Efficacy of the Best Possible Selves Protocol in Diabetes Self-management: A Mixed-Methods Approach

Abstract

Recent research has demonstrated that positive affect may facilitate illness self-management. This study used a sequential exploratory mixed-methods typology to assess whether a task designed to boost positive affect (the Best Possible Self protocol; BPS) could improve aspects of diabetes self-management, specifically. A qualitative investigation explored people with diabetes' (n= 20) views regarding BPS feasibility and acceptability while a subsequent quantitative investigation assigned people with diabetes (n= 50) to a BPS or non-BPS condition and assessed affect and behaviours over a four-week period. Findings indicated that individuals were receptive to the BPS and that it provided benefits for diabetes self-management.

INTRODUCTION

Diabetes mellitus remains a major public health concern in countries across the world (Zhou et al., 2016). Following diagnosis, effective self-management of diabetes can be challenging (Teixeira, 2017; Fritz, 2017) due in part to the negative emotions associated with doing so (Strandberg et al., 2014; Camara et al., 2015). Diabetes self-management is an imperative, if difficult, skill that entails regular monitoring of glycaemic (blood glucose), blood pressure, and LDL-cholesterol levels (Rutter and Nesto, 2011) as well as considerable lifestyle modification (e.g., being active, healthy eating, adhering to medication) (Chen et al., 2013). Improving management strategies is key to decreasing the likelihood of diabetes-related morbidities such as cardiovascular problems, neuropathy, and kidney damage (Turner et al., 1998). However, elevated levels of depression, anxiety, and diabetes related-distress have

shown to disrupt lifestyle behaviours and are therefore associated with poorer clinical markers (such as HbA1c; an indicator of blood glucose levels over the previous 2-3 months), indicating an increased risk of morbidity and mortality (Strandberg et al., 2014). As such, psychology has an important role to play in addressing the emotional aspects of diabetes self-management.

However, though traditional psychological interventions such as Cognitive Behavioural Therapy (CBT) are routinely used to address issues associated with co-morbid mental health issues (Ismail et al., 2004), they have demonstrated mixed results in improving diabetes-related clinical markers, despite their connection to distress (Uchendu and Blake, 2017). It has been argued that CBT, by attempting to teach individuals to control diabetes-related thoughts and feelings in order to "eliminate" distress, may not be appropriate for this population as self-management behaviours, by their nature, evoke thoughts of diabetes and reactions to its dangers (Gregg et al., 2007). One alternative is to utilise psychosocial interventions that protect the individual against the damaging effects of distress (Pascoe et al., 2017). One way to do this is to facilitate positive affect, which has shown to counter against emotion dysfunctions (Garland et al., 2010). The broaden-and-build theory of positive emotions specifically suggests that positive affect helps to 'broaden' one's behavioural repertoire by encouraging new ways of thinking and doing and, in turn, 'building' lasting resources that can be drawn on in times of crisis (Fredrickson, 2004). 'Positive' interventions built on these principles help to cultivate positive emotions (Sin and Lyubomirsky, 2009) and have seen widespread utility across a variety of health topics (Moskowitz et al., 2017; Peters et al., 2017). Early attempts to develop such positive interventions for a population with diabetes have shown to be equally promising (Cohn et al., 2014), though further investigation is required.

The aim of the present study, therefore, was to develop and subsequently assess a novel positive intervention for utilisation in the context of diabetes self-management. A decision was made to modify, rather than develop from scratch, an intervention that could be used by people with type 1 and type 2 diabetes. The Best Possible Self (BPS) exercise was deemed an ideal candidate for this context because it is a brief, self-administered task shown to help people better manage their emotions (Loveday et al., 2016). Furthermore, the BPS's underlying mechanisms of action have also been conceptualised in the context of a second theory: self-regulation theory (SRT) (Bak, 2015; Dark-Freudeman and West, 2016; Markus and Nurius, 1986; Vandellen and Hoyle, 2008) which denotes one's ability to alter and adjust their beliefs and actions, and typically involves goal-directed behaviour (Hagger, 2010). Fundamentally, the BPS is a writing procedure that requires people to imagine and write about an optimistic future in which they have accomplished their life goals (King, 2001: 801). This activity has shown to generate positive emotions (Meevissen et al., 2011), reduce negative affect (Yogo and Fujihara, 2008) and, importantly for this context, produce physical health benefits by notably alleviating illness symptoms (Maddalena et al., 2014) and reducing the number of medical visits (Austenfeld et al., 2006; Austenfeld and Stanton, 2008; King, 2001).

To best evaluate the BPS in the context of diabetes self-management we employed a sequential, exploratory mixed-methods design, consisting of a qualitative phase followed by a quantitative investigation (Creswell and Plano Clark, 2007). This approach had the potential to offer greater breadth and depth of understanding regarding the utility of BPS in a diabetes context, specifically by allowing some degree of triangulation to corroborate findings (Bishop, 2015). The qualitative study used one-to-one interviews and a focus group to first

assess general acceptability and feasibility of the BPS amongst people with diabetes. Further modifications to the BPS would be implemented based on feedback from this phase, if necessary. The quantitative study then took the form of an exploratory study to analyse the BPS's actual influence on diabetes behaviours and emotional factors (i.e. affect and psychopathology). Consistent with results from previous research (Loveday et al., 2016; Maddalena et al., 2014; Austenfeld et al., 2006; Austenfeld and Stanton, 2008; King, 2001), it was expected that constructed themes and/or group differences would demonstrate the appeal of the BPS as well as its utility for generating positive affect and improving health and wellbeing in people with diabetes.

