Psychosocial, psychopharmacological and demographic predictors of changes in psychological distress over a course of computerised cognitive behavioural therapy (cCBT)

Fabia Cientanni[a], Kevin Power[a,b,*], Christopher Wright[c], Fabio Sani[d], Diane Reilly[e], Marie-Louise Blake[f], Kerry Hustings[g], David Morgan[h], Stella Clark[i]

[a] NHS Tayside, 15 Dudhope Terrace, Dundee, Scotland, UK
[b] School of Natural Sciences, University of Stirling, Scotland, UK
[c] Scottish Centre for Telehealth & Telecare, NHS 24, South Queensferry, Scotland, UK
[d] School of Psychology, University of Dundee, Scotland, UK
[e] NHS Lanarkshire, Netherton House, Wishaw General Hospital, Scotland, UK
[f] NHS Fife, Department of Clinical Psychology, Lynebank Hospital, Scotland, UK
[g] NHS Grampian, Royal Cornhill Hospital, Aberdeen, Scotland, UK
[h] NHS Shetland, Gilbert Bain Hospital, Lerwick, Scotland, UK
[i] NHS Fife, Hayfield House, Hayfield Road, Kirkcaldy, Scotland, UK

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ABSTRACT

Social group identification, socioeconomic deprivation, and a number of other clinical and demographic factors have been found to predict severity of psychological distress prior to treatment in those referred to receive computerised cognitive behavioural therapy (cCBT) as an intervention for mild to moderate depression. The aim of the current study is to investigate whether the same key factors are able to predict *magnitude of change* in psychological distress across treatment in a sample receiving cCBT. Participants ($N = 1158$) consisted of individuals completing the 'Beating the Blues' (BtB) programme. Participants completed three versions of the group identifications scale (GIS), one for each of three groups: family, community, and a social group of choice. Changes in psychological distress showed statistically significant improvements between pre- and post-treatment assessment in all outcome measure subscales. Significantly greater changes (reductions) in psychological distress were found in those who had more severe pre-treatment psychological distress, those who lived in a lesser state of socioeconomic deprivation, those who identified with more social groups, and those taking antidepressant medication (ADM) concurrently. These findings provide valuable information on the likely course of treatment in those receiving cCBT, and highlight both the potential of social group identification as a 'social cure' for poor psychological health and the inequalities of the socioeconomic health gradient.

1. Introduction

Internet-based interventions are becoming increasingly integrated within healthcare services worldwide as part of an effort to increase access to psychology services (Vis et al., 2015). In Scotland, mental health and psychological therapy services follow a 'stepped-care' model which sees that patients are offered the least intrusive and most effective intervention appropriate for their presenting symptoms (National Institute for Health and Care Excellence (NICE), 2006). Within this model, internet-based interventions, including cCBT, fit within step two of the model as a low-intensity intervention for mild to moderate

presentations. The Scottish Government (2017) identifies the national implementation of computerised Cognitive Behavioural Therapy (cCBT) services as a key objective in the Mental Health Strategy in an effort to increase the accessibility of psychological self-help resources. This priority is supported by clinical guidelines issued by NICE and the Scottish Intercollegiate Guidelines Network (SIGN) (NICE, 2006; SIGN, 2010). The 'Beating the Blues' (BtB) programme is named specifically within the guidelines as an appropriate intervention for those experiencing mild to moderate symptoms of depression and anxiety. The programme consists of eight one-hour text-based self-help sessions which follow a typical cognitive behavioural therapy (CBT) structure

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* Corresponding author at: NHS Tayside, 15 Dudhope Terrace, Dundee, Scotland, UK.
E-mail address: kevin.power@nhs.net (K. Power).

including elements of psychoeducation, behavioural activation, and cognitive work, with printable worksheets available for patients to download. The programme is fully automated and does not require therapist support, and as such it can be accessed by patients in their own homes as well as community settings such as libraries and outpatient clinics with minimal clinician involvement. As with other cCBT programmes, BtB can be delivered with a varying level of support, with interventions providing greater support being associated with better outcomes and greater rates of adherence compared to unsupported programmes (Kaltenthaler and Cavanagh, 2006). A more recent meta-analysis by Grist and Cavanagh (2013) reported no effect of support time on efficacy of the intervention, however only five studies were included in their analysis and the results of those studies were heterogeneous.

Evidence reporting on the clinical efficacy of BtB in treating mild to moderate depression demonstrates a range of reductions, with significant reductions in self-reported depression (Proudfoot et al., 2003; Proudfoot et al., 2004; Omrod et al., 2010), self-reported anxiety (Proudfoot et al., 2003), and psychological distress (Learmonth and Rai, 2008). Similar symptom improvements have also been found in treating mild to moderate depression across a range of services including primary care (Proudfoot et al., 2004), secondary care (Learmonth and Rai, 2008), and specialist care services (Learmonth et al., 2008), as well as in treating those experiencing depression with physical comorbidities such as multiple sclerosis (Cooper et al., 2011), depression in student populations (Richards et al., 2013), and stress and absenteeism in the work-place (Grime, 2004). One recent study by Gilbody et al. (2015) compared a) General Practitioner (GP) treatment as usual (GPTAU) vs b) GPTAU plus BtB vs c) GPTAU plus MoodGym (Christensen et al., 2004). The study concluded that GPTAU plus BtB provided no greater benefit than GPTAU alone in reducing symptoms of depression. However, these findings have been criticised (Cunningham, 2015; Christensen et al., 2015; Jones, 2015) due to a number of confounding factors. For example, GPTAU included the use of antidepressants, counselling, psychological services (including Improving Access to Psychological Therapies services), and secondary care mental health services. Furthermore, 19% of those in the GPTAU alone condition had access to psychological internet interventions (including cCBT programmes).

Although the clinical efficacy of cCBT programmes is on the whole well supported, there are gaps in the literature relating to which factors might predict the *magnitude of clinical change* gained through completing cCBT, although four studies have made efforts to examine potential predictors. Spek et al. (2007) investigated predictors of outcome (reductions in self-reported depression) in both cCBT and group CBT between pre- and post-treatment, focusing specifically on personality traits as potential predictors of outcome. Spek et al. found that the greatest changes in depression were predicted by higher baseline BDI scores, higher altruism traits, lower neuroticism traits, and being female. Further to these findings, the second study by Esther de Graaf et al. (2010) conducted a randomised controlled trial (RCT) to examine pre-treatment and short-term improvement variables as potential moderators/predictors of outcome at 12-months follow-up following cCBT in participants recruited from the general population. The study focused on exploring perceived quality of life and dysfunctional attitudes as potential predictors of magnitude of changes in self-reported depression scores between pre- and post-treatment. The study found that those with extreme (positive) responding reported greater changes (reduction in symptoms) in self-reported depression following the course of cCBT. A third study by Høifødt et al. (2015) investigated predictors of both response to cCBT (with high-intensity therapist-guidance) as measured by changes in self-reported depression between pre- and post-treatment assessment, and rate of response as measured by how quickly reductions in scores emerged throughout treatment. Høifødt et al. (2015) found that higher numbers of depressive episodes prior to treatment, higher scores of satisfaction with life, and cohabiting

or being married all predicted greater probabilities of positive treatment response. Most recently, El Alaoui et al. (2016) conducted a cohort study of adults receiving routine internet-based psychiatric care. The treatment intervention involved three months' worth of access to cCBT treatment modules guided remotely by a qualified Psychologist who would provide regular feedback. A large battery of potential predictor variables (38 in total) was evaluated against their individual ability to predict the rate of clinical improvements and post-treatment outcomes. Predictor variables were divided broadly into six main categories including clinical characteristics (11 variables), family history of mental illness (10 variables), comorbidity (9 variables), socio-demographic characteristics (6 variables), and two treatment-related factors (adherence and treatment credibility). El Alaoui et al. (2016) found that high adherence to treatment, positive ratings of treatment credibility, working full-time and greater severity of pre-treatment depression all predicted greater reductions in self-reported depression over the course of treatment.

