

**A Randomised Controlled Trial of a Goal-Setting and Planning
Intervention to Improve Working Adults' Well-Being**

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Abstract

The well-being of working adults is an issue of current concern. The aim of the present study was to test whether a goal-setting and planning (GAP) intervention could improve working adults' well-being. The intervention focused on setting meaningful goals, making realistic plans to achieve those goals and overcoming obstacles to progress. GAP was delivered as an online self-help programme, with minimal support. Using a longitudinal, randomised controlled crossover design, the study sought to: (1) test the effectiveness of the intervention relative to wait-list controls; (2) test the effectiveness of the intervention over time, for the whole sample, both immediately after the intervention period and three months later; and (3) establish whether initial well-being was associated with participants' response to the intervention. Relative to wait-list controls ($N = 139$), GAP participants ($N = 111$) reported significantly higher levels of positive affect, life satisfaction and flourishing immediately post-intervention, but not lower levels of negative affect. Longitudinal data were analysed for all participants who completed follow-up measures ($N = 163$). Compared to the start of the intervention, participants reported an increase in positive affect and flourishing, directly after the intervention and three months later. Negative affect and life satisfaction showed no change by the end of the intervention, but both had improved by three-month follow-up compared to the start of the intervention. Initial well-being levels were not associated with intervention response. This study demonstrated that working adults' well-being can be improved through access to online self-help guidance in goal-setting and planning. The study contributes to the evidence base for effective cognitive-behavioural workplace interventions and

provides a potential model for adapting clinically-proven interventions to make them accessible to working adults.

Abbreviations

ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
CSPS	Civil Service People Survey
FS	Flourishing Scale
MANOVA	Multivariate Analysis of Variance
MANCOVA	Multivariate Analysis of Covariance
NA	Negative Affect of PANAS (see below)
OECD	Office for Economic Co-operation and Development
ONS	Office of National Statistics
ONS4	Office of National Statistics - Four Well-being Items
PA	Positive Affect Scale of PANAS (see below)
PANAS	Positive and Negative Affect Schedule
PWB	Psychological Well-being
RTM	Regression to the Mean
SWB	Subjective Well-being
SWLS	Satisfaction With Life Scale
WHO	World Health Organisation

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Chapter 1: Introduction

The well-being of working adults is threatened by increasing levels of workplace stress, with employers expecting more work to be produced in less time and with fewer resources (Rial González, Cockburn, & Irastorza, 2010). Left untreated, workplace stress can cause serious physical and mental health problems, including heart attacks (Kivimäki et al., 2002), depression, anxiety and somatisation disorders (Kessler et al., 2009). To reduce workplace stress and improve employee well-being, effective workplace-based interventions are needed (National Institute for Health and Care Excellence, 2009). Richardson and Rothstein (2008) conducted a meta-analysis of such interventions and found cognitive-behavioural approaches to be the most effective at improving employee well-being. They noted, however, that the long-term effects of these cognitive-behavioural interventions had yet to be tested. A recent systematic review by Yang, Zhu, Chen, Liu, and Deng (2016) found that good quality longitudinal studies of psychological workplace well-being interventions remain scarce, despite being identified as a research priority (Cabinet Office, 2014). The current study was designed to address that gap by testing the effectiveness of an online goal-based intervention to improve working adults' well-being, using a longitudinal, randomised controlled trial.

The following section provides a definition of well-being, then explains the decision to focus on personal goals as a way to help working adults experience improved well-being. Justification is given for choosing to adapt an established goal-setting and action-planning (GAP) intervention (MacLeod, Coates, & Hetherington, 2008). Factors influencing the adaptation of the intervention and the longitudinal,

randomised controlled crossover design are then discussed. The chapter ends with an overview of the current study and the predicted outcomes.

Defining well-being

Well-being is generally regarded as something worth pursuing. If someone is ill, they are encouraged to ‘get well soon’. If someone is embarking on a long journey, they are told to ‘go well’. However, consensus has yet to be reached on a precise definition of what it means to have achieved well-being. The Organisation for Economic Co-operation and Development (OECD) asserts that well-being involves having access to resources such as clean air, broadband and secondary-level education (OECD, 2014). This objective definition assumes that the right environment can bring universal well-being. The World Health Organisation (WHO), by contrast, recognises that individual factors will also affect well-being. The WHO-5 Wellbeing Index (WHO, 1998) asks individuals to rate how often they feel calm, cheerful and rested, and whether they think life is interesting and full of activity. By asking individuals to rate their own experience, WHO defines well-being as a subjective construct.

Philosophers and psychologists draw a similar distinction between subjective and objective definitions of well-being. Hedonists suggest that well-being is achieved if life is enjoyable and free from suffering (Crisp, 2006). Enjoyment of life is a subjective judgment. Eudaimonists take a more objective stance, suggesting that well-being involves an individual living life to their fullest potential, demonstrated through personal growth and relationships (Waterman, 2013). At its most extreme, the

eudaimonic approach asserts that individual achievements should be assessed against a pre-determined list of universal human ideals (Ryan & Deci, 2000).

The hedonic and eudaimonic approaches might seem contradictory, but MacLeod (2015) neatly plots them on a single continuum of well-being constraint. At one end, hedonic well-being is relatively unconstrained, requiring a momentary subjective judgment of emotional experience. At the other end, eudaimonic well-being is highly constrained, requiring achievement against a number of prescribed ideals, only achievable with applied effort over a period of time. MacLeod (2015) introduces the term 'subjective' for approaches to well-being that are located towards the middle of the continuum, providing a useful framework to distinguish between three definitions of well-being that are widely used in empirical research: subjective well-being (SWB; Diener, 1984), psychological well-being (PWB; Ryff, 1989) and flourishing (Huppert & So, 2009).

At the subjective end of the well-being constraint continuum, SWB is defined as experiencing high levels of positive affect, relatively low levels of negative affect and a sense of satisfaction with life (Diener, 1984). All three components involve unconstrained judgments that can be made by the individual based on their own personal experience (MacLeod, 2015). PWB lies further towards the objective end of the continuum and was intended to represent a departure from the hedonic pleasure-based definition of SWB by focusing instead on eudaimonic well-being (Ryff, 1989). PWB is defined as functioning well on six dimensions, each representing an objective human ideal, including autonomy, positive relations with others and personal growth. However, the self-report PWB measure constructed by Ryff (1989) asks individuals

to make subjective judgments relating to those dimensions. For example, personal growth is not measured by asking an individual to list the future plans they have in place, but by asking them to subjectively rate how enjoyable they find making those plans. By adding subjective judgments to objective constructs, PWB can be regarded as a ‘subjective’ approach (MacLeod, 2015).

The concept of flourishing combines hedonic and eudaimonic components, but is measured using statements with less emphasis on affective experience than PWB (e.g. ‘I lead a purposeful and meaningful life’; Diener et al., 2010), so lies slightly further towards the objective end of the well-being constraint continuum (cf. MacLeod, 2015). An individual who is flourishing experiences hedonic well-being, including happiness, calmness and peacefulness, but also eudaimonic well-being, through engagement with life, positive relationships with others and a sense that life is worthwhile (Seligman, 2011). Flourishing is gathering support as a holistic approach to well-being (Huppert & So, 2013), and has been used as an outcome measure in recent empirical studies of well-being in working adults (e.g., Bakker & Sanz-Vergel, 2013; de Manincor et al., 2016; Howells, Ivztan, & Eiroa-Orosa, 2016).

In the current study, *well-being* was defined as high levels of positive affect, low levels of negative affect, a sense of satisfaction with life and the view that life is worthwhile. This definition is used by the Office of National Statistics (ONS, 2015) and has a sound theoretical and empirical basis, integrating the affective and cognitive hedonic components of SWB (Diener, 1984) with a cognitive eudaimonic component of flourishing (Huppert & So, 2013), as shown in Figure 1. Each component is measured as an item in the UK Annual Population Survey and in annual surveys of

working adults (Cabinet Office, 2015; ONS, 2015), the target population of the current study. These four components were therefore used to define well-being in the current study, enhancing ecological validity and increasing the generalisability of the findings to the working adult population.

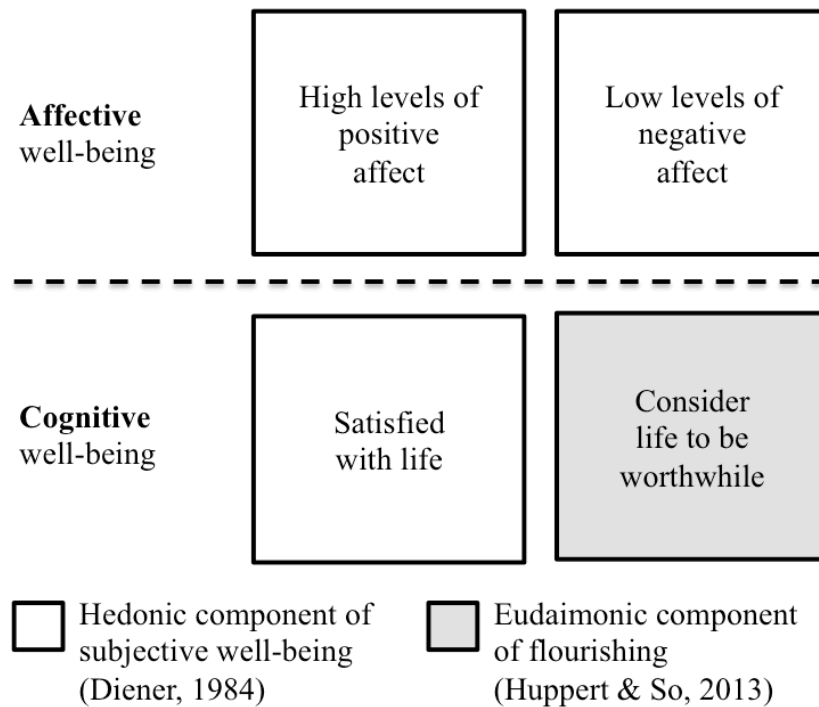


Figure 1. The four components of personal well-being (ONS, 2015)

Influencing well-being

Defining well-being is an important first step to understanding what factors can influence changes in working adults' well-being. Steel, Schmidt, and Shultz (2008) conducted a meta-analysis of studies examining the association between stable personality traits and well-being. Personality traits accounted for 39% of total variance in well-being, or even up to 63% if measurement error was corrected. However, the remaining variance in well-being was not accounted for by personality

traits, suggesting there are other influencing factors that could be targeted in an intervention to improve working adults' well-being. Since Richardson and Rothstein's (2008) meta-analysis was published, indicating that workplace-based cognitive-behavioural interventions were particularly effective at improving well-being for working adults, a number of trials of such interventions have been carried out. These have ranged from group-based mindfulness interventions (e.g., Huang, Li, Huang, & Tang, 2015; Wolever et al., 2012) to positive thinking tasks (e.g., Chancellor, Layous, & Lyubomirsky, 2015). One type of cognitive-behavioural intervention for well-being that has yet to be widely tested in the workplace (Richardson & Rothstein, 2008; Yang et al., 2016) is training in setting and pursuing life goals, despite strong evidence for the association between personal goals and well-being.

Association between goals and well-being

As with well-being, the word goal has a range of definitions. Some definitions emphasise the cognitive features of goals as desired future states stored in memory for comparison with current reality (Cochran & Tesser, 1996), while other definitions emphasise the emotional and behavioural features of goals as planned activities to avoid negative affect (Elliot et al., 1997). In the workplace, goals can describe tasks or projects that an individual is responsible for delivering but has had no role in choosing (Little, Salmela-Aro, & Phillips, 2007). The current study is about personal well-being, so will focus instead on goals that are chosen by the individual, relating to work or home life. In the current study, *goals* will be defined as internal representations of meaningful outcomes that people want to achieve (cf. Austin & Vancouver, 1996). This definition combines cognitive, emotional and behavioural

components, emphasises the personal nature of goals, and is widely used in empirical research with working adults (e.g., Barrick, Mount, & Li, 2013; Green, Oades, & Grant, 2006).

The fundamental association between goals and well-being is described in “Telic theories” proposing that the very definition of well-being is to be engaged in striving towards goals that have personal value (Schmuck & Sheldon, 2001). Cantor and Sanderson (1999) offer an alternative view, suggesting that well-being is not defined by having goals, but is an outcome of goal-directed behaviour. Goals promote engagement in life tasks which, in turn, can generate positive emotions and a sense of purpose (Cantor & Sanderson, 1999). Empirical studies have confirmed that well-being can be increased through the pursuit of chosen goals (e.g., Headey, Muffels, & Wagner, 2013; Sheldon & Lyubomirsky, 2006). Klug and Maier (2015) conducted a meta-analysis of 85 studies examining goal pursuit and well-being, of which 25 were studies of working adults. They found that successfully pursuing goals was significantly associated with higher levels of well-being, with moderate average population correlations of $\rho = .43$ for all adults and $\rho = .39$ for working adults. Klug and Maier (2015) provide empirical support for the association between goals and working adults’ well-being, but the longitudinal effect of a personal goals-based intervention on working adults’ well-being remains untested. To get a better understanding of what components such an intervention should include, the specific ways in which personal goals can influence well-being will now be explored further in chronological order of goal-related activity: setting goals, imagining achieving those goals, planning and taking actions towards them, and overcoming obstacles to progress.

Setting goals. Goal-setting can occur without conscious effort. Carver and Scheier (1990) propose that human beings constantly act to close the gap between current reality and a future desired state that has not necessarily been consciously identified. Emotions signify whether the discrepancy between current and future states is being reduced. Positive affect indicates successful movement towards the future state and negative affect is a warning that inadequate progress is being made. In this way, affective well-being can be an indicator of goal progress even if the goal itself is not consciously identified. Neurological studies confirm that asking people to think of desired future states can induce sub-cortical brain activity, amplified by the dopamine system (Aarts, Custers, & Holland, 2007). Activity in these regions of the brain implies goal-related behaviour is being regulated at a non-conscious level, using emotional response (Aarts et al., 2007).

If affective well-being can be achieved without conscious goal-setting, a goal-based intervention for working adults may seem redundant. However, Locke and Latham (1990) recommend actively setting goals so that effort and attention can be directed towards achieving them. Lyubomirsky, Sheldon, and Schkade (2005) found that choosing a goal to work towards voluntarily, rather than in response to someone else's instruction, can generate long-term positive affect, a key component of affective well-being. The positive affect generated from thinking about chosen goals is thought to play a key role in motivating goal-directed behaviour (Davidson, 1998), suggesting there is value in a goals-based workplace intervention starting with a process of listing and choosing personal goals to be worked on.

Goal content. Although generating and starting to work towards goals can generate positive affect, the longer term impact on well-being depends on the content of the goal and the underlying motivation for pursuing it. Kasser and Ryan (2001) studied the effect on well-being of two different types of goal: intrinsic and extrinsic. Intrinsic goals relate to internal needs for affiliation, self-acceptance and community, and progress towards them is associated with higher well-being. Extrinsic goals, by contrast, relate to striving for external reward, such as financial success or social recognition. Working towards extrinsic goals does not bring well-being and can even harm well-being if pursuing them is an attempt to fulfil an internal, psychological need (Gardarstottir, Dittmar, & Aspinall, 2009). Dittmar, Bond, Hurst, and Kasser (2014) carried out a meta-analysis of studies examining the relationship between materialism (acquisition of money and possessions) and well-being. Overall, having materialistic goals was associated with lower levels of well-being.

In self-determination theory, Deci and Ryan (1985, 2008) proposed that personal goals are motivated by a basic need to feel effective (competency), to be able to choose activities that are personally meaningful (autonomy) and to experience a sense of harmony or connection with other people (relatedness). Sheldon and Elliot (1998) labelled goals that meet these needs, particularly autonomy, as ‘self-concordant’ goals. People who pursued goals with high self-concordance experienced higher well-being compared to those with less self-concordant goals (Sheldon & Elliot, 1998). In a combined study of 251 working adults and 183 students, Judge, Bono, Erez, and Locke (2005) found that the self-concordance of personal life goals was associated with positive self-regard. Those with higher positive self-regard chose more self-concordant goals. In turn, those with more self-concordant goals

experienced greater life, or job, satisfaction. Koletzko, Herrmann, and Brandstätter (2015) provided further evidence for the association between self-concordant goals and life satisfaction, but found that sustained motivation was also an important factor. Students with goals that were more self-concordant reported greater life satisfaction after one year, but this effect was reduced if the student was ambivalent about achieving the goal. In relation to the planned intervention for working adults in the current study, these findings suggest that helping participants to maintain motivation would be important, as well as providing guidance on choosing self-concordant goals.

Approach-avoidance goals. A further way to distinguish both the type of goal and the motivation for pursuing that goal is the concept of approach and avoidance goals (Elliot et al., 1997). Approach goals are generally about moving towards a desirable new event or outcome. Avoidance goals relate to preventing undesirable outcomes. The association between approach goals, avoidance goals and well-being is complex, because all goals sit within a hierarchy of motivations and other goals (MacLeod, 2013). For example, the approach goal ‘to get fit’ could relate to an avoidance goal such as ‘to not be laughed at when I go to the beach on holiday’. People with higher levels of well-being have been found to have more approach than avoidance goals (Elliot et al., 1997), but the reverse has not been demonstrated for those with lower levels of well-being. Dickson, Moberly, and Kinderman (2011) expected adults with depression to have less approach goals than controls, but found no difference between the groups. However, participants with depression gave lower ratings than controls of the likelihood of achieving their desired approach goals (Dickson et al., 2011). In the current study, working adults with lower levels of well-

being might be able to identify approach goals, but may also need support to develop the necessary motivation to pursue those goals.

Imagining goal achievement. Oettingen (2012) asserts that goal motivation can be strengthened by imagining what it would be like to achieve that goal, then identifying what is currently preventing progress towards goal achievement. Within the framework of fantasy realisation theory, Oettingen (2012) calls this process mental contrasting and has confirmed experimentally that it generates more motivation to pursue goals than only thinking about the desired future (indulging), only thinking about the current reality (dwelling), or starting with thoughts about the current reality then trying to extend those to a desired future (reverse contrasting). Mental contrasting has been found to improve motivation and goal pursuit strategies in relation to personal health goals (Oettingen, Mayer, & Thorpe, 2010) and work-related goals (Oettingen, Mayer, & Brinkman, 2010). Schmitt, Zacher, and de Lange (2013) found that working adults who were more skilled at envisaging positive future opportunities experienced a greater sense of purpose and well-being at work. Envisaging future goals success may therefore have a place in a goal-based intervention to improve working adults' well-being. However, to facilitate mental contrasting in the correct order specified by Oettingen (2012), the part of the intervention involving imagining future goal success should come before participants are asked to consider making action plans to move from the current reality to their desired future.

Planning actions towards goals. Once goals have been chosen and their achievement can be clearly envisaged, specific action plans can help them to be

achieved (Gollwitzer, 1999). Planning involves selecting appropriate actions, sequencing those actions and inhibiting actions that will not lead towards the goals (Haith, Benson, Roberts, & Pennington, 1994). Although planning is a behaviour, it can have a positive impact on both cognitive and affective well-being. Prenda and Lachman (2001) studied the association between having future plans, having a sense of control and being satisfied with life. They found that those with more future plans felt more in control and reported greater life satisfaction. MacLeod and Conway (2005) studied the association between planning ability and both cognitive and affective well-being. Participants who generated a higher number of planned steps to achieve goals reported thinking more positively about the future and experiencing high positive affect and life satisfaction.

Plans for achieving goals have also been found to improve positive affect and flourishing. Cheavens, Feldman, Gum, Michael, and Snyder (2006) designed a group intervention based on hope theory (Snyder, Rand, & Sigmon, 2002). This theory suggests that hope arises from agency thoughts, which are beliefs that goals can actually be achieved, and pathways thoughts, which are effective plans to achieve those goals. Participants were encouraged to develop goals they believed in and make plans to achieve those goals. After receiving the intervention, participants reported higher levels of self-esteem and indicated that they felt their life was more meaningful, compared to wait-list controls. Cheavens et al. (2006) did not assess well-being at a later time point, so were not able to demonstrate that the positive impact of the intervention on well-being was maintained.

Taking action towards goals. Once plans are in place, longer-term well-being relies on putting those plans into action (Lyubomirsky et al., 2005). In an online questionnaire study of over 400 adults, Helzer and Jayawickreme (2015) found that actively striving for goals was more strongly associated with high positive affect and low negative affect than simply thinking about goals. Activity towards goals can be encouraged by the right kind of support from others. Koestner, Powers, Carbonneau, Milyavskaya, and Chua (2012) examined the impact of close relationships with other people on goal progress. They found that adults who were supported by their partners or friends in pursuing their personal goals made active progress towards those goals. Better progress was made if the support was empathetic and understanding, allowing a sense of autonomy to be retained in working towards the goal. Such support was also associated with higher levels of well-being. Directive support in the form of advice was also positively related to goal progress, but was not associated with changes in well-being. These findings advocate the use of a self-help format for a goals-based workplace intervention, offering some level of support, but allowing participants to retain a sense of autonomy in completing the intervention.

Overcoming obstacles. The final part of goal-related behaviour associated with well-being is the concept of goal disengagement and re-engagement. Even well-made plans and well-intended goal striving can be hampered by obstacles to progress. Wrosch and colleagues have conducted an empirical programme of research (e.g., Wrosch, Heckhausen, & Lachman, 2000; Wrosch, Miller, Scheier, & De Pontet, 2007; Wrosch, Scheier, & Miller, 2013) into the benefits for well-being and health of setting aside goals that become unattainable and re-engaging with new ones instead. The same idea was examined by Brandtstädter and Rothermund (2002), who

proposed the dual-process model of goal adjustment in which individuals take two approaches to life goals that are difficult to obtain. They either assimilate, which means retaining the goal and devoting more available resources to it, or they accommodate. Accommodation involves dispensing with the goal because sufficient resources are not available to achieve it, but accepting that fact with minimal negative affect. Brandtstädter and Rothermund (2002) offer empirical support for their model (e.g., Brandtstädter, Rothermund, & Schmitz, 1997) and note that the intention of both approaches is to use available resources effectively, guarding against exhaustion and so protecting well-being.

Subsequent studies have provided further empirical support to the idea that well-being is enhanced when unattainable goals are adjusted. Kraaij, Garnefski, and Schroevers (2009) studied the goal-adjustment strategies of 83 Dutch adults who were unable to attain their valued life goal of having children. Those who reported using goal disengagement strategies also reported lower levels of negative affect, and those who reported being able to re-engage with new goals reported higher levels of positive affect. In the workplace context, North, Holahan, Carlson, and Pahl (2014) ran an online and community based study of adults to find out how well-being was affected by the way participants responded to negative job-related events. They found that people who responded by accepting the negative emotions that arose after failure at work, then re-engaged with a new goal, experienced higher levels of flourishing than those less able to accept the negative emotions or re-engage with a new goal.

The literature reviewed here has demonstrated that interventions based on individual aspects of goal-related behaviour have the potential to improve well-being.

However, given the wide range of mechanisms through which goals can affect well-being, a workplace-based intervention based on multiple goal-related mechanisms could be a more effective way to improve well-being in working adults. The five main skills areas such an intervention could focus on would be: generating chosen goals (Lyubomirsky et al., 2005), aligning those goals with personal values (Deci & Ryan, 2008), envisaging future goal success (Oettingen, 2012), providing support in making plans to achieve those goals (Gollwitzer, 1999), and recommending ways to overcome obstacles and enable flexible re-engagement with new goals (Wrosch, Scheier, & Miller, 2013).

Goal-setting and Planning (GAP) intervention

Goal-setting and Planning (GAP) is an established intervention that draws on empirical studies of goal-related behaviour to provide a comprehensive skills-training programme in goal-setting and planning to improve well-being (MacLeod et al., 2008). Key elements of the intervention include: guidance on identifying goals and selecting self-concordant approach goals; exercises to help imagine goal success; support in making realistic action plans, and tips to help identify and overcome obstacles to goal progress. MacLeod et al. (2008) developed the intervention and tested it first on a group of adults comprised mostly of university students. Twenty-nine participants were split into five small groups. Each group attended three sessions over three weeks, led by two facilitators. Sessions covered goal selection and refinement, goal planning and implementation and finding ways to overcome obstacles to goal progress. Participants were expected to do work between sessions, writing action plans and testing them out. To establish the impact of GAP on well-being, measures were taken before and after the intervention, including an affective

well-being measure, the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), and a cognitive well-being measure, the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). These measures were also completed by a control group ($N = 35$), recruited after the intervention group and selected to match that group on age, gender and student status. The control group were not offered the intervention and had no contact with the researcher during the five-week intervention period. GAP participants reported significant improvements in life satisfaction compared to controls. Positive affect also improved compared to controls, but only when group members who missed sessions were excluded from the analysis, indicating that adherence may have been one factor influencing participants' response to the intervention.

The second GAP trial, also by MacLeod et al. (2008), involved a community sample of adults, recruited by letters sent to a random sample of those on the electoral register of a town near London. The same well-being measures and study design (intervention versus inactive control group) were used as for the first MacLeod et al. (2008) trial, but GAP was administered as a self-help booklet, making it more suitable for widescale use by removing the need for weekly group contact. The intervention group appeared to experience greater improvements in all aspects of well-being than controls. However, the overall number of participants was small (intervention group, $N = 9$; control group, $N = 11$) so findings lacked statistical power. MacLeod et al. (2008) attributed the small sample size to difficulties experienced recruiting a sample of adults from the community.

Ferguson, Conway, Endersby, and MacLeod (2009) tested GAP in a forensic mental health service for people with long-term psychiatric diagnoses, including schizophrenia and bipolar disorder. GAP was delivered in weekly group sessions over a six-week period. All participants received the intervention, with no control group. As with previous GAP trials, pre-intervention and post-intervention measures included the PANAS (Watson et al., 1988) and the SWLS (Diener et al., 1985). However, clinical measures of depression, anxiety and schizophrenia symptoms were also added, given the clinical setting in which the trial was being administered. Ferguson et al. (2009) found that participants showed a significant increase in satisfaction with life and decrease in negative affect after completing GAP and two months later. Levels of positive affect did not change from pre-intervention to either post-intervention or follow-up. Given that negative affect decreased, but positive affect remained consistent, this GAP study shows the value of measuring positive and negative affect separately. Ferguson et al. (2009) did not include a control group, so it is possible that their findings could be explained by confounding factors which had a positive impact on well-being, such as environmental changes in the forensic setting.

