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### **Abstract**

Goal reflection can have a beneficial impact on hope and cognitive flexibility, potentially via processes proposed under the Broaden and Build Hypothesis (BBH). In the present study, a novel goal-oriented intervention was developed to explore its efficacy in improving state and trait hope, affect, and cognitive flexibility. Using a convergent mixed methods approach, 44 participants completed a seven-day diary intervention, recording/reflecting on goals daily, in addition to questionnaire and cognitive fluency measures pre- and post- intervention. The intervention elicited increased levels of state hope, trait agency, and task fluency with converging evidence from quantitative/qualitative data. These results suggest a dynamic interrelation between hope and cognitive flexibility.

*Keywords: Hope, Goal-Oriented Intervention, Mixed Methods, Cognitive Flexibility*

## Introduction

### The Role of Hope

Hope can be defined as the ability to successfully achieve one's goals; in particular, by maintaining motivation and overcoming obstacles (Snyder et al., 2002; see Callina, Snow, & Murray, 2017 for an overview). Here, *goals* are short-to-long term targets set by an individual, ranging widely in their personal significance, importance, and specificity (Rand & Cheavens, 2009). Specifically, in Snyder and colleagues' model, hope manifests in two ways; *pathways* and *agency*. *Agency* (or motivation), enables an individual to mentalize the ability to reach their desired goal, whereas *pathways* denote the ability to overcome obstacles that might prevent goal attainment. While both components contribute to hope, Snyder (1994) posits that it is the *interaction* between them that drives an individual's hopefulness (but cf. Tong, Fredrickson, Chang & Lim, 2010; for an alternative perspective). In other words, to demonstrate hope, one must be able to plan a route to achieve a goal, and maintain the motivation to achieve it, even when the plan needs to be adapted.

However, the real-world implications of hope have been explored beyond simple goal attainment, to include corollary behavioural effects. For example, hope was associated with better workplace engagement (Reichard, Avey, Lopez, & Dollwet, 2013), in particular, effective, pro-social, behavioural goal-setting. In academic contexts, hope predicts student performance (e.g., improved grades, decreased drop-out rates; Snyder et al., 2002), with higher levels of hope associated with higher overall academic achievement (Ciarrochi, Heaven, & Davies, 2007). In addition, hope and religious faith are positively correlated (Sethi & Seligman, 1993); people who practiced/engaged with their faith daily demonstrated higher levels of hope (Berthold & Ruch, 2014).

Behavioural benefits of hope extend to physical impact, including links to improved healthful behaviours (e.g., better focus on weight loss-related activity; Nothwehr, Clark, & Perkins, 2013), and

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increased athletic performance (Curry, Snyder, Cook, Ruby, & Rehm, 1997). Further, higher hope levels have been associated with improved levels of mental health, including increased happiness and decreased negativity (see Alarcon, Bowling, & Khazon, 2013 for a review); increased subjective (Park, Peterson, & Seligman, 2004) and psychological (Gallagher & Lopez, 2009) well-being have also been reported.

A theoretical model through which hope can be explored is the Broaden and Build Hypothesis (BBH; Fredrickson, 2001) which accounts for the postulated 'undoing effect' of positivity (e.g., countering the effects of negativity such as narrowing of attention). This suggests the role of positive affect is to 'broaden and build' individuals' thought-action repertoires (T-AR); more simply, boosting the 'resource bank' needed to engage with one's environment in novel and creative ways, while continuing to build up these available resources. This perspective aims to account for behaviour that classical evolutionary theory (e.g., threat-based orientation to negative stimuli, fight, flight or freeze responses; Fredrickson, 2001) fails to address. Potentially, BBH can be extrapolated to our understanding of hope and its applications. In other words, hopeful thinking behaviour is intrinsically positive and may lead to positive affect (also vice versa, positive affect may lead to increased hope), and arguably, the adaptive functions outlined above.

This adaptive behaviour meshes with more traditional (e.g., philosophical, religious) views of hope as a virtue to be cherished (Callina et al., 2017; Gallagher, 2017), and earlier psychotherapists' (e.g., Frank, 1968; Tiger, 1979) perspectives on hope as a powerful cognitive resource necessary for human development. However, the link between positivity and goal-achievement is not restricted to hope or the BBH per se. In fact, goal-orientation and responses to achieved/frustrated goal-directed actions have been suggested as elicitation mechanisms for human emotion (e.g., an achieved goal leads to happiness, a frustrated goal leads to anger etc., Bagozzi & Pieters, 1998). This provides insight into a potentially reciprocal process where affect, intention and motivation influence our goal attainment, but the goal-oriented behaviour itself influences our subsequent affective behaviour

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(see Snyder, Feldman, Taylor, Schroeder, & Adams, 2000, for a hope-based example). These ideas suggest that there exists a complex interrelation between the individual behavioural and affective components that characterize hope as a construct.

Although hope (and more generally, BBH) have been examined in relation to goal-directed behaviour and cognition, one domain that remains relatively unexplored is cognitive flexibility (CF). This phenomenon, broadly understood as thinking creatively and adapting quickly to new circumstances can be taken to subsume a number of higher cognitive functions; for example, planning, monitoring problem-solving, switching between cognitive sets in task performance, and inhibition of no-longer-relevant strategies. However, the literature on CF- even broadly defined- offers mixed evidence for its correlates. For example, Yu and Lee (2017) reported a positive association between CF and hopelessness whereas Muyan-Yilik and Demir (2019) found a positive association between CF and dispositional hope. Additionally, their findings reinforced the idea of a connection between hope and subjective wellbeing (SWB), however, none was found between CF and SWB. One possible reason for this inconsistency may reflect use of a questionnaire to measure CF. While this approach is valid and robust (see Dennis & Vander Wal, 2010), by definition, CF entails deliberate, highly adaptive and creative thinking which may not be consistently captured via self-report questionnaires. In contrast, more naturalistic, ecologically-sound measures may increase both insight and consistency; fluency tasks (e.g., Alternative Uses Task; Guilford, Christensen, Merrifield, & Wilson, 1978) offer effective evaluation of the processes involved in CF. Thus, a fluency task paradigm that uses ecological CF (i.e., creative and adaptive thinking) might avoid the potential limitations of questionnaire-based designs.

### **Can Hope Be Increased?**

If hope plays an important role in improving health, wellbeing and potentially, adaptive behaviour (i.e., via extended T-AR; Frederickson, 2001), then boosting hope within the general population could be considered a priority. Indeed, hope theory has been successfully applied in

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therapeutic and clinical settings, delivered by individual- and group-focused programs (Ciarrochi et al., 2007; Cheavens, Feldman, Gum, Michael, & Snyder, 2006). Among other outcomes (e.g., increased self-esteem, meaning in life), an increase in agency thinking was found.