1.1. Group identification and changes in psychological distress

The idea that social group identification may have a positive impact on mental health and wellbeing stems from social identity theory (Tajfel and Turner, 1979), suggesting that identifying with groups provides one with a positive sense of social identity, self-esteem, and belonging. Having multiple group memberships provides one with multiple sources from which to satisfy such needs, and therefore the number of social groups to which one identifies is conceivably an important factor in mental health and wellbeing. Studies investigating the link between social group identification and depression have found that having more group identifications protects against depression, alleviates symptoms and prevents relapse (Cruwys et al., 2013). Furthermore, when skills to enhance social group identification are fostered through interventions such as 'Groups 4 Health' (G4H; Haslam et al., 2016) and 'Reclink' (Cruwys et al., 2014), positive improvements to psychological wellbeing and reductions in self-reported depression have been found. Therefore, it could be argued that having multiple group memberships might provide a fertile ground from which improvements in mental health can develop, and thus we might expect that those with more identifications may experience greater improvements over a course of any given psychological intervention. Unique from other modalities of CBT, such as 'traditional' face-to-face CBT or group CBT, cCBT involves minimal contact with a clinician and instead relies on the patient completing the course of therapy remotely (either in their own home or at a community setting such as a library or health centre). In this respect, cCBT does not involve much if any contact with others, but rather focuses on cognitive restructuring and behavioural activation as the main treatment components. Some clinicians have argued that referring socially isolated individuals to a treatment that involved minimal human contact could exacerbate the existing social isolation (Stallard et al., 2010). It seems that patients may also share this concern as a qualitative study by Hind et al. (2010) investigating the acceptability of cCBT as an intervention for depression revealed that patients believed the remote nature of the intervention could maintain their existing social isolation.

This is important because it is understood that social isolation (in terms of loneliness) may increase risk of developing depression (Cacioppo et al., 2010; Luo et al., 2012), and that depression may lead to social withdrawal and increased social isolation (American Psychiatric Association [APA], 2013), suggesting that there may be a bidirectional relationship between the two factors. Within those receiving cCBT, previous work suggests that the number of social group identifications held by those referred to cCBT services is already lower than in the general population, with 37.3% of the sample failing to identify with any group and only 8.8% identifying with three groups (Cientanni et al., 2017). This is the opposite pattern typically found within general population samples whereby the majority identify with

at least three social groups (potentially more), and very few identify with no groups (Sani et al., 2015a). Furthermore, previous research has also shown that those who have fewer social group identifications have more severe psychological distress prior to treatment in those referred to cCBT services (Cientanni et al., 2017), however the impact that group identification may have on changes in psychological distress over a course of cCBT is unknown. It is for this reason that the current study aims to measure social group identification as a potentially important predictor of changes in psychological distress over a course of cCBT.

1.2. Socioeconomic deprivation and changes in psychological distress

In relation to mental health, studies show a higher prevalence of common psychological disorders in areas of high socioeconomic deprivation (Fryers et al., 2003). With regards to socioeconomic deprivation and post-treatment clinical changes in those presenting with common mental health disorders, having reduced financial means and fewer resources in which to support positive changes could conceivably equate to a less fertile ground in which to foster clinical improvements. A prevalence study across 224 general practitioner (GP) practices in England found that patients who belonged to GP practices in the most socioeconomically deprived areas not only had the highest prevalence of depressive symptoms, but also and the highest persistence of symptoms (Ostler et al., 2001). Similarly, Delgadillo et al. (2015) reviewed referrals to Improving Access to Psychological Therapies (IAPT) services and found that the prevalence of mental health problems was higher in areas of increased socioeconomic deprivation and that recovery rates were significantly lower. Indeed, when socioeconomic deprivation was investigated as a predictor of psychological distress it was found that the more socioeconomically deprived people were, the more severe the baseline psychological distress and that the number of group identifications and socioeconomic deprivation shared a small but statistically significant negative correlation (Cientanni et al., 2017). In both respects, it can be seen that socioeconomic deprivation may be an important predictor of the magnitude of change in psychological distress over a course of treatment, and that socioeconomic deprivation and social group identification may be related, however no study to date has investigated the impact of socioeconomic deprivation on changes in psychological distress in those receiving cCBT.

1.3. Limitations of existing literature on predictors of magnitude of clinical change

Existing literature into clinical improvements over a course of cCBT tends to focus solely on the clinical efficacy of specific cCBT programmes, rather than exploring predictors of magnitude of clinical change. Of the few studies which have examined predictors of change, none have considered both social group identification and socioeconomic deprivation as potential predictors of changes in psychological distress over the course of cCBT. Additionally, while each predictor study did well to address a number of important factors associated with cCBT treatment response, a number of other limitations remain. These include failing to control for potential effects of education (Høifødt et al., 2015), failing to control for the effects of antidepressant medication (ADM) use (Spek et al., 2007; Esther de Graaf et al., 2010; Høifødt et al., 2015) or measuring history of psychotropic medication use as opposed to current ADM use (El Alaoui et al., 2016), measuring number of previous episodes of depression as opposed to problem duration (Spek et al., 2007; Høifødt et al., 2015), and using a cCBT intervention which involved a high degree of therapist guidance; therefore it is difficult to tell which factors may predict changes in distress throughout cCBT alone without the therapist input (Høifødt et al., 2015).

1.4. The current study

The current study aims to address the gap in the literature by assessing the effects of social group identification, socioeconomic deprivation and other potentially important clinical and demographic factors as predictors of change in psychological distress in those receiving a course of cCBT as an intervention for mild to moderate depression. With regards to potentially important clinical factors, longer durations (greater chronicity) of pre-treatment depression have been found to be related to poorer treatment response to CBT in that those who have experienced symptoms of depression for longer lengths of time prior to treatment tend to have poorer responses to CBT (Hamilton and Dobson, 2002). Chronicity of depression prior to treatment as measured by the number of previous episodes of depression has also been found to be a predictor of positive changes in symptom severity following a course of cCBT (Høifødt et al., 2015). However, Proudfoot et al. (2004) found no significant interaction between clinical changes over a course of cCBT and pre-treatment duration of illness; therefore the effects of chronicity of pre-treatment symptoms on clinical changes over the course of cCBT are unclear.