METHODOLOGY

Study sample and Recruitment

Given the paucity of research in this area, we felt it was essential to explore the utility of the BPS as broadly as possible. People with diabetes were recruited for both phases of the study, irrespective of their T1D and T2D status. Though each etiopathogenetic classification comes with obvious and markedly different biological and psychological profiles (American Diabetes Association, 2014; Shields et al., 2015; de Groot et al., 2016), there was no literature to justify excluding one form over the other, especially as the task is non-prescriptive in nature. In other words, an individual (regardless of diabetes status) could consider their 'Best Possible Self' and set their own individualised goals that accounted for their own experiences and self-management issues without being disadvantaged compared to someone with a different diagnosis, at least in theory. The study was advertised primarily by emailing multiple diabetes support groups whose contact details could be found online (or were available through prior contact), and also by attending routine monthly meetings of

three local diabetes support groups in the North West of England and making direct face-to-face appeals to the audience. The aforementioned local support groups were affiliated to Diabetes UK, a British-based charity that supports people with diabetes and health professionals across the country (Diabetes UK, 2009). The investigation was also advertised online on various forums and social media platforms. The qualitative study consisted of telephone interviews and a focus group session (November 2016 – March 2017), and involved 20 participants in total. The quantitative phase took the form of an exploratory study with a sample of 50 participants (March 2017 – January 2018). Ethical approval for the study was obtained from the Liverpool John Moores University Research Ethics Committee (UREC). All participants were presented with detailed information describing the nature of the study, and listing contact information for local counselling services. Participants were required to indicate consent, prior to participation. There was no monetary incentive for completing the study.

Qualitative data collection

Interviews. Performing both individual interviews and a focus group provided some data source triangulation within this phase of the study (Carter et al., 2014). After each interviewee (n= 12) agreed to take part, the lead researcher (BG) provided a copy of a one-page 'tailored-for-diabetes' version of the BPS (King, 2001) via email. This BPS variant began with a brief paragraph about the importance of blood glucose control (HbA1c), followed by an amended version of the standard BPS protocol whereby 'best possible self' was replaced with 'best possible HbA1c' so that recipients could focus specifically on their self-management goals (Layous et al., 2013). All interviewees were then asked several open-ended questions (e.g., 'Is it clear what you have to do?', 'Would you be happy to use this exercise?', 'Is there anything that might get in the way of you doing this?'). Participants were

encouraged to be honest and to talk freely about their experiences while the interviewer adopted the role of reflective listener. Interviews lasted 21 minutes on average. Saturation was achieved by reaching "sample adequacy" whereby the depth and breadth of the information gathered was deemed sufficient to be representative of participants' views (Bowen, 2008). Common themes were discernible by the seventh interview and it was considered that full saturation had occurred by the twelfth.

Focus group. This event was conducted during a diabetes support group session within a hospital setting. Participants constituted a convenience sample (n= 8); anyone present at the meeting was eligible and invited to participate. The session began with a 10-15 minute PowerPoint presentation by two of the researchers (BG & KU) highlighting the importance of emotional factors in blood glucose testing and diabetes self-management. A copy of the tailored-for-diabetes BPS variant (as used for the interviews, described above) was then presented on the final slide of the presentation. The researchers gave a brief description of the nature and purpose of the intervention, after which group members were invited to share their thoughts about the exercise and its relevance in blood glucose testing and diabetes self-management. During these discussions, they were presented with a PowerPoint slide showing the same open-ended questions used during the interviews. The entire session lasted approximately 1 hour and 30 minutes and was recorded on a digital recorder.

Quantitative data collection

The quantitative study was hosted on the online platform Qualtrics. Interested individuals were provided with a URL link, whereupon they viewed participant information, describing the nature of the study. They were informed their involvement in the study would last for four weeks. Consenting individuals were then randomly assigned to either a BPS or Waiting List

Control (non-BPS) condition using Qualtrics' inbuilt 'randomizer' function. The BPS group were subsequently presented with an amended version of the tailored-for-diabetes BPS, based on feedback from the qualitative phase (see below) while the control group were informed that they would receive the BPS at the end of the four-week study period.

Amended Tailored-for-diabetes BPS

"Take a moment to think about your best possible HbA1c level. Imagine that your blood sugar levels have been very well controlled and that you have resolved some of the issues currently concerning you. Imagine how it felt to achieve those levels and reflect on how positive it would feel to have more control. Then, tell yourself the important things you realised or the critical steps you took to get there. Think of this as the realisation of your best possible HbA1c level.

Now, please use the next 10 minutes to write continuously about what you imagined. Use the tips below to help guide you through this process:

1) Be as creative and imaginative as you want. Do not worry about perfect grammar and spelling as this is for your private use. No one has to know what you wrote down, though you may find it helpful to share and develop ideas with trusted friends, family, or even your health-care team. 2) Do not feel too pressured to write everything down on your first try. As you repeat this task, more ideas will come to you naturally. 3) Remember, steps are often small, even the critical ones. There likely won't be one big fix. You may find it easier to write about more achievable things to start with such as investing in a pedometer/walking app or making a decision to try different recipes more often. However, if you want to write about running a half-marathon, that's okay too! 4) If you find thinking about HbA1c too abstract, try focusing on another aspect of

your self-management. The important thing is to focus on something long-term so that you can make more noticeable improvements to your health."