GAP was tested in two further clinical studies. Coote and MacLeod (2012) showed that GAP in self-help booklet form had a positive impact on well-being in a group of 55 depressed adults. The study used a wait-list crossover design, with two phases. In the intervention phase, participants either received the intervention immediately or were put on a waiting list, creating a control group to compare outcomes. Well-being was defined as high positive affect and life satisfaction, and low negative affect and depression. Relative to controls, GAP participants reported

improved well-being overall and a significant decrease in negative affect. In the crossover phase, the wait-list group also completed the intervention and the whole sample was included when analysing pre-intervention, post-intervention and five-week follow-up data. Compared to pre-intervention, the whole sample reported increased positive affect and life satisfaction, and reduced negative affect and depression, at both post-intervention and follow-up.

In a clinical study of GAP's effectiveness at improving well-being in adults with psychiatric disorders, Farquharson and MacLeod (2014) also used a wait-list crossover design. They delivered the GAP intervention in four two-hour weekly group sessions for 65 adults with psychiatric disorders attending specialist mental health services. In the intervention phase, GAP participants reported improved life satisfaction and reduced negative affect relative to controls. At one month follow-up, all participants reported improved positive affect and life satisfaction, but levels of negative affect were the same as at pre-intervention.

Testing GAP in the workplace

Given that GAP provides training in a wide range of goal-related skills and has proven to be effective at improving well-being in a range of clinical and non-clinical settings, it seems an appropriate intervention to use for the current study, to establish if working adults' well-being can be improved through setting and pursuing personal goals. Successful aspects of previous GAP trials were retained, but the opportunity was also taken to extend various study design aspects, to provide a more robust trial of the GAP intervention in non-clinical settings than has been conducted to date. MacLeod et al. (2008) found GAP to be effective with an almost homogenous sample

of students and a small sample of adults from the local community, but it would now be appropriate to test GAP in a larger non-clinical trial, with a sufficient sample size to achieve adequate power at .8 level. Research studies with greater statistical power are considered to be of higher quality and their findings more persuasive than those with low power (Moher, Dulberg, & Wells, 1994). In line with Consolidated Standards of Reporting Trials (CONSORT) guidance on effective trials of non-pharmacological interventions (Boutron, Moher, Altman, Schulz, & Ravaud, 2008), adaptations to the design should include random allocation to treatment or control groups, a standardised delivery format and a longer follow-up phase. Each of these adaptations will be explained in greater detail below.

Random allocation. Both non-clinical GAP studies conducted to date included a control group, facilitating comparisons between participants receiving the GAP intervention and those not receiving it (MacLeod et al., 2008). However, neither study used simple randomisation to allocate participants to intervention and control groups. Simple randomisation provides more reliable evidence of the efficacy of an intervention (Moher et al., 2010). It reduces bias when selecting participants for groups and allows probability theory to be applied properly when analysing outcomes, so more robust conclusions can be drawn about whether any improvements were caused by the intervention or by chance (Greenland, 1990). Although developed as a methodology for testing drug efficacy in medical settings, randomised controlled trials (RCTs) are now widely used to test behavioural or psychological interventions (Hopewell et al., 2014; Hopewell, Dutton, Yu, Chan, & Altman, 2010).

The CONSORT group note that a particular challenge for non-pharmacological RCTs is ensuring that the intervention is delivered consistently (Boutron et al., 2008). Drug RCTs test medication which, assuming it has been produced in a standard way, offers identical treatment to all intervention group participants. Non-pharmacological treatments are harder to standardise. Psychological treatments involving individual or group therapy sessions, for example, can be affected by interpersonal factors that are unique to each participant-therapist dyad (Boutron et al., 2008). Previous non-clinical GAP studies involved either group sessions or therapist contact via four separate phone calls (MacLeod et al., 2008). Such contact risks biased treatment of different participants. To improve the standardisation of the intervention, it would be better to offer identical materials to all intervention participants and limit therapist contact even further, to one generic email offering the opportunity for a telephone call if required. Limiting therapist contact also minimises the resources involved in delivering the intervention, increasing the potential to make it accessible to a larger group of participants.

Online format. To help achieve consistency of treatment, GAP should be adapted into the format most appropriate for the target population, to encourage maximum uptake of the self-help intervention when it is made available within the trial. If GAP is to be trialled with a large sample of adults in the workplace, an online format seems more appropriate than the booklet form used previously. Online training programmes are replacing bibliographic formats as the preferred means of adult learning in the workplace (Cheng, Wang, Moormann, Olaniran, & Chen, 2012) and have been used in previous RCTs of online positive psychology workplace interventions, with beneficial effects on well-being (e.g., Aikens et al., 2014). Lal and

Adair (2014) conducted a literature review of online interventions focused on improving mental health and noted that the logistical strengths of online intervention were greater accessibility, lower delivery costs once start-up costs had been accounted for, and increased engagement from participants. Matano et al. (2007) conducted a pilot study of an online self-help intervention which successfully reduced alcohol consumption in working adults. They noted that online self-help interventions are particularly appropriate in workplace settings where stigma of admitting feelings related to low well-being might otherwise prevent help-seeking.

Online self-help interventions can help enhance a sense of freedom and control, but some level of support is required to help maintain motivation and a sense of accountability (Andersson, Carlbring, Berger, Almlöv, & Cuijpers, 2009; Donkin & Glozier, 2012). In a meta-analysis of online interventions for depressed adults, Andersson and Cuijpers (2009) found those that included support from professionals either by email, phone, or short face-to-face contact, were over two times as effective (Cohen's $d = 0.61$) as online interventions with no support (Cohen's $d = 0.25$). In addition to professional support, management support in terms of organisational endorsement is also important. Lee, Hsieh and Ma (2011) found that e-learning tools in the workplace were more likely to be perceived as valuable by employees if the organisation and management were clearly supportive.

GAP has not been used in an online format before, so exposing it to a larger scale trial while changing the format could make outcomes difficult to predict. However, the benefits of the online format outlined above are thought to outweigh this potential risk. Although a single study is not conclusive, it is helpful to note that

Layous, Nelson, and Lyubomirsky (2013) ran a four-week trial of positive thinking intervention in which participants were asked to think of their best possible selves once a week. The authors delivered the intervention to one group online and to one group in-person. The positive effect on well-being was the same for both conditions.

Three-month follow-up period. In a review of existing literature of the outcomes of positive psychology interventions in the workplace, Grant and Cavanagh (2007) emphasised the need for longitudinal studies with longer follow-up periods, to determine if interventions can produce sustained effects. Similarly, in response to the UK government's request for research into interventions to improve working adults' well-being (Cabinet Office, 2014), the Economic and Social Research Council (ESRC) specifically asked researchers to establish if the effects of the intervention persist (ESRC, 2014). Previous GAP studies with non-clinical community samples did not include a follow-up period (MacLeod et al. 2008), but three GAP studies with clinical populations had follow-up periods of either one month (Coote & MacLeod, 2012) or two months (Farquharson & MacLeod, 2014; Ferguson et al., 2009). It was considered feasible to extend the follow-up period to three months in the current study, to provide a longer-term assessment of whether any improvements to well-being were sustained, but also enable data to be gathered within the time available.

Outline of current study

The main objective of the current study was to evaluate the effect of an online self-help version of GAP, a goal-setting and action-planning intervention, on working adults' well-being. The intervention was tested in a longitudinal randomised controlled trial with a three-month follow-up period. Participants were recruited from

two government departments. Using a controlled crossover design, the study examined the effectiveness of the five-week self-help GAP intervention (roughly one hour per week) with one support email offering brief telephone contact, compared to a wait-list control group. Minimal support was offered in line with previous GAP studies (e.g. Coote & MacLeod, 2012), with the intention of testing GAP's potential for roll-out to a wider population of working adults with minimal resource impact, if it proved effective at improving well-being. The dependent variables were positive affect, negative affect, life satisfaction and flourishing. They were measured at pre-intervention, post-intervention and follow-up three months later. After the intervention group had completed GAP, the wait-list control group crossed over to receive the intervention and were also followed up three months after completing the intervention. With this design, data were available to assess the intervention effects for GAP participants, relative to controls, but also to analyse the whole sample data at pre-intervention, post-intervention and follow-up, to assess longitudinal changes in well-being.

The current study had four main hypotheses. The first two hypotheses related to the intervention phase in which the intervention group was compared to the wait-list control group. Hypothesis 1 was that relative to controls, GAP participants would show significantly improved well-being immediately post-intervention, with increased positive affect, life satisfaction and flourishing and decreased negative affect. In the most recent study of GAP in self-help format, Coote and MacLeod (2012) found that GAP participants with depression reported improved overall well-being and a decrease in negative affect compared to controls, with trends towards a decrease in depression and an increase in positive affect and life satisfaction. It was

predicted that those positive trends would be replaced by significant findings in the current study because a larger sample was planned, giving more power to detect the effects of the intervention. Flourishing was not included as an outcome measure in Coote and MacLeod (2012), but has been shown to respond well to positive psychology interventions in recent empirical studies (e.g. de Manincor et al., 2016; Howells et al., 2016).

Hypothesis 2 was that GAP participants with lower initial well-being levels would show greater improvements in well-being during the intervention phase than other GAP participants and controls. Coote and MacLeod (2012) had found GAP to have a greater effect on reducing depression symptoms in the more severely depressed participants. The effect was not shown in relation to well-being measures, but confirms the potential of the intervention to help those who might potentially benefit from it most. Furthermore, GAP has proved successful in improving well-being in a number of clinical settings, in which participants' mean well-being levels were expected to be generally lower than the non-clinical population in the current study.

The second set of hypotheses related to the longitudinal phase of the study, in which the whole sample were considered as a single group and changes in well-being were examined across three time points: pre-intervention, post-intervention and three-month follow-up. Hypothesis 3 was that, for the whole sample, well-being would be higher at post-intervention and at follow-up than at pre-intervention. Coote and MacLeod (2012) reported significant improvements in well-being overall, in positive affect and life satisfaction, and reductions in negative affect both at post-intervention

and follow-up, compared to pre-intervention. MacLeod et al. (2008), in the only other study of the self-help version of GAP, also observed changes in the positive direction on these variables, albeit without the power to detect significant changes. With a larger sample of non-clinical adults in the current study, improvements in well-being could be more confidently predicted. The three-month follow-up period was at least one month longer than for any previous GAP study (Coote & MacLeod, 2012; Farquharson & MacLeod, 2014; Ferguson et al., 2009) but it was hoped that any positive effects of GAP would be sustained.

Hypothesis 4 was that participants with lower initial well-being levels would experience greater improvements in well-being across time, from pre-intervention to follow-up, than those with higher initial well-being levels. This hypothesis was based on the same reasoning as Hypothesis 2. A summary of all four hypotheses is provided below:

Hypothesis 1: Relative to controls, GAP participants will show significantly improved well-being (increased positive affect, life satisfaction and flourishing and decreased negative affect) immediately post-intervention.

Hypothesis 2: GAP participants with lower initial well-being levels will show greater improvements in well-being during the intervention phase than other GAP participants and controls.

Hypothesis 3: For the whole sample, well-being levels will be higher at post-intervention and at follow-up than at pre-intervention.

Hypothesis 4: Participants with lower initial well-being levels will experience greater improvements in well-being across time, from pre-intervention to follow-up, than those with higher initial well-being levels.

Chapter 2: Method

Design

A randomised, controlled crossover design was used, with longitudinal follow-up at three months. Participants were randomly allocated to either an intervention group or a wait-list control group. The intervention group were given access to the online training intervention and asked to work through six modules individually over five weeks, for about one hour per week. Each intervention group member received an email from the researcher (JO) two weeks into that five-week period, offering a short support phone call. The wait-list control group had no access to the intervention and no contact with JO during that time. Both groups completed a set of well-being measures at the start (Time 1) and end (Time 2) of that five-week period. The measures comprised the PANAS (Watson et al., 1988), the SWLS (Diener et al., 1985), the Flourishing Scale (FS; Diener et al., 2010) and the ONS4 well-being items (ONS, 2015). After Time 2, the wait-list control group crossed over to the intervention condition. They were given access to the intervention for five weeks, with the support described above, then asked to complete the same well-being measures. Three months after the five-week intervention period ended, both groups were asked to complete the well-being measures again, to provide follow-up outcomes.

Participants

The target population was working adults. Two UK Civil Service departments agreed to participate in the study. There is extensive precedent for using government employees as a representative working adult sample in health and well-being studies

(e.g., Flaxman & Bond, 2010; University College London, 2015). All adult employees were considered eligible for inclusion, with no exclusion criteria, to maximise the generalisability of the findings. If participants were unable to read or access online material, a hard-copy version of the intervention, translated into Braille or another accessible format, was available. The online participant information sheet was accessed by 335 people, of whom 330 (98.5%) gave consent to participate. These 330 participants were mostly female (72.9%), aged 45-54 (35.8%), identified their ethnic group as White (95.3%), earned a full-time equivalent salary of £20,000-£39,999 (55.5%) and had worked for their employer for more than 10 years (64%). Further details of participant characteristics are on page 61 in the Results section.

The CONSORT flow diagram (Moher et al., 2010) in Figure 2 shows the number of participants who reached each stage of the study, from consent to follow-up. Participants were randomly assigned in chronological order of consent to either the intervention group ($N = 170$) or the wait-list control group ($N = 160$). The randomisation schedule had been generated online (Dallal, 2013) using a block size of 1000 to achieve a close approximation of simple randomisation. Of the 330 people randomly assigned to groups, two withdrew for personal reasons and a further 78 failed to complete either Time 1 or Time 2 measures. The remaining 250 people completed Time 2 measures and were included in the between-groups Time 1/Time 2 ('T1/T2') analysis (intervention group, $N = 111$; wait-list control group, $N = 139$). Between Time 2 and follow-up, six people withdrew for personal reasons and 81 failed to complete either pre-intervention, post-intervention or follow-up measures, leaving 163 people eligible for the Pre/Post/Follow-up ('PPF') analysis.

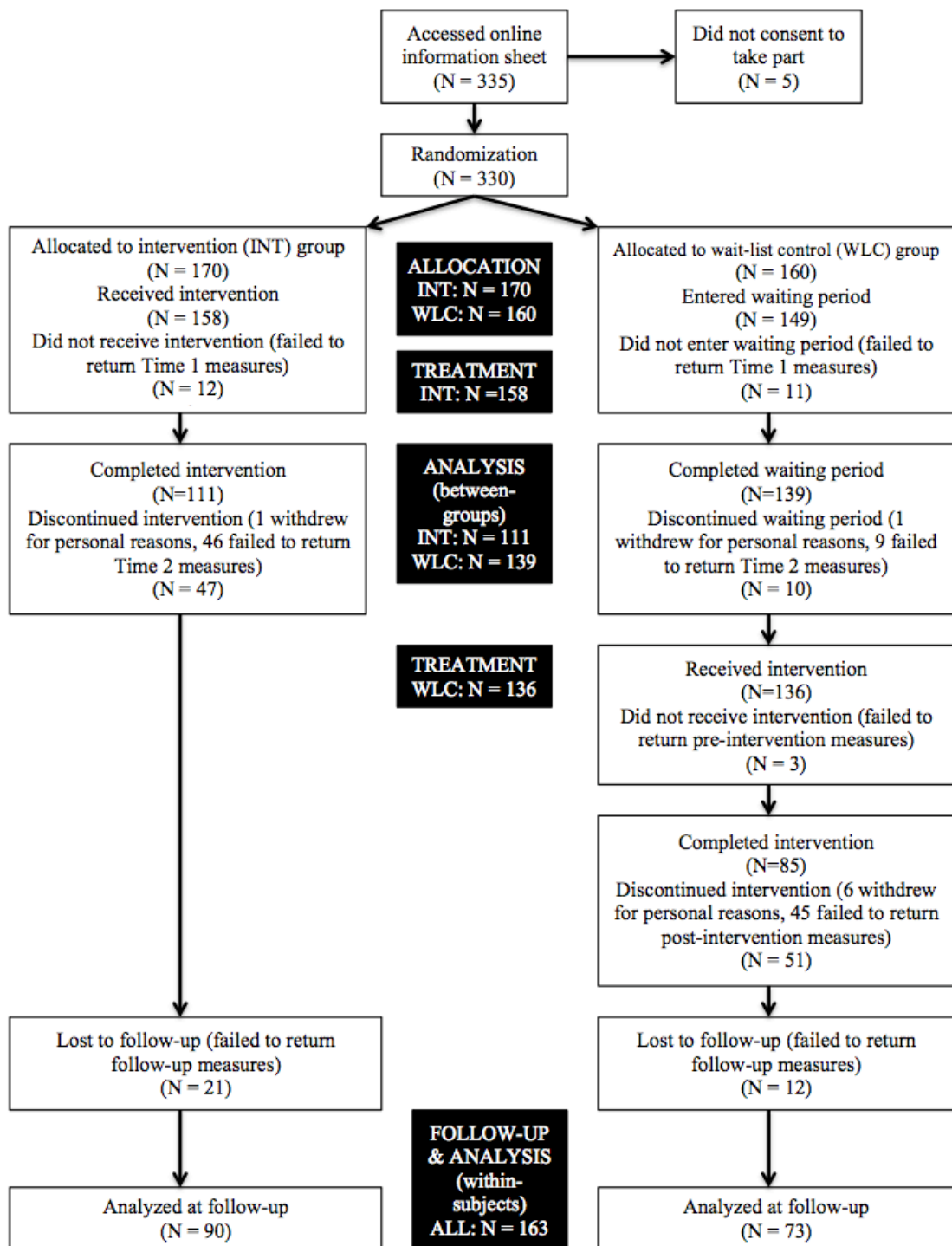


Figure 2. CONSORT flow diagram of participant numbers at each study stage

Power analysis

The GAP intervention was predicted to improve working adults' well-being with a medium effect size (Cohen's $f = .25$; Cohen, 1988), based on previous GAP study outcomes (e.g., Coote & MacLeod, 2012). Power analysis was carried out using G*Power (Faul, Erdfelder, Buchner, & Lang, 2008). To detect a medium effect size with .8 (two-tailed) power and alpha set at .05, 196 participants would be needed at Time 2 for the between-groups T1/T2 analysis (MANCOVA with two groups, four dependent variables, four covariates). The four covariates were included in the power analysis as extra groups (Dattalo, 2008). For the same power, effect size and alpha level, 29 participants would be needed at follow-up for the within-subjects PPF analysis (repeated measures MANOVA with one group, three measurements, estimated correlation of 0.5 among repeated measures).

Attrition was estimated at 30% between randomisation and Time 2 and 30% again between Time 2 and follow-up, based on overall attrition rates of 30-50% in previous RCTs of psychology interventions (e.g., Farquharson & MacLeod, 2014; Querstret, Cropley, & Fife-Schaw, 2016). The target sample size was therefore 300 participants, allowing 30% attrition to 210 participants at Time 2. This would meet the sample size of 196 required for sufficient power in the T1/T2 analysis. With a further 30% attrition by follow-up, roughly 150 participants would be eligible for the PPF analysis, far exceeding the 29 required for .8 power.

Three hundred and thirty participants were recruited, exceeding the target overall sample size of 300. Attrition estimates proved fairly accurate, with 27% attrition between group allocation and Time 2, leaving 240 participants eligible for the

T1/T2 analysis, achieving .88 power to detect a medium effect in the planned MANCOVA. The rate of attrition between Time 2 and follow-up was 32%, so 163 participants were eligible for the PPF analysis, achieving 1.00 power to detect a medium effect in the planned repeated measures MANOVA.

Materials

All materials used in the study were provided online. Measures were administered using survey software hosted by Bristol Online Survey, which is used widely by academic institutions and complies with the Data Protection Act 1998 (University of Bristol, 2016). Intervention materials were hosted on Wordpress.com using a domain name (www.lifebalanceprogramme.com) purchased for the current study. Appendix 1 contains copies of all measures used. An example screen shot and downloadable worksheet from the intervention website are provided in Appendix 2.

Outcome measures. Four outcome measures were used, covering the affective and cognitive components of well-being: positive affect, negative affect, life satisfaction and flourishing (ONS, 2015).

Positive and Negative Affect Schedule. The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) measures affective well-being and has two mood scales: positive affect (PA) and negative affect (NA). Each scale comprises 10 adjectives describing that affect state, such as ‘excited’ and ‘strong’ for positive affect and ‘guilty’ and ‘scared’ for negative affect. For each adjective, participants indicate the extent to which they ‘feel this way generally’ on a scale from 1 (*very slightly or not at all*) to 5 (*extremely*). Each scale has a minimum score of 10 and maximum

score of 50. High well-being is indicated by high positive affect and low negative affect scores.

Different versions of the PANAS cover different timescales, from ‘the present moment’ to ‘generally’. The ‘generally’ version was used in the current study, so that findings could be compared with previous GAP studies using the same version (e.g., Coote & MacLeod, 2012). In a US student sample, the scales showed good test-retest reliability (PA, $r = .68$; NA, $r = .71$) and internal consistency (PA, $\alpha = .88$; NA, $\alpha = .87$), and were quasi-independent from each other ($r = .17$; Watson et al., 1988). Crawford and Henry (2004) found good internal consistency (PA, $\alpha = .89$; NA, $\alpha = .85$) in a large UK adult sample ($N = 1,003$), providing additional evidence for the suitability of PANAS for the target population of UK adults in the current study.

Satisfaction with Life Scale. The Satisfaction with Life Scale (SWLS; Diener et al., 1985) measures one cognitive component of well-being. High well-being is indicated by high scores on the SWLS. Participants are asked to rate five statements, such as ‘in most ways, my life is close to my ideal’, from 1 (*strongly disagree*) to 7 (*strongly agree*). In development with a sample of US adults, the scale showed good internal consistency ($\alpha = .87$) and test-retest reliability over a two-month period ($r = .82$; Diener et al., 1985). In a sample of UK adults, Maltby and Day (2004) also found good internal consistency ($\alpha = .85$).

Flourishing Scale. The Flourishing Scale (FS; Diener et al., 2010) was selected as the most appropriate measure for the second cognitive component of well-being in the ONS definition used in the current study, the view that life is worthwhile

(ONS, 2015). The single item used in the ONS4 to assess this view was not considered reliable or valid for the current study. The FS was selected as the most appropriate multi-item, reliable and valid scale available. The FS measures the view that life is worthwhile using the statement ‘I lead a purposeful and meaningful life’, alongside seven other statements about flourishing, including engagement with life and positive relationships with others. Participants rate each statement from 1 (*strongly disagree*) to 7 (*strongly agree*). All items are positively phrased, so the highest total score of 56 represents a high level of flourishing. In a US adult sample, Diener et al. (2010) found the scale to have good internal consistency ($\alpha = .87$) and test-retest reliability ($r = .71$).

Discrimination between scales. To ensure participants did not have to complete redundant questionnaires, it was important to check that SWLS, PANAS and FS measured distinct components of well-being. Their extensive use in previous research and the wording of the items on each scale suggests that each measures the well-being component they were designed for, achieving content validity. Their discriminant validity has been confirmed in two studies. With German adults, Cheung and Lucas (2014) found SWLS and FS to correlate only modestly ($r = .51$) and with US adults, Chang and Sanna (2001) found that the SWLS correlated only modestly with PA ($r = .41$) and NA ($r = -.44$).

Secondary measures. Three secondary measures were used, comprising the four ONS well-being items (ONS, 2015), a demographic questionnaire and an intervention adherence and skills survey.

ONS Well-being items. The Office of National Statistics well-being items (ONS4; ONS 2015) are four questions about the four components of well-being shown in Figure 1: ‘overall, how happy did you feel yesterday?’, ‘overall, how anxious did you feel yesterday?’, ‘overall, how satisfied are you with your life nowadays?’ and ‘overall, to what extent do you feel the things you do in your life are worthwhile?’. Respondents answer each question with a rating from 0 (*not at all*) to 10 (*completely*). The ONS4 items are used in the Annual Population Survey (ONS, 2015) and the annual employee survey for all civil servants (Civil Service People Survey: CSPS; Cabinet Office, 2015). Cabinet Office and the ONS analyse responses to each of the four items individually. Validity and reliability data are not yet available (ONS, 2015), so the ONS4 items were not considered suitable for primary analysis in the current study. However, they were administered to provide supplementary anonymised outcome data for participants’ employing departments, negotiated as part of the agreement to recruit from their sites.

Demographics questionnaire. The demographics questionnaire was designed for the current study and was an adapted version of items in the Civil Service People Survey, comprising gender, ethnic group, age, salary band and length of employment (Cabinet Office, 2015). Demographic data were gathered to determine whether the sample was representative of the working adult population and whether the random allocation process had resulted in an intervention group and a wait-list control group

with similar demographic profiles. Group differences in demographic characteristics could have had a confounding influence on well-being levels (Contrada et al., 2000; Ryff & Keyes, 1995), making it harder to attribute any changes in well-being to the intervention itself.

Adherence and skills survey. The adherence and skills survey was also designed for the current study. Participants were asked to indicate how many modules they had completed and whether work goals had impacted on their ability to devise personal goals, from 0 (*no impact*) to 10 (*severe impact*). Participants were also asked to rate on a scale of 0 (*not at all*) to 4 (*extremely*) how helpful they had found the intervention overall and how helpful it had been for developing specific skills in goal-setting and planning.

Intervention materials

The intervention was an online self-help training programme with six modules covering a range of skills associated with goal-setting and action-planning. The modules are listed in Table 1 and were adapted from a self-help booklet and group session materials used in previous GAP studies (Coote & MacLeod, 2012; Ferguson et al., 2009; MacLeod et al., 2008). These GAP materials were derived from empirical literature on setting goals (Lyubomirsky et al., 2005), identifying goals that align with personal values (Deci & Ryan, 2008), envisaging goal achievement (Oettingen, 2012), planning to achieve those goals (Gollwitzer, 1999) and adjusting goals in the face of obstacles (Wrosch et al., 2013).

Table 1. *Intervention module numbers and titles*

Number	Title
1	Making goals
1.1	<i>Making a list of goals</i>
1.2	<i>Refining your goals</i>
1.3	<i>Selecting your goals</i>
2	Imagining achieving goals
2.1	<i>Effective imagination</i>
3	Planning to achieve goals
3.1	<i>Making specific plans</i>
3.2	<i>Making realistic plans</i>
4	Overcoming obstacles
4.1	<i>Identifying obstacles</i>
4.2	<i>Finding solutions to obstacles</i>
5	Putting it all into practice
6	Review
6.1	<i>Reviewing progress</i>
6.2	<i>Maintaining and developing goal and action-planning skills</i>

The GAP materials were adapted for the current study to support an online format and to make the learning experience appropriate for busy working adults. Adaptations included re-naming the intervention ‘Life Balance Programme’ to emphasise the focus on personal goals rather than work targets, converting paragraphs to bullet points for quick reading, sub-dividing modules for easy online navigation and creating downloadable worksheets for participants to save and/or print personal,

private versions. The learning experience was further tailored for working adults by adding case study examples to support the main learning points and providing a clear recommended timetable to help participants plan completion of modules around their job role.