Therapeutic techniques may focus on developing agency- and pathways-thinking separately, as both traits are highly correlated, but distinct (Cheavens & Guter, 2017). For example, pathways can be enhanced through goal-mapping activities, where individuals are encouraged to evaluate routes to a goal in order to identify the optimal one. In contrast, agency interventions focus on developing goal-focused motivation, adjusting thought patterns that may cause goal pursuit to falter. These interventions also focus on the goal-setting process itself (e.g., assessing 'Goldilocks' just-right goals or 'stretch' goals); these challenge the individual to develop and increase the likelihood of self-concordant (i.e., personally relevant) goals being set (see also Pedrotti, Edwards, & Lopez, 2008). Such goals are more likely to be achieved, creating a positive feedback-loop, with higher levels of agency-and pathways-thinking evident (Koestner, Lekes, Powers, & Chicoine, 2002). Thus, we can suggest that supporting all facets of goal-directed action (i.e., goal-setting, motivation, obstacle-avoidance, attainment-orientation) may positively influence overall levels of hope in the individual.

Methods like those in therapeutic settings have also been applied more broadly, indicating their potentially wider remit. In an educational context, the *Making Hope Happen* program (see Pedrotti et al., 2008) found that children's levels of hope increased over a five-week intervention. Children were guided through various activities (e.g., The Hope Game; participants collect both 'pathway' and 'willpower/agency' cards, bolstering the need for both in order to progress) aimed to augment trait hope. Similarly, Marques, Lopez, and Pais-Ribeiro (2011) conducted a group-based, five-week long intervention designed to develop goal conceptualisation, setting, and attainment, which led to post-intervention increases in hope.

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One-off sessions have also proved effective; following a 90-minute goal-oriented intervention, college students increased in hope and progressed better towards goal attainment (Feldman and Dreher, 2012). Supporting this design, meta-analysis by Weis and Speridakos (2011) found that hope levels improved more with single session interventions in a laboratory setting (27 studies were included; seven studies were one-off interventions, 19 were multi-sessional). However, they suggested this disparity could be explained by delivery of sustained interventions in clinical settings. Thus, typical participants (i.e., from clinical populations) may respond less to hope enhancement strategies, regardless of delivery method. This suggests a 'middle ground', to date, less frequently examined; sustained intervention could be delivered to a non-clinical population over a comparatively short period (e.g., 7 days), with participants engaging in goal-reflective behaviour. In this regard, diary studies have proved an effective method for investigating reflection-related phenomena (Ouweneel, Le Blanc, Schaufeli, & van Wijhe, 2012); the diary forms the intervention, allowing a combination of objective, validated measures with individually-tailored methodology. This intervention type has also been used frequently within the positive psychology literature (e.g., Amabile, Barsade, Mueller, & Staw, 2005, examined the relationship between positive affect and creativity).

### **Purpose of the Current Study**

Primarily, we aimed to assess a novel goal-oriented intervention for increasing hope and subsequently, CF (see predictions below), via a brief, self-administered design located between single-session and sustained interventions. The intervention consisted of a daily diary task in which participants set *and* reflected on their goals. We used a convergent mixed methods design (Creswell & Plano Clark, 2018), with quantitative data (Phase 1) collected at two time points (i.e., before diary entries and after) to examine efficacy of the 'self-conducted' intervention (i.e., daily goal reflection). These data included hope, affect, and self-efficacy scores, alongside performance on a CF/fluency task (the Alternative Uses Task, see *Measures*). In Phase 2, qualitative data comprised entries from a

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daily open-ended goal reflection diary collected over one week, as well as general experiences of using the diary. To establish environmental and individual differences in hope, groups identified as having dispositional high levels of hope (e.g., spiritual/religious), or in environments found to respond well to hope interventions (e.g., office workers, students) were recruited (e.g., Ciarrocchi et al., 2008; Ouweneel et al., 2012). Overall, this enabled us to: 1) evaluate behaviour beyond the ‘typically-studied’ student population, 2) ensure sufficient diversity in age, educational background and occupation, and 3) maximize input from groups that have established relevance to the literature (e.g., dispositional or interventional relevance).

In terms of intervention impact on quantitative data, we expected an increase across all measures, including questionnaires, and the fluency task. In terms of qualitative data, we aimed to explore how participants engaged with their goals (i.e., how they reflect on them, whether goals elicit particular thoughts and/or affect etc). We also examined participants’ overall experience of the intervention, expecting participants to have a generally positive experience. Lastly, utilizing the benefits of mixed methods design, we investigated emergence of behavioural patterns, linking reflection activity (i.e., qualitative findings) and increases in quantitative measures (e.g., increased hope, positive affect, CF, and/or reduced negative affect). In summary, we explored the data for evidence of a reciprocal, symbiotic-style association.

### **General Method**

A mixed method design convergent approach was used collecting both qualitative and quantitative data concurrently (from the same sample) allowing increased understanding (Creswell & Plano Clark, 2018). For clarity, the methodology and results are presented in two phases, representing the qualitative and quantitative aspects of the study. However, their combination is used where appropriate to provide holistic perspective.

### **Participants**



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Forty-four participants (29 Female, 19 Male,  $M_{\text{age}} = 36.9$  years,  $SD = 14.4$ ) were recruited by opportunity sampling<sup>1</sup>. Participants comprised three groups; Ordained, Office, Student. The Office and Student groups each had 15 participants, the Ordained group had 14. Forty (90%) of the participants self-reported English as their first language, two (5%) reporting Chinese, and one (2.5%) each for Turkish and Malay respectively. All members of the Ordained group were Christian. Further, six of the Office workers also identified as Christian. Three of the Student group were Christian and Muslim respectively, with one as Buddhist and Hindu. The Office and Students groups were recruited through University of Warwick Networks, Ordained participants via the Church of England Birmingham diocesan clergy bulletin. All participants completed both qualitative and quantitative phases of the study. The study was approved by the University of Warwick Psychology Department Ethics Committee. Participants received £30 upon finishing both phases of the study.

### Phase 1: Quantitative Data

#### Method

##### Measures

##### *Questionnaires*

A battery of six questionnaires was administered, divided into two sub-batteries: 1) Hope, 2) Affect and Efficacy<sup>2</sup>. In the hope sub-battery, state hope was measured using the State Hope Scale (SHS; Snyder et al., 1996), which consists of six items, with ratings made on an eight-point Likert scale (1 = Definitely false; 8 = Definitely true). Trait hope was measured using the Trait Hope scale<sup>3</sup> (THS; Snyder et al., 1991), with 12 items, and ratings made using an eight-point Likert Scale (1 = Definitely false; 8 = Definitely true).

