to Mr Hefin Francis, School Manager, School of Psychology, Bangor University, Bangor, Gwynedd LL57 2AS. Tel: 01248 388339. E-mail <u>h.francis@bangor.ac.uk</u>.

#### Will my taking part in the study be kept confidential?

Only the members of the research team will have access to your personal information. All data will be stored securely and separately from any of your personal details. No-one will ever be able to identify you personally from anything that we write or say in public about the research.

#### What will happen to the results of the research study?

When the study is complete, all the anonymised data will be analysed and written up in theses, may be published in scientific journals and presented at conferences. Please be assured your data will not be identifiable as you. All data is coded with a participant number and stored securely.

#### Who can I contact for further information?

You can contact the experimenter (Amanda Shanks) at <u>pspf01@bangor.ac.uk</u>, 01248 388583, or 07917241352 You can also contact the lead supervisor Dr John Parkinson at: School of Psychology, Bangor University, Gwynedd LL57 2AS. Telephone: 01248 388340

E-mail: j.parkinson@bangor.ac.uk

Thank you for considering taking part in this research study.

### Appendix Q Consent Form – Three Good Things



Any complaints you have about this study or your participation can be addressed by Mr Hefin Francis, School Manager, who can be contacted by email at <u>h.francis@bangor.ac.uk</u>, by phone at 01248 388339, or by mail at:

School of Psychology

Adeilad Brigantia

Penrallt Rd

Bangor, Gwynedd LL57 2AS

I have read and understand this consent form, and I volunteer to participate in this research study. I understand that my consent does not take away any legal rights in the case of negligence or other legal fault of anyone who is involved in this study.

Participant name and signature: Date:

Signature of Researcher: Date:

Study Name	The effects of Positive Psychology on levels of happiness, depression and well-being
Study Type	2-Part Study This is a 2-part study.Both parts should be scheduled at the same time, and the second part should be scheduled to occur 7 day(s) after the first part. The second part should be scheduled to occur at exactly the same time (on a different day) as the first part
Duration	60 minutes (Part 1) 60 minutes (Part 2)
Credits	2 Credits (Part 1) 2 Credits (Part 2) (4 Credits total)
Description	Participants will be asked to complete pre-intervention, demographics and follow-up questionnaires. This study is looking into Positive Psychology. This study involves a semi-structured interview with the experimenter using a Dictaphone and is designed to get you to focus on your strengths and positive aspects in your life rather than negatives. If you decide to take part you will be asked to complete some questionnaires and demographic questionnaire. This should take no longer than 30 -40 minutes for each of the 2 sessions. The experimenter will contact you again at 3/6 months and ask you to complete the questionnaires again in order to assess the lasting effects of the Positive Psychology exercises. You will be asked to provide a mobile number at the start of the study, you will also be given the mobile number of the experimenter should you need to contact them. The experimenter will send you reminder texts or cmails of session times and also contact you via email and text at 3/6months after the study
Sign-Up Restrictions	<ul> <li>Must NOT have signed up or completed ANY of these studies:</li> <li>! The effects of Positive Psychology on levels of happiness, depression and well- being - Part 1</li> <li>! The effects of Positive Psychology on levels of happiness, depression and well- being - Part 2</li> </ul>
Ethics Review Board Approval Code	2012-7882-A10243 (expires 30 September 2014)

# Appendix R SONA advert – Signature Strengths

### Appendix S List of Character Strengths

### List of Character Strengths and Descriptions

### 1. Love of Learning

You love learning new things, whether you are in a class or on your own. You find opportunities to learn wherever you go and what ever you do. You always loved school, reading, museums-anywhere and everywhere there is an opportunity to learn. 2. Bravery(valor)

You don't shrink from threat, challenge, difficulty, or pain. Valor is more than bravery under fire, when one's physical well-being is threatened. It refers as well to intellectual or emotional stances that are unpopular, difficult or dangerous. You speak up for what is right even if you encounter opposition and act on convictions even if they are unpopular. 3. Vitality (zest, enthusiasm, vigor, energy)

You approach life with zest, enthusiasm, and energy - For you, life is an adventure. You are a spirited person. You throw yourself, body and soul, into the activities you undertake? You wake in the morning looking forward to the day. The passion you bring to activities is infectious.

### 4. Leadership

You excel at the tasks of leadership: encouraging a group to get things done and preserving harmony within the group by making everyone feel included. You do a good job organizing activities and seeing to it that they happen.