The use of ADM is also an important factor to consider in relation to measuring changes in psychological distress because ADM use may, as intended, reduce the severity of depressive symptoms (APA, 2000; Fournier et al., 2010), and may therefore lead to greater reductions in psychological distress over the course of cCBT when taken concurrently compared to using cCBT as a stand-alone intervention. In contrast, those with a history of psychotropic medication use have been found to have slower improvement rates and higher post-treatment self-reported depression scores in those completing cCBT (El Alaoui et al., 2016). Indeed, Proudfoot et al. (2004) found that the effects of BtB did not interact with concurrent ADM use, indicating that BtB can provide clinical benefits with or without concurrent ADM use; therefore again the impact of this factor in relation to changes in psychological distress over the course of cCBT is unclear.

Finally, the severity of pre-treatment clinical presentation may be an important factor to consider when investigating changes in psychological distress over a course of cCBT. In a comprehensive meta-analysis examining the influence of pre-treatment severity of depression on outcome in those receiving low intensity interventions as a treatment for depression, Bower et al. (2013) found that those who were more severely depressed prior to treatment benefited from larger treatment effects than those who were less severely depressed. While some previous research found no significant interaction between pre-treatment depression severity and the therapeutic effects of cCBT (Proudfoot et al., 2003) or between pre-treatment depression and treatment response as measured by changes in BDI scores (Høifødt et al., 2015), other studies have identified that those with more severe symptoms pre-treatment make greater improvements over the course of cCBT (Spek et al., 2007; El Alaoui et al., 2016). To gain clarity on these issues, the current study will investigate current ADM use, problem duration, and pre-treatment severity of psychological distress as potential predictors of changes in psychological distress over a course of cCBT.

With regards to demographic factors, a number of potentially important variables have been established in relation to changes in symptoms following a course of cCBT. Firstly, being female has been found to significantly predict better outcomes in internet-based CBT as measured by differences in BDI scores from pre- to post-treatment (Spek et al., 2007). Secondly, a meta-analysis revealed that those who are older seem to have poorer outcomes in cCBT (Grist and Cavanagh, 2013). Thirdly, higher educational attainment has been found to predict greater cCBT treatment outcomes, with the authors suggesting that this may be because cCBT as an intervention relies on literacy and self-directed learning; therefore experience in education might be an important factor in clinical gains (Spek et al., 2007). It is for these reasons that we chose to investigate the predictive value of age, gender, and

education in changes in psychological distress over a course of cCBT.

Finally, local research on $N = 1873$ patients completing BtB is NHS Tayside revealed no significant difference between patients' clinical improvements as measured by the CORE-OM between sessions 5 and 8 of BtB, indicating a potential 'dosage' effect of 5 sessions to gain maximum clinical benefits of the programme (Battersby and Power, 2015). It is for this reason that we chose to investigate predictors of change scores between sessions 1 and 5 (pre- to mid-treatment) as well as between sessions 1 and 8 (pre- to post-treatment).

2. Methods

2.1. Participants and procedure

The current study used data collected as part of the MasterMind project (Vis et al., 2015) from four NHS Scotland health boards (Grampian, Fife, Shetland and Lanarkshire) as well as data collected from NHS Tayside over 33 months between September 2014 and April 2017. Participants include patients referred by a clinician to receive cCBT via the BtB programme. Referral criteria for the BtB service include a suspected diagnosis of mild to moderate depression (as determined by the referring clinician), > 16 years of age, must not have other significant psychological morbidity, and must not be actively suicidal.

During the inclusion period $N = 9736$ patients were referred to the BtB service across the five health boards. Referrals to the service came primarily from GPs ($n = 7633$, 78.4%), but also from psychology services ($n = 808$, 8.3%), mental health services and community mental health teams ($n = 469$, 4.8%), psychiatry services ($n = 242$, 2.5%), and other health services e.g. speech and language therapy, occupational therapy services, and community nursing ($n = 584$, 6.0%). A designated local BtB coordinator contacted all referred patients to facilitate access to the BtB system and to address any queries. All patients were given the name and contact number of their local BtB coordinator should they have any difficulty in activating or completing the treatment thereafter. Routine contact with the BtB coordinator varied across health boards, with some providing telephone support when required, to others offering an email or text message at specific points during treatment to offer encouragement and support.

Of those referred during the inclusion period $n = 5332$ (54.8%) started treatment, of which $n = 1157$ (21.7%) also completed the measure of group identifications. Only those who started treatment and completed the required measure of group identification were included in this study. One patient started the BtB programme twice during the inclusion period and data from each time this patient completed session one is included and treated as two separate cases. Therefore, the total sample size of the current study is $N = 1158$, of which 371 (32%) were male, 787 (68%) were female ($M_{age} = 39.99$ years, SD = 14.71, range 16–87 years). The patients forming the sample are referred to as participants from this point forwards.

2.2. Social group identifications

Identification with three distinct groups (family, community, and a third group chosen by the participant from a list including groups such as a sports team, a friendship group, a hobby group, or a workplace group) was assessed using a self-report questionnaire, the Group Identification Scale (GIS) Sani et al. (2012). The GIS is a global scale with four items measuring one's sense of belonging and connectedness to the group (e.g., "I have a sense of belonging to [my group]") together with one's sense of commonality with in-group members (e.g., "I have a lot in common with the members of [my group]"). Participants specify their disagreement or agreement with each item using a seven-point scale (1 = "strongly disagree", 7 = "strongly agree"). Previous research has shown that GIS has good reliability, with alpha values ranging from high .80s to the low .90s, regardless of the specific group to which it is

adapted (e.g., family, friends) (Sani et al., 2015b).

In line with previous research (Sani et al., 2015a), the current study established the presence of identification with each social group by calculating the mean score across the four items. If the mean score was > 5, a '1' was allocated to a binary variable (indicating identification with the group), and a mean score < 5 was allocated a '0' (indicating no group identification present). We then calculated the number of group identifications for each participant by summing the three binary variables to create scores ranging from 0 (no group identifications present) to 3 (identification with all three groups). Missing items were assigned a mean value based on scores on other items within the particular social group to which the questions are aimed.

2.3. Socioeconomic deprivation

Participant postal codes were collected from medical records and were categorised in accordance with the Scottish Index of Multiple Deprivation (SIMD) (Scottish Government, 2016). The SIMD uses information taken from the most recent Census and Small Area Population Estimates (SAPEs) to determine a deprivation rank per datazone. Scotland is divided into 6505 small geographical areas called 'datazones' with datazone ranks ranging from 1 (most deprived) to 6505 (least deprived). The level of socioeconomic deprivation is determined by seven aspects of deprivation to form one index. These include employment, income, health, education (skills and training), geographic access to services, crime, and housing. The SIMD is the official tool used by the Scottish Government to identify areas of socioeconomic deprivation in Scotland. The current study uses deciles of the SIMD ranks to indicate socioeconomic deprivation; however the scores are reversed so that 1 indicates the least deprived and 10 indicates the most deprived areas.

2.4. ADM use

To measure ADM use participants were asked the following single-item self-report question: 'How long have you used antidepressant medication?' to which they could respond 'less than 1 month', 'less than 2 months', 'more than 2 months', or 'I do not take antidepressant medication'. For the purpose of the analyses ADM use answers were dichotomised to represent those taking and those not taking ADM.