Focus group. The proposed adaptations were discussed with a focus group of six working adults before seeking ethical approval. The group were asked to consider the format and tone of the intervention, including whether the psychological language used was appropriate for working adults. In response to feedback, changes were made to the website layout and content, including making text easier to read and the font look more contemporary. The focus group outcome report is at Appendix 3.

Procedure

Recruitment and consent. To accommodate departmental preferences, employees were invited to participate in one of three study waves, starting in July, September or November 2015, as shown in Table 2. Invitations were sent to staff across the UK in a range of administrative, managerial and technical roles. Staff received the invitation via their work email address in a group email from a senior manager in their department. The email explained that the study was supported by the department, but was voluntary and participation would be confidential. Staff were invited to click on a link within the email to an online participant information sheet and consent form (Appendix 4). The information sheet included an email address for questions, which were responded to by JO within one working day. Those who chose to participate were asked to complete the consent form online and to provide their name, date of consent and email address.

Table 2. *Implementation timetable for the three study waves*

Month	Wave 1 (N = 123)		Wave 2 (N = 105)		Wave 3 (N = 102)	
	Intervention	Wait-list control	Intervention	Wait-list control	Intervention	Wait-list control
July 2015	Demographics Time 1/Pre*	Demographics Time 1				
August						
September	Time 2/Post	Time 2/Pre*	Demographics Time 1/Pre*	Demographics Time 1		
October						
November	Follow-up	Post	Time 2/Post	Time 2/Pre*	Demographics Time 1/Pre*	Demographics Time 1
December						
January 2016						
February	Follow-up	Follow-up	Follow-up	Follow-up	Time 2/Post	Time 2 Pre*
March						
April						
May						

* After submitting these measures online, participants were given access to the self-help intervention and asked to complete it in five weeks.

Demographics:

Time 1, Time 1/Pre, Pre, Time 2 & Time 2/Pre: age, gender, ethnicity, salary band, length of service
ONS well-being items (ONS4), Positive and Negative Affect Schedule (PANAS), Satisfaction with Life Scale (SWLS), Flourishing Scale (FS)

Time 2/Post & Post: ONS4, PANAS, SWLS, FS and intervention adherence measure

Follow-up: ONS4 PANAS, SWLS, FS and de-brief questionnaire

All participants were sent a welcome email within two working days of providing consent to participate in the study. If the email was delivered successfully and no reply was received to indicate the wrong person had been contacted, the participant was assigned a unique study ID number, sent a link by email to the demographic questionnaire and randomly allocated to either the intervention or wait-list control group. Participants who did not complete the demographics questionnaire received up to two reminder emails over the following two weeks.

Time 1 assessment. Within two weeks of consent, participants received an email asking them to complete Time 1 measures (ONS4, PANAS, SWLS and FS) online. Participants who did not complete the Time 1 measures received up to two email reminders over two weeks. If they still did not complete the measures, they were considered to have withdrawn from the study. Withdrawn participants were not given access to the intervention or asked to complete any further questionnaires.

Intervention condition. Immediately after submitting their Time 1 (pre-intervention) responses online, intervention group participants were taken to a final page containing instructions for accessing the online self-help GAP intervention. They were asked to complete the intervention over a five-week period, spending around one hour per week working their way through six modules. A confirmation email was sent within two working days, repeating the access instructions and attaching a screenshot of the intervention website. Two weeks later, participants received a support email indicating that by now they would ideally have completed the first three modules. The email also offered a 20-minute support phone call with the researcher to review progress and discuss any issues with making plans for their

chosen goals. Those who wanted a call were asked to reply with suitable dates/times and an appointment was agreed by email. Twelve participants requested support calls and each lasted between 15 and 20 minutes.

Five weeks after starting the intervention, participants received an email asking them to complete Time 2 (post-intervention) measures, comprising the well-being outcome measures (ONS4, PANAS, SWLS and FS) and the intervention adherence and skills survey. At follow-up three months later, participants were sent a final email asking them to complete the same well-being outcome measures. Those who completed follow-up measures were thanked for their participation in the study and asked to indicate whether they wanted to receive a summary of research findings, be entered into a prize draw to win one of two £100 shopping vouchers and be invited to attend a focus group about how to improve the intervention. In the three month period between post-intervention and follow-up, the intervention website remained accessible, in the same way that the intervention booklet had been retained by participants in the previous trial of GAP as a self-help intervention by Coote and MacLeod (2012).

Wait-list control condition. After submitting Time 1 responses, wait-list control group participants entered a five-week waiting period, during which they had no contact with the researcher. At the end of the waiting period, Time 2, they received an email asking them to complete the well-being outcome measures (ONS4, PANAS, SWLS and FS). After submitting Time 2 measures, wait-list group participants crossed over to the intervention condition. For Wave 1 and 2 participants ($N = 90$; see Table 2 for wave timings), this transfer was immediate. Their Time 2

measure responses were treated as pre-intervention responses and, having submitted their responses, they were taken straight to a webpage providing the intervention website address. The procedure then followed exactly the same course as for intervention group participants, as described in the 'intervention condition' section above, including post-intervention and follow-up measures.

The crossover procedure was altered slightly for wait-list control group participants recruited in Wave 3 ($N = 46$) because Time 2 fell in mid-December, close to the Christmas holiday period. Rather than progressing immediately to the intervention phase, these participants had an additional three-week waiting period between completing the Time 2 measures and starting the intervention. In early January, they received an email asking them to complete the well-being outcome measures (ONS4, PANAS, SWLS and FS). Their responses at this stage were counted solely as pre-intervention responses. Apart from this slight alteration, the rest of the procedure remained the same as for all wait-list control group participants.

Additional email correspondence. All participants were provided with an email address to contact should they have questions during the intervention, or require technical support. This email address was provided on the final page of the Time 1 measures survey and on the intervention website. Email queries included questions about accessing the website from different devices (e.g. mobile phone) and pro-active updates about participants' progress with the intervention. Eight participants emailed to actively withdraw from the study, of which five cited lack of time available because their workload had increased. Other withdrawal reasons included maternity leave, two hospital admissions and a surprise wedding proposal.

Ethical considerations

The Royal Holloway Psychology Department Ethics Committee granted approval for the study (2015/030; Appendix 5). Recruitment, data collection and the intervention were administered online in accordance with professional guidance on internet-mediated research (British Psychological Society, 2013). Participants were provided with a research team support email address and, if appropriate, information about the Samaritans and local mental health services. Participants did not incur any costs. Incentives comprised counting the intervention towards employee training requirements (one day of five days per year) and the opportunity to enter into a draw for one of two £100 shopping vouchers on completion of the follow-up measures.

After submitting follow-up measures, one participant emailed to explain that their life circumstances had changed and this might have had a negative impact on their follow-up well-being scores. The email contained reference to circumstances that suggested further support from a counsellor or therapist might be helpful. In line with the procedure outlined above, the participant was advised to contact their GP, the Samaritans or a local talking therapy service. This was the only occasion during the study in which a risk issue arose that required a response of this nature.

Data analysis approach

Primary analysis. Four stages of primary analysis were carried out, one for each hypothesis. The first stage used the sample of participants who had completed Time 2 measures (intervention group, $N = 111$; wait-list control group, $N = 139$) to test Hypothesis 1, that relative to those in the wait-list control group, participants in

the intervention group would show significantly improved well-being immediately post-intervention. Improved well-being was defined as change in four dependent variables: higher positive affect, life satisfaction and flourishing; and lower negative affect. Multivariate analysis of covariance (MANCOVA) was used to determine the effect of group (intervention versus wait-list control) on all four dependent variables at Time 2, with Time 1 scores as covariates (Vickers & Altman, 2001). If the MANCOVA showed a significant group effect, follow-up univariate analysis of variance (ANCOVA) was carried out on each dependent variable separately (Rausch, Maxwell, & Kelley, 2003), to establish whether individual components of well-being were affected by participating in the GAP intervention instead of being in the control group.

The second analysis stage tested Hypothesis 2, that GAP participants with lower initial well-being levels would show greater improvements in well-being than other GAP participants and controls, between Time 1 and Time 2. The T1/T2 analysis sample ($N = 250$) was stratified into two groups for each dependent variable, split on the median Time 1 score. A mixed-model ANOVA was used to examine the Allocation group [intervention, wait-list control] \times Initial well-being group [high, low] \times Time [Time 1, Time 2] interaction. Time 1 scores were not introduced as covariates because the median Time 1 scores had been used to split the high and low well-being groups, so the ANCOVA assumption that covariates are independent of grouping factors would have been violated (Field, 2009).

The third stage of primary analysis examined Hypothesis 3, relating to the longitudinal phase of the study. Comparison with controls was not required, so all

participants who had completed three-month follow-up measures ($N = 163$) were considered as a single group. In the absence of a control group, observed changes over time could be attributable to regression to the mean (RTM). The possible effect of RTM was controlled for using adjustments to post-intervention and follow-up variables recommended by Barnett, van der Pols, and Dobson (2005) and Nielsen, Karpatschof, and Kreiner (2007). In brief, the adjustments involved estimating the RTM effect based on the correlation between the variables at each time point, then correcting the values at the later time point to remove the estimated RTM effect. Further details of the adjustment procedure can be found at Appendix 6. Analyses relating to Hypotheses 3 and 4 were carried out on RTM-adjusted data.

Hypothesis 3, that well-being levels would be higher at post-intervention and at follow-up than at pre-intervention, was tested using a within-subjects repeated measures MANOVA, with follow-up univariate repeated measures ANOVA for each of the four dependent variables across three time points: pre-intervention, post-intervention and follow-up). If ANOVAs yielded significant outcomes, they were followed up with further ANOVAs between two time points, pre-intervention and post-intervention, then pre-intervention and follow-up, with Bonferroni correction for multiple tests.

Finally, Hypothesis 4 (participants with lower initial well-being levels would experience greater improvements in well-being across time than those with higher initial well-being levels) was tested by stratifying the PPF sample ($N = 163$) into two groups for each dependent variable, split on the median pre-intervention score. Time [pre-intervention, post-intervention, follow-up] \times Initial well-being group [high, low]

mixed-model ANOVAs were carried out to examine the interaction between time and initial well-being levels, with follow-up ANOVAs to help understand the direction of effect if significant.

Preliminary analysis. Before carrying out the primary analysis, a number of preliminary checks were needed to establish if the data were distributed appropriately and if any methodological confounding factors were affecting the quality of the data or might affect the outcomes of the analysis. The following section explains which preliminary analyses were carried out and why they were deemed necessary.

Missing data. As expected, participant attrition resulted in missing data at each time point (see Figure 2 on page 39). Missing data are not uncommon in longitudinal studies, but can introduce bias to the analytical process and result in loss of statistical power (Graham, 2009). Listwise deletion was selected as the most appropriate way to handle the missing data, meaning that participants who had not completed measures at the final time point for each analysis were excluded from that analysis. Graham (2009) notes that although data replacement techniques such as multiple imputation are preferable, listwise deletion is acceptable in practice if sufficient statistical power remains and if initial measures are included as covariates. Time 1 scores were used as covariates for the T1/T2 analysis. The PPF analysis did not use covariates, but listwise deletion features in many published studies using repeated measures ANOVAs for PPF analysis (e.g., Querstret et al., 2016), including previous GAP studies (e.g., Coote & MacLeod, 2012). Following listwise deletion, the remaining participants' data were analysed using 'intent to treat' principles, based on the group

they had been randomly allocated to initially (intervention versus wait-list control), rather than how closely they had adhered to the intervention.

Data distribution. Analysis of variance and covariance relies on dependent variables and covariates being normally distributed and having no outliers (Mayers, 2013). Before carrying out the primary analysis, normality was assessed by checking for outliers and calculating the skewness and kurtosis z-scores for each variable at each time point. The sample size was between 50 and 300 for each group in the T1/T2 analysis (intervention, $N = 111$; wait-list control, $N = 139$) and the whole sample in the PPF analysis ($N = 163$), so a skewness and kurtosis z-score limit of 3.29 was set (Kim, 2013). Similarly, outliers were defined as values more than 3.29 standard deviations from the mean (Mayers, 2013). Where required, Box-Cox transformations were applied to achieve normality and remove outliers, with lambda values determined by an iterative estimation process (Osborne, 2010). Within each stage of analysis, the same transformation was used for variables relating to the same measure (e.g. Time 1 SWLS and Time 2 SWLS) so that these values could be meaningfully compared (Field, 2009).

Sample characteristics. Data were gathered over three waves (Table 2, page 48) which could have resulted in cluster effects, so repeated measures MANOVAs were carried out to check whether there was any effect of recruitment wave on any of the four dependent variables (positive affect, negative affect, life satisfaction and flourishing) used in the T1/T2 analysis and in the PPF analysis. To assess whether the sample was representative of the general working adult population, one sample t-

tests were run, comparing participants' initial well-being levels with population norms.

Randomisation process. Simple randomisation was used to allocate participants to either the intervention group or the wait-list control group to reduce bias when assessing the effect of the intervention (Rausch et al., 2003). The randomisation schedule was generated online (Dallal, 2013), using a .5 probability of being allocated to one of two conditions (intervention or wait-list control) within a block size of 1000, to achieve a close approximation of simple randomisation. The randomisation schedule comprised a fixed list indicating which condition each participant should be assigned to based on their study ID number. Study ID numbers were allocated to participants in chronological order of consent. However, simple randomisation may have resulted in unequal group sizes or differences in demographic characteristics and initial well-being levels between groups. If so, any observed changes in well-being at Time 2 could have been influenced by group differences rather than the intervention. Chi-square tests and t-tests were performed on the demographic variables and Time 1 scores on the dependent variables to check for significant differences between the intervention and wait-list control groups.

Response consistency. The final potential methodological confounding factor was the speed with which working adults may have completed the online measures. The measures were kept short to ensure they could be completed within 10 minutes, accounting for the maximum time participants may have available in a busy working day. Nonetheless, some participants may have found it difficult to find time and may have rushed measure completion, resulting in inconsistent responses. Response

consistency between measures was examined by checking that dependent variable scores at Time 1 correlated as expected, showing positive correlations between positive affect, life satisfaction and flourishing, and negative correlations between each of those and negative affect. Response consistency within measures was checked by calculating Cronbach's alpha for each dependent variable at Time 1 and comparing it with the internal consistencies established in previous empirical studies, listed in the Materials section on pages 41-43.

Chapter 3: Results

Data analysis was carried out using SPSS (IBM Corp., 2012) in four stages: preliminary analysis to check the data distribution and potential confounding factors; T1/T2 analysis to test Hypotheses 1 and 2; PPF analysis to test Hypotheses 3 and 4; and secondary analysis to inform discussion about the findings. Primary and secondary analysis outcomes are reported in full. Preliminary analysis outcomes are reported briefly, with additional information provided in appendices, as appropriate.

Preliminary analysis

Missing data. Listwise deletion was performed as planned, leaving 250 participants eligible for the T1/T2 analysis and 163 eligible for the PPF analysis.

Data distribution. For both the T1/T2 analysis, negative affect, life satisfaction and flourishing scores exceeded skewness z-score limit of 3.29 at one or more time point. No variables exceeded the kurtosis z-score limit. Appendix 7 provides the Box-Cox transformation formulae and the pre- and post-transformation skewness and kurtosis z-scores for the T1/T2 variables (Table A7.1) and the PPF variables (Table A7.2). The transformed variables were normally distributed, without skewness, kurtosis or outliers, so they met the assumption of parametric distribution for analysis of variance.

Sample characteristics. Participants were recruited from teams across the UK between July and November 2015. Table 3 provides details of the staff groups invited and the number recruited in each study wave. Planned MANOVAs confirmed that

the study wave in which participants were recruited was not associated with any of the dependent variables (positive affect, negative affect, life satisfaction and flourishing) between Time 1 and Time 2, Pillai's Trace $V = .04$, $F(8, 490) = 1.22$, $p = .28$, or across pre-intervention, post-intervention and follow-up, Pillai's Trace $V = .04$, $F(8, 316) = 0.74$, $p = .66$. Participant data were therefore combined over all three study waves for both the T1/T2 and the PPF analyses.

Table 3. *Staff groups invited and number recruited in each study wave*

Wave	Staff group	Invite method	Number invited	Number recruited
1 - July	Staff who attended well-being roadshows	Group email from well-being champion on senior management team	c.200	123
2 - Sep	All staff in a central corporate function	Weekly corporate news email from senior management team	c.3,500	105
3 - Nov	Staff in public-facing teams in a regional area	Group email from HR Director, cascaded via local team managers	c. 600	102

The demographic characteristics of the full recruited sample ($N = 330$) the T1/T2 sample ($N = 250$) and the PPF sample ($N = 163$) are provided in Table 4. All three samples were predominantly female, aged 45-54, White, earned £20,000-£39,999 and had worked for their employer for more than 10 years.

Table 4. *Demographic characteristics of the samples at each stage of the study*

Characteristic	Initial sample (N = 330)		T1/T2 analysis (N = 250)		PPF analysis (N = 163)	
	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)
Gender ^a						
Male	86	(27.1)	63	(25.6)	40	(24.5)
Female	231	(72.9)	183	(74.4)	120	(75.0)
Age ^b						
18-34	57	(18.0)	48	(19.6)	29	(18.2)
35-44	105	(33.2)	76	(31.0)	54	(34.0)
45-54	113	(35.8)	85	(34.7)	59	(37.1)
55 or more	41	(13.0)	36	(14.7)	17	(10.7)
Ethnic group ^c						
White	301	(95.3)	236	(95.9)	155	(96.9)
Other ^d	15	(4.7)	10	(4.1)	5	(3.2)
Salary band ^a						
Up to £20,000	54	(17.0)	44	(17.9)	28	(17.5)
£20,000-£39,999	176	(55.5)	139	(56.5)	94	(58.8)
£40,000-£59,999	72	(22.7)	52	(21.1)	29	(18.1)
£60,000 or more	15	(4.7)	11	(4.5)	9	(5.6)
Time with employer ^{a,e}						
Less than 5 years	56	(17.7)	41	(16.7)	25	(15.7)
5-9.99 years	58	(18.3)	45	(18.3)	33	(20.6)
10 years or more	203	(64.0)	160	(65.0)	102	(63.8)

Note. Dominant categories are in boldface. T1/T2 = Time 1/Time 2; PPF = Pre/Post/Follow-up.

^aMissing data: initial, n=13; T1/T2, n=4; PPF, n=3. ^bMissing data: initial, n=14; T1/T2, n=5; PPF, n=4. ^cMissing data: initial, n=14; T1/T2, n=4; PPF, n=3.

^dCategory includes Asian/Black/Mixed/Other ethnic groups. ^eCategories were merged to create boundaries an equal distance of five years apart.

A study of 1,003 UK adults yielded population means of 31.31 and 16.00 for the PANAS positive affect and negative affect scales respectively (Crawford & Henry, 2004). Maltby and Day (2004) obtained a population mean of 23.30 for SWLS in a study of 420 UK adults recruited from workplaces and community groups. Norms for UK adult samples could not be found for FS, but Silva and Caetano (2013) reported a mean of 42.92 in a study of 717 working adults in Portugal. Table 5 shows the outcome of one-sample t-tests comparing these population means with Time 1 scores on the dependent variables for the current study sample who completed measures at Time 1 ($N = 307$). Participants reported higher levels of both positive and negative affect, and lower levels of life satisfaction and flourishing, compared to population norms. These differences may have increased the likelihood of regression to the mean, but were controlled for using planned adjustments.

Table 5. *Comparison between initial well-being scores and population means*

Measure	Study sample at Time 1 ($N = 307$)		General adult population	$t_{(df=306)}$	p
	M	(SD)	M		
PA	32.29	(6.56)	31.31	2.62	.01
NA	20.26	(7.22)	16.00	10.34	<.001
SWLS	22.20	(6.35)	23.30	-3.03	.003
FS	41.71	(7.55)	42.92	-2.81	.01

Note. PA = positive affect; NA = negative affect; SWLS = life satisfaction; FS = flourishing.

Response consistency. For the sample who completed Time 1 measures ($N = 307$) the relationship between scores on dependent variables at Time 1 was as expected. Table 6 shows that positive affect, life satisfaction and flourishing correlated positively with each other, and negative affect correlated negatively with each of the other three dependent variables. Responses at Time 1 also showed good internal consistency on all dependent variables (PA, $\alpha = .87$; NA, $\alpha = .89$; SWLS, $\alpha = .87$; FS, $\alpha = .88$) at the levels expected for UK or US adult samples (Crawford & Henry, 2004; Diener et al., 2010; Maltby & Day, 2004).

Table 6. *Pearson correlations between initial well-being scores*

	PA	NA	SWLS	FS
PA	-	-.33**	.58**	.67**
NA		-	-.42**	-.51**
SWLS			-	.69**
FS				-

Note. PA = positive affect; NA = negative affect; SWLS = life satisfaction; FS = flourishing.

**Correlation is significant at .01 level (two-tailed).

Randomisation process. As planned, the randomly created intervention and wait-list control groups in the T1/T2 analysis sample ($N = 250$) were assessed for similarity in terms of group size, demographic characteristics and well-being levels at Time 1. Unequal group sizes could have confounded the T1/T2 analysis if one group was at least 1.5 times larger than the other group (Green & Salkind, 2003). However, the wait-list control group ($N = 139$) was only 1.25 times larger than the intervention group ($N = 111$) so the difference in group size was not expected to confound analyses (Green & Salkind, 2003).

Chi-square and t-tests found no significant differences between the groups' demographic characteristics or initial well-being levels, as shown in Tables 7 and 8 respectively. The groups were therefore considered to be similar in terms of characteristics that might otherwise have affected changes in well-being levels during the intervention.

Table 7. *Between-groups comparison of demographic characteristics*

Characteristic	INT (N = 111)		WLC (N = 139)		χ^2	p
	n	(%)	n	(%)		
Gender^a						
Male	27	(25.0)	36	(26.1)	0.04	.88
Female	81	(75.0)	102	(73.9)		
Age^b						
18-24	21	(19.6)	27	(19.6)	7.37	.06
35-44	33	(30.8)	43	(31.2)		
45-54	44	(41.1)	41	(29.7)		
55+	9	(8.4)	27	(19.6)		
Ethnic group^a						
White	103	(95.4)	133	(96.4)	0.16	.75
Other ^c	5	(4.6)	5	(3.6)		
Salary band^a						
Up to £20,000	22	(20.4)	22	(15.9)	3.06	.38
£20,000-£39,999	62	(57.4)	77	(55.8)		
£40,000-£59,999	18	(16.7)	34	(24.6)		
£60,000+	6	(5.6)	5	(3.6)		
Time with employer^{a,d}						
Less than 5 years	17	(15.7)	24	(17.4)	5.82	.06
5-9.99 years	27	(25.0)	18	(13.0)		
10 years+	64	(59.3)	96	(69.6)		

Note. INT = intervention group; WLC = wait-list control group; χ^2 = Pearson's Chi Square.

^aMissing data: INT, n = 3; WLC, n = 1. ^bMissing data: INT, n = 4; WLC, n = 1. ^cCategory

includes Asian/Black/Mixed/Other ethnic groups. ^dCategories were merged to create

boundaries an equal distance of five years apart.

Table 8. *Between-groups comparison of initial well-being levels*

Measure	INT (<i>N</i> = 111)		WLC (<i>N</i> = 139)		<i>F</i> _(<i>df</i>=1)	<i>p</i>
	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)		
PA	33.05	(6.08)	32.57	(6.59)	0.23	.63
NA	19.42	(6.85)	20.06	(6.92)	0.52	.47
SWLS	23.14	(6.43)	22.42	(5.94)	1.31	.25
FS	42.04	(7.28)	42.71	(7.10)	0.61	.44

Note. INT = intervention group; WLC = wait-list control group; *F* = univariate ANOVA group effect; PA = positive affect; NA = negative affect; SWLS = life satisfaction; FS = flourishing.

Time 1/Time 2 analysis

Intervention group well-being compared to controls. The following section presents the analysis carried out on the T1/T2 sample (intervention group, *N* = 111; wait-list control group, *N* = 139) to examine Hypothesis 1, that intervention group participants, relative to controls, would show increases in positive affect, life satisfaction and flourishing, and a decrease in negative affect immediately post-intervention. Table 9 shows the mean scores and standard deviations on the dependent variables at Time 1 and Time 2 for each group.

Table 9. Mean well-being scores for each group at Time 1 and Time 2

Measure	Intervention group (<i>N</i> = 111)				Wait-list control group (<i>N</i> = 139)			
	Time 1		Time 2		Time 1		Time 2	
	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)
PA	33.05	(6.08)	34.24	(6.68)	32.57	(6.59)	32.12	(7.22)
NA	19.42	(6.85)	17.95	(6.58)	20.06	(6.92)	19.12	(6.78)
SWLS	23.14	(6.43)	24.22	(6.66)	22.42	(5.94)	22.51	(5.97)
FS	42.04	(7.28)	43.74	(7.37)	42.71	(7.10)	42.41	(6.63)

Note. PA = positive affect; NA = negative affect; SWLS = life satisfaction; FS = flourishing.

To find out whether there was an overall effect of the intervention on all four well-being outcome measures in combination, compared to controls, a MANCOVA was run with Time 2 scores for positive affect, negative affect, life satisfaction and flourishing entered as dependent variables. Time 1 scores were entered as covariates and allocation group (intervention, wait-list control) was entered as the factor. Before the main analysis was carried out, the assumptions on which MANCOVA relies were tested and confirmed as met, as shown in Table 10.