Both groups then immediately completed questionnaires (Time 1; T1) assessing emotion (frequency of positive and negative affect) and psychopathology (symptoms of depression and anxiety) using the Positive and Negative Affect Schedule (PANAS) (Crawford and Henry, 2004) and the Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith, 1983), respectively. Participants were then told they would be contacted four weeks later (Time 2; T2) to repeat the questionnaires so that we could assess task effects. Those in the BPS condition were told to use the intervening time to use the writing exercise as much as they found helpful. Upon returning, they also completed the Diabetes Self-Management Questionnaire (DSMQ) (Schmitt et al., 2013). The DSMQ consists of four subscales; 'Glucose Management' (5 items), 'Dietary Control' (4 items), 'Physical Activity' (3 items), and 'Health-Care Use' (3 items). One additional item assessed the individual's perceptions of their 'Self-Care' activity. Sub-scale scores were calculated individually and a total overall DSMQ score was also computed. Cronbach Alpha's for the HADS were 0.87 (anxiety) and 0.81 (depression) whilst they ranged from 0.69 (Glucose Management) to 0.91 (Health Care Use) for the DSMQ.

Qualitative Analysis

The primary researcher (BG) transcribed audio-recordings of the interviews and focus group session verbatim. The data were analysed using Thematic Analysis (Clarke and Braun, 2017). Transcripts were read and re-read by the same researcher (BG), in order to familiarise themselves with the breadth and depth of data. Initial codes were then generated systematically on a line-by-line basis. Codes were collated into a large number of candidate

themes. These initial themes were reworked and constantly checked against the data until only a smaller set of super-ordinate and master themes remained. The final themes were then written up as a series of draft result sections that were scrutinised and reworked by the research team. After key themes had been derived, the researchers met to discuss and reflect on the analytical process. Final results were also discussed amongst the research team.

Quantitative analysis

Given that the BPS is intended to work by facilitating positive affect and has shown to reduce mental health symptoms, the PROCESS SPSS dialogue (version 2.15) (Hayes, 2013) was used to assess direct and indirect BPS effects. This would allow us to understand the mechanisms by which the BPS was achieving its effects in this context. Specifically, the PROCESS dialogue was used to examine whether BPS exposure (at T1) improved diabetes self-management at follow-up (T2), and/or the aforementioned association was mediated by emotional factors (i.e. affect and psychopathology) (T1, T2). Thus, the BPS condition variable was entered into the equation as variable 'X' (i.e., *Predictor),* while each of the five diabetes self-management factors (DSMQ) were entered as variable 'Y' (i.e., *Outcome*). Emotional factors (PANAS/HADS) were entered as the 'M' variables (i.e., the *mediators*), with T1 and T2 emotions evaluated as mediators in separate models. Overall, each mediation model assessed three regression pathways; the effect of X on M (*'path a'*); the effect of M on Y (*'path b'*), and the effect of X on Y *('path c'*). Mediation was deemed to have occurred if paths 'a' and 'b' (i.e., the *'indirect effect'*, or *'a*b'*) emerged as statistically significant. The number of bootstrap samples (for bias-corrected bootstrap confidence intervals) was set at 1000 with an alpha of $p < 0.05$. All analysis was performed using SPSS (version 23).

RESULTS

Descriptive data

Table 1 shows participant characteristic data for the interviews, focus group, and exploratory study. Most of the interviewees and focus group participants had T2D. The distribution of T1D/T2D cases was more even for the exploratory participants, with just over half diagnosed with T1D. In the combined (qualitative and quantitative) sample there was a 50-50 split between T1D and T2D cases. The average number of years since diagnosis for quantitative participants was just over 16 years, and a maximum value just exceeding 50 years. The sample was predominantly Caucasian (68%). At least 50% were UK nationals, with other nationalities stated as 'Australian', 'Caribbean', 'German/Dutch', and 'Irish'.

…….

Table 1 Participant characteristics by phase

…….

Qualitative findings

Thematic analysis produced four main themes: (1) *Illness Ownership*, (2) *Advocating a Personal Approach*, (3) *Barriers & Facilitators*, and (4) *Real-world Context*. The first main theme included two sub-themes ('Control and the Diabetes Experience' and 'Taking a Pro-Active Approach') (*Table* 2). The 'Advocating a Personal Approach' theme comprised two sub-themes ('The Importance of Personalised Care' and 'The Importance of Support') (*Table* 3). The 'Barriers and Facilitators' theme contained three sub-themes ('Individual Factors', 'Motivation' and 'Clarity and Promoting Awareness') (*Table* 4). The 'Real-world Context' theme consisted of the two sub-themes ('Alternatives to Thinking about HbA1c' and 'Considerations for Implementation'). Details of the first three themes are illustrated in the

Tables below. The final 'Context' theme highlighted real-world challenges associated with using the BPS.

…….

Table 2 The 'illness ownership' theme (comprising two sub-themes); illustrative quotes from interviewees and focus group participants

…….

…….

Table 3 The 'advocating a personal approach' (comprising two subthemes); illustrative quotes from interviewees and focus group participants

…….

…….

Table 4 The 'barriers and facilitators' theme (comprising three subthemes); illustrative quotes from interviewees and focus group participants

…….