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<sup>1</sup> Originally, 45 participants were recruited, however one participant withdrew, and their data was excluded.

<sup>2</sup> General Religiosity Scale (Ritter & Preston, 2011) was administered to ensure that the religious emphasis placed on group differences was meaningful. As expected, Religiosity was higher for Ordained than both Student ( $p < .001$ ) and Office ( $p < .001$ ) groups (no differences between Office and Student groups;  $p = .14$ ).

<sup>3</sup> This is often referred to as the Adult Hope Scale, however, here, it has been labelled as the Trait Hope Scale to distinguish it from the State Hope measure.

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In the Affect and Efficacy sub-battery, mood was measured using the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) which produces both a positive (PP) and negative (PN) score. This scale consists of 20 items, with responses made using five-point Likert scales (1 = Very slightly, 5 = Extremely). Self-efficacy was measured using the General Self-Efficacy Scale (GSE; Schwarzer & Jerusalem, 1995), which comprised ten items, each measured on a four-point Likert scale (1 = Not true at all, 4 = Exactly true).

### ***Alternative Uses Task (AUT; Guilford et al., 1978)<sup>4</sup>***

Participants are asked to generate up to six novel uses for each of a set of household items (e.g., a sewing needle), within a given time (4 minutes per section). The task is separated into four sections, each containing three different items. Five measures were taken from participants' responses: 1) Fluency (the total number of acceptable responses), 2) Flexibility (the number of categories acceptable uses related to), 3) Elaboration (how much participants elaborated on their answers), 4) Originality (how original the suggested use was compared to the rest of the sample), and 5) Accuracy (how many suggested uses were considered acceptable).

**AUT Analysis.** Initially, responses were coded by one researcher (see Guilford et al., 1978 handbook), however to ensure objectivity and consistency, the analysis was reviewed by a second coder (i.e., verify accepted/rejected responses). Responses were rejected if they met one of the following two conditions; first, if they were a repetition of a previous answer in the same part (e.g., A or B) by the same participant (e.g., 'sewing needle' and 'fork' might both be used as jewellery, but if the participant had just stated 'jewellery' or phrased the use in the same way for both, it would be rejected the second time). Second, responses were also rejected if the proposed use was infeasible, or did not make sense without further explanation. For example, an unacceptable response would

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be 'lightbulb- start a fire', however, 'lightbulb- glass used to focus light and start a fire' would be accepted.

*Fluency* was calculated as total acceptable responses for each section, with accuracy as total rejected responses. The *elaboration* score was determined based on the detail included in an acceptable response. Thus, 'bedsheet-protect furniture' would receive no elaboration points, whereas 'bedsheet- protect furniture when painting' would receive one point. *Flexibility* scores were obtained by summing the different use categories for each item. In this case, 'shoe- used as a plant pot', 'shoe- used to squash bugs', and 'shoe- used as a weapon' would receive two flexibility points; one for decoration, and one for weapon. Finally, *originality* was scored by comparing the frequency of accepted responses across the whole participant sample. For example, a use provided by fewer than 1% of the sample (in this instance, once) would accrue two points, and by fewer than 5% (twice), one point.

## **Procedure**

### ***Time One (T1): Before diary initiation***

The researcher met with participants individually in a quiet, private space, or at the participant's home (see *Phase 2: Method*, for goal-diary procedure). Participants were provided with an information sheet detailing the expectations of the study, and informed consent and demographic details were collected. Part A of the AUT (Guilford et al., 1978) was administered. Participants were instructed that they would be presented with some common objects with a specified use (e.g., *newspaper; used for reading*), and that their task was to think of up to six alternative uses for each item.

Each participant was provided with the completed example for *newspaper* above and asked to note that each of the example uses differed from each other, and the primary use. Part A comprised two sections (six items and eight minutes total). All items in each section could be

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completed simultaneously, however, participants could not return to their responses once the four minutes were complete. Finally, the battery of six questionnaires was administered (see *Measures: Questionnaires*), without time limit. Each questionnaire included its own instructions, and the order of the questionnaires was randomly allocated prior to participation.

### ***Time Two (T2): After diary completion***

The researcher met with the participant again, in the same environment as time one, between one and two days after the final diary entry (approximately seven days after *T1*). Participants were administered part B of the AUT (Guilford et al., 1978), and an identical questionnaire battery as at time one. Finally, participants responded to two questions about their general experience of completing the diary (see *Phase 2: Methods* below). Participants were instructed to write as much as they wanted, without any time limit.

## **Results**

### **Questionnaires**

Table 1 shows questionnaire scores at T1 and T2. To test for the differences in questionnaire responses between T1 and T2, across the entire sample and between participant groups, a series of 2x3 (Questionnaire Time x Group) Mixed ANOVA's were conducted<sup>5</sup>. The differences in scores between T1 and T2 for all questionnaire batteries are shown in Figure 1.

### ***Battery 1: Hope***

For SHS, responses at T2 were higher than at T1 for all groups,  $F(1, 41) = 23.42, p < .001, \eta^2 = .364$ , with differences between Groups,  $F(1, 41) = 3.82, p = .030, \eta^2 = .157$ ; no interaction was found ( $p = .240$ ). Post-hoc pairwise comparisons revealed the Ordained group was higher in state hope than the Student group ( $p = .009$ ), although no other differences were found (all  $ps > .159$ ). In

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<sup>5</sup> Methodologically, a larger sample size would be ideal, however tension between the qualitative and quantitative phases limits participant numbers. Effect sizes are reported to substantiate results, and data from both phases are converged (see *Discussion* for more details).

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comparison, while there was difference between Groups for THS,  $F(1, 41) = 3.75, p = .032, \eta^2 = .155$ , no main effect of Time ( $p = .175$ ) and no interaction ( $p = .733$ ) was found. Similarly, post-hoc pairwise comparisons showed the Ordained group to be higher in trait hope than the Student group ( $p = .012$ ); no difference was found between the Office and Ordained groups ( $p = .518$ ), and between Office and Student groups ( $p = .052$ ). Interestingly, THS sub-scales suggested more nuanced effects. While no main effect of Time ( $p = .632$ ), Group ( $p = .179$ ) nor interaction ( $p = .871$ ) was seen for the Pathways sub-scale, a striking contrast was seen with the other subscale. The Agency sub-scale demonstrated a main effect of Time,  $F(1, 41) = 5.93, p = .019, \eta^2 = .126$ , with scores higher at T2. No effect of Group ( $p = .157$ ), nor an interaction ( $p = .743$ ) achieved significance.