Table 10. Checklist indicating MANCOVA assumptions and restrictions were met

Variable type	Assumption	Met?	Explanation of how assumption has been met
Dependent (DV)	All DVs are parametric	Yes	All DVs are interval variables and, when transformed, are normally distributed, with skewness and kurtosis within expected range for sample size. ^a
	Reasonable correlation between DVs	Yes	Correlations between DVs are all significant ($p < .01$) and reasonable, ranging from .33 to .70 (positive correlations between PA, SWLS and FS) and -.33 to -.48 (negative correlations between NA and the other three DVs). ^b
	DV correlation does not differ between groups	Yes	Box's M test of variance-covariance matrices is non-significant ($p = .60$).
	Homogeneity of between-group variances for each DV	Yes	Levene's test non-significant for PA ($p = .74$), SWLS ($p = .21$) and FS ($p = .30$), but significant for NA ($p = .03$). However, MANCOVA is robust to this minor assumption violation given the large sample size ($N = 250$; Field, 2009).
Independent (IV)	IVs are categorical	Yes	The IV, group, has two categories: intervention and wait-list control.
Co-variate	Co-variables are parametric	Yes	All co-variables are interval variables and, when transformed, are normally distributed, with skewness and kurtosis within expected range for sample size. ^a
	Co-variables do not differ between groups	Yes	There were no significant differences between group means for positive affect, $t(248) = 0.48, p = .63$, negative affect, $t(248) = -0.72, p = .47$, life satisfaction, $t(248) = 1.14, p = .25$, or flourishing, $t(248) = -0.78, p = .44$.
	Reasonable correlation between DVs and co-variables, without between-group differences ('homogeneity of regression slopes')	Yes	Correlations between DVs and co-variables are all significant ($p < .01$) and reasonable. ^b Homogeneity of regression slopes was mostly achieved. Between-group effects of group-co-variate interactions on each DV were checked and 15 out of 16 were non-significant ($p = .09 - .97$). The effect of 'group*Time 1 PA' on 'Time 2 SWLS' was significant, $F(1,240) = 7.51, p = .007$, but MANCOVA is robust to this minor assumption violation given the large sample size ($N = 250$; Field, 2009).

^a Skewness and kurtosis scores are listed in Table A7.1 in Appendix 7. ^b Individual correlations are listed in Table A7.3 in Appendix 7.

A significant multivariate effect for group was found, Pillai's Trace $V = .07$, $F(4, 241) = 4.40$, $p = .002$, $\eta_p^2 = .07$. The intervention group and wait-list control group therefore differed on combined well-being scores at Time 2, when controlling for Time 1 scores. A partial-eta squared of .07 can be considered a medium effect size (Cohen, 1988).

Having established an overall effect of group on the well-being outcome measures in combination, the intervention's effect on each individual component of well-being was then assessed. For each outcome measure, an ANCOVA was run with Time 2 scores as the dependent variable, allocation group (intervention, wait-list control) as the factor and Time 1 scores as the covariate. The assumptions on which ANCOVA relies were confirmed to have been met for positive affect, life satisfaction and flourishing, but not negative affect, as shown in Table 11. Exceptions will be reported where appropriate.

Table 11. Checklist indicating ANCOVA assumptions were largely met

Separate ANCOVAs (each with DV Time 2 score, IV Group and co-variate Time 1 score)					
Variable type	Assumption	PA	NA	SWLS	FS
Dependent (DV)	DV is parametric across groups	Met. ^a	Met. ^a	Met. ^a	Met. ^a
	Reasonable correlation between DV and co-variate	Met. $r(248) = .68, p < .001$	Met. $r(248) = .77, p < .001$	Met. $r(248) = .77, p < .001$	Met. $r(248) = .79, p < .001$
	DV has homogeneity of between-group variances	Met. Levene's test, $p = .95$	Not met. Levene's test, $p = .04$	Met. Levene's test, $p = .22$	Met. Levene's test, $p = .12$
Independent (IV)	IVs are categorical	Met. ^b	Met. ^b	Met. ^b	Met. ^b
Co-variate	Co-variate is parametric across groups	Met. ^a	Met. ^a	Met. ^a	Met. ^a
	Co-variate does not differ between groups	Met. $t(248) = 0.48, p = .63$	Met. $t(248) = -0.71, p = .47$	Met. $t(248) = 1.14, p = .25$	Met. $t(248) = -0.78, p = .43$
	Homogeneity of regression slopes between DV and co-variate across groups	Met. $F(1,246) = 1.15, p = .28$	Met. $F(1,246) = 1.15, p = .73$	Met. $F(1,246) = 3.61, p = .06$	Met. $F(1,246) = 0.34, p = .56$

^aSkewness and kurtosis z-scores are listed in Table A7.1 in Appendix 7. ^bThe IV, Group, has two categories: intervention and wait-list control.

Positive affect. ANCOVA results showed a significant effect of group on positive affect at Time 2, $F(1, 247) = 7.95, p = .005, \eta_p^2 = .03$, with the intervention group reporting higher levels of positive affect compared the wait-list control group, after Time 1 positive affect scores were taken into account. A partial-eta squared of .03 indicates a small effect (Cohen, 1988). Figure 3 shows a graph of mean positive affect scores for each group at Time 1 and Time 2.

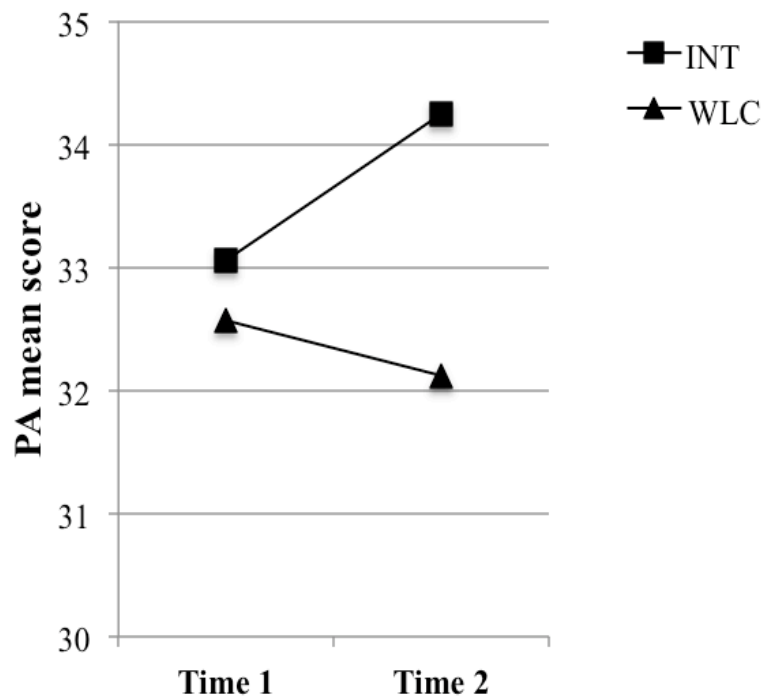


Figure 3. Mean positive affect (PA) scores at Time 1 and Time 2 for the intervention (INT) and wait-list control (WLC) group

Negative affect. There was no significant effect of group on Time 2 negative affect scores, $F(1, 247) = 2.78, p = .10, \eta_p^2 = .01$. This finding should be treated with caution because Levene's test confirmed that homogeneity of between-group variances cannot be assumed ($p = .04$). Nonetheless, the indication is that negative affect neither decreased nor increased significantly for participants in the intervention group compared to the wait-list control group. The graph of mean negative affect scores for both groups at Time 1 and Time 2 is shown in Figure 4.

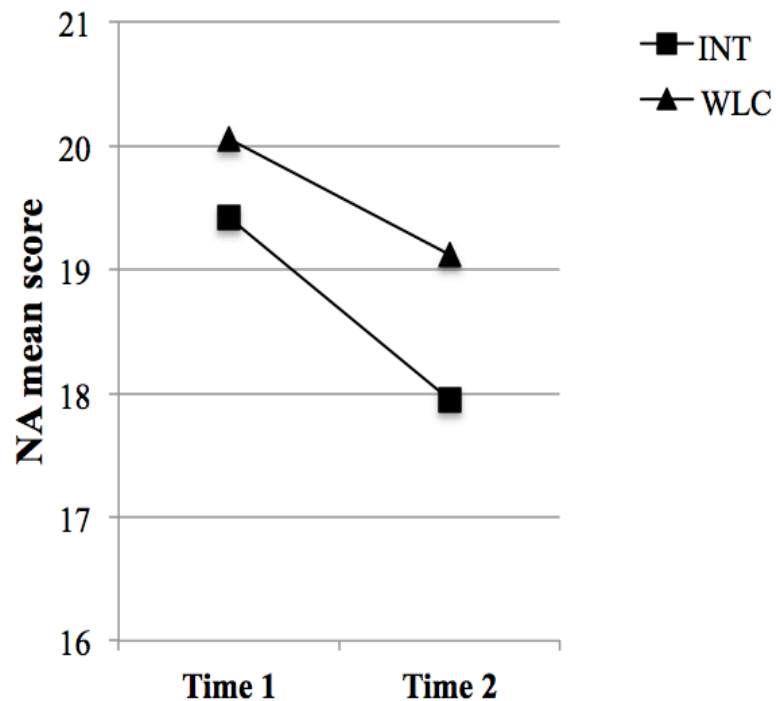


Figure 4. Mean negative affect (NA) scores at Time 1 and Time 2 for the intervention (INT) and wait-list control (WLC) group

Life satisfaction. There was a significant effect of group on life satisfaction, $F(1, 247) = 6.78, p = .01, \eta_p^2 = .03$. The intervention group reported higher levels of life satisfaction at Time 2, relative to controls, after controlling for Time 1 life satisfaction scores. As with positive affect, partial-eta squared was around .03, indicating a small effect (Cohen, 1988). Figure 5 is a graph of mean life satisfaction scores for each group at Time 1 and Time 2.

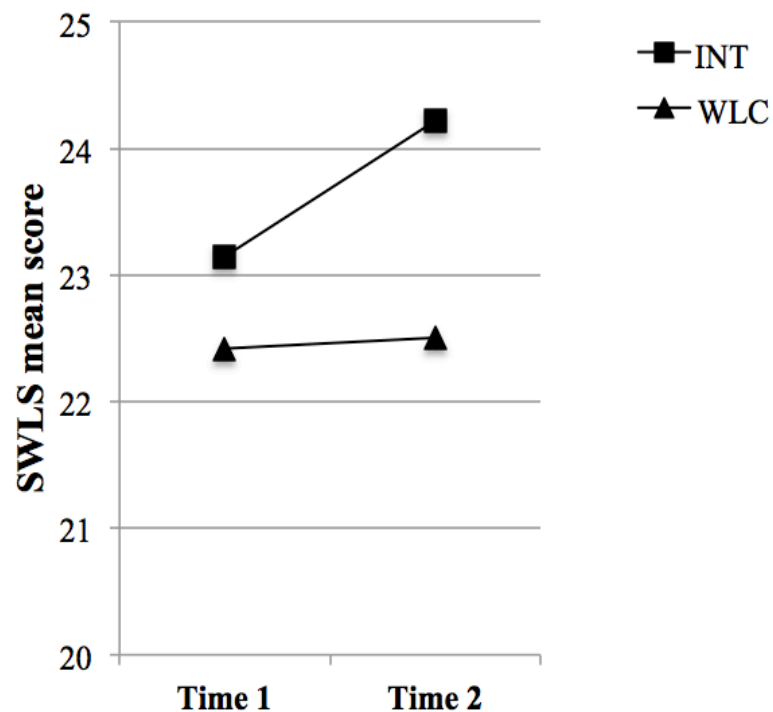


Figure 5. Mean life satisfaction (SWLS) scores at Time 1 and Time 2 for the intervention (INT) and wait-list control (WLC) group

Flourishing. The intervention had a significant effect on flourishing, $F(1, 247) = 16.98, p < .001, \eta_p^2 = .06$. Intervention group participants reported higher levels of flourishing at Time 2, relative to controls, once Time 1 flourishing scores had been taken into account. A medium effect size of around .06 was indicated (Cohen, 1988). A graph of mean flourishing scores for each group at Time 1 and Time 2 is shown in Figure 6.

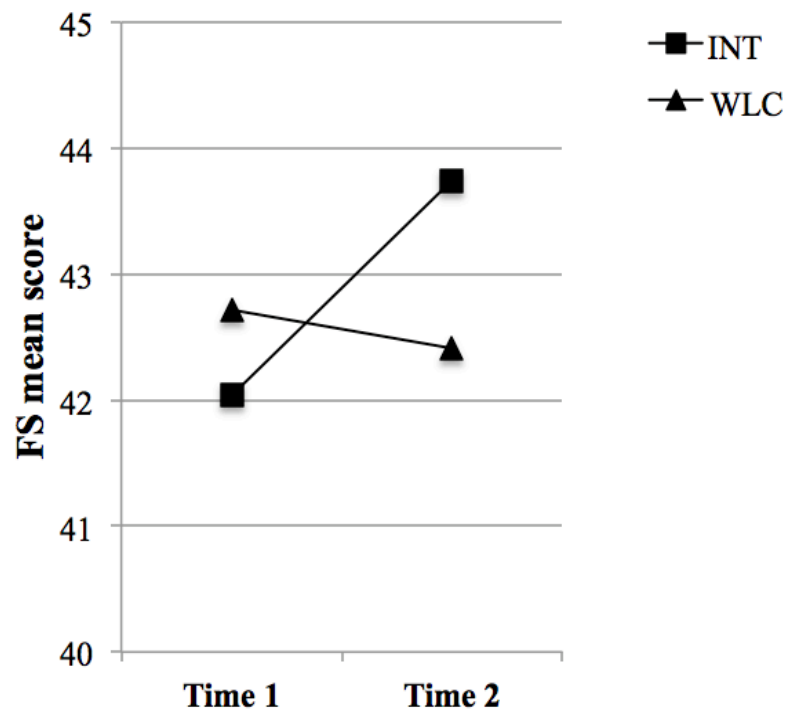


Figure 6. Mean flourishing (FS) scores at Time 1 and Time 2 for the intervention (INT) and wait-list control (WLC) group

In summary, Hypothesis 1 was largely confirmed. Relative to controls, the intervention group reported improved positive affect, life satisfaction and flourishing over the five-week intervention period, but no decrease in negative affect.

Stratification by initial well-being levels. Having largely confirmed that GAP participants reported improved well-being relative to controls, analysis was carried out to test Hypothesis 2, that GAP participants with lower initial well-being levels would show greater improvements in well-being than other GAP participants and controls, between Time 1 and Time 2. Using the same approach as previous GAP studies (e.g., Coote & MacLeod, 2012; MacLeod et al., 2008), the sample was stratified into high well-being and low well-being groups for each individual component of well-being, split on the median of that variable. Means and standard deviations for each outcome measure and each stratified group at Time 1 and Time 2 are provided in Table 12.

As planned, an Allocation group [intervention, wait-list control] x Initial well-being group [high, low] x Time [Time 1, Time 2] mixed model ANOVA was used to examine the three-way interaction between allocation group, initial well-being group and time. There was no significant three-way interaction in any of the ANOVAs for positive affect, $F(1, 246) = 0.76, p = .39$, negative affect, $F(1, 246) = 0.31, p = .58$, life satisfaction, $F(1, 246) = 1.52, p = .22$, or flourishing, $F(1, 246) = 0.04, p = .84$. Given the lack of significant three-way interactions, no further ANOVAs were run. Hypothesis 2 was therefore not supported, because initial well-being levels had no effect on changes in well-being levels during the intervention phase.

Table 12. Mean well-being scores for each stratified group at Time 1 and Time 2

Measure	Stratified groupings		Intervention group (N = 111)				Wait-list control group (N = 139)				
	n		Time 1		Time 2		Time 1		Time 2		
			M	(SD)	M	(SD)	M	(SD)	M	(SD)	
PA	137	High PA	37.36	(3.46)	37.51	(3.44)	76	37.32	(3.11)	35.29	(5.88)
	113	Low PA	27.78	(4.12)	30.26	(6.80)	63	26.84	(4.91)	28.28	(6.86)
NA	132	High NA	25.19	(5.26)	21.81	(6.55)	78	24.85	(5.41)	22.84	(6.43)
	118	Low NA	13.96	(1.94)	14.28	(4.03)	61	13.93	(2.13)	14.36	(3.39)
SWLS	143	High SWLS	26.99	(3.44)	27.54	(4.22)	73	27.07	(3.08)	26.10	(3.97)
	107	Low SWLS	16.58	(4.85)	18.54	(6.24)	66	17.29	(3.66)	18.54	(5.27)
FS	126	High FS	47.65	(2.75)	47.93	(4.44)	72	48.13	(2.81)	46.56	(4.46)
	124	Low FS	36.72	(6.14)	39.77	(7.43)	67	36.90	(5.54)	37.96	(5.62)

Note. PA = positive affect; NA = negative affect; SWLS = life satisfaction; FS = flourishing.

Pre/Post/Follow-up Analysis

Changes in well-being across time. The following section presents the analysis carried out on the PPF sample ($N = 163$) to examine Hypothesis 3, that across the whole sample, well-being levels would be higher (higher positive affect, life satisfaction and flourishing, and lower negative affect) at post-intervention and at three month follow-up than at pre-intervention. Table 13 shows the mean scores and standard deviations on the well-being outcome measures at pre-intervention, post-intervention and follow-up.

Table 13. *Mean well-being scores for the PPF sample ($N = 163$) across time*

Measure	Pre-intervention		Post-intervention		Follow-up	
	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>
PA	32.64	(6.17)	33.59	(6.67)	33.55	(7.18)
NA	19.24	(6.84)	18.44	(6.95)	17.82	(7.48)
SWLS	23.27	(5.89)	23.56	(6.50)	23.79	(6.79)
FS	42.36	(6.97)	43.47	(7.68)	43.81	(8.56)

Note. PA = positive affect; NA = negative affect; SWLS = life satisfaction; FS = flourishing.

Planned adjustments¹ were made to account for potential regression to the mean between repeated measurements. A repeated measures MANOVA was run to assess the effect of time on participants' scores on all four outcome variables (positive affect, negative affect, life satisfaction and flourishing) over three time points (pre-intervention, post-intervention and at three-month follow-up). There was a significant multivariate effect across time, Pillai's Trace $V = .14$, $F(8, 644) = 6.19$, $p < .001$, $\eta_p^2 = .07$. This indicates that when the components of well-being were considered in combination, participants experienced significant change in well-being levels over the time period from before they started the intervention to being followed-up after three months. A partial-eta squared of .07 can be considered a medium effect size (Cohen, 1988).

Having established an overall effect of time on the dependent variables in combination, individual repeated measures ANOVAs were conducted to assess the effect of time on each individual component of well-being. Mauchly's tests indicated that the assumption of sphericity had been violated for the main effect of time on positive affect, $\chi^2(2) = 11.02$, $p = .004$, and life satisfaction, $\chi^2(2) = 13.64$, $p = .001$. Degrees of freedom were corrected using Huynh-Feldt estimates of sphericity, because $\epsilon > .75$ for both variables (Girden, 1992). Similar corrections were made for subsequent ANOVAs, where required, and are not reported each time.

¹ Detailed RTM adjustment calculations are provided in Appendix 6.

Positive affect. A repeated measures one-way ANOVA across three time points (pre-intervention, post-intervention, follow-up) showed a medium effect of time on positive affect, $F(1.90, 307.32) = 11.41, p < .001, \eta_p^2 = .07$. Two further ANOVAs were run to compare changes across two time points of interest, with a Bonferroni corrected significance level of .025. Time had a medium to large effect on positive affect between pre-intervention and post-intervention, $F(1, 162) = 21.10, p < .001, \eta_p^2 = .12$, and a medium effect between pre-intervention and follow-up, $F(1, 162) = 14.51, p < .001, \eta_p^2 = .08$. The significant effect of time was in the positive direction, as indicated by the means in Table 13, with participants reporting increased positive affect directly after the intervention and at follow-up, when compared to pre-intervention scores. The changes in positive affect over time are shown as a graph in Figure 7.

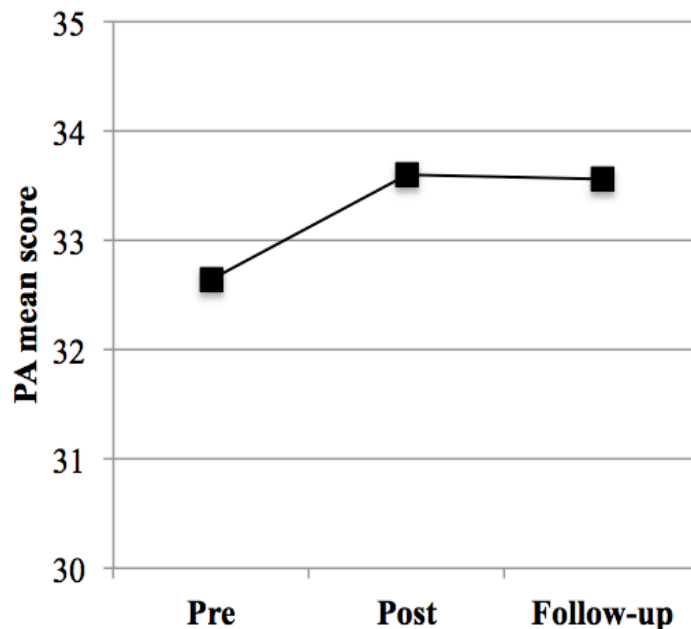


Figure 7. Mean positive affect (PA) scores at pre-intervention, post-intervention and follow-up

Negative affect. A repeated measures one-way ANOVA showed a medium effect of time on negative affect, $F(2, 324) = 9.44, p < .001, \eta_p^2 = .06$, across the three PPF time points. Further ANOVAs with Bonferroni corrections found that there was no significant effect of time on negative affect between pre- and post-intervention, $F(1, 162) = 3.82, p = .052$. There was, however, a medium effect of time on negative affect between pre-intervention and follow-up, $F(1, 162) = 15.97, p < .001, \eta_p^2 = .09$. The means in Table 13, plotted in graph form in Figure 8, show that the significant effect of time was to reduce negative affect, contributing to improved well-being. Participants reported experiencing lower levels of negative affect at follow-up than when they started the intervention, but the same effect was not observed directly after the intervention period.

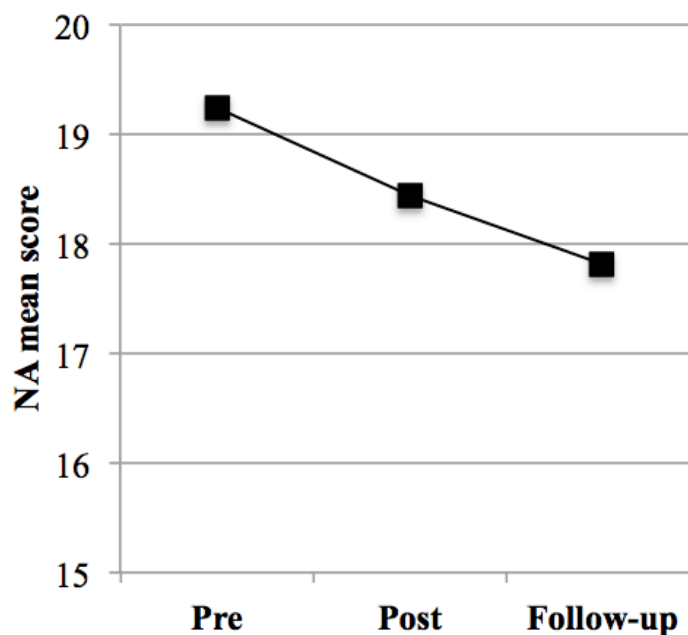


Figure 8. Mean negative affect (NA) scores at pre-intervention, post-intervention and follow-up

Life satisfaction. The effect of time on life satisfaction across pre-, post-intervention and follow-up was found to be significant, $F(1.87, 302.96) = 4.19, p = .02, \eta_p^2 = .03$, with a small effect size. A further ANOVA demonstrated that time had no significant effect on life satisfaction between pre- and post-intervention, at the Bonferroni corrected significance level of 0.025, $F(1, 162) = 4.97, p = .027$. However, time was found to have a small to medium effect on life satisfaction between pre-intervention and follow-up, $F(1, 162) = 7.10, p = .008, \eta_p^2 = .04$. As represented visually in the graph of mean scores over time in Figure 9, the significant effect of time was in the positive direction, with participants reporting higher levels of life satisfaction three months after the intervention than they did before it began.

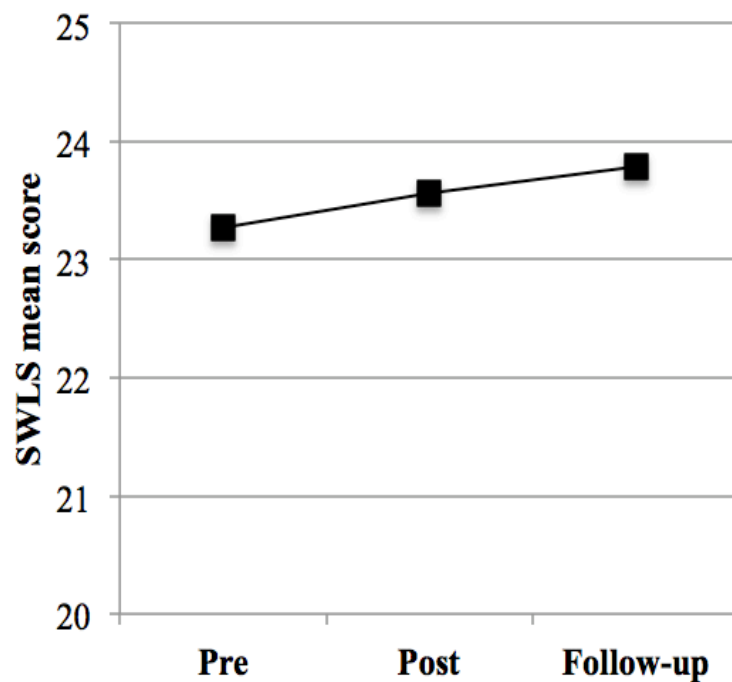


Figure 9. Mean life satisfaction (SWLS) scores at pre-intervention, post-intervention and follow-up

Flourishing. The final set of ANOVAs relating to Hypothesis 3 were carried out with flourishing as the dependent variable. A repeated measures one-way ANOVA across the three time points showed a medium to large effect of time on flourishing, $F(2, 324) = 19.31, p < .001, \eta_p^2 = .11$. Additional ANOVAs with Bonferroni corrections demonstrated that time had a medium to large effect on flourishing between pre-intervention and post-intervention, $F(1, 162) = 21.32, p < .001, \eta_p^2 = .12$. There was large effect of time on flourishing over the longer-term from pre-intervention to three-month follow-up, $F(1, 162) = 31.50, p < .001, \eta_p^2 = .16$. The means in Table 13 and graph in Figure 10 show that the significant effect of time was in the positive direction. Participants reported a greater sense that their life was flourishing after doing the intervention and three months later, than before the intervention began.