2.5. Problem duration

To measure problem duration, participants were asked 'How long have you had this problem?' to which they could respond 'less than 6 months', '6 months to 1 year', '1 to 3 years', '3 to 5 years', '5 to 10 years', '10 to 20 years', '20 to 40 years', or 'more than 40 years'. The items were delivered by the BtB programme at the start of treatment.

2.6. Demographic measures

Participant's age and gender were taken from medical records on referral to the BtB programme. Educational attainment was measured using the following single-item self-report question: 'What is the highest level of education you have completed?' to which participants could respond 'primary', 'secondary', 'higher/and or university', or 'other'.

2.7. Psychological distress

The CORE-OM is widely accepted and used in routine clinical practice as a tool to measure global psychological distress (Gray and Mellor-Clark, 2007). The CORE-OM is a pan-diagnostic measure with four domains; 'wellbeing' (4 items), 'problem severity' (12 items), 'functioning' (12 items), and 'risk' (6 items) which draw upon the opinions of clinicians regarding the most important elements of psychological wellbeing and health to measure (Mellor-Clark et al., 1999).

Each of the 34 items are presented as statements to which participants are asked to rate how frequently, from 'not at all' to 'most or all of the time', they have felt the way the statement describes in the last week. The wellbeing domain measures the overall psychological wellbeing without being condition-specific, including statements such as "I have felt like crying". The functioning domain measures participants' level of social and general everyday functioning and includes statements such as "Talking to people has felt too much for me". The risk domain measures both risk to one's self (4 items) and to others (2 items) and includes items such as "I have thought of hurting myself" and "I have been physically violent to others". Finally, the problem severity domain measures participants' severity of presenting symptoms, again without being condition-specific, by assessing different indicators of heightened psychological distress including physiological symptoms such as sleep. The current study explores changes within each of these domains over a course of cCBT as independent outcome measures of potentially important clinical and demographic predictors.

The CORE-OM was used to assess severity of psychological distress at session 1 (pre-treatment), session 5 (mid-treatment), and session 8 (post-treatment). Participants indicate a score between 0 and 3 per item, resulting in a total possible score range of 0 to 102. The total score is then divided by 34 to produce a total mean score. Internal reliability across all subscales has been reported to show alpha levels between > 0.75 and < 0.95, with an alpha level of 0.94 for all items in a clinical sample (Evans et al., 2002). Test-retest reliability of subscales has also been reported as high (between 0.87 and 0.91), with the exception of the risk subscale (0.64) (Evans et al., 2002). Both individual domain and overall scores show excellent convergent validity against other self-report measures of symptom severity within clinical populations (CI ranges between 0.63 and 0.88 for all items) (Connell et al., 2007).

2.8. Anxiety and depression

The BtB programme includes two single-item self-report measures of depression and anxiety at each session as part of a session-by-session progress report for patients and clinicians to monitor changes in mood. Participants are asked "How (anxious or stressed)/(depressed) have you felt in the past week" on a scale of 0 (not at all) to 8 (extremely anxious or stressed/depressed). Scores on these two single-item measures were collected at each session and were investigated within the preliminary analysis.

2.9. Change score calculations

Change score variables were computed by calculating the difference between participants' pre-and mid-treatment scores as well as pre- and post-treatment scores on each treatment outcome measure (each of the CORE-OM domains including 'functioning', 'wellbeing', 'problem severity', and 'risk', the 'total' and 'total minus risk' CORE-OM scores, and the self-rated depression and anxiety scores). Greater change scores (CSs) indicate larger clinical improvements (reductions in psychological distress) whereas smaller positive CSs indicate modest clinical improvements.

2.10. Statistical analyses

All analyses were conducted using Statistical Package for Social Science (SPSS) software version 24 (IBM Corp., 2013). A series of Pearson's r correlation analyses were at first conducted as preliminary analyses to establish any intercorrelations between the key variables (pre-treatment severity of psychological distress as indicated by CORE Total scores at session 1, total number of group identifications, socioeconomic deprivation, age, gender, education, ADM use, problem duration, and changes in psychological distress). Repeated measures t-test with Cohen's d was then conducted to explore changes in scores in

each CORE-OM subscale, and in BtB depression and anxiety ratings, between pre- and mid- and the pre- and post-treatment assessments. We applied the Bonferroni correction to the alpha level ($\alpha = 0.007$) of the t-tests to eliminate the risk of repeated testing effects. Finally, a series of multiple linear regression (MLR) analyses were then conducted as our main analyses to establish any predictors of change in psychological distress scores of each of the CORE-OM domains between pre- and mid-treatment and between pre- and post-treatment respectively. The predictor variables investigated were pre-treatment severity of psychological distress, total number of group identifications, socioeconomic deprivation, age, gender, education, ADM use, and problem duration. The pre-treatment severity predictor used in each MLR analysis is matched to the corresponding outcome variable (CORE-OM domain CSs); for example, the pre-treatment CORE-OM functioning domain scores are entered as a predictor when investigating changes in functioning, whereas pre-treatment CORE-OM wellbeing scores are entered as a predictor when investigating changes in wellbeing and so on.

3. Results

3.1. Descriptive statistics

Of the 1158 who started session one and completed the GIS, $n = 278$ (24.0%) completed all eight sessions. The largest drop-out rate occurred between sessions one and two when $n = 265$ (22.9%) of those who completed session one did not proceed to complete session two. Table 1 shows the number of patients completing each session and the attrition rate between sessions, the means and standard deviations of participants self-rated depression and anxiety scores at each session, and the mean psychological distress score (CORE-OM Total) at sessions 1, 5 and 8.

Of the 1158 participants, 417 (36.0%) did not identify with any groups, 352 (30.4%) identified with one group, 278 (24.0%) identified with two groups, and only 111 (9.6%) identified with all three groups. Participant postal codes demonstrated the full range of socioeconomic deprivation rank deciles, $M = 4.95$, SD = 2.59. In terms of ADM use, 720 (62.2%) participants indicated that they are currently taking ADM and 411 (35.5%) participants indicated that they were not (27 participants, 2.3%, did not answer). In terms of problem duration, a little over a 5th of the sample ($n = 237$, 20.5%) indicated that they have had their problem for 1–3 years, and over half the sample reported having their problem for > 3 years ($n = 587$, 50.7%).

Table 1
Frequencies and percentages of participants completing each session, and the means and standard deviations of self-rated depression, anxiety and psychological distress scores across BtB sessions.

Time point (session number)	Depression		Anxiety		Psychological distress	
	M	SD	M	SD	M	SD
Session 1 (N = 1158, 100%)	4.49	2.22	5.21	1.86	1.90	0.64
Session 2 (n = 893, 77.1%)	4.40	2.19	5.08	1.79	–	–
Session 3 (n = 688, 59.4%)	4.13	2.26	4.89	1.89	–	–
Session 4 (n = 565, 48.8%)	3.88	2.37	4.56	2.10	–	–
Session 5 (n = 456, 39.4%)	3.46	2.33	4.08	2.24	1.28	0.66
Session 6 (n = 382, 33.0%)	3.43	2.38	4.02	2.18	–	–
Session 7 (n = 322, 27.8%)	3.28	2.38	3.75	2.16	–	–
Session 8 (n = 278, 24.0%)	2.92	2.50	3.40	2.34	1.02	0.69

Table 2

Means, SDs, t-test results and effect sizes of changes between pre- and mid-treatment assessment of psychological distress, anxiety and depression.