5. Appreciation of beauty and excellence (awe, wonder, elevation)

You notice and appreciate beauty, excellence, and skilled performance in all domains of life, in nature, art, mathematics and science and in everyday things. You stop and smell the roses. 6. Humor (playfulness)

You like to laugh, tease and bring smiles to other people. You try to see the light side of all situations.

7. Creativity (originality, ingenuity)

Thinking of new ways to do things is a crucial part of who you are. You are never content with doing something the conventional way if a better way is possible. When you are faced with something you want, you are outstanding at finding novel yet appropriate behaviour to reach that goal. You are rarely content with doing something the conventional way. This strength is also called practical intelligence, common sense or street smarts.

8. Curiosity (interest, novelty-seeking, openness to experience)

You take an interest in all of ongoing experience for its own sake. You find subjects and topics fascinating, and love exploring and discovering. Curiosity about the world entails openness to experience and flexibility about matters that do not fit one's preconceptions/prior opinions. You like and are intrigued by ambiguity. Curiosity is actively engaging novelty and absorption of information.

### 9. Open-mindedness (judgment, critical thinking)

You tend to think things through and examine them from all sides. You don't jump to conclusions and are able to change your mind in light of evidence.

#### 10. Perspective (wisdom)

You are able to provide wise counsel to others. You have ways of looking at the world that make sense to yourself and to other people. Others seek you out to draw on your experience to help them solve problems and gain perspective for themselves. You have a way of looking at the world that makes sense to others.

11. Persistence (perseverance, industriousness)

You work hard to finish what you start. No matter what the project is, you get it done in time. You do what you say and sometimes more! You are flexible, diliget and not a perfectionist. 12. Integrity [authenticity, honesty]

You are an honest person, not only by speaking the truth but by living your life in a genuine and authentic way. You are down to earth and a "real" person. You are sincere in word, deed and commitment.

13. Love

You value close relations with others. The people to whom you feel most close are the same people who feel most close to you.

14. Kindness (generosity, nurturance, care, compassion, altruistic love, "niceness") You are kind and generous to others, and you are never too busy to do a favour. You enjoy doing good deeds for other, even if you do not know them well. You have empathy and sympathy for others and will put others needs above your own.

15. Social Intelligence (emotional intelligence, personal intelligence)

You are aware of the motives and feelings of other people. You know what to do to fit in to different social situations, and you know what to do to put others at ease. Social intelligence is the ability to notice differences among others, especially with respect to their modds, temperant, motivations and intentions. Personal intelligence consists of being aware able to access your own feelings and the ability to use that knowledge to understand and guide your behaviour.

#### 16. Fairness

Treating all people fairly is one of your most important principles. You do not let your personal feelings bias your decisions about other people. You give everyone a chance. You take the welfare of others even those you do not know as importantly as your own. You can set aside any personal prejudices.

#### 17. Gratitude

You are aware of the good things that happen to you, and you never take them for granted. You always take the time to express your thanks.

18. Hope [optimism, future-mindedness, future orientation]

You expect the best in the future, and you work to achieve it. You believe that the future is something that you can control.

19. Spirituality [religiousness, faith, purpose]

You have strong and coherent beliefs about the higher purpose and meaning of the universe. You know where you fit in the larger scheme of things. Your beliefs shape your actions and are a soource of comfort to you.

#### 20. Forgiveness and mercy

You forgive those who have done you wrong. You always give people a second chance. Your guiding principle is mercy and not revenge.

#### 21. Self-regulation[self-control]

You regulate what you feel and what you do. You are a disciplined person. You can easily hold your desires, needs and impulses in check when it is appropriate. It is not enough to know what is correct, you must also put this knowledge into action. You can control your emotions.

22. Citizenship [social responsibility, loyalty, teamwork]

You excel as a member of a group. You are a loyal and dedicated teammate, you always do your share, and you work hard for the success of the group.

### 23. Humility/Modesty

You do not seek the spotlight, preferring to let your accomplishments speak for themselves. You do not regard yourself as special, and others recognise and value your modesty. You are unpretentious and humble. 24. Prudence You are a careful person. You do not say or do things that you might later regret. You are good at resisting impulses about short-term goals for the sake of longer-term success.