Quantitative findings

The mediation analysis, in assessing the BPS effect (T1) on self-management variables (T2) with emotional factors (T2) as the mediating factors, revealed that there was a significant direct effect for the writing exercise, *Effect* = 0.62 (95% CI 0.02 to 1.21), $p > 0.05$; the BPS group reported greater self-care activity approximately 4 weeks post-intervention compared with the control group. Emotional factors failed to mediate this relationship ($p > 0.05$). The BPS had no other significant effects (direct or indirect) on the remaining four self-management variables (all p's > 0.05). The mediational analysis was then re-ran to control for diabetes type (T1D, T2D) to see if this affected the direct effect of the BPS on self-care activity. Results showed that accounting for this covariate slightly attenuated but did not

completely negate the significant BPS influence, *Effect* = 0.62 (95% CI 0.00 to 1.24), p = 0.05.

…….

Figure 1 The direct effect of BPS exposure (T1) on self-care activity at the 4-week post-intervention follow-up (T2)

…….

DISCUSSION

In this mixed-methods study applying the BPS protocol within a diabetes context, the BPS was found to be a potentially useful tool in relation to diabetes self-management. Analysis of the qualitative data provided several key themes suggesting people with type 1 and type 2 diabetes would find the BPS useful, but would like it to have a more personalised format, and perhaps refined further for a diabetes context. This supports previous academic suggestions that any version of the BPS should be especially tailored for its target population (Layous et al., 2013). Whilst the BPS received some initial modifications between qualitative and quantitative phases of this study, further development of a diabetes-specific BPS may still be required. Analysis of the quantitative data, meanwhile, indicated that the BPS improved perceptions of self-care though not the actual behaviours themselves. Importantly, the effect on self-care was only slightly attenuated after controlling for diabetes type, meaning that people with type 1 and type 2 diabetes were receiving the same effects from the BPS.

Interview and focus group feedback suggested most participants found the BPS to be a viable tool that could be incorporated into patient treatment plans to help promote person centred care (Coulter et al., 2013). Several participants suggested ‘sharing’ written ideas from the BPS with other individuals within their support networks. Indeed, the qualitative data suggested the BPS might help strengthen doctor-patient relationships if people with diabetes

share ideas with their health care team. This finding is important as previous research suggests doctor-patient rapport has a significant impact on clinical outcomes (Coulter et al., 2015; Coulter et al., 2013).

Other important things to note include the individual's need to understand the benefits of engaging with the BPS. There was frequent mention of a need to provide scientific evidence so that people felt the intervention was worthwhile and valid. This point relates specifically to the 'illness ownership' theme where participants emphasised that by 'taking ownership' they were constantly busy making decisions and managing their diabetes. Consequently, they did not necessarily want to spend more time and effort performing an exercise unless it was to be of some knowable benefit. It is essential to consider some of the salient facilitating and hindering factors involved with engagement with the exercise, especially at initial contact. Participants considered emotions and personality traits important, with feelings of "laziness" being a notable barrier for some. By contrast, resilience and will power were viewed as important characteristics to have by many individuals. Individual's perceptions of their agency were therefore important. Overall, the qualitative data revealed both favourable and challenging features of the BPS.

Evaluation of the quantitative data showed that exposure to the BPS can improve perceptions of self-care after approximately 4 weeks following initial exposure, albeit the underlying mechanism for this effect may not necessarily be emotional. In this case, the broaden-and-build theory (Fredrickson, 2004) may not have been an appropriate model to use. Previous research suggests the BPS is effective at improving positive affect, optimism, and mood (Layous et al., 2013; Huffman et al., 2014; Parks et al., 2012; Peters et al., 2010; King, 2001); nevertheless, the intervention appeared to have no impact on actual diabetes self-management

behaviours – blood glucose control, dietary control, physical activity, or health care use. Rather, these findings suggest the efficacy of the BPS in a diabetes context may be attributable to complex self-regulatory mechanisms (Vandellen and Hoyle, 2008).

According to self-regulation theorists, the BPS provides people with an image of a future self (that is a self-standard) which they then compare to the present self (Vandellen and Hoyle, 2008) so any mismatch must motivate people to modify their behaviours in order to reduce the disparity (Cross and Markus, 1991; Markus and Nurius, 1986). Indeed, previous research has shown that the BPS increases motivation, which may be one possible mediator by which it is positively influencing perceptions of self-care (Seear and Vella-Brodrick, 2013; Sheldon and Lyubomirsky, 2006). In this scenario, positive perceptions would emerge as the result of being motivated by the task. Indeed, this finding, combined with the absence of a BPS effect on other aspects of diabetes self-management (blood glucose control, physical activity, diet, health service use), seems to validate our qualitative data. Self-care suggests autonomous, deliberate, and self-initiated activity; concepts that seem to resonate with the 'Illness Ownership' and 'Advocating a Personal Approach' themes. In essence, the BPS may be achieving its effects in this context because it makes people with diabetes feel 'in control' of their illness. Given that people with diabetes generally receive extensive education about self-management, it is plausible the BPS activates related cognitive appraisals (e.g., perceptions of 'control' or 'ownership') that then mediate its effect on self-care activities. If so, it is necessary for future research to demonstrate such mediator effects.