Measure	Pre-treatment (session 1)		Mid-treatment (session 5)		Change score (pre- to mid-treatment)		t		
	M	SD	M	D	M	SD	(df = 455)	p[*]	Cohen's d[a]
CORE (total)	1.90	0.64	1.28	0.66	0.51	0.53	20.56	0.000	0.95
Total minus risk	2.01	0.72	1.35	0.72	0.55	0.59	19.88	0.000	0.92
Wellbeing	2.34	0.86	1.57	0.88	0.65	0.79	17.50	0.000	0.88
Problem severity	2.07	0.80	1.35	0.79	0.61	0.67	19.38	0.000	0.91
Functioning	1.83	0.74	1.27	0.71	0.45	0.59	16.40	0.000	0.77
Risk	0.42	0.57	0.15	0.31	0.18	0.40	9.70	0.000	0.59
BtB anxiety	5.21	1.86	4.08	2.24	1.02	2.17	10.09	0.000	0.55
BtB depression	4.49	2.22	3.46	2.33	0.91	2.17	9.01	0.000	0.45

[*] $p < .007$ (two-tailed, Bonferroni correction applied).

[a] Cohen's d effect size $d = 0.2$ (small), $d = 0.5$ (medium), $d = 0.8$ (large) (Cohen, 1988).

3.2. Changes between pre- and mid-treatment

Mean changes in CORE-OM Total scores between pre- and mid-treatment were equivalent to one shift in severity category from 'moderate' to 'mild' as indicated by the advised mean cut-off points for severity ranges within a clinical population (Connell et al., 2007).

A paired-samples *t*-test was conducted to investigate changes in psychological distress, anxiety and depression between pre- and mid-treatment. A paired-samples *t*-test was conducted to investigate changes in psychological distress, anxiety and depression between pre- and mid-treatment. The *t*-test revealed that changes in scores across all CORE-OM domains and BtB depression and anxiety measures between pre- and mid-treatment were statistically significant ($p < .001$). The results of the *t*-test, along with the Cohen's *d* effect size for each change in outcome measure score, and the means and standard deviations for each CORE-OM subscale and the BtB anxiety and depression measures at each time point, are displayed in Table 2.

3.2.1. Intercorrelations between variables

A Pearson's *r* correlation analysis was conducted to explore any significant intercorrelations between variables. The following inter-correlations between the outcome measures (changes in psychological distress between pre- and mid-treatment as measured by each of the CORE-OM domains and the BtB anxiety and depression measures) and the predictor variables proved statistically significant. Changes in the BtB anxiety and depression measures and all CORE-OM domains with the exception of wellbeing shared a positive correlation with ADM use, indicating that those who were taking ADM benefited from greater changes in both self-reported anxiety and depression and psychological distress as measured by all but one CORE-OM domains. Similarly, changes in all CORE-OM domains and the BtB depression measure positively correlated with pre-treatment severity (pre-treatment CORE-OM Total scores), indicating that greater pre-treatment severity was associated with greater (positive) changes in psychological distress. Negative correlations were found between the number of groups to which participants identified and changes in the functioning and risk domains, indicating that the more groups a person identifies with the greater the change (reduction in severity) in functioning and risk. There were no significant correlations between socioeconomic deprivation and changes in any of the clinical measures (CORE-OM domains and the BtB anxiety and depression measures). Changes in the risk domain correlated negatively with gender in that males exhibited greater changes (reductions) in the risk domain, and changes in the wellbeing domain correlated negatively with education indicating that those with a lower standard of educational attainment showed greater (positive) changes in wellbeing.

Significant intercorrelations were also found between several predictor variables. Socioeconomic deprivation negatively correlated with age and educational attainment, and the number of groups to which

participants identified, suggesting that those who are more socio-economically deprived are younger, have a lower standard of educational attainment, and identify with fewer social groups. The number of groups participants identified with positively correlated with age and gender, and negatively correlated with ADM use and problem duration, indicating that those who identified with more groups were older, female, were not taking ADM and had shorter problem durations. Pre-treatment severity of psychological distress (pre-treatment CORE-OM Total scores) positively correlated with socioeconomic deprivation, ADM use and problem duration, and negatively correlated with age and the number of groups participants identified with. This suggests that those with more severe pre-treatment psychological distress were more likely to be more socioeconomically deprived, to be taking ADM, to have longer problem durations, to be younger and to have fewer group identifications. Age positively correlated with ADM use and problem duration, and negatively correlated with gender, revealing that those who were older were taking ADM, had longer problem durations, and were male. ADM use positively correlated with problem duration showing that those taking ADM had longer problem durations. A matrix of the intercorrelations between all variables can be found in Table 3.

3.2.2. MLR analyses

A series of MLR analyses were conducted to explore the effects of eight potentially important predictors of changes in psychological distress as measured by each of the CORE-OM domains between pre- and mid-treatment. The predictor variables included pre-treatment severity of psychological distress, total number of group identifications, socioeconomic deprivation, age, gender, education, ADM use, and problem duration.

The MLR analyses identified pre-treatment severity of psychological distress, number of group identifications, socioeconomic deprivation, ADM use, age, and education as significant predictors of pre- to mid-treatment changes in psychological distress. Pre-treatment severity of psychological distress consistently predicted changes in psychological distress in all CORE-OM domains in that increased pre-treatment severity predicted greater changes in distress. The greater the number of groups participants identified with also significantly predicted greater changes in psychological distress in all CORE-OM domains with the exception of the risk domain. Greater (positive) changes in CORE-OM minus risk scores were predicted by taking ADM and being more so-cioeconomically deprived, and greater changes in CORE-OM functioning scores were predicted by taking ADM and having shorter problem durations. Greater changes in CORE-OM wellbeing scores were predicted by lower levels of educational attainment, greater changes in CORE-OM problem severity were predicted by shorter problem durations, and greater changes in both CORE-OM total and risk scores were predicted by older age.

The results of the MLR analyses can be found in Table 4, with the pre-treatment severity predictor changing depending on the