# Appendix T Using Signature Strengths in a New Way Form

United of	insure strengths in a New Way Form
Using S	ignature Strengths in a New Way
You have been given your top 5 s you answered. Please list your top you warm to most and write it in can use that strength for each day use the strength in the chosen wa	strengths based on your responses to the strengths questions p 5 strength in the box below. Then please pick the strength the chosen strength box. Please then think of a new way you y throughout the following week. You will then be asked to y each day of the following week.
Top 5 Strengths	1)
	2)
	3)
	4)
	5)
Chosen strength	
Day 1	
Day 2	
Day 3	
Day 4	
Day 5	
Day 6	
Day 7	

Using Signature S	trengths in a new way-examples
Strength	
Strength	Example
openness to experience)	Expand your knowledge in an area of interest through books, journals, magazines, TV, radio or
Creativity (originality, ingenuity)	Compile an original and practical list of solutions or tips that will address common challenges faced by you and your peers
Open Mindedness (judgement, critical thinking)	When deciding about an important issue write pros and cons and repeat them while taking breaks in between.
Love of learning	Converse with someone on a topic of mutual interest.
Perspective (Wisdom)	Pursue endeavours which have a significant impact on the world.
Bravery (Valour)	Protect or stand up for someone who will not otherwise stand up for themself (verbally or in writing).
Persistence (perseverance, industriousness)	Select two activities that you find engaging and meaningful and give 100% to them.
Integrity (authenticity, honesty)	Monitor every time you tell a lie, even if it is a small one. Try to make your list shorter every day.
Vitality (Zest, enthusiasm, vigour, energy)	Take time to celebrate your next two accomplishments and victories.
Love	Explore and appreciate the strengths of your loved ones.
Kindness (generosity, nurturance, care, compassion, altruistic love, "nice- ness")	Greet others with a smile.
Social Intelligence (emotional intelligence, personal intelligence)	Perceive and acknowledge three sincere gestures of a friend.
Citizenship (social responsibility, loyalty, teamwork)	Ask you neighbours, especially elderly ones, if they need anything from the supermarket.
Fairness, Equity and Justice	Encourage equal participation of everyone, especially those who feel left out in a discussion/activity.
Leadership	Organize an event (surprise birthday party, shower etc.) at your work that involves your colleagues/at home for your family.
Forgiveness and Mercy y	Remember times when you offended someone and were forgiven then extend this gift to others.
Humility/Modesty	Resist showing off when others show off.
Prudence	Think twice before saying anything. Do this exercise at least ten times a week and note its effects.

# Appendix U Example Sheet – Signature Strengths

Self-regulation (self control)	Monitor and eliminate distractions (phone, computer, TV) while focusing on a particular assignment.
Appreciation of Beauty and Excellence (awe, wonder, evaluation)	Notice at least one instance of natural beauty around you every day (sunrise, sunset, clouds, sunshine, snowfall, rainbows, trees, moving leaves, birds chirping, flowers, fruits and vegetables etc.).
Gratitude	Everyday select one small yet important thing you take for granted. Work on being mindful of this thing in the future.
Hope (optimism, future-mindedness, future orientation)	When facing adversity, focus on how you overcame a similar adversity in the past.
Humour (playfulness)	Cheer up a gloomy friend.
Spirituality (religiousness, faith, purpose)	Spend some time every day in at least one activity that connects you with a higher power or reminds you where you fit in the large scheme of things.

# Appendix V Signature Strengths Interview Questions

Qualitative Strengths Interview questions
Work Job
-What jobs have you had in the past?
-What did the jobs involve? What did you have to do?
-What aspects of the job were you good at or enjoy?
-Have you ever done any volunteering?
Studying
-What did you enjoy at school or university?
-What subjects or studies were you good at?
-Did you have any roles in the school/class?
-What did your teachers/lecturers praise you for or say you were good at?
Leisure
-Do you have any hobbies?
-What skills or strengths do you need to have to do these?
-What hobbies have you had in the past?
-What skills/strengths did you need to complete that hobby?
-What do you do with your spare time?
Family
-Tell me about your family?
-What is your relationship like with your family?
-What skills and strengths do you have in the family?
-What strengths would your family say you have?

### Social

-How would you describe your friendship circle?

-What strengths do you have that make you a good friend?

.What sort of activities do you and your friends do together? What skills do these involve?

.What role do you have in your group of friends? What are you known for?

.What strengths and skills do you bring to the group?

-What strengths would your friends say you have?

### Appendix W Information Sheet – Signature Strengths



#### Bangor LL57 2DF

01248 388520 or e-mail counselling@bangor.ac.uk for appointments for support sessions and assessments.