### ***Battery 2: Affect and efficacy***

Self-efficacy scores at T2 were higher than T1,  $F(1, 41) = 7.37, p = .010, \eta^2 = .152$ , although no interaction ( $p = .736$ ) or Group differences were found ( $p = .409$ ). For positivity (PP), differences were seen between Groups,  $F(1, 41) = 4.71, p = .014, \eta^2 = .187$ ; post-hoc pairwise comparisons revealed both the Ordained and Office groups to be more positive than the Student group ( $p$ 's = .008 and .016 respectively), although the difference between Ordained and Office groups was not ( $p = .770$ ); no main effect of Time ( $p = .377$ ), or interaction was found ( $p = .164$ ). For negativity (PN), participants were found to be less negative at T2 compared to T1,  $F(1, 41) = 16.54, p < .001, \eta^2 = .287$ ; no interaction ( $p = .359$ ), or Group main effect was found ( $p = .229$ ). As a main effect of Time was only found for negativity, a paired sample t-test was calculated post-hoc to explore the difference in affect change (PN change mean = -3.75, PP change mean = 0.73),  $t(44) = 3.19, p = .003$ , with a medium effect size,  $d = 0.75^6$ , revealing the reduction in negativity between T1 and T2 to be independent from the absence of changes to positivity.

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<sup>6</sup> Cohen's d was used to evaluate effect size

## AUT

To test for the differences in AUT performance between T1 and T2, both overall and between participant groups, a series of 2x3 Mixed ANOVA's (AUT Time x Group) were conducted, see Table 2 for AUT scores. The differences between T1 and T2 for all AUT outcome measures are shown in Figure 2.

At T2, Fluency scores were found to be higher than T1 across all groups,  $F(1, 41) = 82.24, P < .001, \eta^2 = .667$ . No interaction ( $p = .834$ ), or Group differences were found ( $p = .090$ ). Across all groups, Flexibility at T2 was found to be higher than T1,  $F(1, 41) = 110.23, P < .001, \eta^2 = .729$ , although no interaction ( $p = .656$ ), or Group differences were found ( $p = .059$ ). A main effect for Time was found for Elaboration,  $F(1, 41) = 9.99, P = .003, \eta^2 = .196$ ; no interaction ( $p = .493$ ), or Group differences were found ( $p = .152$ ). Similarly, all groups were found to make fewer mistakes at T2 compared to T1,  $F(1, 41) = 45.85, P < .001, \eta^2 = .528$ , although no interaction ( $p = .109$ ), or group differences were found ( $p = .478$ ). Finally, for Originality no main effect was found for Time ( $p = .319$ ), Group ( $p = .443$ ), or interaction ( $p = .418$ ).

### Phase 1 Discussion

Overall, participants' scores increased between T1 and T2, indicating an effective intervention. Improvement in THS agency scores was notable, particularly when compared to trait hope overall, and pathways scores (which did not increase). For affect specifically (i.e., PANAS scores), an elevation was indicated overall, but this occurred via a decrease in negative affect scores; positive scores per se did not increase. Echoing questionnaire data, scores on AUT measures (cf Originality scores) increased between T1 and T2. However, no Group x Time interactions were seen for questionnaire or AUT scores.

Although a general improvement in scores was predicted across all measures, in terms of hope, the distinction between state and trait measure effects (and thereafter, between pathways

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and agency effects) suggests separate mechanisms may underlie these processes. In particular, the improved agency score aligned more with measures such as self-efficacy and state hope (consistent with previous literature; see Aspinwall & Leaf, 2002), indicating an overall shift in goal-orientation. Furthermore, the divergence between trait sub-scales reinforces a debate on the conceptualisation of hope (i.e., interconnectedness of agency and pathway; see Tong et al, 2010), suggesting a potential for more concrete, focused goals to enable pathway thinking. On a simplistic level, this is consistent with the nature of undertaking the diary task; participants reflected on goals, their attainment and implications. Indeed, it is possible that GSE (i.e., improved perception of personal competence; Scholz, Gutiérrez Doña, Sud, & Schwarzer, 2002) increases along with agency, indicating that the intervention encourages participants towards more self-concordant thinking and internal motivation. In turn, this highlights differences between the facets of trait hope (see *Phase 2* for further discussion in light of qualitative findings).

Examining these results in the light of BBH, tentative evidence of the ‘undoing effect’ emerges (e.g., countering negative effects; Fredrickson, 2001). As PANAS scores are: 1) not a reciprocal measure (i.e., positivity did not increase because negativity decreased), nor 2) behaviourally linked as constructs (i.e., validation data has confirmed independence of negative and positive affect in the scales; see Watson et al., 1988), completing the diary task may have contributed to ‘undoing’ negative affect experienced by participants (e.g., due to prior affective state or concurrent life experiences etc.). However, the lack of increase in positivity is perplexing, particularly as positivity (and optimism more broadly), have been connected with hope previously (see e.g., Gasper, Spencer, & Middlewood, 2019; Kelberer, Kraines, & Wells, 2018).

That said, the posited undoing effect indicates the impact of the intervention may be more restorative than preventative. Rather than boosting positivity to secure protection against future negativity, the intervention may restore affective equilibrium. This appears consistent with the wide-range of improved ‘coping’ effects associated with increased hope (e.g., athletic performance, stress,

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physical health; Berg et al., 2008; Curry et al., 1997; Nothwehr et al., 2013). Individual differences in the subjective experiences of participants may give further insight into these unexpected results (see *Phase 2* below).

Data from the AUT suggest improved CF in a number of domains; specifically, precision of response, elaboration and overall number of responses over time, while acknowledging possible training effects, given the short time span. This is particularly important to both the CF and BBH literatures, as it demonstrates CF in a naturalistic, applied setting (cf. previously used questionnaire measures; e.g., Dennis & Vander Wal, 2010), and consolidates previous findings (e.g., Muyan-Yilik & Demir, 2019). Additionally, it is possible to argue that CF, as a collection of higher cognitive functions (or an overarching ability that ‘marshals’ lower cognition), is affected by positivity in a similar way to low-level functions (e.g., memory and attention; Gasper & Clore, 2002).

## **Phase 2: Qualitative data**

### **Method**

#### ***Materials***

**Goal Diary.** The diary was divided into four sections, and consisted of seven prompts, each with a free-response answer (see Table 3 below). The diary was in digital format as a secure online form, or a word-processing document (if internet access was limited). The diary was completed each evening, between 6pm and midnight, and was estimated to take 15 minutes to complete. In section 1, participants were asked to think about the goals set for that day. Section 2 required participants to set goals for the next day. Finally, section 3 was an open section to be utilised by participants to write about whatever they wanted.