Curiously, the quantitative data revealed that the intervention failed to influence health service use, conflicting with several previous studies that reported fewer health centre visits in BPS users (King, 2001; Austenfeld et al., 2006; Austenfeld and Stanton, 2008; Maddalena

et al., 2014). There is a need for further research to explain this inconsistency. One important factor to consider here is that previous studies generally used non-clinical samples, whereas the present study examined people with diabetes (although recruited through community settings). Health care use in the latter group may be heavily dependent on various other factors (e.g., scheduled medical testing, treatment plans). It is also plausible that a longer follow-up period (i.e. greater than 4 weeks post intervention) was needed to detect whether any significant behaviour changes occur (not just health care use), given the discrepancy between individual's perceptions of care and their scores on actual self-management. There may be lag between people's improved attitudes towards their care and a statistically significant change in behaviour.

Limitations

The sample was arguably biased, as it consisted primarily of pro-active individuals sufficiently motivated to participate in an interview, attend group meetings and/or complete an online study. Future research should look at using larger scale trials to rigorously assess this intervention using a significantly larger sample size. Furthermore, the short follow-up period built into the quantitative study meant we were unable to assess long-term effects on not only behaviours but on emotions and perceptions. Long-term efficacy is particularly important in individuals living with a long-term condition (as opposed to short-lived illness), for obvious reasons. Additionally, the impact of the BPS on clinical markers is unclear. Finally, it is noteworthy that people living with diabetes in the UK receive free healthcare, which may present different emotional challenges in diabetes self-management, compared to those from countries without a universal health care system.

Conclusion

In conclusion, the BPS was found to have some utility within a diabetes context, but needs further refinement. The procedure improved perception of self-care up to four weeks after exposure but did not affect other self-management behaviours. However, behaviour change may occur over time. This investigation builds on previous studies, which have demonstrated the efficacy of the BPS for improving mood and general wellbeing, but not within a diabetes context. To the best of our knowledge, this is the first study to evaluate the BPS in individuals with diabetes. This research also highlighted the importance of personalising the BPS and tailoring language accordingly for this population (National Health Service, 2018). One important avenue for further research is evaluating the impact of this intervention on actual physical health. Given that the BPS facilitates self-care perceptions in people with diabetes, as observed here, there is a need to determine whether the protocol can help reduce actual diabetes-related symptoms and clinical outcomes – previous research suggests the intervention may improve health and well-being (Layous et al., 2013).

REFERENCES

American Diabetes Association. (2014) Diagnosis and Classification of Diabetes Mellitus. *Diabetes Care* 37: S81-S90.

Austenfeld JL, Paolo AM and Stanton AL. (2006) Effects of writing about emotions versus goals on psychological and physical health. *Journal of Personality* 74: 267-286.

Austenfeld JL and Stanton AL. (2008) Writing about emotions versus goals: Effects on hostility and medical care utilization moderated by emotional approach coping processes. *Br J Health Psychol* 13: 35-38.

Bak W. (2015) Possible Selves: Implications for Psychotherapy. *International Journal of Mental Health and Addiction* 13: 650-658.

Bargh JA, Gollwitzer PM, Lee-Chai A, et al. (2001) The automated will: Nonconscious activation and pursuit of behavioral goals. *J Pers Soc Psychol* 81: 1014-1027.

Bishop FL. (2015) Using mixed methods research designs in health psychology: An illustrated discussion from a pragmatist perspective. *Br J Health Psychol* 20: 5-20.

Bowen GA. (2008) Naturalistic inquiry and the saturation concept: a research note. *Qualitative Research* 8: 137-152.

Camara A, Balde NM, Enoru S, et al. (2015) Prevalence of anxiety and depression among diabetic African patients in Guinea: association with HbA1c levels. *Diabetes Metab* 41: 62-68.

Carter N, Bryant-Lukosius D, DiCenso A, et al. (2014) The Use of Triangulation in Qualitative Research. *Oncology Nursing Forum* 41: 545-547.

Chen L, Chuang LM, Chang CH, et al. (2013) Evaluating self-management behaviors of diabetic patients in a telehealthcare program: longitudinal study over 18 months. *J Med Internet Res* 15: e266.

Clarke V and Braun V. (2017) Thematic analysis. *Journal of Positive Psychology* 12: 297-298.

Cohn MA, Pietrucha ME, Saslow LR, et al. (2014) An online positive affect skills intervention reduces depression in adults with type 2 diabetes. *Journal of Positive Psychology* 9: 523-534.

Coulter A, Entwistle VA, Eccles A, et al. (2015) Personalised care planning for adults with chronic or long-term health conditions. *Cochrane Database Syst Rev*.

Coulter A, Roberts S and Dixon A. (2013) Delivering better services for people with long-term conditions: Building the house of care. London.

Crawford JR and Henry JD. (2004) The positive and negative affect schedule (PANAS): Construct validity, measurement properties and normative data in a large non-clinical sample. *British Journal of Clinical Psychology* 43: 245-265.

Creswell JW and Plano Clark VL. (2007) *Designing and conducting mixed methods research,* Thousand Oaks, CA: Sage.

Cross S and Markus H. (1991) Possible Selves across the Life-Span. *Human Development* 34: 230-255.

Dark-Freudeman A and West RL. (2016) Possible Selves and Self-Regulatory Beliefs: Exploring the Relationship Between Health Selves, Health Efficacy, and Psychological Well-Being. *International Journal of Aging & Human Development* 82: 139-165.

de Groot M, Golden SH and Wagner J. (2016) Psychological Conditions in Adults With Diabetes. *American Psychologist* 71: 552-562.