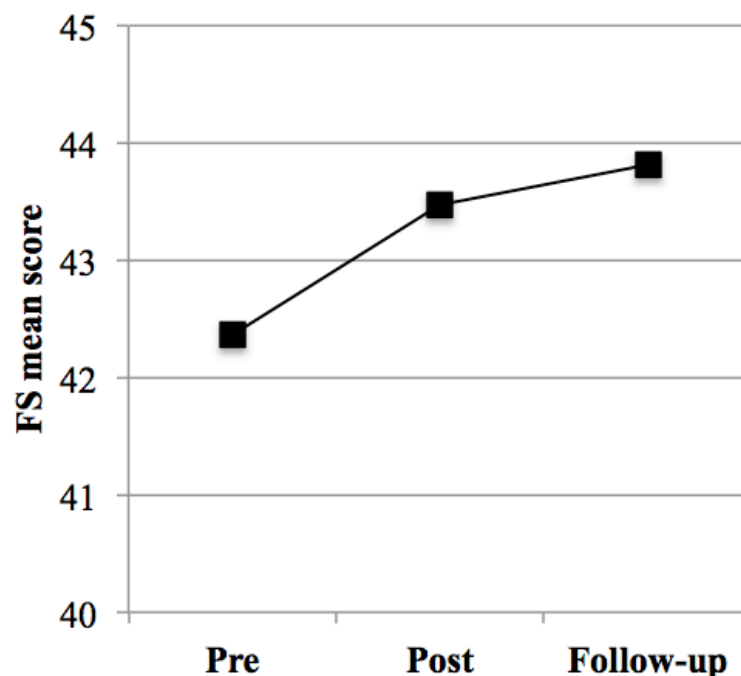


Figure 10. Mean flourishing (FS) scores at pre-intervention, post-intervention and follow-up

In summary, Hypothesis 3 was largely supported. Immediately after the five-week intervention period and three months later, participants reported higher levels of positive affect and flourishing than before the intervention started. Negative affect and life satisfaction did not change significantly over the course of the five-week intervention period. However, by three-month follow-up, negative affect had reduced and life satisfaction had increased compared to pre-intervention levels, as predicted.

Stratification by initial well-being levels. Having confirmed that well-being levels improved between pre-intervention and post-intervention, and between pre-intervention and follow-up, analysis was carried out to test Hypothesis 4. It had been predicted that participants with lower initial well-being levels would experience greater improvements in well-being across time than those with higher initial well-being levels. The PPF analysis sample ($N = 163$) was stratified into high and low well-being groups for each individual well-being variable, split on the median of that variable. Means and standard deviations on the well-being variables for each stratified group at pre-intervention, post-intervention and follow-up are provided in Table 14.

Table 14. Mean well-being scores for each stratified group at pre-intervention, post-intervention and follow-up

Measure	Group	n	Pre-intervention		Post-intervention		Follow-up	
			M	(SD)	M	(SD)	M	(SD)
PA	High PA	83	37.48	(3.28)	37.29	(4.75)	36.53	(5.95)
	Low PA	80	27.61	(4.08)	29.75	(6.20)	30.45	(7.06)
NA	High NA	82	24.70	(5.34)	22.51	(6.62)	21.23	(7.27)
	Low NA	81	13.72	(2.10)	14.31	(4.38)	14.36	(5.98)
SWLS	High SWLS	87	27.67	(2.96)	27.62	(4.03)	27.24	(5.26)
	Low SWLS	76	18.24	(4.10)	18.92	(5.63)	19.84	(6.17)
FS	High FS	91	47.26	(2.95)	47.67	(4.67)	48.18	(5.09)
	Low FS	72	36.15	(5.47)	38.15	(7.45)	38.29	(8.88)

Note. PA = positive affect; NA = negative affect; SWLS = life satisfaction; FS = flourishing.

To determine whether participants with lower initial well-being levels would experience greater improvements in well-being across time than those with higher initial well-being levels, four Time [pre, post, follow-up] x Initial well-being group [high, low] mixed-model ANOVAs were run, one for each well-being variable. As before, ANOVA assumptions were tested and corrections applied if necessary. If initial well-being levels had an impact on changes in well-being levels over time, a significant two-way interaction between time and initial well-being group would need to be demonstrated. However, no significant two-way interactions were found in any of the ANOVAs for positive affect, $F(1.89, 304.09) = 0.10, p = .89$, negative affect, $F(2, 322) = 1.15, p = .32$, life satisfaction, $F(1.88, 302.75) = 1.75, p = .18$, or flourishing, $F(1.96, 315.10) = 2.71, p = .07$. Given the lack of significant two-way interactions, no further ANOVAs were run. Hypothesis 4 was therefore not supported, because initial well-being levels had no effect on changes in well-being levels across time, from pre-intervention to follow-up.

Secondary analysis

Secondary analysis was carried out to help understand the primary analysis outcomes and to inform recommendations for future research. As explained, the primary analysis was carried out on intent-to-treat principles. Participants were included in the analysis regardless of whether they had actually completed the modules contained in the intervention itself. This approach was taken to provide a robust test of the effectiveness of a self-help programme, adherence to which cannot be controlled. However, given that improvements in well-being relative to controls and over time were found using this approach, it seemed permissible, and sensible, to

examine factors relating to intervention adherence that might be associated with the observed effects of the intervention.

Adherence and skills survey. As explained previously, adherence to the intervention was measured using an adherence and skills survey at the end of the intervention period. The survey was completed by 196 participants. Participants were asked to indicate how many of the six GAP modules they had completed and to rate the impact of work-related goals on their progress from 0 (*no impact*) to 10 (*severe impact*). The graph in Figure 11 shows that only 20% of participants reached the final module (Module 6: Review) and Figure 12 shows that 19% rated work-related goals as having had a severe impact (rating 8-10) on their progress with the intervention.

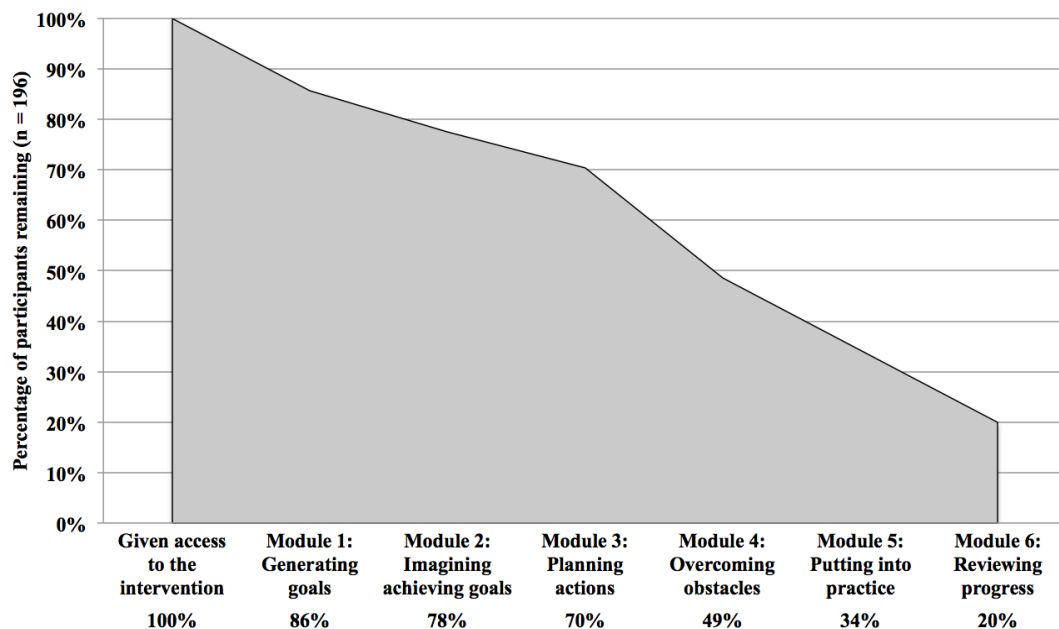


Figure 11. Percentage of participants who completed each module

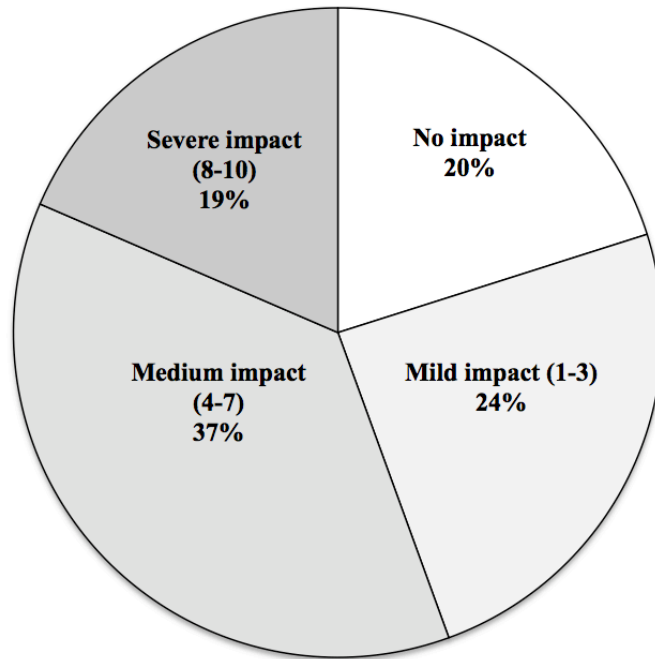


Figure 12. The impact of work-related goals on ability to make personal goals

To test the extent to which observed improvements in well-being over time were related to the number of modules completed, their predictive power was examined using regression analysis. Hierarchical multiple regressions were performed for each well-being component individually (positive affect, negative affect, life satisfaction and flourishing) with post-intervention score as the outcome variable. Pre-intervention scores were likely to account for significant variance in post-intervention scores (Vickers & Altman, 2001), so were entered first. Once the effect of pre-intervention scores had been accounted for, the number of modules completed was entered. Separate regressions were run for each of four well-being outcome variables, so a family-wise error corrected significance level of .0125 was used. Tabachnik and Fidell (2013) note that regressions with two predictor variables require $N \geq 50 + 8(2) = 66$. The PPF sample ($N = 163$) was used for the analysis, exceeding the minimum required sample size for the planned regression.

Positive affect. As expected, pre-intervention positive affect scores explained a significant amount of variance in post-intervention positive affect scores, $F(1, 161) = 381.49, p < .001; R^2 = .703$, adjusted $R^2 = .701$. More importantly, the predictor variable at Step 2, the number of modules completed, contributed an increase in variance explained from 70% to 74%, adjusted $R^2 = .734$, a change that was highly significant, $F(1, 160) = 21.06, p < .001, \eta_p^2 = .12$. After taking into account pre-intervention positive affect scores, the more modules completed, the higher the post-intervention positive affect score, with a medium to large effect (Cohen, 1988).

Negative affect. As expected, pre-intervention negative affect scores explained a significant amount of variance in post-intervention negative affect scores, $F(1, 161) = 350.59, p < .001; R^2 = .685$, adjusted $R^2 = .683$. However, at Step 2, number of modules completed did not contribute a significant change in variance explained, narrowly failing to meet the family-wise corrected .0125 significance level, $F(1, 160) = 6.32, p = .013$.

Life satisfaction. Again, as predicted, pre-intervention life satisfaction scores explained a significant amount of variance in post-intervention life satisfaction scores, $F(1, 161) = 406.80, p < .001; R^2 = .716$, adjusted $R^2 = .715$. At Step 2, the number of modules completed contributed a significant increase in the variance explained from 72% to 73%, adjusted $R^2 = .728$, with a small to medium effect, $F(1, 160) = 9.10, p = .003, \eta_p^2 = .05$. The positive co-efficient in the final equation indicated that completing more modules predicted higher post-intervention life satisfaction scores, once pre-intervention life satisfaction scores has been taken into account.

Flourishing. The final hierarchical multiple regression, for flourishing, found that pre-intervention flourishing scores explained a significant amount of variance in post-intervention flourishing scores, $F(1, 161) = 491.74, p < .001; R^2 = .753$, adjusted $R^2 = .752$. The predictor variable at Step 2, number of modules completed, contributed an increase in variance explained from 75% to 77%, adjusted $R^2 = .770$, a change that was small but highly significant, $F(1, 160) = 13.89, p < .001, \eta_p^2 = .05$. Higher post-intervention flourishing scores could be predicted for participants that had completed more modules, once their pre-intervention flourishing scores had been taken into account.

Helpfulness ratings. In the adherence and skills survey, participants were also asked to rate how helpful they had found the programme overall and the extent to which it had helped them to develop GAP skills in generating goals, aligning goals to personal values, planning actions towards those goals and identifying and overcoming obstacles. One hundred and nineteen participants provided all five helpfulness ratings and these ratings had high internal consistency ($\alpha = .90$). The ratings were found to be normally distributed using a skewness and kurtosis z-score limit of 3.29, as appropriate for the sample size (Kim, 2013). Overall, the intervention was rated as being moderately to very helpful ($M = 2.32, SD = .95$). Figure 13 shows the distribution of the overall ratings.

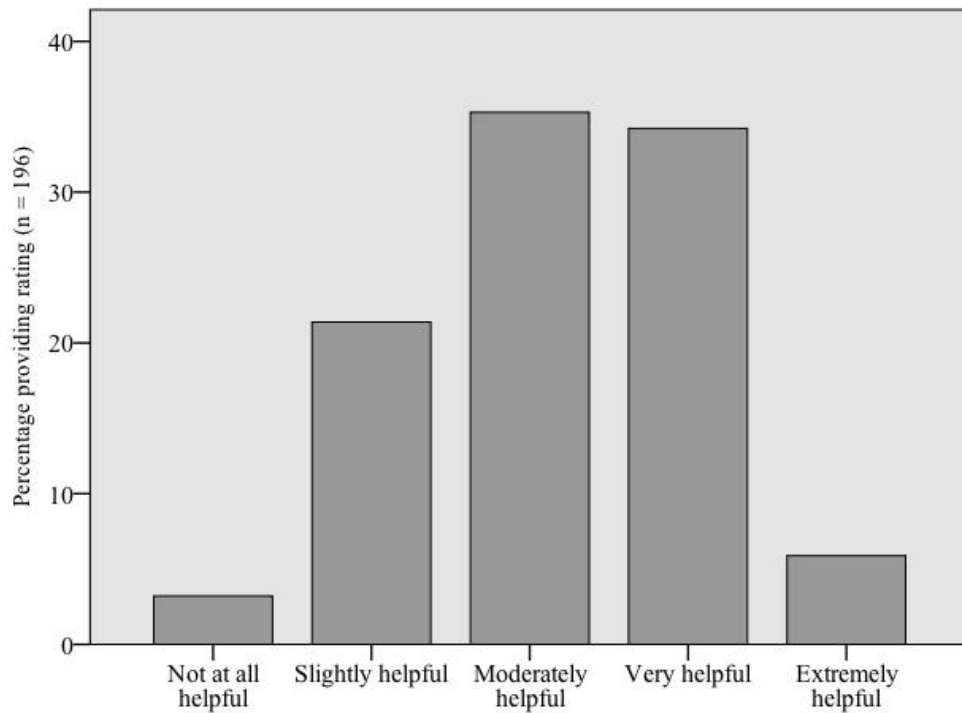


Figure 13. Ratings of GAP's overall helpfulness

Mean helpfulness ratings for individual GAP skills were also in the moderately to very helpful range: generating goals ($M = 2.31, SD = 1.01$), checking goals are in line with personal values ($M = 2.16, SD = 1.12$), planning actions towards goals ($M = 2.37, SD = 1.11$) and overcoming obstacles ($M = 2.02, SD = 1.20$). Figures 14-17 shows the distribution of the ratings for each of the four GAP skills. A one-way ANOVA with Type of GAP skills (generating, aligning, planning, obstacles) as a factor showed a significant difference in helpfulness ratings between the four skills types, $F(2.74, 323.62) = 6.32, p = .001, \eta_p^2 = .05$, indicating that the intervention was rated as being more helpful in developing some GAP skills than others. Follow-up t-tests with a Bonferroni corrected level of .005 for 10 comparisons found that the intervention was thought to be significantly more helpful in developing skills for generating goals, $t(118) = 2.98, p = .003$, and planning actions towards goals, $t(118) = 5.03, p < .001$, than overcoming obstacles.

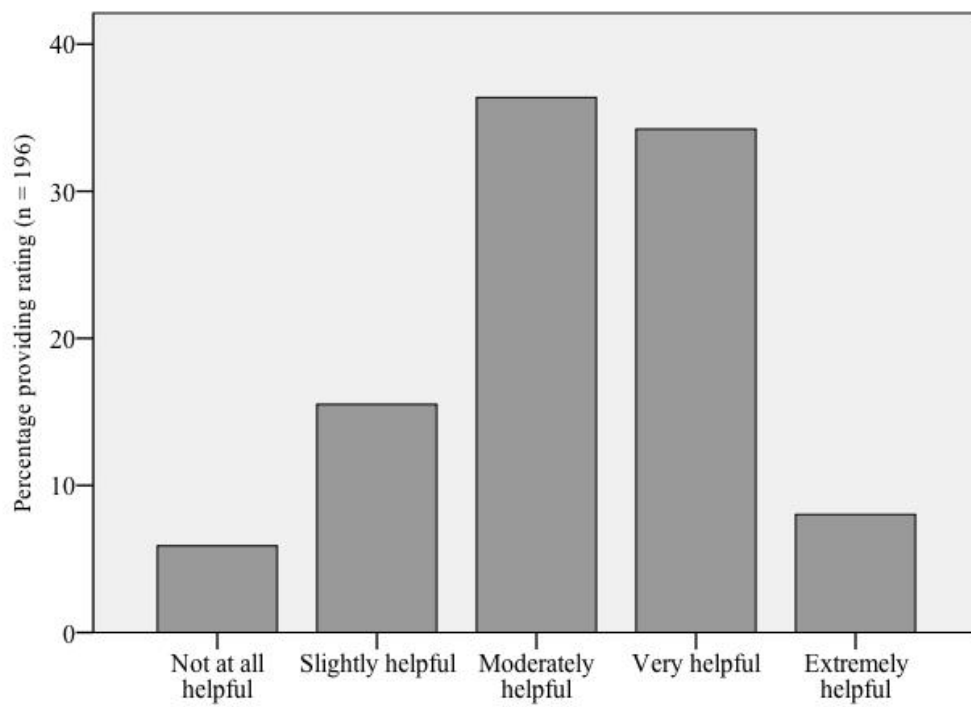


Figure 14. Ratings of GAP's helpfulness for generating goals

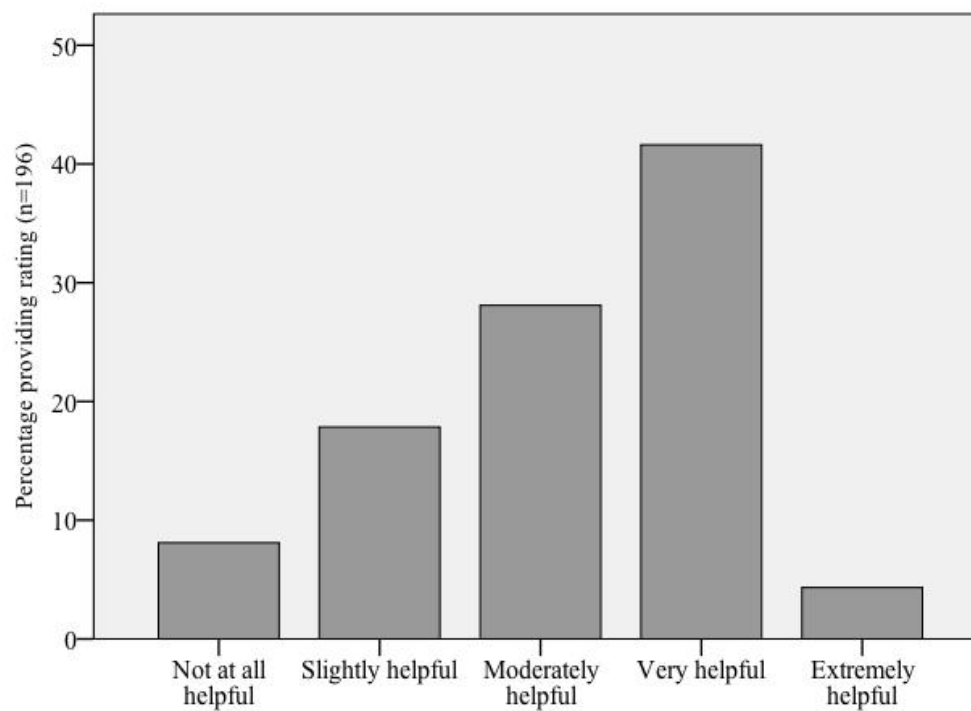


Figure 15. Ratings of GAP's helpfulness for aligning goals with personal values

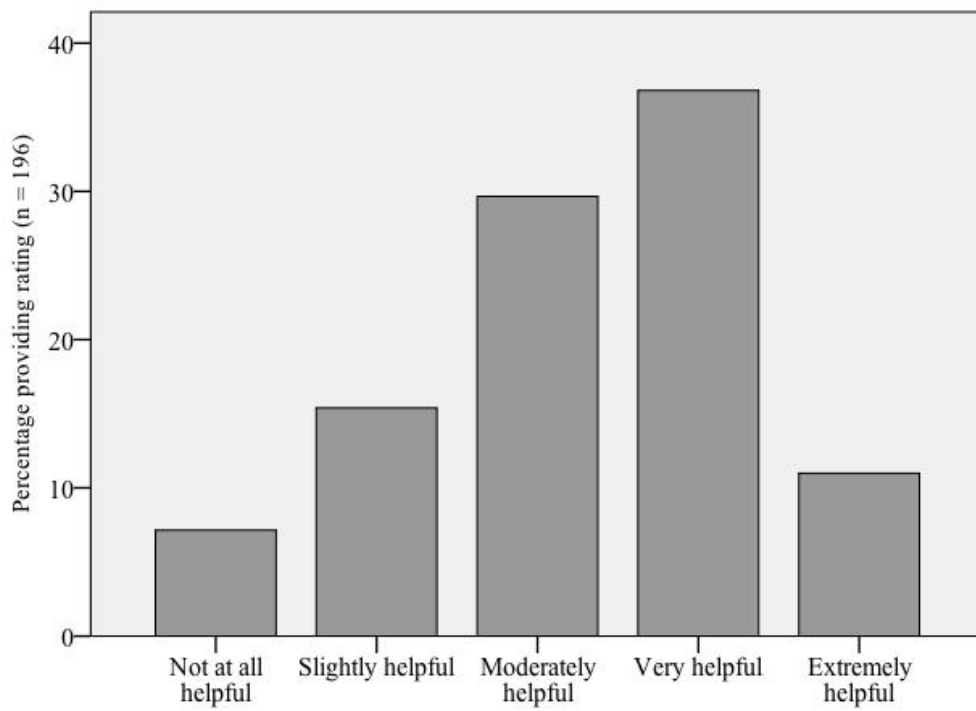


Figure 16. Ratings of GAP's helpfulness for planning actions towards goals

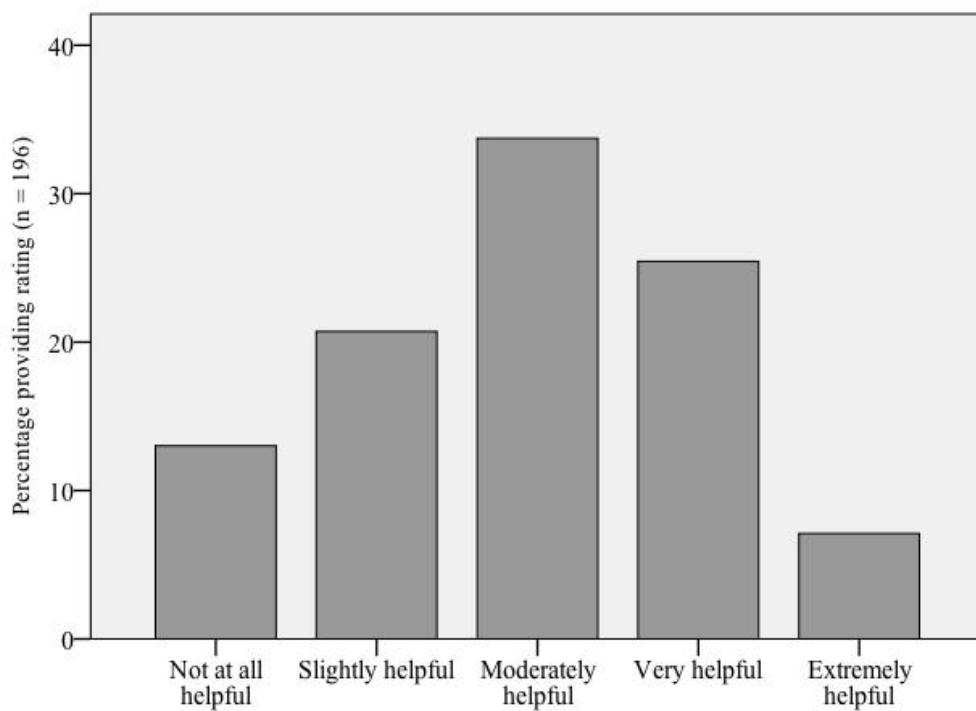


Figure 17. Ratings of GAP's helpfulness for identifying and overcoming obstacles

Supplementary ONS4 outcome data. Finally, analysis was carried out on the ONS4 well-being items completed by participants at each time point to provide supplementary outcome data to government managers who had given permission to recruit their staff. Responses to the items were analysed using the same approach as the Civil Service People Survey (CSPS; Cabinet Office, 2015). For each ONS4 item, Cabinet Office (2015) calculate the percentage of staff indicating high well-being levels², then compare that percentage against the Civil Service benchmark, the median percentage for all organisations completing the CSPS. Table 15 shows the proportion of participants in the PPF sample ($N = 163$) reporting high well-being on each ONS4 item at pre-intervention, post-intervention and follow-up, alongside the Civil Service 2015 benchmark (Cabinet Office, 2015). Figures 18-21 show graphs of the changes in the proportion of participants reporting high well-being on each item across time, plotted against the Civil Service benchmark.

² ‘High well-being’ is defined as ratings between 7 and 10 for ONS4 happiness, life satisfaction and ‘life is worthwhile’ items, and ratings between 0 and 3 for the ONS4 anxiety item.