**End of diary questions.** At the end of the study (i.e., T2), each participant was given two prompts, designed to elicit a response of their overall experience after completing the diary. First, participants were asked to write about their ‘*General ideas, thoughts and experience*’, and secondly,



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to consider the following questions, *'Do you think completing the goal diary has had any lasting effects? Have any aspects of your behaviour changed?'*. Each question was free-response, with no limits on word length or time taken.

### **Procedure**

Participants received instruction on completing the diary at the end of T1 (see *Phase 1: Procedure* above). An example version of the diary was provided, and the researcher described each section to the participant, explaining each question in detail and responding to queries. Participants were instructed that these goals should be personally relevant. That is, goals did not need to be 'life-changing' and could vary in both significance and number *"so long as they mean something to you"*. The requirement to reflect on goals set on the following day was also outlined at this point. Finally, participants were reminded that all seven entries should be completed, but that the style of diary interaction within this framework was entirely their choice (e.g., number of goals, personal relevance of goals, description style). Participants were sent a digital copy of the diary immediately after completion of T1, and the same template was used each day.

Participants were assigned an ID code to input with each entry. They were instructed that the diary would take around 15 minutes each day to complete, between 6 pm midnight (if possible, at the same time each evening). A reminder email was sent each day at 6pm. Participants were provided with contact details for the researcher to ask any questions throughout the week of the diary. Participants completed all sections on all days, with the exception of part one on day one (as no goals had previously been set). Day one of the diary started within a day of T1 completion.

### **Data Analysis**

All diary data were prepared for analysis by combining entries, and anonymising any identifying information; data were then entered into an NVivo (QSR International Pty Ltd, 2015) database. Thematic Analysis (TA) was used to explore the diaries (Braun & Clarke, 2006); specifically,

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this is an inductive, essentialist TA, extracting semantic themes that describe meaning as reported by participants, rather than situating responses within wider context or pre-established theories. For themes to be classified, codes must occur across the whole data set and represent prevalent ideas or experiences. The PI was working from a positive psychology perspective and the research and subsequent analysis was conducted as part of their PhD. In order to combat any bias, analysis was reviewed by the final author to ensure themes were a credible representation of codes (i.e., checking initial coding and emergent themes for validity); where discrepancies arose, the initial codes were reviewed until an agreement was reached.

## **Results**

The most frequent goals were social (e.g., spending time with friends or family), followed by work- or academic-related goals. Distribution of goal type within each group appeared approximately equivalent, beyond those intuitively connected with specific groups (e.g., worship would be expected to be higher for the Ordained group than other groups). The research questions of goal reflection and subjective experience of the intervention were analysed separately using TA and are presented below, followed by a discussion of the Phase 2 findings.

### **How Do Participants Reflect On Their Goals?**

Two overarching themes were identified from the data: Positivity and Negativity, each with corresponding sub-themes.

#### ***Positivity***

Broadly, the *Positivity* theme recognised participants' experience of reflection on daily goals to be beneficial. The idea that reflection invoked a positive feeling or emotion was strongly evident, albeit often reported in a succinct way:

*"It feels good to have achieved these goals"* (Ordained, Male, age 35).

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This positivity theme was present across all diaries, with approximately consistent representation each day of the diary, and across groups. Four sub-themes were also identified: *Relief*, *Completeness*, *Unexpected Bonus*, and *Positive Self*.

In the first sub-theme of *Relief*, people described the achievement of goals as being coupled with release of pressure, often using words that invoked a physical release:

*"It had helped my head feel clearer too without all the clutter that often feels 'on top' of me"*

(Ordained, Female, age 51).

Another distinct sub-theme, was *Completeness*, where participants described achievement of their goals as finalised, or having finished everything they planned:

*"It's always pleasing to get all the jobs done"* (Student, Male, age 35).

Interestingly, items here also described extensive, time-demanding goals which might have taken a long time to complete, or that the individual had avoided, thereby achieving a sense of completion after delay or procrastination:

*"LinkedIn has been on my to do list for a long time so I got up early to do it today and feel*

*happy to have achieved this"* (Office, Female, age 44).

A third sub-theme *Unexpected Bonus*, identified semi-meta analytical reflections on how positive the actual diary was, and how in turn, the diary task impacted on the way they thought about their goals, and resulting satisfaction:

*"I recognise that setting myself these goals make me actively pursue them. I have previously written about not feeling the need to set goals for work because I manage my workload...*

*Clearly, I need to adopt the same process when it comes to achieving my overall goal for myself to feel healthier and focus on myself some more"* (Office, Female, aged 32).

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In addition, via daily reflection, participants were able to recognise that they had achieved more than they planned:

*“It feels great to have not only accomplished your tasks but to also have ‘put out fires’ for other people”* (Ordained, Male, age 32).

These reflections often enabled people to take account of everything they completed that day, *and* how such ‘bonus goals’ added to a sense of achievement; note, *Unexpected Bonus* was mostly (but not exclusively) comprised from the Ordained participants:

*“It feels like an especially productive day. It is really satisfying to end the day knowing not only that planned goals were met, but lots of additional things accomplished too”*

(Office, Female, age 41).

Finally, the last sub-theme was *Positive Self*; specifically, the idea that the reflection process allowed participants to recognise their own strengths and capabilities:

*“Many of my achievements are focused on my values - empowering others, reducing stress in others, enabling self-awareness. So when I achieve these things I feel happy”* (Office, Male, age 49).

In addition, the idea of pride was often cited here, with participants recognising their goal achievement(s):

*“I feel proud that I finally achieved my goals”* (Student, Female, age 22).

### **Negativity**

While far less common than the *Positivity* themes above, an overarching *Negativity* theme was also identified, along with three sub-themes: *Dissatisfaction*, *Negative Self Reflection*, and *Guilt*. The first, and most substantial sub-theme was that of *Dissatisfaction*, and the notion of being upset at what was (or was not) achieved that day. Participants described or reflected disappointingly on the balance of what they did achieve:

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*“I'm disappointed because I don't think I achieved enough”* (Student, Female, age 18).

Although this theme was represented in all groups, dissatisfaction was most commonly identified in the Student group. Further, this sub-theme was most common on the first day of the diary and tended to decrease over time.

A less frequent, but noteworthy sub-theme was that of *Negative Self Reflection*. People who reflected in this way considered reasons behind personal blame for not achieving their goals, expressing ideas such as disappointment:

*“:( [SIC] I am irritated about this because it is something I really want to achieve and have done for a while, but when it comes to it, I prioritise everything else”* (Office, Female, age 27).

This also extended to ideas of an individual not being good enough as the reason for not meeting their goal:

*“what I have done is never good enough”* (Office, Female, age 23).