Table 3

Means, standard deviations, and reliabilities for, and intercorrelations between change score variables (pre- to mid-treatment) and the predictor variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. CORE total CS (−1.06–2.24) (M = 0.51; SD = 0.53)	–															
2. Total minus risk CS (−1.39–2.29) (M = 0.55; SD = 0.59)	0.973**	–														
3. Risk CS (−1.00–2.33) (M = 0.18; SD = 0.40)	0.529**	0.474**	–													
4. Functioning CS (−1.58–2.58) (M = 0.45; SD = 0.59)	0.892**	0.903**	0.460**	–												
5. Problem severity CS (−1.25–2.50) (M = 0.61; SD = 0.67)	0.888**	0.927**	0.421**	0.703**	–											
6. Wellbeing CS (−1.75–3.00) (M = 0.65; SD = 0.79)	0.812**	0.828**	0.368**	0.677**	0.707**	–										
7. Pre-treatment severity (0.15–3.68) (M = 1.90; SD = 0.64)	0.377**	0.423**	0.447**	0.409**	0.393**	0.285**	–									
8. Anxiety CS (−5–7) (M = 1.02; SD = 2.17)	0.507**	0.499**	0.198**	0.433**	0.475**	0.424**	0.058	–								
9. Depression CS (−7–8) (M = 0.91; SD = 2.17)	0.592**	0.583**	0.286**	0.530**	0.510**	0.552**	0.130**	0.488**	–							
10. Total identifications (0–3) (M = 1.02; SD = 0.99)	−0.066	−0.089	−0.223**	−0.135**	−0.053	−0.031	−0.445**	0.053	−0.010	–						
11. SIMD (1–10) (M = 4.95; SD = 2.59)	0.044	0.056	0.059	0.079	0.037	0.024	0.139**	−0.014	−0.001	−0.088**	–					
12. Age (years) (16–87) (M = 39.99; SD = 14.71)	0.004	−0.027	−0.032	−0.048	0.011	0.010	−0.205**	0.073	0.069	0.062*	−0.078**	–				
13. Gender (male/female)	−0.017	0.007	−0.132**	−0.024	0.030	−0.028	0.010	−0.031	−0.031	0.065*	−0.044	−0.115**	–			
14. Education (1–4)	−0.035	−0.032	−0.031	−0.001	−0.024	−0.100**	−0.028	−0.075	−0.075	0.018	−0.096**	−0.015	0.061*	–		
15. ADM use (yes/no)	0.104*	0.125**	0.094*	0.124**	0.113*	0.088	0.100**	0.095*	0.135**	−0.062*	0.031	0.113*	0.020	0.026	–	
16. Problem duration (1–9)	−0.084	−0.091	0.062	−0.073	−0.090	−0.081	0.071*	−0.052	−0.070	−0.070	0.020	0.177**	−0.032	0.007	0.093**	–

* $p < .05$ (two-tailed).
** $p < .01$ (two-tailed).

Table 4
MLR analyses exploring predictors of changes in psychological distress in each CORE-OM domain between pre- and mid-treatment.

| | CORE-OM domain change scores between pre- and post-treatment | | | | | | | | | | | | | | | | |
| | CORE total | | | CORE minus risk | | | Functioning | | | Wellbeing | | | Problem severity | | | Risk | | |
	β	t	p	β	t	p	β	t	p	β	t	p	β	t	p	β	t	p
Total GIs (0–3)	0.176	3.43	0.001**	−306	−6.56	0.000**	0.180	3.58	0.000**	0.180	3.85	0.000**	0.142	3.05	0.002**	0.040	1.28	0.201
SIMD	−0.034	−0.759	0.448	0.112	2.66	0.008**	−0.009	−0.206	0.837	−0.054	−1.26	0.210	−0.044	−1.01	0.313	−0.048	−1.60	0.110
Age	0.103	2.26	0.024*	−0.105	−2.44	0.015	0.018	1.84	0.067	0.061	1.37	0.172	0.082	1.89	0.059	0.113	3.68	0.000**
Gender	−0.020	−0.456	0.649	0.041	0.972	0.332	0.011	0.269	0.788	−0.054	−1.27	0.203	−0.009	−0.217	0.828	−0.039	−1.30	0.194
Education	−0.055	−1.25	0.213	0.017	0.409	0.683	−0.029	−0.691	0.490	−0.115	−2.71	0.007**	−0.056	−1.31	0.192	−0.032	−1.09	0.277
ADM use	0.078	1.76	0.080	0.092	2.18	0.030*	0.091	2.14	0.033*	0.064	1.50	0.134	0.077	1.81	0.072	−0.001	−0.026	0.979
Problem duration	−0.085	−1.91	0.056	−0.059	−1.39	0.167	−0.084	−1.97	0.049*	−0.049	−1.14	0.253	−0.088	−2.04	0.042*	−0.013	−0.443	0.658
Pre-treatment severity	0.493	9.33	0.000**	−0.555	−11.73	0.000**	0.581	11.15	0.000**	0.549	11.32	0.000**	0.527	11.20	0.000**	0.823	25.68	0.000**

* $p < .05$ (two-tailed).
** $p < .01$ (two-tailed).

corresponding outcome variable.

3.3. Changes between pre- and post-treatment

Mean changes in total CORE-OM scores between pre- and post-treatment were equivalent to one shift in severity category from 'moderate' to 'mild' as indicated by the advised mean cut-off points for severity ranges within a clinical population (Connell et al., 2007). A series of paired-samples t-tests were conducted to investigate changes in psychological distress, anxiety and depression between pre- and post-treatment. The t-tests revealed that changes in scores across all CORE-OM domains and BtB depression and anxiety measures between pre- and post-treatment were statistically significant ($p < .001$).

The results of the t-tests, along with the Cohen's d effect size for each change in outcome measure score, and the means and standard deviations for each CORE-OM subscale and the BtB anxiety and depression measures at each time point are displayed in Table 5.

3.3.1. Intercorrelations between variables

A Pearson's r correlation analysis was conducted to explore any significant intercorrelations between variables. The following inter-correlations between the outcome measures (changes in psychological distress between pre- and post-treatment as measured by each of the CORE-OM domains and the BtB anxiety and depression measures) and the predictor variables proved statistically significant. Significant negative correlations were found between the number of groups to which participants identified and changes in the functioning, risk, and total minus risk CORE-OM domains, indicating that the fewer groups a person identifies with the greater the changes in psychological distress within these specific domains. There were no statistically significant correlations between socioeconomic deprivation and the CORE-OM domain CSs, however there were significant negative correlations between socioeconomic deprivation and CSs in the BtB anxiety and depression measures indicating an association between those who were less socioeconomically deprived and greater improvements in both self-reported anxiety and depression between pre- and post-treatment. Significant positive correlations were found between changes in each of the CORE-OM domains and pre-treatment severity of psychological distress, suggesting that those who have more severe pre-treatment experience greater changes in distress over the course of cCBT. Significant positive correlations were also found between ADM use and the BtB anxiety measure as well as the following CORE-OM domains: total, total minus risk, functioning, and wellbeing. This suggests that those currently taking ADM report greater symptom improvements as indicated by these measures.

Significant intercorrelations were also found between several predictor variables. Negative correlations were found between socio-economic deprivation and number of group identifications, age and educational attainment, suggesting that those who are more socio-economically deprived have less group identifications, educational attainment, and are younger. The number of groups participants identified with significantly correlated with age, gender, ADM use and problem duration in that those who identified with more groups were older, female, were not taking ADM, and had shorter problem durations. Pre-treatment severity of psychological distress positively correlated with socioeconomic deprivation, ADM use and problem duration, and negatively correlated with age and the number of groups participants identified with. This suggests that those with more severe pre-treatment psychological distress were more likely to be more socio-economically deprived, to be taking ADM, to have longer problem durations, to be younger and to have fewer group identifications. Older age significantly correlated with longer problem durations, being male, and taking ADM, and there was also a significant positive correlation between ADM use and problem duration. A matrix of the intercorrelations between all variables can be found in Table 6.

Table 5

Means, SDs, t-test results and effect sizes of changes between pre- and post-treatment assessment of psychological distress, anxiety and depression.