#### What are the possible benefits of taking part?

Positive psychology exercises have been shown to improve well-being, increase levels of happiness and decrease levels of depression for up to 6 months.

#### Will I be paid for taking part in the study?

You will be awarded course credits and printer credits for your time

#### What if something goes wrong?

If you are unhappy or dissatisfied about any aspect of your participation, we would like you to tell us about this in the first instance, so that we can try to address your concerns and find a solution. You can talk to the researcher (see contact details below) or to Dr John Parkinson (School of Psychology, Bangor University, Bangor, Gwynedd LL57 2AS. Tel: 01248 388340. E-mail j.parkinson@bangor.ac.uk.

If you are not satisfied with our response you can make a complaint to Mr Hefin Francis, School Manager, School of Psychology, Bangor University, Bangor, Gwynedd LL57 2AS. Tel: 01248 388339. E-mail <u>h.francis@bangor.ac.uk</u>.

#### Will my taking part in the study be kept confidential?

Only the members of the research team will have access to your personal information. All data will be stored securely and separately from any of your personal details. No-one will ever be able to identify you personally from anything that we write or say in public about the research.

#### What will happen to the results of the research study?

When the study is complete, all the anonymised data will be analysed and written up in theses, may be published in scientific journals and presented at conferences. Please be assured your data will not be identifiable as you. All data is coded with a participant number and stored securely.

#### Who has reviewed the study?

This research has been reviewed and approved by the School of Psychology Ethics Committee, Bangor University.

#### Who can I contact for further information?

You can contact the experimenter (Amanda Shanks) at pspf01@bangor.ac.uk, 01248 388583, or 07917241352

You can also contact the lead supervisor Dr John Parkinson at: School of Psychology, Bangor University, Gwynedd LL57 2AS. Telephone: 01248 388340 E-mail: j.parkinson@bangor.ac.uk

Thank you for considering taking part in this research study.





Any complaints you have about this study or your participation can be addressed by Mr Hefin Francis, School Manager, who can be contacted by email at <u>h.francis@bangor.ac.uk</u>, by phone at 01248 388339, or by mail at:

School of Psychology

Adeilad Brigantia

Penrallt Rd

Bangor, Gwynedd LL57 2AS

I have read and understand this consent form, and I volunteer to participate in this research study. I understand that my consent does not take away any legal rights in the case of negligence or other legal fault of anyone who is involved in this study.

Participant name and signature: Date:

Signature of Researcher: Date:

Appendix Y Exercise scenarios (samples)



### Appendix Z Primer text

Participants were asked to read the following passage.

Snake was crawling on the ground. Eagle flew to her and said: "How unfortunate you are, doomed to crawl all your life. Not like me – I am destined to fly." Snake looked at Eagle and said:

"You are right Eagle, I can't fly. But only I know what it means to fly."

"How can you know that?" Eagle smiled, "you don't have wings!"

"Thoughts are my wings," said Snake proudly, "dreams are my heaven. While crawling on the ground I close my eyes and I see heaven. I image that I'm crawling in heaven not on the ground. Yes, it's impossible to crawl in heaven, you can only fly. It means that in those moments I am flying. In my free thoughts I am learning to fly, Eagle. With my soul I rise to the high heaven, so when my time comes and my life as a snake comes to an end, I could ascend into the blue heaven, into the endless heaven and fly, to fly and not think about anything, enjoying my freedom. And I won't be afraid to fly, because it won't be a new thing for me. For you Eagle, wings were given to you from birth, but not for me. But the heaven will make us equal. We will be flying together one day, Eagle, under the clouds. Only I will be stronger and freer than you, because I have learned how to fly without having wings, simply crawling on the ground. Both things are available for me. I am not afraid to lose my wings because I know how to crawl, and I am not afraid to gain wings because I know how to fly. And what will you do, Eagle, if you lose your wings?

They were then asked to answer the following two questions.

- 1. How many animals are mentioned in the story?
- 2. True or False: The Snake is female.