Finally, *Guilt* (almost exclusively represented in the Student group) was also a common construct identified by participants, with guilty feelings being expressed in respect of failure to achieve what they planned:

*“Feeling guilty for not completing my tasks, hoping to try to complete them tomorrow”*

(Student, Female, age 29).

Notably these ideas of guilt were sometimes accompanied with an attempt to nullify the feeling, or motivate a change in behaviour:

*“I'm actually sitting here contemplating whether to go out for a walk now in an effort to feel less guilty”* (Office, Female, age 52).

### **Changes Throughout The Week and Moving Forwards**

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From the responses to the free-response question at T2 (*'Do you think completing the goal diary has had any lasting effects? Have any aspects of your behaviour changed?'*) two overarching themes were identified: Diary issues, and Benefits of reflection, with corresponding sub-themes

### **Diary Issues**

Comprised of two sub-themes (*Mundane Goals* and *Inexperience*) a small sample in each group (most frequent in the Office group), reflected on finding the diary itself difficult to manage. Specifically, participants suggested that the diary became a *'chore'* as the week progressed, but also acknowledged that their engagement with the diary may have been lacking:

*"I started to feel that doing the goals and diary became a chore in itself. In hindsight the goals were probably more tasks"* (Office, Female, age 55).

This emphasizes the highly subjective experience of the diary task, as well as the importance of both motivation and volition. This is further evidenced by the sub-theme of *Mundane Goals*; here, participants self-described their goals set as ordinary or simple. Not engaging in the reflective elements of the diary (due to a perceived problem with the goals) appears to constrain participant experience:

*"I have found that the goals I set myself were not always the most significant things on paper about my day, but they were the things that would likely get overlooked, for example having a rest"* (Ordained, Female, age 34).

Further, a related sub-theme of *Inexperience* highlighted this issue with engagement, with participants struggling with goal-setting due to unfamiliarity with the concept:

*"It was a new experience for me having to set goals for the next day as I am more of a spontaneous person, and my plans change all the time"* (Student, Female, age 29).

### **Benefits of Reflection**

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Formed of three sub-themes (*Continued Behaviour*, *Goal Understanding*, and *Dedicated Time*), participants postulated positive aspects of the intervention. An especially prevalent sub-theme identified was *Continued Behaviour*, with participants from all groups discussing the merits of continuing with their established practices:

*“Overall this has been a positive experience and one which I can see would be useful and beneficial for me to continue”* (Ordained, Female, age 51).

A second sub-theme (*Goal Understanding*) identified the benefits of the diary structure, and how the procedure allowed participants to be more aware of their goal directed behaviour:

*“I looked forward to the time to reflect on the day. The goal setting worked for me. The process of writing down the goals - almost felt like a contract with myself which I would commit to. This fed my drive to keep at it. The goals were not huge but together overtime will have an impact on my sense of well being”* (Office, Female, age 52).

The final sub-theme identified was *Dedicated Time*; people found they were able to recognise the benefits of having some time set aside each day:

*“Having that time to reflect has made me think about not just the day but the whole situation I am currently in... it has been a really useful half an hour each day to sit and quietly reflect and something that I will hope to do moving forward”* (Student, Male, age 35).

By allowing some time to think and process their day, it could be suggested that participants were able to process their goals in a more meaningful way. In particular, an idea emerged that by considering the day holistically (i.e., not separating work, personal, social goal and chores), people were able to recognise how each thing they achieved contributed to their day, indicating a general increase in willpower or agency related thinking:

*“I think that completing the diary has helped me to begin to think more carefully about how I am using my time each day, and to what extent certain tasks ought to take up my time. I*

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*have noticed that I tended to set very few 'personal' goals... This has made me start to ask myself when and how I might re-balance this aspect of my life” (Ordained, Male, age 49).*

Finally, as part of *Dedicated Time*, it was also identified that this enabled participants to reflect more broadly on their goals and specifically, the way they engage with them:

*“I have found the diary helpful as a tool for reflection and for revisiting this aspect of my daily life. It has been positive and supportive. I feel it has given me the opportunity to reconsider some ways I work and live” (Ordained, Male, age 59).*

Commonality between the *Benefits of Reflection* sub-themes suggests that people found reflective time to be beneficial to their lives, instilling a sense of motivation and productivity that allows them to reach their goal(s).

### **Discussion: Phase 2**

Echoing Phase 1, a shift towards more self-concordant, internally-motivated thinking was demonstrated by participants, providing converging support for the effectiveness of the intervention. Overall, participants found undertaking the diary task a positive experience, with many expressing an intention to continue goal-setting/reflection practice. However, this positive experience was not universal, with a small number of participants citing restrictions or repetitious design to be an issue.

The richness of the qualitative data allows for a more nuanced understanding of the behaviour on display, and extends the findings of Phase 1. For example, we can argue that the subjective importance of participants' goals (e.g., daily chores and obligations) as a means to evaluate 'success' emerged, regardless of objective goal magnitude/relevance. In fact, participants appeared to view goal attainment more holistically, recognising positive impact on wellbeing (e.g., spending more time focused on things important to them). Similarly, a level of critical reflection was also evident, promoting meaningful, self-concordant goal- setting in participants and reducing



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mechanistic checking items off a 'to-do' list. However, those for whom the diary task was not positive still represented an important voice. Notably, a consistent interpretation of this group focused on obligation, as well as the lack of freedom and spontaneity in respect of the task, despite the lack of concrete constraints. That said, more negative responses (e.g., guilt) still motivated a change in behaviour (or at least, thought), suggesting increased goal awareness, and goal-oriented behaviour, regardless of subjective experience.

### **General Discussion**

We can affirm quantitative and qualitative support for a successful intervention. Our findings are consistent with previous work on positivity interventions (e.g., Cheavens et al, 2006). Participants demonstrated increased levels of state hope and trait hope agency, decreased negativity, and enhanced CF. Subjectively, most participants found the study to be a positive experience, and subsequently, demonstrated a substantial shift in goal-oriented thinking. Evidence from both study phases converged strongly (see *Converging Quantitative and Qualitative Data* below), giving further insight into efficacy of the intervention. However, interesting divergence was also noted. For example, no increase in positive affect was seen in Phase 1, despite robust subjective experience of task 'positivity' in Phase 2. The contrast between objective measures and subjective experience underlines how the same phenomenon (i.e., positivity) can be expressed. Overall, this highlights the nuanced findings characteristic of (and arguably, only attainable via) a mixed methods approach.