Table 15. *Participants reporting high well-being on the ONS4 items across time*

ONS4 item	Pre-intervention		Post-intervention		Follow-up		Civil ^c Service benchmark
	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	(%)
Happy							
High well-being ^a	85	(52.1)	93	(57.1)	106	(65.0)	(62.0)
Other	78	(47.9)	70	(42.9)	57	(35.0)	(38.0)
Anxious							
High well-being ^b	72	(44.2)	78	(47.9)	92	(56.4)	(50.0)
Other	91	(55.8)	85	(52.1)	71	(43.6)	(50.0)
Life is satisfying							
High well-being ^a	98	(60.1)	103	(63.2)	116	(71.2)	(65.0)
Other	65	(39.9)	60	(36.8)	47	(28.8)	(35.0)
Life is worthwhile							
High well-being ^a	111	(68.1)	115	(70.6)	122	(74.8)	(71.0)
Other	52	(31.9)	48	(29.4)	41	(25.2)	(29.0)

^a Score of 7-10 on rating scale (0 = not at all, 10 = completely). ^b Score of 0-3 on rating scale (0 = not at all, 10 = completely). ^c Median percentage of high well-being responses in the Civil Service People Survey 2015 ($N = 279,653$ respondents; Cabinet Office, 2015).

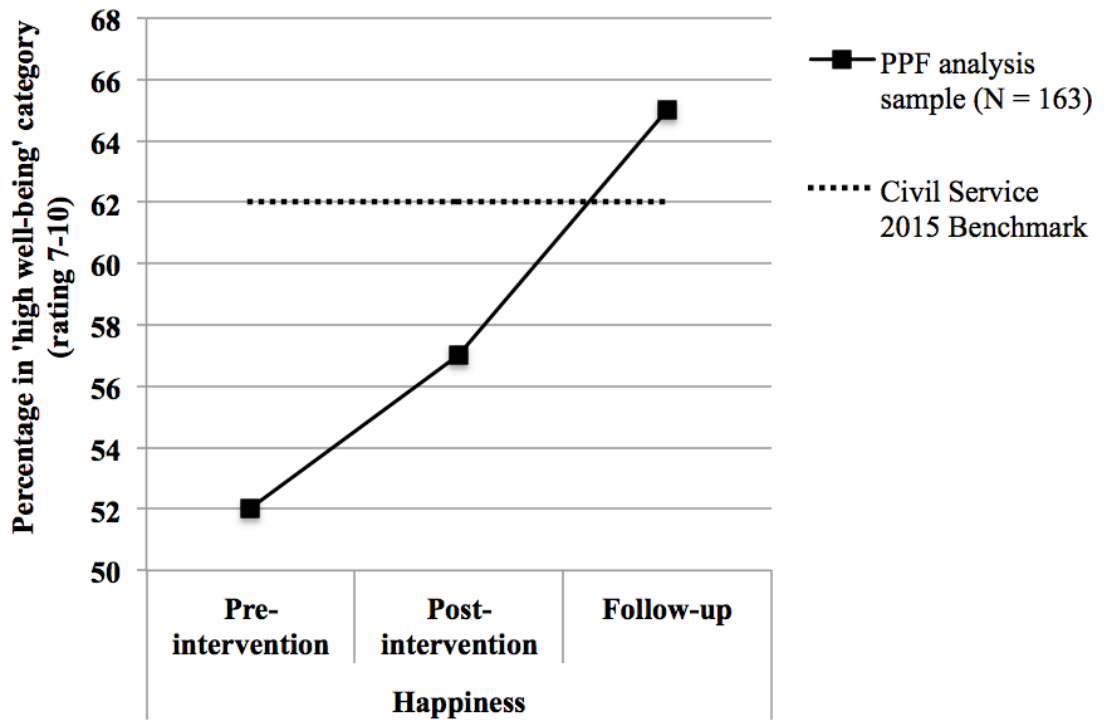


Figure 18. Participants reporting 'high well-being' on the ONS4 happiness item

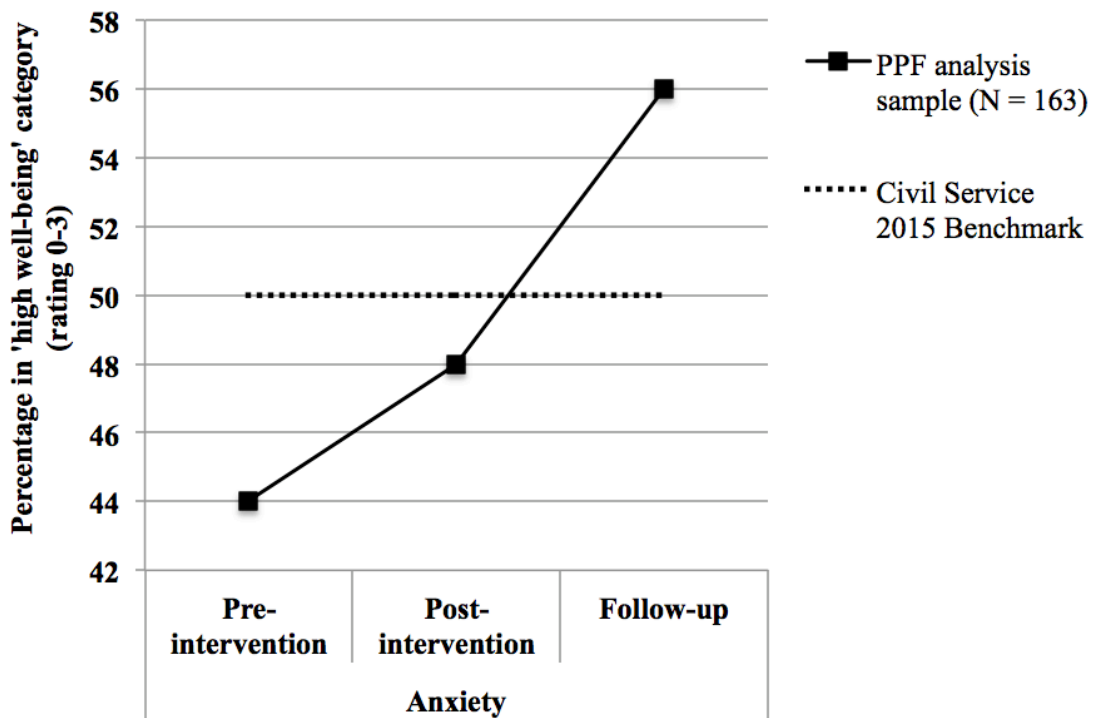


Figure 19. Participants reporting 'high well-being' on the ONS4 anxiety item

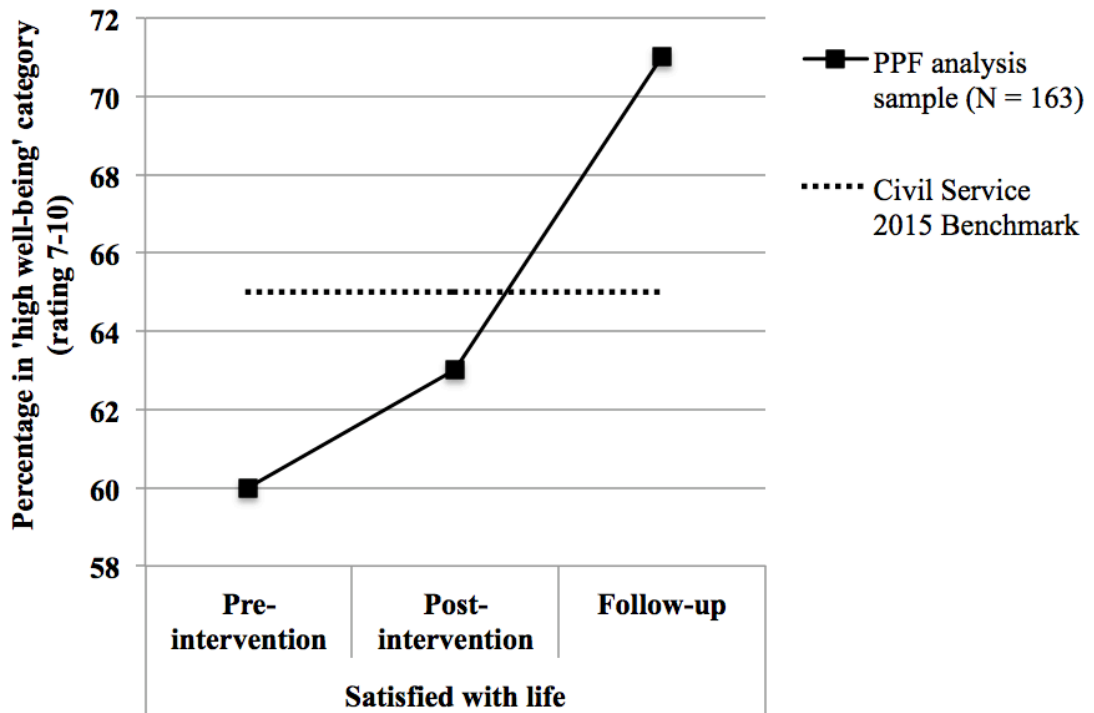


Figure 20. Participants reporting ‘high well-being’ on the ONS4 life satisfaction item

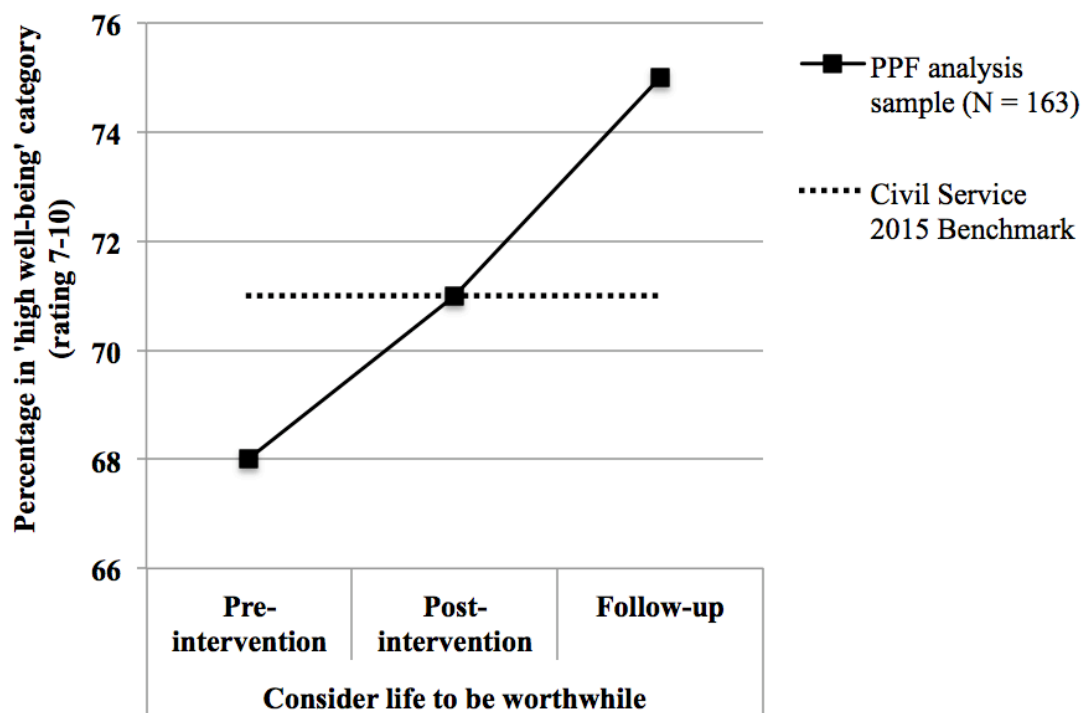


Figure 21. Participants reporting ‘high well-being’ on the ONS4 worthwhile life item

The ONS4 items do not have sufficient reliability and validity for further statistical analysis to be appropriate, so conclusions about the effect of the intervention on well-being in relation to these supplementary items cannot be drawn. However, in descriptive terms, as shown visually in Figures 18-21, the proportion of participants reporting high well-being was either below or on the benchmark at pre-intervention, and above the benchmark at follow-up, on all four ONS4 items. For the two cognitive well-being items, life satisfaction and ‘life is worthwhile’, the proportion of study participants reporting high well-being was also above the Civil Service benchmark directly following the intervention.

Chapter 4: Discussion

Summary of the results

The aim of the present study was to determine whether an online adaptation of a goal-setting and planning (GAP) self-help intervention (MacLeod et al., 2008) could improve working adults' well-being in a randomised controlled trial. The study extended a previous trial of the GAP intervention with a non-clinical sample of adults in the community (MacLeod et al., 2008) in three ways. Simple randomisation was added to the study design, a sample large enough to detect medium effects with 88% power was recruited and the intervention was adapted for online delivery in the workplace. Minimal support was offered to participants, comprising one support email, with a follow-up phone call if requested. 330 participants consented to take part in the study, of which 250 remained after the initial intervention phase and 163 remained at follow-up, three months later.

The first predicted outcome of the study, Hypothesis 1, was that, relative to controls, GAP participants would show significantly improved well-being immediately post-intervention. An improvement in well-being was defined as an increase in positive affect, life satisfaction and flourishing, and a decrease in negative affect. The study showed that, compared to the wait-list control group, participants who were given access to the GAP intervention showed significantly improved well-being immediately post-intervention, for all well-being components considered in combination and for each separate component except negative affect. The findings therefore largely supported Hypothesis 1, with the exception of the predicted decrease in negative affect relative to controls.

Hypothesis 2 was that participants with lower levels of well-being before starting the intervention would experience greater improvements in well-being during the initial phase, compared to other GAP participants and controls. This hypothesis was not supported. Initial well-being levels were not associated with participants' response to the intervention during the initial phase.

The remaining two hypotheses related to the longitudinal phase of the study. All participants were considered as a single group and the focus was whether well-being changed over time from pre-intervention to post-intervention and from pre-intervention to follow-up, three months later. Hypothesis 3 proposed that, for the whole sample, well-being would be higher at post-intervention and follow-up than at pre-intervention. The study found that there was a significant improvement in well-being across time, when the components were considered in combination and individually. Directly after the five-week intervention period and three months later, participants reported higher levels of positive affect and flourishing than before the intervention started. Negative affect and life satisfaction did not change significantly over the course of the five-week intervention period but by three-month follow-up, negative affect had reduced and life satisfaction had increased compared to pre-intervention levels. Hypothesis 3 was therefore largely supported, with the exception of predicted changes to negative affect and life satisfaction over the five-week intervention period.

Hypothesis 4 was that participants with lower initial well-being levels would experience greater improvements in well-being across time, from pre-intervention to

follow-up, than those with higher initial well-being levels. This hypothesis was not supported. As with Hypothesis 2, initial well-being levels were not associated with changes in well-being across time.

The adherence and skills survey provided data about how many modules participants had completed and how helpful they had found the programme for developing skills in goal-setting and action-planning. The primary analysis had not taken into account the number of modules completed by participants because the intervention was a self-help programme with minimal support, so needed to be proved effective, or otherwise, regardless of adherence. However, given that the intervention was shown to be largely effective in improving well-being, it seemed appropriate to explore whether adherence to the programme was related to successful outcomes. Regression analysis indicated that post-intervention scores were strongly associated with pre-intervention well-being levels. The number of modules completed was a significant, additional contributing factor to post-intervention scores for positive affect, life satisfaction and flourishing. Completing more modules was significantly associated with improvements on each of these three positive components of well-being following the intervention. Post-intervention negative affect levels were not related to the number of modules completed.

In the skills section of the adherence and skills survey, most participants rated the intervention as being either moderately or very helpful overall. The majority of participants also reported finding the intervention either moderately or very helpful for developing specific skills in generating goals, aligning those goals with values, planning actions towards those goals and overcoming obstacles. The intervention was

perceived as more helpful for developing skills in generating goals and planning actions than it was for helping participants overcome obstacles to goal progress. Finally, supplementary analysis on the ONS4 well-being items indicated that the percentage of participants reporting high levels of well-being increased consistently from pre-intervention to post-intervention to follow-up on all four ONS4 well-being items. At follow-up, these percentages exceeded the Civil Service 2015 benchmark for each ONS4 item (Cabinet Office, 2015).

Consideration of key findings

The online version of GAP had a largely positive effect on working adults' well-being. As predicted, when compared to wait-list controls, GAP participants reported significantly higher levels of positive affect, life satisfaction and flourishing immediately post-intervention. In the longitudinal phase, compared to before the intervention, participants reported improved positive affect and flourishing directly after the intervention, and improvements to all four components of well-being three months later. These quantitative findings are supported by participants' free-text comments in the adherence and skills survey. For example, one stated that the intervention had "*promoted a more positive outlook than before*" and another emphasised the link between behaviour and affect, commenting that "*Now I can see how important each step is, no matter how small, in helping me to feel motivated and feel successful in working towards my goal*". These comments, and the proven positive effect of the GAP intervention on well-being in both phases of the present study, lend support to the architecture of sustainable change theory (Lyubomirsky et al., 2005) that choosing goals and voluntarily working towards them leads to sustained increases in well-being.

Contrary to the hypotheses, there was no decrease in negative affect levels relative to controls in the initial phase and, for the whole sample, neither negative affect nor life satisfaction levels changed significantly between pre-intervention and post-intervention. Another unexpected finding was that initial well-being levels were not associated with participants' response to the intervention in either phase of the study. Possible reasons for these hypotheses being refuted are offered below, with reference to existing theoretical and empirical literature.

Negative affect. In the initial phase, it had been expected that GAP participants would experience a decrease in negative affect compared to controls, but this was not the case. In the longitudinal phase, it was predicted that negative affect levels would reduce between the start and end of the intervention, but this was not supported by the findings. These predictions were based on Coote and MacLeod's (2012) study in which GAP participants in a depression self-help group experienced an alleviation of their low mood compared to controls, and on previous GAP studies in clinical settings in which levels of negative affect decreased (Ferguson et al., 2009; Farquharson & MacLeod, 2014). However, working adults' negative affect levels may be resistant to short-term change because of specific pressures associated with work.

Time pressure is cited as a key detractor to workplace well-being across Europe (Rial Gonzalez et al., 2010). Several of the present study participants explained that lack of time had hampered progress with the intervention. *"I'm only sorry I had so little time, given competing work pressures to complete"*. Negative affect levels did not rise across the group, relative to controls, but did not fall either. It may be that for individual participants, at a within-subjects level, aspects of the intervention

contributed to a reduction in their negative affect, but that this reduction was offset by an increase in negative affect directly caused by the brevity of the intervention period. Moberly and Watkins (2010) found that having important goals but being unsuccessful in working towards them induced negative affect. By asking participants in the present study to identify important personal goals, but for them to not feel they had time to act on those goals, it is possible that the intervention made some people feel worse. As one explained *“It was rather sad to fail to complete the course because of work commitments...Rather than inspire me it almost made me think about the things I couldn't do.”* This comment perfectly describes the discrepancy reduction feedback loop posited by Carver and Scheier (1990), as outlined in the introduction. The intervention in the present study effectively highlighted a future desired state, but with no time to reach that desired state, negative affect entered the feedback loop and provided a background reminder that no progress towards the desired state was being made. A future study with a longer intervention phase, to take account of work pressures and give participants time to complete the modules and make real progress on their goals, may observe reductions in GAP participants’ negative affect relative to controls in the initial phase, not just for the whole sample in the longitudinal analysis.

In addition to the direct effect of time pressure on negative affect through being frustrated at not having time to make progress towards goals, there may have been an indirect effect in terms of not reaching the modules that were designed to help with overcoming obstacles such as lack of time. The adherence data presented graphically in Figure 18 indicates that only 49% of participants reached Module 4, which includes guidance and exercises to help participants overcome obstacles to goal progress.

Module 4 is intended to be completed after participants have spent a week or so trying out the action plans towards goals they chose and refined in Module 1-2, using plans they made in Module 3. Practical experience of the obstacles was thought to be a helpful preparation for the learning experience of Module 4. However, in adapting the intervention for future use, it may be worth considering a message on the Welcome page reminding participants that if they are finding it hard to make a start because of lack of time, or for another reason, there are some tips in Module 4 they could try out.

It might also have been assumed that observed increases in positive affect and flourishing for GAP participants' relative to controls, and for the whole sample, would result in concurrent decreases in negative affect. However, positive and negative affect are quasi-independent (Watson et al., 1988). Positive psychology interventions therefore face a challenge in focusing on positive strengths, but having an impact on both positive and negative affect. A number of other positive psychology interventions have reported similar findings to the present study: positive affect has increased, but there has been no change in negative affect relative to controls. Hanssen, Peters, Vlaeyen, Meevissen, and Vancleef (2013) exposed two groups of participants to a painful experience, with one group having completed an optimism-inducing task beforehand. Relative to controls, those in the optimism condition showed higher levels of positive affect following the pain task, but no difference in negative affect. Meevissen, Peters, and Alberts (2011) compared the effects of a positive psychology intervention in which participants imagined their best possible selves and a control group imagined daily activities. The intervention group showed increased positive affect relative to controls, but no difference in negative

affect. Other positive psychology interventions have also shown no change in negative affect in the short-term (Odou & Vella-Broderick, 2013; Peters, Flink, Boersma, & Linton, 2010). As with the present study, two of these studies have reported longer-term reductions in negative affect, by follow-up stage (Meevissen et al., 2011; Odou & Vella-Broderick, 2013). It may be a more general pattern among positive psychology interventions that negative affect is resistant to change during the intervention itself, but that comparison between pre-intervention and follow-up scores shows reduced negative affect in the longer-term. As more high-quality longitudinal RCTs of positive psychology interventions emerge, this hypothesis could be explored in a meta-analysis.

Life satisfaction. Life satisfaction levels improved for GAP participants relative to controls in the initial phase and also improved between pre-intervention and follow-up in the longitudinal phase. However, it is worth considering why significant improvements in life satisfaction were not observed in the whole sample between pre-intervention and post-intervention. As with negative affect, it could be that life satisfaction is resistant to change during a short five-week goal-based intervention, but that change occurs over a longer follow-up period when there is the opportunity to put new skills into practice. Bauer and McAdams (2004) found that life satisfaction was associated with having community-related goals. The high workloads cited by participants in the current study as reasons for not completing the modules may have impeded their ability to spend time in their community outside work, hampering life satisfaction increases. Krings, Bangerter, Gomez, and Grob (2008) found that for adults of working age, life satisfaction was associated with goal achievement. Over the three month follow-up period, participants may have had time

to engage with their community-related goals and achieve some goals, resulting in longer-term improvements in life satisfaction. These hypotheses could be explored in future research into the effectiveness of GAP in workplace interventions by including measures such as the Inter-goal Relations Questionnaire (IRQ; Riediger & Freund, 2004). The IRQ explores how different types of work and life goals interact to impede goal progress. Using the IRQ and other measures examining mechanisms of change might also help explain why positive affect or flourishing still increased significantly during all phases of the study, remaining apparently unaffected by the reported impact of workloads and work-related goals on goal progress.

Initial well-being levels. It had been expected that participants with lower initial well-being levels would experience greater improvements in well-being across both the initial and longitudinal phases. This prediction was based on findings by Coote & MacLeod (2012) that GAP participants in a depression self-help group who were more severely depressed initially saw greater improvements in emotional well-being, measured as a combination of depression, positive affect and negative affect, than their less depressed peers. Depression was not measured in the present study, but given the significant correlation between depression and both positive and negative affect (Watson, Clark, & Carey, 1988), it could sensibly be predicted that participants with lower positive affect and higher negative affect initially would experience greater improvements in well-being. However, these hypotheses were not confirmed by the findings. Participants reported improvements in well-being after the intervention and three months later regardless of how high or low their well-being was before the intervention. Had the hypotheses been confirmed, it might have been appropriate to recommend offering the intervention only to working adults with low

well-being. By refuting these hypotheses, the intervention was shown to be effective for working adults across the spectrum of initial well-being levels.

The capacity of the online GAP intervention to improve well-being even for people whose well-being levels are already high lends empirical support to the broaden-and-build theory (Frederickson, 2001). Frederickson (2001) asserted that individuals with high levels of positive affect have a greater capacity for flexibility in their thoughts and actions, leading to greater resilience in overcoming obstacles and progressing towards their goals. Such progress reduces negative affect and generates greater positive affect in the longer term, in a perpetuating upward spiral. The broaden-and-build effect was emphasised by a participant in the present study who commented that the intervention added to her existing skill base: *“It gave structure and time to think about goals that I want in my life balance, which I tend to do anyway, but help [sic] give me a clear priority of what was important to me”*.

Positive outcomes despite low adherence. Although it had been expected that the intervention would bring improvements in well-being, its success in doing so despite only 20% of participants reaching the final module is worth further consideration. Participants’ well-being may have improved simply by consenting to take part in a positive psychology study. Agreeing to start a positive psychology intervention activity has been shown to improve psychological well-being in the short-term through anticipation of change and the activation of positive information about the self, even if the positive psychology activity itself is not undertaken (Gander, Proyer, Ruch, & Wyss, 2013; Mongrain & Anselmo-Matthews, 2012; Seligman, Steen, Park, & Peterson, 2005). A participant in the present study hinted at

this phenomenon, noting that although they did not have time to access the modules within the intervention period, they were “*grateful for the opportunity to be included*”. Seligman et al. (2005) found, however, that the initial ‘placebo’ effect on improved well-being lasted only until immediately after an intervention. Further explanations must be considered, therefore, for the long-term improvements in well-being over the three month follow-up period in the present study, despite low adherence during the intervention period.

Participants’ longer-term improvements in well-being despite low overall adherence could indicate that the earlier modules were able to exert a strong effect on well-being, even if participants failed to progress any further. For example, the first module about generating goals was completed by 86% of participants, suggesting that, at the very least, most participants in the study wrote a list of goals and selected two that were in line with their values and were approach rather than avoidance goals. As discussed in the Introduction section, Cantor and Sanderson (1999) associated goal-setting with improved life engagement, leading to increased positive affect and a sense of purpose, which is one aspect of flourishing. The high rate of completion of Module 1 may therefore have been an important factor contributing to the medium to strong effect of the intervention on positive affect and the strong effect on flourishing between starting the intervention and three month follow-up. Further evidence of the impact of the content of Module 1 alone was that participants rated it as moderately to very helpful, and significantly more helpful than the later module on over-coming obstacles. One participant commented that they had “*...found the concept of concordancy very interesting and useful. It was also an interesting exercise to write a list of goals and then whittle that down to just two.*” Participant ratings of the

helpfulness of individual components of an intervention have been associated with successful outcomes relating to those components (Hasson et al., 2014).