Diabetes UK. (2009) Diabetes care and you: what diabetes care you can expect. *Diabetes UK.* London: Diabetes UK.

Fredrickson BL. (2004) The broaden-and-build theory of positive emotions. *Philos Trans R Soc Lond B Biol Sci* 359: 1367-1378.

Fritz HA. (2017) Challenges to developing diabetes self-management skills in a low-income sample in North Carolina, USA. *Health & Social Care in the Community* 25: 26-34.

Garland EL, Fredrickson B, Kring AM, et al. (2010) Upward spirals of positive emotions counter downward spirals of negativity: Insights from the broaden-and-build theory and affective neuroscience on the treatment of emotion dysfunctions and deficits in psychopathology. *Clinical Psychology Review* 30: 849-864.

446 Gregg JA, Callaghan GA, Hayes SC, et al. (2007) Improving diabetes self-management
447 through acceptance, mindfulness, and values: A randomized controlled trial. *Journal*
448 *of Consulting and Clinical Psychology* 75: 336-343.
449 Hagger MS. (2010) Self-regulation: an important construct in health psychology research and
450 practice. *Health Psychology Review* 4: 57-65.
451 Hayes AF. (2013) *Introduction to Mediation, Moderation, and Conditional Process Analysis:*
452 *A Regression-based Approach,* New York, NY: The Guilford Press.
453 Huffman JC, DuBois CM, Healy BC, et al. (2014) Feasibility and utility of positive
454 psychology exercises for suicidal inpatients. *General Hospital Psychiatry* 36: 88-94.
455 Ismail K, Winkley K and Rabe-Hesketh S. (2004) Systematic review and meta-analysis of
456 randomised controlled trials of psychological interventions to improve glycaemic
457 control in patients with type 2 diabetes. *Lancet* 363: 1589-1597.
458 King LA. (2001) The health benefits of writing about life goals. *Personality and Social*
459 *Psychology Bulletin* 27: 798-807.
460 Layous K, Nelson SK and Lyubomirsky S. (2013) What Is the Optimal Way to Deliver a
461 Positive Activity Intervention? The Case of Writing About One's Best Possible
462 Selves. *Journal of Happiness Studies* 14: 635-654.
463 Loveday PM, Lovell GP and Jones CM. (2016) The best possible selves intervention: A
464 review of the literature to evaluate efficacy and guide future research. *Journal of*
465 *Happiness Studies*: 1-22.
466 Maddalena CJ, Saxey-Reese R and Barnes EL. (2014) Targeting writing interventions to
467 emotional processing level: a factorial experimental design. *Quality & Quantity* 48:
468 2939-2962.
469 Markus H and Nurius P. (1986) Possible Selves. *American Psychologist* 41: 954-969.

Meevissen YMC, Peters ML and Alberts HJEM. (2011) Become more optimistic by imagining a best possible self: Effects of a two week intervention. *Journal of Behavior Therapy and Experimental Psychiatry* 42: 371-378.

Moskowitz JT, Carrico AW, Duncan LG, et al. (2017) Randomized Controlled Trial of a Positive Affect Intervention for People Newly Diagnosed With HIV. *Journal of Consulting and Clinical Psychology* 85: 409-423.

National Health Service. (2018) Language matters: language and diabetes. London: NHS England Gateway Number: 07922.

Parks AC, Della Porta MD, Pierce RS, et al. (2012) Pursuing Happiness in Everyday Life: The Characteristics and Behaviors of Online Happiness Seekers. *Emotion* 12: 1222-1234.

Pascoe MC, Thompson D, Castle D, et al. (2017) Psychosocial interventions decrease depression and anxiety in individuals with diabetes mellitus: a meta analysis. *European Journal of Cardiovascular Nursing* 16: S4-S5.

Peters ML, Flink IK, Boersma K, et al. (2010) Manipulating optimism: Can imagining a best possible self be used to increase positive future expectancies? *Journal of Positive Psychology* 5: 204-211.

Peters ML, Smeets E, Feijge M, et al. (2017) Happy Despite Pain A Randomized Controlled Trial of an 8-Week Internet-delivered Positive Psychology Intervention for Enhancing Well-being in Patients With Chronic Pain. *Clinical Journal of Pain* 33: 962-975.

Rutter MK and Nesto RW. (2011) Blood pressure, lipids and glucose in type 2 diabetes: how low should we go? Re-discovering personalized care. *European Heart Journal* 32: 2247-U2132.