### **Converging Quantitative and Qualitative Data**

The use of a convergent mixed methods design (Creswell & Plano Clark, 2018) is a distinct strength of this study. For example, diary entries may account for differences between agency and pathway changes whereas the quantitative data alone would suggest the intervention did not access the depth of reflection typically required for pathway-related hope. Conversely, Phase 2 data highlighted increased engagement (e.g., more comprehensive responses) to agency-centred

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questions, indicating a focus on agency (i.e. rather than absence of pathway orientation). Intuitively, pathways thinking is more aligned to practical aspects of goal attainment (e.g., problem-solving, obstacle avoidance), thus, the *reflective* goal-oriented task may elicit more abstract, agency-based constructs (e.g., willpower, self-concordance). Moreover, gaining insight into changes of affect also evidences convergence. The 'undoing effect' (i.e., reduction in negativity; Fredrickson, 2001) suggested by Phase 1 is ostensibly different in nature to positive task experience observed in Phase 2. Overall, subjective experience of this affect change is interpreted by participants as positive, but is manifested behaviourally by a reduction in negativity.

In addition, these convergent data are useful as confirmatory measures where objective evidence is unavailable; for example, regarding absence of Time x Group interactions (see *Phase 1: Results*). That is, insight into participants' experience of the intervention (i.e., seen via qualitative data) allows fuller interpretation of the quantitative data. Clearly, goals were individual to participants, but shifts in goal-oriented thinking were identifiable across all groups. Instead, it could be suggested that the act of reflection (i.e., evaluating goals and their significance) has similar impact on all participants, regardless of pre-intervention individual differences. Overall, these conclusions represent a holistic view of participant behaviour and experience, mainly due to the methodological approach adopted.

### **Study Implications and Future Directions**

Evidence showed the current intervention to be both robust and effective, with increases in CF, state hope, agency, and reduced negativity, as well as positive subjective experience of the task. Although this converges with previous literature (e.g., see Weis and Speridakos, 2011), that is not to say improvements could not be made. A pertinent future avenue of research could consider the implication of age. Age and hope have been examined previously, with some debate about their relationship (i.e., limited evidence for negative correlation; see Gum, 2017, for a discussion). However, age was not controlled here, as participants were recruited based on their occupation

Evaluating a goal-oriented intervention linked with increased hope and cognitive flexibility (e.g., HE students, office workers, ordained clergy), with differences in mean age seen as a consequence of group membership. Moreover, we did not anticipate particular age-related differences, as participants have responded positively to hope-based interventions across the lifespan (e.g., Marques et al., 2011).

However, age differences in related phenomena have been found in other studies (e.g., optimism; You, Fung, & Isaacowitz, 2009) and we observed small qualitative differences in behaviour that were potentially reflective of age. Older participants tended to have family- or children-centred goals, whereas a focus on friendship typified student responses, and we might still question if the content of the goal is important, or simply having a goal is sufficient to influence behaviour. Future research might consider controlling for age across participant groups or exploring its relationship (or interaction) with this intervention.

Future work could also develop the intervention, focusing more closely on trait hope. While shorter interventions have been found to be more effective (Weis & Speridakos, 2011), hence our methodological choices, an extended duration might yield more insight. This is indicated particularly by current participants' desire to continue reflective practices involved in the diary task. Agency and pathways aspects of hope are considered iterative and additive (i.e., increase in agency leads to increase in pathways, and vice versa; Snyder et al., 1991), and while this claim is contentious (e.g., Tong et al., 2011) more time may have been needed for an increase in pathways to emerge. However, the observations (i.e., absence of pathway and positivity changes) may be reflective of a wider population's response to the intervention; thus, controlling for these via methodological changes may constrain the richness of the data that has proved valuable in this instance. Finally, analysis focused on connecting the two data phases more clearly (e.g., Triangulation Design) may yield more insight into the interplay between subjective experience and outcome measures. Moreover, qualitative analysis focused specifically on goal type or motivation may allow for an understanding of the impact goal *content* has on behavioural outcomes, or indeed, hope.

### Conclusions

This study showed reliable increases in state hope and trait agency across three groups of participants (HE students, office workers, ordained clergy) with use of a novel goal-oriented intervention. Further, using a more naturalistic test of CF (i.e., the AUT; cf. questionnaires/deficit measures) appeared to facilitate nuanced understanding of behaviour, especially in the case of CF enhancement. Finally, application of a mixed methods approach elicited both objective and subjective support for the intervention, in addition to a convergence of findings that would not be possible with a single methodological approach.

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### Figures and Tables

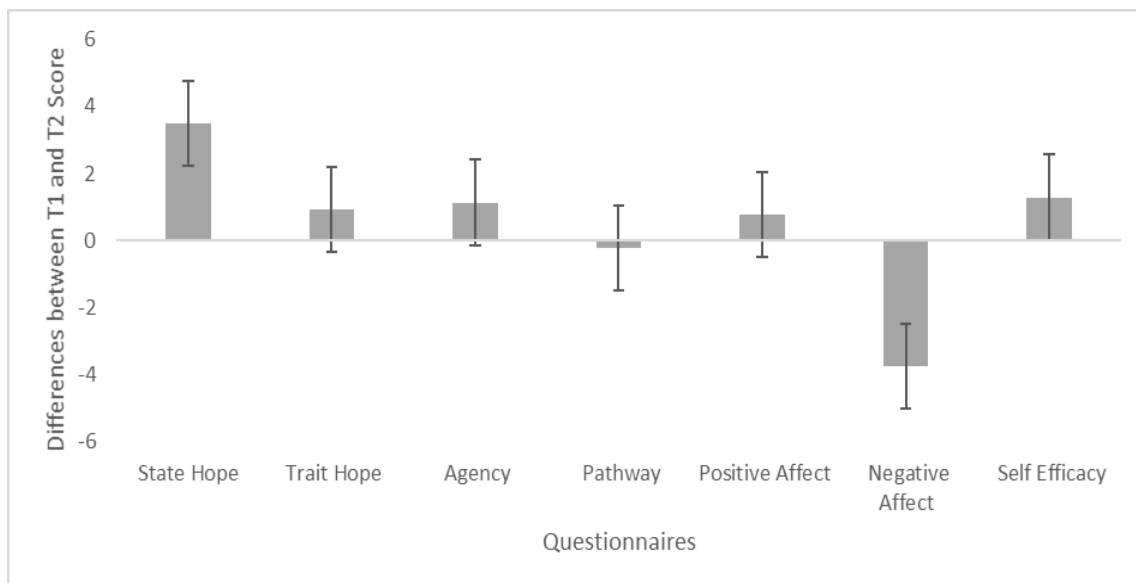


Figure 1. Differences in questionnaire scores between T1 and T2. Error bars indicate  $\pm 1$  standard error of the mean.