Another possible explanation for the positive effect of the intervention on well-being despite low adherence may be participants' status as working adults. The present study was the first trial of GAP in the workplace and found improvements in more components of well-being across both the initial and longitudinal phases than any previous GAP study (Coote & MacLeod, 2012; Farquharson & MacLeod, 2014; Ferguson et al., 2009; MacLeod et al., 2008). As a cohort, working adults may respond better to even part of a personal goal-based intervention than clinical or community populations. With rising demands from employers (Rial Gonzalez et al., 2010), working adults are likely to be trying to achieve a number of goals at work which they have not had a role in setting, so are driven by controlled motivation rather than autonomous motivation (Sheldon & Elliot, 1998). Lack of personal control in the workplace can lead to depression, anxiety and anger (Ross & Mirowsky, 2013). An intervention in personal goal-setting offers an opportunity for working towards autonomously-motivated goals, potentially promoting keen engagement with the material presented in the initial modules by the participants in the present study, enhancing the effectiveness of those modules. If working adults did engage with the initial modules keenly, this enthusiasm was not sustained for completion of the later modules. However, 80% of participants indicated that work-related goals had hampered their progress with the intervention, so contextual factors may have overwhelmed their enthusiasm. One participant commented that they *“struggled...to find time to invest in [the intervention], unfortunately, even though I am very interested in the programme and support it can provide”*. Future GAP trials

or other studies into self-help workplace positive psychology interventions could measure the associations between strength of engagement with intervention components, time and outcomes. It would also be helpful to conduct future research into whether adherence to the full GAP intervention could be improved by adding a first module to help provide resilience to work pressures, perhaps through developing self-compassion using a compassion-focused therapy approach (Gilbert, 2009).

Strengths of present study

Two key strengths of the present study were its ecological validity and practical relevance. An actual well-being intervention was tested with a sample of working adults in their own workplace, answering the UK government's recent call for evidence-based interventions to improve well-being levels in working adults (Cabinet Office, 2014; ESRC, 2014). Findings confirmed that working adults' well-being can be improved through access to online self-help guidance in goal-setting and planning for five weeks. The online self-help format, agreed with a focus group of working adults, allowed the intervention to be offered with minimal therapeutic support, enabling convenient access by a large group of employees at relatively low-cost. Improvements to the intervention may be helpful, as mentioned already, but the longitudinal, randomised controlled design and the positive findings in the present study arguably provide strong enough evidence for the intervention to be confidently offered to working adults in its current format.

A third strength of the present study was the way that confounding factors were controlled for, in both the study design and the analysis techniques used. Participants were allocated randomly to either the intervention or wait-list control groups,

contributing to the validity of findings relating to the effect of the intervention (Moher et al., 2010). Bonferroni and family-wise error corrections introduced stricter criteria under which an observed change would be regarded as significant, reducing the likelihood of committing a Type I error. Type II errors, missing a true effect through insufficient statistical power, were controlled for by conducting a priori power analysis, accurately estimating attrition rates, and recruiting a large sample exceeding the target indicated by the power analysis. Longitudinal psychology and health intervention studies do not always take sufficient account of regression to the mean (RTM), leading to overestimates of the effect of time on the outcome variables (Linden, 2013; Yu & Chen, 2015). In the present study RTM was carefully considered. A control group was included in the intervention phase. The longitudinal phase had no control group, so adjustments were made so that analysis could be based on estimated real change, with RTM effects attenuated (Barnett et al., 2005; Nielsen et al., 2007). RTM is not the only threat to internal validity associated with the absence of a control group. Events such as economic fluctuations or departmental job losses may have also impacted participants' well-being during the course of the study. However, RTM can be controlled for more effectively than such events and the RTM adjustments made in the present study helped improve confidence in attributing observed improvements in well-being to the intervention itself.

A final strength of the present study was the measurement of flourishing. Previous trials of GAP had used the three established components of subjective well-being, positive affect, negative affect and life satisfaction, in common with many studies of positive psychology well-being interventions (e.g., Green, Oades, & Grant, 2006; Sheldon & Lyubomirsky, 2006). However, there is growing recognition that

flourishing is an important additional cognitive component of well-being, because positive relations with other people, optimism for the future, and the sense that life is worthwhile are also important to positive participation in a good life (Gokcen, Hefferon, & Attree, 2012; Huppert & So, 2009). By measuring flourishing, the present study has demonstrated that these aspects of working adults' well-being are improved with training in personal goal-setting and planning, in addition to the more traditional components of subjective well-being. Indeed, the present study demonstrated large effect sizes for flourishing, alongside small, medium and medium to large effect sizes for other well-being components. Flourishing could be considered particularly important to working adults' well-being because a number of studies have shown flourishing to be associated with stronger engagement with work (Bakker & Sanz-Vergel, 2013), better adoption of new technologies (Partala & Saari, 2015) and a greater likelihood of seeking resources and challenges at work (Demerouti, Bakker, & Gevers, 2015).

Limitations of present study

One limitation of the present study was that mechanisms of change were not measured. By using a control group and measuring outcomes across time points, the study design enabled improvements in well-being to be attributed to the intervention itself. The intervention itself was designed to facilitate improvements in well-being based on empirically-proven theories of change, which might imply that the observed improvements in well-being were brought about by the intended mechanisms of change. However, such a conclusion could only be drawn if mechanisms of change had been directly measured. In their RCT of a mindfulness-based workplace intervention, Querstret et al. (2016) measured well-being outcomes, but also

administered a measure designed to assess specific mechanisms of change, the Five Facet Mindfulness Questionnaire (FFMQ-SF; Bohlmeijer, ten Klooster, Fledderus, Veehof, & Baer, 2011). Using mediation analysis, Querstret et al. (2016) identified the specific facet of mindfulness, acting with awareness, that contributed most to the intervention's positive effect on work-related rumination, fatigue and sleep.

Measuring possible mechanisms of change in future GAP trials could also inform further exploration of why some participants dropped out of the study early. Attrition rates were roughly as expected, but it would be useful to identify factors affecting attrition at each stage of the study. The positive findings in relation to the effectiveness of the online GAP intervention were based on analysis of data for participants who remained in the study until Time 2 (T1/T2 analysis) and follow-up (PPF analysis). These participants may have had higher levels of intrinsic motivation than those who dropped out early, potentially predicting engagement in GAP and exaggerating its effectiveness. GAP's effectiveness compared to controls may also have been exaggerated by the control group's relative lack of activity. The act of completing the GAP intervention rather than waiting may have created anticipation of a positive outcome, enhancing well-being in the intervention group. In future GAP trials, intrinsic motivation and anticipation could be assessed as part of a set of measures focusing on mechanisms of change, to help establish their association with adherence and outcomes. An active control group, completing an intervention similar in style to GAP but with neutral or alternative content, could also be used to reduce the potential confounding effect of anticipation arising from completing an intervention rather than waiting.

A further limitation of the present study was the inability to monitor individual usage of the intervention website. An important feature of an RCT is that the intervention remains inaccessible to participants until they enter the intervention condition. In pharmacological RCTs, access to medication can be carefully controlled. In non-pharmacological RCTs involving direct therapeutic contact or group work, access to therapists can be carefully controlled. However, for non-pharmacological RCTs of online self-help interventions, controlling access to the intervention and monitoring usage presents more challenges. In the present study, the intervention website was hidden from search engines and overall usage rates could be tracked, but individual usage could not be monitored to check cross-contamination between conditions. Research resources did not allow the intervention to be hosted by a service provider that could offer individual password access to the intervention website, but this would be a helpful feature to add in any future RCT of the online GAP intervention.

Finally, the generalisability of the findings would have been improved if the study sample had included more males (27%), 18-24 year olds (18%) and staff from ethnic groups other than White (5%). In the UK adult working population, 53% are male, 32% are 18-24 year olds and 11% are from Asian, Black, Mixed or Other ethnic groups (ONS, 2015). It is not uncommon in online well-being studies to have fewer males, young adult and non-White participants (e.g., Cheung, Gillebaart, Kroese, & De Ridder, 2014; Howells et al., 2016; Mongrain, Chin, & Shapira, 2011). GAP is designed to be a voluntary self-help intervention and participation in the current study was voluntary, with over 4,000 staff invited, so it is possible that the present study sample represented a typical demographic profile of those that would choose to do

GAP in the future. Hasson, Brown, and Hasson (2010) examined factors associated with participation and adherence to an online workplace well-being intervention and found that the odds of female employees volunteering for the intervention and adhering to it were almost two times higher than for their male colleagues. Although the demographic profile was comparable to other studies, caution should nonetheless be taken when considering the relevance of the present study findings for the working adult population as a whole. Future trials of GAP may benefit from recruitment strategies to increase participation from males, younger adults and staff from a wider range of ethnic backgrounds.

Clinical implications

The present study was carried out in a workplace setting using well-being measures appropriate for non-clinical populations, so context-relevant change was assessed rather than clinically-significant change. In the Civil Service, improvement in well-being is defined as an increase in the percentage of participants reporting high levels of well-being on the ONS4 items (ONS, 2015). In the present study, the percentage of participants reporting high levels of well-being increased consistently from pre-intervention to post-intervention to follow-up on all four ONS4 well-being items. At follow-up, these percentages exceeded the Civil Service 2015 benchmark for each ONS4 item (Cabinet Office, 2015). In practical terms, therefore, the intervention could be regarded as showing promise for improving well-being in relation to Civil Service measures of workplace well-being.

The present study achieved its aim to adapt a clinically-proven cognitive-behavioural intervention for use in the workplace, providing a potential model for

similar future adaptations. The first step in the adaptation model was to decide on the online format and layout of the learning material, with reference to contemporary research on workplace-based learning (e.g., Cheng et al., 2012). The second step was to edit the self-help material and check that there were no references to clinical cases or mental health disorders. As a positive psychology intervention, previous versions of GAP focussed on strengths and future-focused thinking, rather than pathological, historical thinking more associated with mental health treatments (Duckworth, Steen, & Seligman, 2005), so clinical references were not expected. There was only one brief clinical reference to depression in the introduction of the GAP self-help manual used by Coote & MacLeod (2012), to make it relevant to their target population, so that sentence was not used in the present study. The third step was to add case study examples appropriate to the non-clinical population, with examples of goals and actions that working adults might take to meet their personal goals.

Having prepared the intervention materials, the final step in the adaptation model was to test the suitability of the intervention with a focus group of working adults, as recommended by Cousineau, Houle, Bromberg, Fernandez, and Kling (2008). The focus group was held in a workplace setting. Focus group members' views were sought on the format of the intervention, the language used and the suitability of the practical exercises involved. Amendments made in response to their comments included changes in the layout of the information on the website and removal of some psychological jargon. A report of planned amendments (Appendix 3) was sent to each focus group member to confirm that their input and time had been worthwhile. A similar four-step model may prove useful to others seeking to adapt psychological interventions for use in the workplace.

Research implications

If another trial of the online version of GAP is carried out in the future, perhaps with a different working population or an even larger sample as part of a Phase III RCT comparing GAP with another goals-based intervention (Medical Research Council, 2000), consideration will be given to adapting the intervention and study design in response to findings from the present study. A number of suggested adaptations have already been mentioned earlier in the Discussion section, including increasing the intervention period to give participants more time to practice their goal-setting and planning skills, measuring mechanisms of change and finding ways to recruit more males, young adults and employees from a wide range of ethnic groups. A further adaptation would be to try to improve intervention adherence by providing regular reminders by email. One participant commented that they would have liked to have completed the intervention but *“the lack of regular prompts (e.g. by e-mail) meant it had to be self-driven”*. The intervention was designed to involve minimal input from the researcher, to keep running costs low, so it would not be desirable to increase the therapeutic support offered. However, online software could be used to provide automatic reminders by email or text message, with participants selecting their preferred frequency of reminder messages when they start the intervention. Cooley, Pedersen, and Mainsbridge (2014) conducted a qualitative evaluation of an online workplace intervention to improve physical health through exercise. Participants reported finding the reminders initially annoying because it disrupted their workflow, but began to adhere more closely to the intervention once they had become habituated to the reminders and had adapted their work behaviour around them (Cooley et al., 2014).

In addition to automated reminders, motivation to adhere to the intervention may be increased by encouraging social contact to discuss progress. Social interaction can help increase motivation and lead to more staff becoming interested in the intervention (Cooley et al., 2014). In the present study, participants were encouraged to share their goals with other people if they felt this would provide helpful motivation, but information was not gathered about whether participants had done this. In future trials of GAP as an online intervention, participants could be encouraged to set up workplace-based action learning groups to discuss goal progress. A possible criticism of this approach would be that participants may be unwilling to share their personal goals in an action learning group. However, GAP has proved to be effective as a group intervention in both clinical (Farquharson & MacLeod, 2014; Ferguson et al., 2009) and non-clinical settings (MacLeod et al., 2008), suggesting that groups are perceived as an appropriate place to discuss personal goals. Doing so with work colleagues may seem less appropriate than in community or clinical settings. However, action learning sets are now widely used within organisations (Volz-Peacock, Carson, & Marquardt, 2016) and group members are encouraged to share personal issues to help gather support from the group (Pedler, 2012), so this approach may be more familiar than expected.

Conclusion

The aim of the present study was to determine whether an online adaptation of a goal-setting and action-planning self-help intervention (MacLeod et al., 2008) could improve working adults' well-being. The intervention included guidance and worksheets about setting goals, aligning goals with personal values, imagining goal

achievement, making realistic plans towards those goals and overcoming obstacles to progress. The study extended a previous trial of GAP with a non-clinical sample of adults in the community (MacLeod et al., 2008) by adding randomisation to the study design, recruiting a sample large enough to detect medium effects with 88% power and adapting the intervention to be delivered online in a workplace setting. The intervention was delivered with minimal support in the hope that, if it proved effective, it could be made available to more adults in their workplace as a low-cost, accessible well-being initiative.

Recognising the underrepresentation of males, young adults and employees from a wide range of ethnic groups, the study nonetheless provided empirical evidence that working adults' well-being can be improved through access to online self-help guidance in goal-setting and planning. Relative to wait-list controls, GAP participants reported significantly higher levels of positive affect, life satisfaction and flourishing, but not lower levels of negative affect. In the longitudinal phase, compared to the start of the intervention, participants reported an increase in positive affect and flourishing, directly after the intervention and three months later. Negative affect and life satisfaction showed no change by the end of the intervention, but both had improved by three-month follow-up compared to the start of the intervention.

The study demonstrated that working adults' well-being can be improved through access to online self-help guidance in goal-setting and planning. Completing more modules was a significant predictor of higher levels of positive affect, life satisfaction and flourishing after the intervention, once pre-intervention scores had been taken into account. The study contributes to the evidence base for the

effectiveness of cognitive-behavioural workplace interventions and provides a potential model for adapting clinically-proven interventions to make them accessible to working adults.

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APPENDIX 1: MEASURES

Positive and Negative Affect Schedule (PANAS; Watson et al., 1988)

This scale consists of a number of words that describe different feelings and emotions. Read each word and then indicate the extent to which **you generally feel this way (that is, how you feel on average)**, using the 1-5 scale below.

Having trouble with the format of this question? [View in tableless mode](#)

	1. Very slightly or not at all	2. A little	3. Moderately	4. Quite a bit	5. Extremely
Interested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Distressed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Excited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Upset	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strong	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Guilty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scared	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hostile	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enthusiastic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proud	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Irritable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alert	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ashamed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspired	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nervous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Determined	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attentive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jittery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Active	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Afraid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Satisfaction with Life Scale (SWLS; Diener et al., 1985)

Below are five statements that you may agree or disagree with. Using the 1-7 scale below, indicate **your agreement with each item**. Please be open and honest in your response.

Having trouble with the format of this question? [View in tableless mode](#)

	1. Strongly disagree	2. Disagree	3. Slightly disagree	4. Neither agree nor disagree	5. Slightly agree	6. Agree	7. Strongly agree
In most ways my life is close to my ideal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The conditions of my life are excellent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am satisfied with my life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
So far I have got the important things I want in life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I could live my life again, I would change almost nothing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Flourishing Scale (FS; Diener et al., 2010)

Below are eight statements that you may agree or disagree with. Using the 1-7 scale below, indicate **your agreement with each item**.

Having trouble with the format of this question? [View in tableless mode](#)

	1. Strongly disagree	2. Disagree	3. Slightly disagree	4. Mixed or neither agree nor disagree	5. Slightly agree	6. Agree	7. Strongly agree
I lead a purposeful and meaningful life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My social relationships are supportive and rewarding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am engaged and interested in my daily activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I actively contribute to the happiness and well-being of others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am competent and capable in the activities that are important to me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am a good person and live a good life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am optimistic about my future	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People respect me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Secondary measures

ONS well-being items (ONS4; ONS, 2015)

Please answer the following four questions. Indicate your answer by clicking on the appropriate circle on the 0-10 scale below, where 0 is 'not at all' and 10 is 'completely'.

Having trouble with the format of this question? [View in tableless mode](#)

	0. Not at all	1.	2.	3.	4.	5.	6.	7.	8.	9.	10. Completely
Overall, how satisfied are you with your life nowadays?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall, to what extent do you feel the things you do in your life are worthwhile?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall, how happy did you feel yesterday?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall, how anxious did you feel yesterday?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Demographic questionnaire

(adapted from Civil Service People Survey; Cabinet Office, 2015)

The first questionnaire of the Life Balance Programme Research Study is a short one about demographics. It will help us check whether we have recruited a representative sample of working adults.

Please select the options below that best describe you. The categories are the same as those used in the Civil Service People Survey. Your responses will be allocated to an anonymous ID number rather than to your name.

1

Having trouble with the format of this question? [View in tableless mode](#)

	Male	Female
Gender	<input type="radio"/>	<input type="radio"/>

2

Having trouble with the format of this question? [View in tableless mode](#)

	18-34	35-44	45-54	55+
Age	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3

Having trouble with the format of this question? [View in tableless mode](#)

	White	Mixed	Asian	Black	Other ethnic group
Ethnicity - major group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4

Having trouble with the format of this question? [View in tableless mode](#)

	Up to £20,000	£20,000- £39,999	£40,000- £59,999	£60,000- £79,999	£80,000 or more
Salary band (if part-time, please select the full-time-equivalent salary)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5

Having trouble with the format of this question? [View in tableless mode](#)

	Less than 1 year	1-3 years (less than 3)	3-5 years (less than 5)	5-10 years (less than 10)	10 years or more
Time working for current employer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Adherence and skills survey

Thank you. Finally, this short questionnaire asks how the on-line modules in the Life Balance Programme worked for you. Your answers will help us improve future versions of the Programme.

Which modules did you complete? (please select all that apply)

- Module 1 - Making goals
- Module 2 - Imagining achieving goals
- Module 3 - Planning to achieve goals
- Module 4 - Overcoming obstacles
- Module 5 - Putting it all into practice
- Module 6 - Review

Having trouble with the format of this question? [View in tableless mode](#)

	100% at work; none at home	75% at work; 25% at home	50% at work; 50% at home	25% at work; 75% at home	0% at work; 100% at home
Roughly how much of the Life Balance Programme did you access at work vs. at home/elsewhere?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Having trouble with the format of this question? [View in tableless mode](#)

	0 - No impact	1	2	3	4	5	6	7	8	9	10 - Severe impact
How much did having existing work-related goals/targets impact your ability to make new personal goals during the Life Balance Programme?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please indicate the extent to which you think the Life Balance Programme helped you to develop skills in...

Having trouble with the format of this question? [View in tableless mode](#)

	0 - Not at all helpful	1 - Slightly helpful	2 - Moderately helpful	3 - Very helpful	4 - Extremely helpful
Coming up with ideas for new personal goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working out whether goals were in line with your values	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Planning actions towards those goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Identifying and overcoming obstacles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Did you develop any other skills while doing the Life Balance Programme?

Overall, how helpful did you find the Life Balance Programme?

Having trouble with the format of this question? [View in tableless mode](#)

	Not at all helpful	Slightly helpful	Moderately helpful	Very helpful	Extremely helpful
The Life Balance Programme was....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you have any other comments about the Life Balance Programme?

APPENDIX 2: INTERVENTION MATERIALS

Website screenshot

LIFE BALANCE PROGRAMME
Improving well-being for working adults

ROYAL HOLLOWAY UNIVERSITY

WELCOME | TIMETABLE | **MODULE 1: MAKING GOALS** | MODULE 2: IMAGINING ACHIEVING GOALS | MODULE 3: PLANNING TO ACHIEVE GOALS | MODULE 4: OVERCOMING OBSTACLES | MODULE 5: PUTTING IT ALL INTO PRACTICE | MODULE 6: REVIEW | WORKSHEETS

Thank you for agreeing to take part in the Life Balance Programme. This version of the self-help programme has been developed for people in busy jobs.

We want to know whether doing the programme can help improve mood and general well-being. You will be asked to identify positive goals that you would like to achieve and to make plans for reaching those goals.

- **'Well-being'** is about how you feel – feeling good and having a positive view of your life.
- **'Goal'** means something you want to achieve and think you can do with a bit of effort. It does not matter how small or 'silly' you think the goal is, or whether it relates to work or the rest of life. Any goal that seems positive and important to you matters.
- **'Self-help'** means working on the programme without much support from us. We will check in with you once by email (followed by a phone call/meeting if

Example of a downloadable worksheet from the intervention



Worksheet 4A

Identifying obstacles

List below the sorts of obstacles that have prevented you from taking the planned steps towards your chosen goals. If you have not experienced any recent obstacles, widen it out to things you know have prevented you from taking steps to achieve goals in the past.

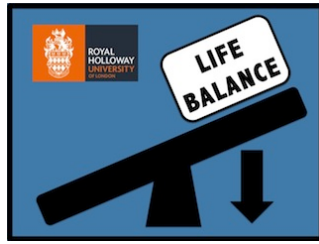
For each obstacle, decide whether it was:

- **Easy to anticipate** – when you made the action plan, if you had thought about potential obstacles, this one seemed likely
- **Hard to anticipate** – when you made the action plan, even if you had thought about potential obstacles, you would not have predicted this one

	Description of obstacle	'Easy' or 'Hard' to anticipate?
1		
2		
3		
4		
5		
6		
7		

You might like to save or print this worksheet for your records.

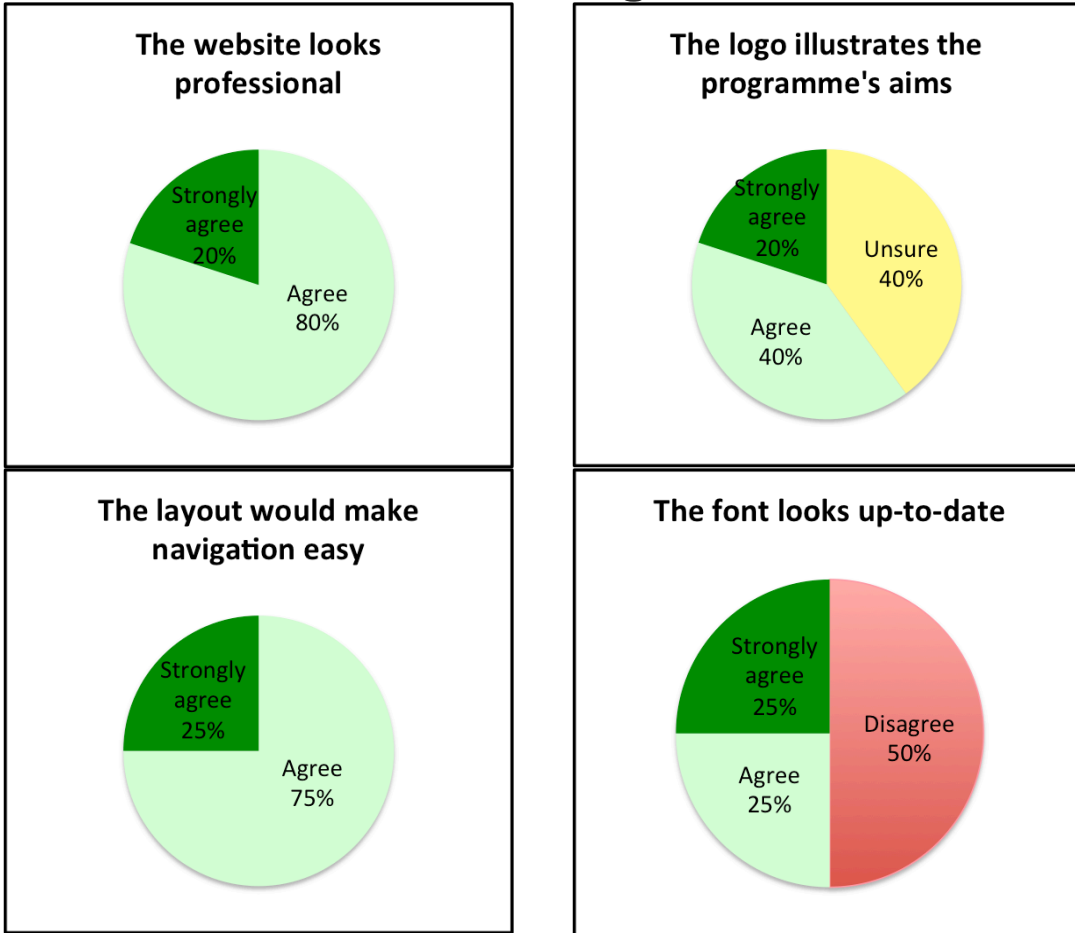
APPENDIX 3: FOCUS GROUP OUTCOME REPORT



Focus Group Outcome Report

Monday 9 Feb 2015

1. Website design feedback



Comments on website design

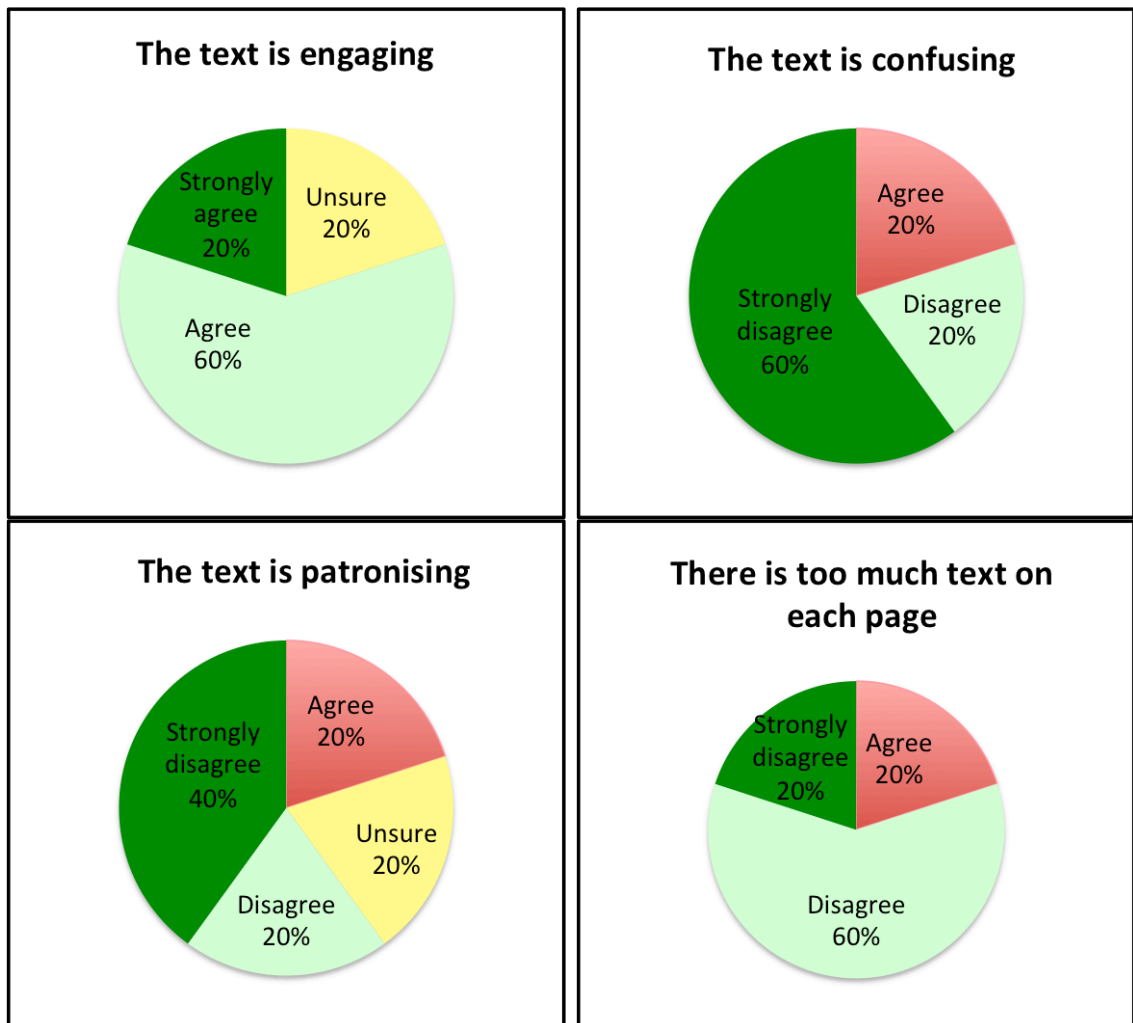
- Font should be Arial – accessible and clear
- Need to look at layout when all modules loaded to check it still works
- The colour is too dark – consider warm, fresh, motivating colour
- Logo may need 'work' adding to one side, as it is not immediately clear that programme is focusing on the life side of work-life balance
- Run a check for blind accessibility using [redacted] software

Actions for research team to take based on comments

- Change font to Arial to make accessible and clear
- Find warmer colour scheme
- Add 'work' to logo on left-hand side of see-saw
- Contact [redacted] once website is complete – they can run [redacted] check.