Measure	Pre-treatment (session 1)		Post-treatment (session 8)		Change score (pre- to post-treatment)		t		
	M	SD	M	SD	M	SD	(df = 277)	p*	Cohen's d[a]
CORE (total)	1.90	0.64	1.02	0.69	0.72	0.62	19.40	0.000	1.32
Total minus risk	2.01	0.72	1.07	0.73	0.76	0.66	19.07	0.000	1.17
Wellbeing	2.34	0.86	1.23	0.88	0.91	0.88	17.24	0.000	1.28
Problem severity	2.07	0.80	1.06	0.76	0.83	0.73	18.83	0.000	1.29
Functioning	1.83	0.74	1.03	0.73	0.64	0.66	16.20	0.000	1.08
Risk	0.42	0.57	0.14	0.33	0.20	0.44	7.65	0.000	0.60
BtB anxiety	5.21	1.86	3.40	2.34	1.60	2.47	10.98	0.000	0.86
BtB depression	4.49	2.22	2.92	2.50	1.39	2.45	9.69	0.000	0.66

* $p < .007$ (two-tailed, Bonferroni correction applied).
[a] Cohen's d effect size $d = 0.2$ (small), $d = 0.5$ (medium), $d = 0.8$ (large) (Cohen, 1988).

3.3.2. MLR analyses

A series of MLR analyses were conducted to explore the effects of eight potentially important predictors of changes in psychological distress as measured by each of the CORE-OM domains between pre- and post-treatment. The predictor variables included pre-treatment severity of psychological distress, total number of group identifications, socioeconomic deprivation, age, gender, education, ADM use, and problem duration.

The MLR analyses identified pre-treatment severity of psychological distress, number of group identifications, socioeconomic deprivation, and ADM use as significant predictors of pre- to post-treatment changes in psychological distress. Pre-treatment severity of psychological distress consistently predicted changes in psychological distress in all CORE-OM domains in that increased pre-treatment severity predicted greater changes. Being less socioeconomically deprived also predicted greater changes in psychological distress in all CORE-OM domains with the exception of the risk domain. Greater (positive) changes in CORE-OM total, total minus risk, wellbeing and problem severity domains were predicted by taking ADM, and greater changes in CORE-OM total and wellbeing domains were predicted by identifying with more social groups. Finally, greater changes in CORE-OM risk scores were predicted by older age.

The results of the MLR analyses can be found in Table 7, with the pre-treatment severity predictor changing depending on the corresponding outcome variable.

4. Discussion

The current study demonstrates that those who are more severely psychologically distressed at pre-treatment, those who identify with more social groups, those from less socioeconomically deprived backgrounds, and those concurrently taking ADM make greater improvements in psychological distress over the course of cCBT. Of the eight predictors we examined, pre-treatment severity of psychological distress proved to be the most consistent predictor of changes in psychological distress between both pre- and mid- and pre- and post-treatment assessment across all CORE-OM domains. Acknowledging that the current study examined the impact of pre-treatment severity of psychological distress as opposed to severity of depression, our findings mirror previous research in that higher pre-treatment severity seems to predict greater clinical changes in low intensity interventions (Bower et al., 2013) and more specifically in cCBT (Spek et al., 2007; El Alaoui et al., 2016). While these findings seem to suggest that those who are more severely distressed prior to treatment experience greater clinical changes, it is important to note that this is within the context of those experiencing mild to moderate symptoms of depression.

Other consistent predictors of changes in psychological distress included socioeconomic deprivation, the number of groups participants

identified with, and ADM use. Those taking ADM experience greater reductions in psychological distress as measured by the total, functioning, wellbeing and problem severity domains of the CORE-OM. This finding is perhaps not surprising given the desired effect of prescribing ADM is to reduce psychological distress, therefore we might expect that those taking ADM concurrently while completing a cCBT intervention might experience greater reductions in psychological distress than those completing cCBT alone.

With regards to the number of groups patients identified with being predictive of greater (positive) changes in psychological distress, it may be the case that those who have more social group identifications have a greater support network to not only provide encouragement to complete cCBT independently, but to also provide a more fertile ground to make positive changes to improve their mental health. To relate this finding to the potential bidirectional relationship between depression and social group identification (Saeri et al., 2017), the current study is unable to confirm that improving symptoms of depression may increase the number of social groups to which people identify as we did not measure group identification at post-treatment. This therefore supports Saeri et al.'s (2017) general conclusion that social connectedness may be viewed as a 'social cure' for poor psychological health.

In relation to socioeconomic deprivation, the current study finds further evidence to support the concept of the socioeconomic health gradient (Marmot, 2005), suggesting that those who live in the most socioeconomically deprived areas experience the poorest health outcomes in that those living in a lesser state of socioeconomic deprivation benefitted from greater reductions in psychological distress over the course of cCBT. One possible theory for why this pattern may exist is that those living in a greater state of socioeconomic deprivation may be experiencing ongoing adverse life events, continued exposure to stress, and may be more poorly equipped in terms of coping resources and social support (Turner and Lloyd, 1999). Therefore, those living in a greater state of socioeconomic deprivation have fewer opportunities to support positive changes to improve mental health compared to those living in a lesser state of socioeconomic deprivation.

The statistically non-significant results of the current study also send important messages to referring clinicians. The fact that age, gender, educational attainment, and problem duration all failed to predict changes in psychological distress suggest that one is just as likely to experience reductions in psychological distress through cCBT regardless of these factors.

Overall these findings represent an enhancement to the existing literature as only one other study to date (Cientanni et al., 2017) has considered the value of social group identification and socioeconomic deprivation together as predictors of psychological distress, however this study was limited to examining psychological distress at baseline (pre-treatment), as opposed to the impact of these predictors on changes in psychological distress over a course of cCBT.

Table 6

Means, standard deviations, and reliabilities for, and intercorrelations between change score variables (pre- to post-treatment) and the predictor variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. CORE total CS (−1.09–2.91) (M = 0.72; SD = 0.62)	–															
2. Total minus risk CS (−1.57–2.89) (M = 0.76; SD = 0.66)	0.971**	–														
3. Risk CS (−1.00–2.50) (M = 0.20; SD = 0.44)	0.576**	0.509**	–													
4. Functioning CS (−1.33–2.58) (M = 0.64; SD = 0.66)	0.911**	0.926**	0.504**	–												
5. Problem severity CS (−1.75–3.17) (M = 0.83; SD = 0.73)	0.888**	0.936**	0.440**	0.757**	–											
6. Wellbeing CS (−1.75–3.17) (M = 0.91; SD = 0.88)	0.864**	0.861**	0.454**	0.752**	0.741**	–										
7. Pre-treatment severity (0.15–3.68) (M = 1.90; SD = 0.64)	0.408**	0.449**	0.489**	0.438**	0.422**	0.333**	–									
8. Anxiety CS (−5–8) (M = 1.60; SD = 2.47)	0.540**	0.517**	0.186**	0.452**	0.513**	0.429**	0.061	–								
9. Depression CS (−8–7) (M = 1.39; SD = 2.45)	0.539**	0.509**	0.290**	0.484**	0.457**	0.458**	0.112	0.582**	–							
10. Total identifications (0–3) (M = 1.07; SD = 0.99)	−0.114	−0.149*	−0.239**	−0.207**	−0.097	−0.081	−0.445**	0.100	−0.001	–						
11. SIMD (1–10) (M = 4.95; SD = 2.59)	−0.071	−0.054	0.020	−0.049	−0.039	−0.075	0.139**	−0.140*	−0.137*	−0.088**	–					
12. Age (years) (M = 39.99; SD = 14.71)	0.006	−0.029	−0.060	−0.040	−0.001	−0.061	−0.205**	0.019	0.053	0.062*	−0.078**	–				
13. Gender (male/female)	−0.003	0.025	−0.099	−0.037	0.069	0.044	0.010	−0.058	−0.079	0.065*	−0.044	−0.115**	–			
14. Education (1–4)	0.046	0.072	−0.008	0.067	0.082	0.026	−0.028	−0.009	0.016	0.018	−0.096**	−0.015	0.061*	–		
15. ADM Use (yes/no)	0.208**	0.209**	0.119	0.188**	0.180**	0.231**	0.100**	0.047	0.107	−0.062*	0.031	0.113**	0.020	0.026	–	
16. Problem duration (1–8)	−0.024	−0.027	0.097	−0.014	−0.018	−0.072	0.071*	−0.054	−0.056	−0.070*	0.020	0.177**	−0.032	0.007	0.093**	–