493 Schmitt A, Gahr A, Hermanns N, et al. (2013) The Diabetes Self-Management Questionnaire
494 (DSMQ): development and evaluation of an instrument to assess diabetes self-care
495 activities associated with glycaemic control. *Health and Quality of Life Outcomes* 11.
496 Seear KH and Vella-Brodrick DA. (2013) Efficacy of Positive Psychology Interventions to
497 Increase Well-Being: Examining the Role of Dispositional Mindfulness. *Social*
498 *Indicators Research* 114: 1125-1141.
499 Sheldon KM and Lyubomirsky S. (2006) How to increase and sustain positive emotion: The
500 effects of expressing gratitude and visualizing best possible selves. *The Journal of*
501 *Positive Psychology* 1: 73-82.
502 Shields BM, Peters JL, Cooper C, et al. (2015) Can clinical features be used to differentiate
503 type 1 from type 2 diabetes? A systematic review of the literature. *BMJ Open* 5.
504 Sin NL and Lyubomirsky S. (2009) Enhancing Well-Being and Alleviating Depressive
505 Symptoms With Positive Psychology Interventions: A Practice-Friendly Meta-
506 Analysis. *Journal of Clinical Psychology* 65: 467-487.
507 Strandberg RB, Graue M, Wentzel-Larsen T, et al. (2014) Relationships of diabetes-specific
508 emotional distress, depression, anxiety, and overall well-being with HbA1c in adult
509 persons with type 1 diabetes. *J Psychosom Res* 77: 174-179.
510 Teixeira ME. (2017) Challenges to Effective Self-Management of Type 2 Diabetes (T2D) in
511 Adults: Results of a Phenomenological Study. *Nursing Research* 66: E94-E94.
512 Turner RC, Holman RR, Cull CA, et al. (1998) Intensive blood-glucose control with
513 sulphonylureas or insulin compared with conventional treatment and risk of
514 complications in patients with type 2 diabetes (UKPDS 33). *Lancet* 352: 837-853.
515 Uchendu C and Blake H. (2017) Effectiveness of cognitive-behavioural therapy on glycaemic
516 control and psychological outcomes in adults with diabetes mellitus: a systematic

review and meta-analysis of randomized controlled trials. *Diabetic Medicine* 34: 328-339.

Vandellen MR and Hoyle RH. (2008) Possible selves as behavioral standards in self-regulation. *Self and Identity* 7: 295-304.

Yogo M and Fujihara S. (2008) Working memory capacity can be improved by expressive writing: A randomized experiment in a Japanese sample. *Br J Health Psychol* 13: 77-80.

Zhou B, Lu Y, Hajifathalian K, et al. (2016) Worldwide trends in diabetes since 1980: a pooled analysis of 751 population-based studies with 4.4 million participants. *Lancet* 387: 1513-1530.

Zigmond AS and Snaith RP. (1983) The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica* 67: 361-370.

Table 1 Participant characteristics

Phase	Interviews	Focus group	RCT	Combined
Age (Mean/SD)	Aged 23 to 25 years (based on 6 participants – the remainder did not state their exact age) (Mean = 45.66, SD = 21.09).	Ages 40 to 70 years (Mean = 58.25, SD = 10.43).	Age 20 to 76 years (Mean = 48.66, SD = 16.99)	Aged 20 to 76 years (Mean = 49.58, SD = 17.10)
No. recruited	12	8	50	70
Females/Males, *N* (%)	8 Females (66.6%), and 4 Males (33.3%)	5 Females (62.5%) and 3 Males (37.5%)	38 Females (76%) and 12 Males (24%).	51 (72.85%) Females and 19 Males (27.14%)
Type 1 diabetes, *N* (%)	5 (41.66%)	2 (25%)	28 (56%)	35 (50%)
Type 2 diabetes, *N* (%)	7 (58.33%)	6 (75%)	22 (44%)	35 (50%)

Table 2 The 'Illness Ownership' theme (comprising two sub-themes); illustrative quotes from interviewees and focus group participants

'Control and the Diabetes Experience'
Control over one's condition was seen to be very important to participants. Individuals expressed a desire to be "in charge"
➢ "If you sort of take responsibility for it and come out with a good result then you can feel like "oh I did that well this time… When you've got control you feel like you're more… you know what you're in for?" (K1)
One participant saw the intervention as a way of giving back control to the individual
➢ "What you're doing now is putting it back in control of the person by giving them a tool that's meaningful" (G8)
'Taking a Pro-Active Approach'
Participants believe that taking control requires a pro-active approach
➢ "I think anyone who doesn't use the available resources I think is just asking for trouble because, much as we like to say "oh yeah we can do it all, we're fine, we're fine", half the time we're not" (C7)
Becoming pro-active ultimately involves a decision to take responsibility
➢ "I think the doctor's gone as far as he can go and I think it's now completely down to me" (M3)

Table 3 The 'Advocating a Personal Approach' theme (comprising two sub-themes); illustrative quotes from interviewees and focus group participants

'Importance of Personalised Care'
Of significant importance to participants was the need for *personalised* care. They discussed a need to be recognised as *individuals.* ➢ "To make it feel more personal and to inspire confidence… I think there has to be a couple more strands to it. Okay? Like erm how, you know? Write down how you think you can accomplish it" (R2)
Some liked that the BPS was: ➢ "…an individualised erm bit of thinking which you can take reflective time on" (G8)
'The importance of Support'
Multiple participants say the intervention as a way to open up a dialogue between patient and health care professional. ➢ "If you wish to share it with your diabetes team…" they have that option don't they..? Because then that might open a further discussion with their team… because if they said something "I think I can achieve it by doing this…" I mean that's an opening into the team to discuss what that is" (R2) ➢ "You've got, like, a sort of quick reference to say "well okay diabetic nurse/you know, dietician/whatever it is… this is what's been going on" (C7)
Some acknowledged not every little detail needed to be shared with a professional. ➢ "You don't necessarily always want to tell them EVERYTHING that's going on… but, you know, if it's there then they can go "oh well actually that would directly impact" (C7)

582

Table 4 The 'Barriers and Facilitators' theme (comprising three sub-themes); illustrative quotes from interviewees and focus group participants