# Appendix AA Demographic questionnaire

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				P. (FOR RESEA	ARTICIPANT # RCH USE ONLY)	
wно	IS IN	CONTROL: A STUDY	OF CC	NTINGENCY	LEARNING	
		Demo	ograp	hic Questic	onnaire	
<ul> <li>Th</li> <li>Yo</li> <li>Ple</li> <li>Ple</li> <li>pla</li> </ul>	is que u do i ease a ease a acing a	stionnaire is designa not have to answer i sk if there is any qu nswer the questions an 'X' in the appropr	ed to g the que estion <u>;</u> ON TF iate blo	ather some b estions, but it you are unsur IIS SHEET by pck.	asic data abou helps us if you e of. filling in the bl	it you. u do. anks provided or by
BASIC	S					
1. In	what	year were you born'	?			
2. Ho	ow wo	uld you define your	gender	?		
		Male		Female		Prefer not to say
3. W	hich C	NE of the following	best de	escribes what	you currently	do?
		Student		Employed		Not employed
EXERC	SISE					
Please within	e answ the la	ver the following wit ast month.)	h respe	ect to your CL	IRRENT level o	f exercise (i.e.
4. W	hich o	f the following best	descrit	bes you?		
		Not an athlete			Keep reasor	nably fit and active
		A regular athlete			A serious/p	rofessional athlete

5. How we	ould you describe your level	of exercise a	ctivity (30 minutes or more)?
	None		1–2 times per week
	3-4 times per week		Almost every day or more
6. If you d	do exercise, which ONE of th	ne following is	your most frequent type of
exercise	e?		
	Walking		Running/jogging
	Cycling		Swimming
	Other (please specify)		
	l don't exercise		No single exercise type
<b>STATE</b> Please ans to think to	wer the following with respe to much about your answer	ect to how you and just choo.	ı are feeling RIGHT NOW. Try not se what first comes into your
STATE Please ans to think to head.	wer the following with respe to much about your answer	ect to how you and just choo	u are feeling RIGHT NOW. Try not se what first comes into your
STATE Please ans to think to head. Make a ma I AM NOT SURE	wer the following with respe to much about your answer a rk on the line to indicate yo	ect to how you and just choo. ur response, f	u are feeling RIGHT NOW. Try not se what first comes into your for example: I AM COMPLETELY SURE
STATE Please ans to think to head. Make a ma I AM NOT SURE 7. How CC	wer the following with respe to much about your answer ork on the line to indicate yo DNFIDENT do you feel right i	ect to how you and just choo ur response, f	are feeling RIGHT NOW. Try not se what first comes into your for example: I AM COMPLETELY SURE rforming well in this experiment?
STATE Please ans to think to head. Make a ma I AM NOT SURE 7. How CO NOT CONFI AT ALL	wer the following with respe to much about your answer ork on the line to indicate yo DNFIDENT do you feel right IDENT	ect to how you and just choo. ur response, f	u are feeling RIGHT NOW. Try not se what first comes into your for example: I AM COMPLETELY SURE rforming well in this experiment? TOTALLY CONFIDENT
STATE Please ans to think to head. Make a ma I AM NOT SURE 7. How CO NOT CONFI AT ALL 8. How TI	wer the following with respe to much about your answer ork on the line to indicate yo DNFIDENT do you feel right IDENT	ect to how you and just choo. ur response, f	u are feeling RIGHT NOW. Try not se what first comes into your for example: I AM COMPLETELY SURE rforming well in this experiment? TOTALLY CONFIDENT

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9. How much control do you believe fit?	you have over your ability to exercise and keep
NO CONTROL	TOTAL CONTROL
10. How much control do you believe healthy weight?	you have over your ability to maintain a
NO CONTROL	TOTAL CONTROL
т	ΓΗΑΝΚ ΥΟυ
Т	THANK YOU
This research study has been ap Psychology Research Et Ethics Appro	proved by the Bangor University School of hics and Governance Committee. val Code: 2015-14589

#### Adult MHC-SF (ages 18 or older)

Please answer the following questions are about how you have been feeling during the past month. Place a check mark in the box that best represents how often you have experienced or felt the following:

During the past month, how often did you feel	NEVER	ONCE OR TWICE	ABOUT ONCE A WEEK	ABOUT 2 OR 3 TIMES A WEEK	ALMOST EVERY DAY	EVERY DAY
1. happy						
2. interested in life						
3. satisfied with life						
<ol> <li>that you had something important to contribute to society</li> <li>that you belonged to a community (like a social group, or your neighborhood)</li> </ol>						
SEE BELOW 6. that our society is a good place, or is becoming a better place, for all people						
7. that people are basically good						
8. that the way our society works makes sense to you						
9. that you liked most parts of your personality						
10. good at managing the responsibilities of your daily life						
11. that you had warm and trusting relationships with others						
12. that you had experiences that challenged you to grow and become a better person						
13. confident to think or express your own ideas and opinions						
14. that your life has a sense of direction or meaning to it						

Note: The original wording for item 6 was "that our society is becoming a better place for people like you." This item does not work in all cultural contexts. However, when validating the MHC-SF, test both versions of item 6 to see which one works best in your context.