2. Website text feedback

[Note: For negatively worded statements, 'agree' is shown in red, so that red still means remedial action needed]



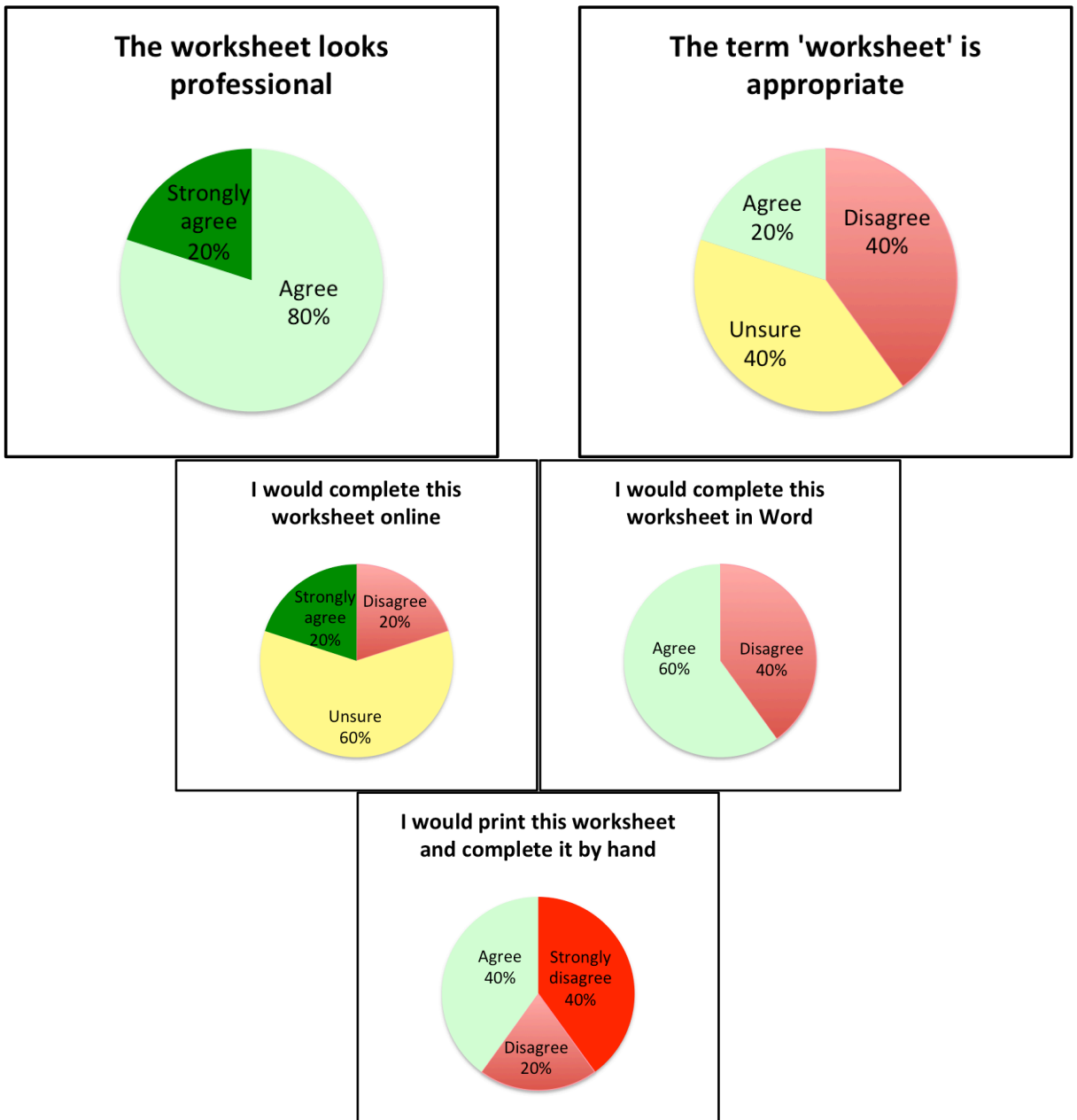
Comments on website text

- Good clarification up-front of definitions
- Use plainer English – less psychological, perhaps with pictures and examples
- Need to set expectations and context of programme up front – context includes work-life balance aims, some level of endorsement from [XXXXXX] to do in work time (as one of 5 day/yr training), and positioning it as one of several [XXXXXX] offerings (incl. employee assistance)
- Statement 'now let's get going with 1.1' could be viewed as patronising.
- Consider 'Week 1' instead of 'Module 1'

Actions for research team to take based on comments

- Agree context statement with [XXXXXX]
- Re-word to make English plainer and remove any patronising statements
- Add pictures and examples to help define concepts
- Move technical definitions to side margin

3. Worksheet design feedback



Comments on worksheet design

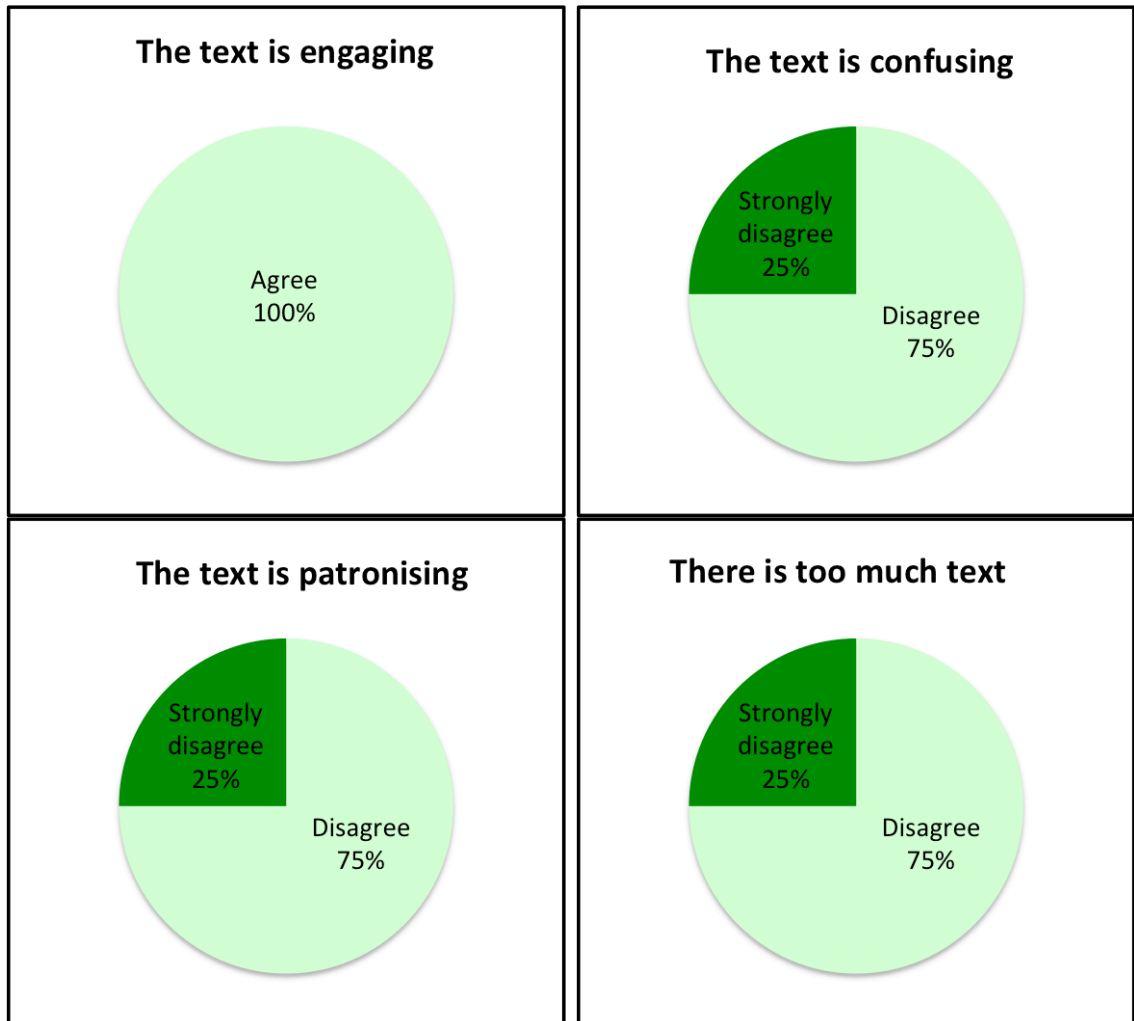
- Background blue colour may affect accessibility
- Being able to download and print might help people be more honest as they can be more sure of confidentiality compared to completing online
- Might not be good to call it 'worksheet' – too much like school/enforced training. Consider something like 'Life Balance Sheet 1.1'
- Change font to Arial to make it accessible

Actions for research team to take based on comments

- Remove background blue colour
- Change font to Arial
- Give participants range of options for completion – online, in Word, download and print
- Change worksheet name to 'Life Balance Sheet'

4. Worksheet text feedback

[Note: For negatively worded statements, 'agree' is shown in red, so that red still means remedial action needed]



Comments on worksheet text

- Are the goal sections expandable?
- Liven up page
- Glossary option for definitions etc.?
- Don't like 'self-concordant' – find a different way to explain it

Actions for research team to take based on comments

- Re-word text to make it more lively, removing some drier psychological terms if possible, illustrating with pictures and examples, as on website.

5. Recruitment plans discussion

Timing

- September start better than May – May is election time so lots of department will be busy.
- September also could make it easier to position recruitment for study within context of other well-being initiatives (e.g. health kiosk, work-life balance week).
- October involves People Survey, but that takes 15 mins to complete, so should not clash with participants' time.

Invitation to participate

- Invitation to participate should come from senior figure (e.g. [REDACTED] current Well-being Champion) if possible, to underline [REDACTED]'s support for well-being and for the study.
- The invitation should set the context in which the study sits – i.e. one of [REDACTED]'s well-being offerings, in line with Work-Life Balance strategy, part of the 5 days/year training quota etc etc.
- Invitation to participate could be specifically forwarded to diversity group chairs to encourage wide range of participation

Support for managers

- A separate email to managers might be helpful, to ask them to support staff who choose to participate by allowing completion in work time (in line with 5 training days per year quota), and encouraging managers themselves to participate.

6. Next steps

Ethical approval

- **Jeremy** to pursue ethical approval for study, for which these focus group outcomes will be very useful – many thanks to **all focus group members**.

Check of revised website style

- **All focus group members** kindly agreed to look at revised website when produced (April/May) to check for style etc. and see if today's comments have been taken into account – **Jeremy** to email link when available

Road-test the programme

- [REDACTED] kindly agreed to road-test the 5-week programme before invitations are sent out to potential participants, so at least two [REDACTED] staff have tried programme out first. **Jeremy** to brief them and email link when available (May/June).

Jeremy Oliver (jeremy.oliver.2013@live.rhul.ac.uk)
Life Balance Programme Research Team
Royal Holloway, University of London
9 February 2015

APPENDIX 4: PARTICIPANT INFORMATION SHEET AND CONSENT FORM

Participant information sheet



Life Balance Programme Research Study

0% complete

Information sheet

Purpose of study

My name is Jeremy Oliver and I am a doctoral research student at Royal Holloway, University of London. I am carrying out a study to find out if **on-line training in personal goal-setting and action-planning can help improve well-being**. I would appreciate your participation because if we find out the on-line training programme does help improve well-being, we can then make it available to more adults around the country.

What will the study involve?

If you decide to take part, I will ask you to complete an on-line training programme that is focused on helping people to identify personal goals and planning actions to achieve them. The programme will take around **30 mins-1 hour per week for 6 weeks**. Before you start the training programme and after you finish it, I will also ask you to complete some short questionnaires about your feelings of well-being. In total, your commitment to the study would be around **6-7 hours, spread across several weeks, with some more short follow-up questionnaires after 3 months**.

How and when?

The on-line training programme and research study questionnaires can be accessed anywhere with a computer and an internet connection. To help test whether the on-line training programme works, some people will start the training in **November 2015** and some will be asked to wait to start it in **January 2016**.

(continued overleaf)

What do I get in return?

As a thank you for your time, participants completing the study will be given the chance to enter into a **draw to win one of two £100 Amazon vouchers** (funded by Royal Holloway). Some organisations (e.g. [REDACTED]) have also confirmed that participants can count the on-line training programme as one of their annual recommended training days at work.

Will my information be kept safe?

Nobody except me and my supervisor will be allowed to see your files/questionnaires and in the study you will be known only by a random number. A summary of the study's results will be sent to participating organisations and to all participants, but no individual participant's data will be shared at any time. So your data is **completely confidential**. If the study is published in an academic journal, your data will be part of a group and will not be identifiable as referring to you.

Do I have to take part?

You do not have to take part in this study if you don't want to. If you decide to take part you may withdraw at any time without having to give a reason. Civil Service departments are kindly supporting this study, but there will be **no impact on how you are treated at work** if you decide to take part or not to take part.

Any questions?

If you have any questions about the study at any time, you can contact me on jeremy.oliver.2013@live.rhul.ac.uk. Feel free to either ask your question directly by email, or request a phone call or meeting with me to discuss your query in more detail. You can also contact my supervisor, Professor Andy MacLeod on A.MacLeod@rhul.ac.uk. If you would prefer to phone, please call 01784 414042 (research answermachine, checked each working day).

I think I would like to take part...

If you have read the information above and think you would like to take part, please select the '*I am interested - take me to the consent form*' option below.

If you are not interested in participating, please select the '*I am not interested*' option below. Thank you for your time.

Please select your option below:

- I am interested - please take me to the consent form
- I am not interested

Consent form

Consent form

You have been invited to participate in a study to find out if on-line training in personal goal-setting and action-planning can help improve adults' well-being. The study is being carried out by Jeremy Oliver, a doctoral research student at Royal Holloway, University of London.

Having trouble with the format of this question? [View in tableless mode](#)

	Please tick Yes or No (or N/a for Q3)		
	Yes	No	N/a
1. Have you read the information sheet about the study (on previous page)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Are you aware that if you have any questions you can email jeremy.oliver.2013@live.rhul.ac.uk?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. If you have asked any questions, have you now had satisfactory answers to them?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Do you understand that you are free to withdraw from the study at any time, without giving a reason and without it affecting how you are treated at work?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you agree to take part in the study? (N.B. by selecting the 'Yes' box, you are providing electronic confirmation of your consent to take part - you will then be taken to a page to provide your contact details)

Yes

No

APPENDIX 5: ETHICAL APPROVAL

Ref: 2015/030 Ethics Form Approved – Oliver, Jeremy (2013)

31/05/2016 06:12

Ref: 2015/030 Ethics Form Approved

psychology.it.support@rhul.ac.uk

Thu 21/05/2015 14:00

To: pava047@rhul.ac.uk <pava047@rhul.ac.uk>; Macleod, A <A.Macleod@rhul.ac.uk>;

Cc: PSY-EthicsAdmin@rhul.ac.uk <PSY-EthicsAdmin@rhul.ac.uk>; Zagefka, Hanna <Hanna.Zagefka@rhul.ac.uk>; Lock, Annette <Annette.Lock@rhul.ac.uk>; uqjt005@rhul.ac.uk <uqjt005@rhul.ac.uk>;

Application Details: View the form click [here](#) Revise the form click [here](#)

Applicant Name: **Jeremy Oliver**

Application title: **The impact of an on-line goal-setting and planning intervention on adults' wellbeing**

Comments: **Approved.**

APPENDIX 6: ADJUSTMENTS FOR REGRESSION TO THE MEAN (RTM)

RTM adjustment for whole sample changes in well-being (Hypothesis 3)

Effect of RTM to be controlled for:

The whole study sample may regress to population norms over time.

Sources of population means:

Norms from previous studies with similar populations were used as population means (as in Table 5 on page 62).

Sources of reference correlations for temporal stability between measurements:

Test-re-test reliability of each measure (as cited on pages 41-43) were used as reference correlations for temporal stability, because norm studies did not report these.

RTM adjustment formulae (Barnett et al., 2005; Nielsen et al., 2007):

The following RTM adjustment formulae were applied to post-intervention and follow-up scores (already Box-Cox transformed for normality as in Appendix 7).

$$x_{\text{post}}' = x_{\text{post}} + (1 - r) * (x_{\text{pre}} - \mu)$$

$$x_{\text{follow}}' = x_{\text{follow}} + (1 - r) * (x_{\text{pre}} - \mu)$$

where

x_{pre} = observed pre-intervention score

x_{post} = observed post-intervention score

μ = population mean (taken from published norm)

r = correlation coefficient for test-retest reliability (temporal stability)

x_{post}' = observed values at post-intervention corrected for regression to the mean effect (true effect or real change)

x_{follow}' = observed values at follow-up corrected for regression to the mean effect (true effect or real change)

Table A6.1 *Values of μ and r used in adjustment formulae (see above for definitions)*

Measure	Variable	Value ^a	Published norm	Reference source
PA	μ	84.92	31.31	Crawford and Henry (2004) Watson et al. (1998)
	r	.68		
NA	μ	2.31	16.00	Crawford and Henry (2004) Watson et al. (1998)
	r	.71		
SWLS	μ	181.21	23.30	Maltby and Day (2004) Diener et al. (1985)
	r	.82		
FS	μ	10974.39	42.92	Silva and Caetano (2013) Diener et al. (2010)
	r	.71		

Note. PA = positive affect, NA = negative affect, SWLS = life satisfaction, FS = flourishing.

^a μ value was calculated by transforming published norms using Box-Cox formulae in Appendix 7.

RTM adjustment for stratified sample changes in well-being (Hypothesis 4)

Effect of RTM to be controlled for:

Each group (High/Low well-being) has potential to regress to current study sample mean over time (and, eventually population norms, but after regressing to study sample mean).

Sources of population means:

Whole study sample means at pre-intervention were used as reference means (Nielsen et al., 2007).

Sources of reference correlations for temporal stability between measurements:

Correlations between pre-intervention and post-intervention scores, and pre-intervention and follow-up scores, for the whole sample were used as reference correlations (Nielsen et al., 2007).

RTM adjustment formulae (Barnett et al., 2005; Nielsen et al., 2007):

The following RTM adjustment formulae were applied to post-intervention and follow-up scores (already Box-Cox transformed for normality as in Appendix 7).

$$x_{\text{post}}' = x_{\text{post}} + (1 - r_{\text{post}}) * (x_{\text{pre}} - m)$$

$$x_{\text{follow}}' = x_{\text{follow}} + (1 - r_{\text{follow}}) * (x_{\text{pre}} - m)$$

where

x_{pre} = observed pre-intervention score

x_{post} = observed post-intervention score

m = pre-intervention mean for PPF sample ($N = 163$)

r_{post} = coefficient of correlation between x_{pre} and x_{post}

r_{follow} = coefficient of correlation between x_{pre} and x_{follow}

x_{post}' = observed values at post-intervention corrected for regression to the mean effect (true effect or real change)

x_{follow}' = observed values at follow-up corrected for regression to the mean effect (true effect or real change)

Table A6.2 *Values of m and r used in adjustment formulae (see definitions above)*

Measure	m	r_{post}	r_{follow}
PA (Box-Cox transformed)	97.16	.742	.577
NA (Box-Cox transformed)	2.54	.737	.684
SWLS (Box-Cox transformed)	197.24	.796	.674
FS (Box-Cox transformed)	11590.16	.799	.734

Note. PA = positive affect; NA = negative affect; SWLS = life satisfaction; FS = flourishing.

APPENDIX 7: PRELIMINARY ANALYSIS – ADDITIONAL DATA

Box-Cox transformation – T1/T2 analysis

Table A7.1 Box-Cox transformations with skewness and kurtosis z-scores for the T1/T2 outcome variables before and after transformation

Variable	Time	Box-Cox transformation	Intervention group (N = 111)				Wait-list control group (N = 139)			
			Before transformation		After transformation		Before transformation		After transformation	
			Skewness z-score	Kurtosis z-score	Skewness z-score	Kurtosis z-score	Skewness z-score	Kurtosis z-score	Skewness z-score	Kurtosis z-score
PA	T1	$x^2 = ((x-10)^{1.59}-1) / 1.59$	1.31	0.42	0.77	0.09	3.07	0.83	0.55	0.97
	T2		2.96	1.09	0.59	0.41	2.66	0.97	0.53	0.46
NA	T1	$x^2 = ((x-9)^{0.39}-1) / 0.39$	3.44 ^a	0.76	0.68	1.41	3.47 ^a	0.41	0.41	1.26
	T2		4.01 ^a	0.77	0.08	1.28	4.32 ^a	0.59	0.07	1.15
SWLS	T1	$x^2 = ((x-4)^{1.79}-1) / 1.79$	2.76	0.61	0.47	0.99	1.28	0.96	1.49	1.30
	T2		3.55 ^b	0.65	0.72	1.18	2.05	1.20	0.30	1.46
FS	T1	$x^2 = ((x-9)^{2.24}-1) / 2.24$	5.13 ^b	2.37	0.15	0.28	4.46 ^b	1.78	0.41	1.17
	T2		6.11 ^b	2.93	0.38	0.30	2.33	0.87	0.18	1.37

Note. PA = positive affect; NA = negative affect; SWLS = life satisfaction; FS = flourishing.

^a Positive skew with z-score > 3.29, significant at p<.001 (Kim, 2013). ^b Negative skew with z-score > 3.29, significant at p<.001 (Kim, 2013).

Box-Cox transformation – PPF analysis

Table A7.2. Box-Cox transformations for the PPF analysis (N = 163) variables with skewness and kurtosis z-scores before and after transformation

Variable	Time point	Box-Cox transformation	Before transformation		After transformation	
			Skewness z- score	Kurtosis z-score	Skewness z- score	Kurtosis z-score
PA	Pre	$x' = ((x-10)^{1.61}-1) / 1.61$	1.45	0.75	0.85	0.90
	Post		1.72	0.90	0.54	1.02
	Follow-up		2.96	0.69	0.01	0.69
NA	Pre	$x' = ((x-9)^{0.17}-1) / 0.17$	4.11 ^a	0.71	1.76	1.12
	Post		4.50 ^a	0.42	1.77	1.32
	Follow-up		6.10 ^a	1.32	0.02	1.56
SWLS	Pre	$x' = ((x-4)^{1.99}-1) / 1.99$	2.35	0.56	1.49	1.22
	Post		3.09	1.12	0.01	1.61
	Follow-up		3.59 ^b	0.98	0.32	1.58
FS	Pre	$x' = ((x-8)^{2.92}-1) / 2.92$	5.19 ^b	2.18	1.26	0.79
	Post		5.61 ^b	2.14	0.92	0.96
	Follow-up		7.02 ^b	2.36	0.01	1.11

Note. PA = positive affect; NA = negative affect; SWLS = life satisfaction; FS = flourishing; Pre = pre-intervention; Post = post-intervention.
^a Positive skew with z-score > 3.29, significant at p<.001 (Kim, 2013). ^b Negative skew with z-score > 3.29, significant at p<.001 (Kim, 2013).

MANCOVA correlations – T1/T2 analysis

Table A7.3. Pearson correlations between dependent variables and covariates for T1/T2 MANCOVA analysis

Time 2 (dependent variables)	Time 2 (dependent variables)				Time 1 (covariates)			
	PA	NA	SWLS	FS	PA	NA	SWLS	FS
PA	-	-.33**	.55**	.70**	.68**	-.25**	.43**	.58**
NA		-	-.35**	-.48**	-.26**	.76**	-.29**	-.43**
SWLS			-	.63**	.47**	-.33**	.78**	.53**
FS				-	.58**	-.42**	.60**	.80**

Note. PA = positive affect; NA = negative affect; SWLS = life satisfaction; FS = flourishing.

** Correlation significant at 0.01 level (two-tailed).