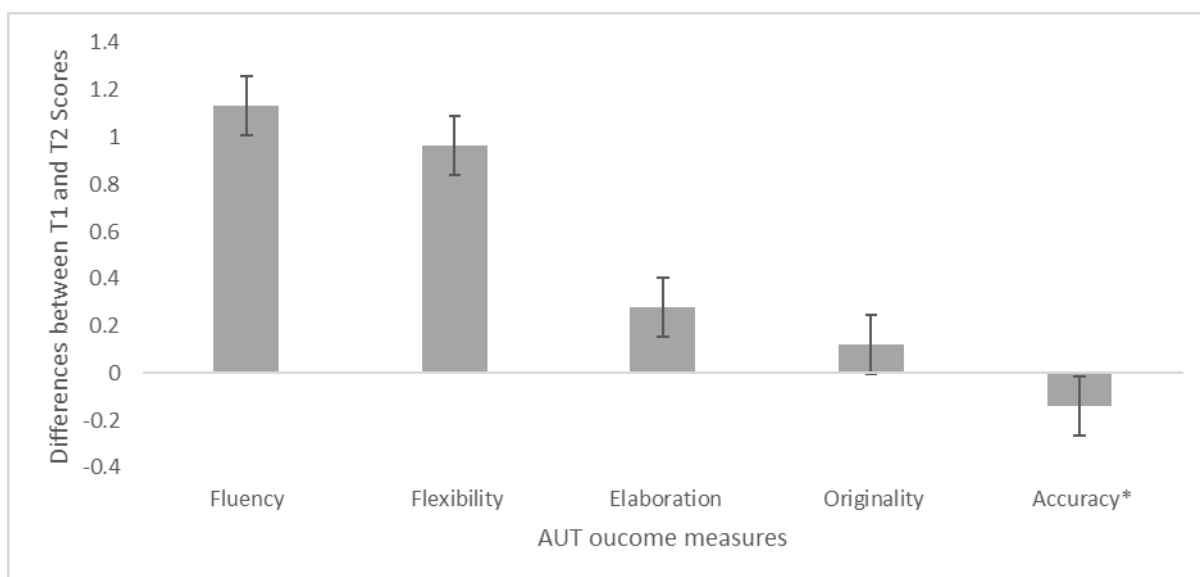


Figure 2. Differences in AUT outcome scores between T1 and T2. Error bars indicate  $\pm 1$  standard error of the mean. \*Typically in the text, Accuracy has been presented as a percentage, however for consistency in Figure 2, this value reflects the absolute score difference.

## Evaluating a goal-oriented intervention linked with increased hope and cognitive flexibility

Table 1

Mean questionnaire scores (Standard Deviations in parenthesis) both T1 and T2, by group

Group	SHS		THS		Agency		Pathways		PP		PN		GSE	
	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
Ordained	37.14 (6.38)	40.50 (5.75)	46.14 (3.55)	46.71 (4.39)	25.36 (3.25)	26.43 (4.16)	20.79 (3.56)	20.29 (3.97)	37.36 (7.98)	40.07 (7.60)	25.50 (1.29)	12.14 (2.85)	32.07 (4.53)	33.00 (4.11)
Office	34.73 (5.13)	36.80 (3.78)	45.13 (3.31)	45.67 (3.64)	24.27 (2.84)	25.00 (2.93)	20.87 (3.18)	20.67 (2.66)	37.47 (6.80)	38.47 (4.12)	9.80 (5.02)	12.07 (2.60)	30.13 (3.68)	31.93 (3.75)
Student	30.40 (7.62)	35.47 (7.68)	41.47 (5.42)	43.13 (7.16)	22.53 (4.37)	24.13 (4.90)	18.93 (2.52)	19.00 (3.00)	32.40 (7.03)	31.00 (9.76)	12.60 (6.95)	16.07 (6.31)	30.07 (4.62)	31.20 (4.81)
Overall Mean	34.02 (6.91)	37.52 (6.20)	44.20 (4.59)	45.14 (5.40)	24.02 (3.66)	25.16 (4.09)	20.18 (3.16)	19.98 (3.25)	35.70 (7.49)	36.43 (8.37)	15.75 (8.44)	13.45 (4.61)	30.73 (4.29)	32.02 (4.22)

Note: N= 44; n= 15 Office and Student groups, n=14 Ordained group. State Hope Scale (SHS), Trait Hope Scale (THS; Agency and Pathway subscales), PANAS Positive subscale (PP), PANAS Negative subscale (PN), General Self Efficacy (GSE).

Table 2

Mean AUT scores (Standard Deviation in parenthesis) across T1 and T2, by dependent variable and group

Group	Fluency		Flexibility		Elaboration		Originality		Accuracy	
	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
Ordained	2.32 (1.07)	3.56 (1.20)	1.75 (0.73)	2.77 (0.96)	0.88 (0.99)	1.30 (1.08)	1.04 (1.06)	1.17 (1.17)	70.93% (22.63)	90.83% (10.41)
Office	2.64 (0.68)	3.76 (0.87)	1.84 (0.43)	2.87 (0.67)	0.74 (0.42)	1.01 (0.78)	0.96 (0.74)	0.88 (0.93)	79.52% (14.38)	88.43% (8.37)
Student	1.91 (0.80)	2.97 (1.37)	1.40 (0.41)	2.24 (0.86)	0.51 (0.48)	0.67 (0.48)	0.57 (0.64)	0.88 (0.69)	72.11% (12.51)	85.39% (8.46)
Overall mean	2.29 (0.90)	3.42 (1.19)	1.66 (0.56)	2.63 (0.86)	0.71 (0.67)	0.98 (0.83)	0.85 (0.83)	0.97 (0.93)	74.26% (16.97)	88.16% (9.16)

## Evaluating a goal-oriented intervention linked with increased hope and cognitive flexibility

Table 3

*Prompts and questions to be answered in each daily diary entry*

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- Q1 *Please briefly recap the goals that you had set for yourself today, and if you achieved them?*
- Q2 *Thinking about these goals, describe any plan that you might have used, or any obstacles or problems occur that you had to overcome*
- Q3 *Please reflect on and describe how it feels now to think on what you achieved today*
- Q4 *If you did not reach all of your goals, think about and detail what you could have done to change the outcome. If you did achieve everything, would you do anything differently?*
- Q5 *Please detail the goal, or goals you want to achieve tomorrow*
- Q6 *Why do you want to achieve these goals, and what will it mean to achieve them?*
- Q7 *This is an open section for you to share any thoughts or feelings from today. They can relate to the goals you have listed, or anything else that you think may be relevant or that you just want to record*
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