18.	One of the major reasons we have wars is because people don't take enough interest in politics.
19.	Bad luck has sometimes prevented me from achieving things.
20.	If there's someone I want to meet, I can usually arrange it.
21.	There is nothing we, as consumers, can do to keep the cost of living from going higher.
22.	Almost anything is possible for me if I really want it.
23.	I often find it hard to get my point of view across to others.
24.	It is impossible to have any real influence over what big businesses do.
25.	Most of what happens in my career is beyond my control.
26.	In attempting to smooth over a disagreement, I sometimes make it worse.
27.	I prefer to concentrate my energy on other things rather than on solving the world's problems.
28.	I find it pointless to keep working on something that's too difficult for me.
29.	I find it easy to play an important part in most group situations.
30.	In the long run, we the voters are responsible for bad government on a national as well as a local level.

### Appendix DD Participant Information Sheet



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SCHOOL OF PSYCHOLOGY
DO I HAVE A RIGHT TO REFUSE OR WITHDRAW? You may refuse to participate in the study and you may withdraw at any time.
WHAT WILL HAPPEN TO THE STUDY RESULTS? Data will be kept securely for a minimum of 10 years and possibly indefinitely in a data archive, in accordance with good research practice. Information obtained in the research may be shared with interested parties and published in scientific journals, but your name will not appear in any public document, nor will the results be published in a form that would make it possible for you to be identified.
WHAT IF I HAVE FURTHER QUESTIONS? We welcome the opportunity to answer any question you may have about any aspect of this study or your participation in it. Please contact Paul Carter, School of Psychology, Bangor University, Gwynedd, LL57 2AS, phone 01248 388824.
ARE THERE COMPENSATION ARRANGEMENTS IF SOMETHING GOES WRONG? In the unlikely event of anything untoward happening, the University's insurer provides insurance for negligent harm. It does not provide insurance for non-negligent harm but does take a sympathetic view should a claim be made.
WHAT IF I HAVE COMPLAINTS? In the case of any complaints concerning the conduct of research, please address these to: Hefin Francis, School Manager, School of Psychology, Bangor University, Gwynedd, LL57 2AS. Thank you for considering taking part in this study. Our research depends entirely on the goodwill of potential volunteers such as you. If you require further information, we will be pleased to help you in any way we can.
This research study has been approved by the Bangor University School of Psychology Research Ethics and Governance Committee. Ethics Approval Code: 2015-14589-A13631
Page 2 of 2

# Appendix EE Consent Form

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	PARTICIPANT # (FOR RESEARCHER USE ONLY)	
Who i	is in control? A Study of Contingency Learning	
INVES Dr Joh Paul C Dina E Sultar	STIGATORS hn Parkinson Carter Elias n Aljwiser	
	Participant Consent Form	
The p	participant should complete this entire sheet himself/herself.	
Please	e circle as appropriate:	
1.	Have you read the Participant Information Sheet? YES / NO	
2.	Have you had the opportunity to ask questions and discuss this study?	
3.	Have you received enough information about the study? YES / NO	
4.	Do you understand that your participation is voluntary and that you are free to	
	withdraw from the study:	
	i. at any time;	
	ii. without having to give a reason? YES / NO	
5.	Do you understand that Bangor University provides insurance for negligent harm	but
	that it does not provide insurance for non-negligent harm?	
6.	Do you understand that the research data may be accessed by researchers worki	ng
	at or in collaboration with the Bangor Psychology, but that at all times your person	al
	data will be kept confidential and anonymous in accordance with data protection	
	data will be kept confidential and anonymous in accordance with data protection guidelines?	
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COLLEGE OF HEALTH & BEHAVIOURAL SCIENCES		
YSGOL SEICOLEG SCHOOL OF PSYCHOLOGY		
Date	Signature of Participant	
Name (IN BLOCK LETTERS)		
Date	Signature of Investigator	
Name (IN BLOCK LETTERS)		
Name (IN BLOCK LETTERS)		
Name (IN BLOCK LETTERS) This research study has been approved	by the Bangor University School of Psychology	
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