'Individual Factors'
Personality frequently came up as a barrier/facilitator. ➢ "My personality dictates that I'm a fighter and I haven't given up even though I'm doing the right things and not getting the results" (G11).
Some participants were concerned some would find it hard to articulate their thoughts. ➢ "My initial thought on looking at it was, this would not work for most people I know with diabetes because most of them would find it VERY hard to write. Most of them find it hard enough to talk" (G8)
'Motivation'
Participants saw diabetes as a "challenge", and the BPS was yet "another thing to do": ➢ "I'm not prepared to spend that amount of time on my diabetes. I don't live for my diabetes. I have… I have improved it once. Erm, for a fortnight..." (J10)
Therefore, the BPS needed to be quick and easy-to-use. ➢ "We have a lot to do anyway, we have to take our blood every day erm we have to take our medication… so having another thing to do is a bit… it is asking quite a lot of people… You need somebody who's happy to do that and it's not just putting something else on their plate that will stress them out further" (D9)
'Clarity and Promoting Awareness'
The BPS may serve as a way for improving awareness. ➢ "I think I could get quite a lot out of it [the BPS] and a lot of, kind of, what's the word where… self-realisation?... where you find out more about yourself" (M3)
Awareness did not always translate into action, however. ➢ "Has this motivated me to get myself into the gym? Erm to be honest, no not really… it's made me… I guess it's made me a bit more self-aware? Erm… I'm fully… I'm very aware that I need to get myself into the gym" (R6)

583

584

585

586

587

588

589

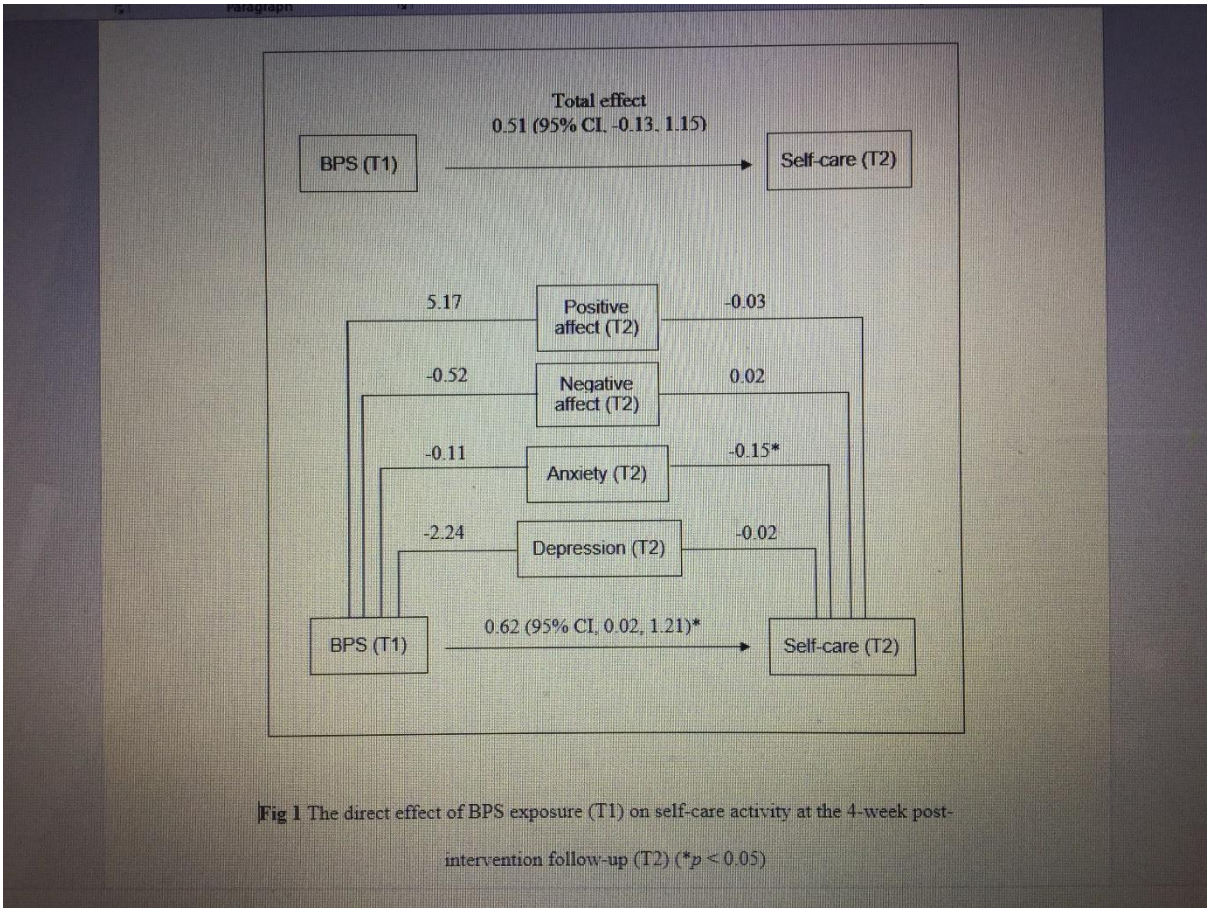

Fig 1 The direct effect of BPS exposure (T1) on self-care activity at the 4-week post-intervention follow-up (T2) (*$p < 0.05$)

590