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

Table 7
Multiple linear regression analyses exploring predictors of changes in psychological distress in each CORE-OM domain between pre- and post-treatment.

| | CORE-OM domain change scores between pre- and post-treatment | | | | | | | | | | | | | | | | | |
| | CORE Total | | | CORE minus risk | | | Functioning | | | Wellbeing | | | Problem severity | | | Risk | | |
	β	t	p	β	t	p	β	t	p	β	t	p	β	t	p	β	t	p
Total GIs (0–3)	0.136	2.11	0.036*	0.104	1.65	0.101	0.099	1.58	0.128	0.136	2.36	0.019*	0.103	1.78	0.076	0.031	0.728	0.467
SIMD	−0.187	−3.31	0.001**	−0.185	−3.33	0.001**	−0.192	−3.49	0.001**	−0.196	−3.68	0.000**	−0.152	−2.83	0.005**	−0.038	−0.940	0.348
Age	0.080	1.41	0.161	0.052	0.930	0.353	0.059	1.05	0.294	0.041	0.751	0.453	0.053	0.981	0.328	0.090	2.19	0.030*
Gender	0.080	1.41	0.853	0.013	0.249	0.804	0.003	0.054	0.957	−0.011	−0.214	0.831	0.027	0.507	0.612	−0.014	−0.354	0.724
Education	−0.023	−0.421	0.674	−0.008	−0.155	0.877	−0.011	−0.206	0.837	−0.028	−0.534	0.594	−0.003	−0.056	0.955	−0.061	−1.55	0.123
ADM use	0.159	2.82	0.005**	0.147	2.65	0.009**	0.142	2.60	0.010	0.155	2.90	0.004**	0.114	2.12	0.035*	0.021	0.523	0.601
Problem duration	−0.082	−1.44	0.150	−0.081	−1.46	0.146	−0.091	−1.66	0.098	−0.093	−1.74	0.083	−0.055	−1.03	0.305	0.019	0.464	0.643
Pre-treatment severity	0.518	7.90	0.000**	0.540	8.45	0.000**	0.576	8.68	0.000**	0.579	9.88	0.000**	0.573	9.98	0.000**	0.806	18.89	0.000**

* $p < .05$ (two-tailed).
** $p < .01$ (two-tailed).

4.1. Limitations and future directions

It is important to note that the current study was only able to analyse the change scores of those who completed at least five or all eight sessions of BtB, therefore we are unable to determine the predictors of any clinical change in those who withdrew from treatment prior to these time points. The cross-sectional nature of the current study also means that it is not possible to make inferences regarding causal relationships between our predictor variables and changes in psychological distress; therefore we cannot claim that having greater pre-treatment psychological distress, having more group identifications, living in a lesser state of socioeconomic deprivation, and taking ADM *causes* greater reductions in psychological distress over a course of cCBT. Related to our measure of ADM, we acknowledge that our analysis is limited by the dichotomised categorisation of this variable ('taking' or 'not taking' ADM). Future studies could seek to further examine the effects of ADM use on psychological distress across a course of cCBT by measuring how long ADM was being taken prior to starting cCBT, what type of ADM was being taken, and the dosage, for example. The current study is also unable to determine whether any clinical gains derived from completing cCBT would be further enhanced if social connectedness was promoted, or if these gains would be stronger maintained over time if this were the case. Indeed, interventions that are based on enhancing social group identification, such as G4H (Haslam et al., 2016) and Reclick (Cruwys et al., 2014), have illustrated the clinical benefits for those experiencing symptoms of depression. Therefore, it may be the case that a combination of both internet-delivered psychotherapy (to address maladaptive thinking styles and promote positive behaviours) alongside community-based social group identification enhancing interventions (to address poor social connectedness) may be an optimal way of treating and preventing psychological distress. Future studies could seek to explore these possibilities.

Additionally, while the current study provides evidence of predictors of changes in psychological distress in those who complete at least five or all eight sessions of BtB, we do not know the characteristics of the patients who do not start treatment. Gaining a better understanding of these factors could, for example, help to establish whether those who are most socioeconomically deprived, or those who feel the most socially disconnected, do not start or drop out of treatment early. Indeed, Grant et al. (2012) found that those who are more socioeconomically deprived are less likely to 'opt-in' to receive psychological therapy. Future studies could seek to rectify these limitations by conducting a longitudinal study measuring group identification at both pre- and post-treatment to establish any bidirectional links between group identification and psychological distress, and could examine the characteristics of those who are referred to BtB but do not start or do not finish the treatment. Future studies could also take additional steps to describe the profile of group identification and socioeconomic deprivation by, for example, subcategorising participants into those with 'high' and those with 'low' group identification and those with 'high' and 'low' socioeconomic deprivation prior to treatment.

4.2. Implications and conclusions

The current study demonstrates that, within the context of those with mild to moderate depression, those with more severe pre-treatment psychological distress, those who feel more socially connected, those who live in a lesser state of socioeconomic deprivation, and those taking ADM benefit from greater reductions in psychological distress over a course of cCBT. In this sense, the current study may help to inform 'what works for whom' and under what circumstances. While this may be true, clinicians must always carefully assess the suitability of the referrals they make on an individual basis, practicing in accordance with the national clinical guidelines and within the guidelines recommended by the programme itself. Overall this research highlights

the importance of social group identification in the reduction of psychological distress and emphasises the need to address gross socioeconomic inequalities in health as a matter of social justice. As healthcare providers, we must play a part in reducing the discrepancies between treatment outcomes across socioeconomic backgrounds. Similarly, given the found effect of social group identification in reductions of psychological distress, efforts should be made to increase feelings of social connectedness across the population for the sake of the associated benefits for psychological health. However, we need to recognize the multifactorial nature of social connectedness that most probably includes other salient features such as behavioural activation, reducing social avoidance and generally enhancing social skills and confidence in social interactions.

Declaration of conflicting interests

The authors declare that there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical statement

The current study acts in accordance with the ethical standards set by the 1964 Declaration of Helsinki and its later amendments.

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