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The influence of socio-demographic similarity and difference on adequate attendance of group psychoeducational cognitive behavioural therapy

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Abstract

Aim: The study aimed to investigate the impact of socio-demographic similarity on the probability of attending an adequate dose of a psychoeducational group intervention (≥4 of 6 sessions).

Method: The sample comprised 2071 patients (63% female, 93% White, 15% unemployed, mean age 43) who received the Stress Control intervention in the UK's national Improving Access to Psychological Services (IAPT) programme. Similarity indices were constructed to measure each patient's similarity to the rest of their group on four characteristics: age, gender, ethnicity, and neighbourhood deprivation (Index of Multiple Deprivation; IMD).

Results: Multilevel analysis found that patients with greater IMD similarity to their group had significantly higher probabilities of attending an adequate dose of intervention (p=.026, controlling for absolute IMD). A cumulative effect of age similarity, ethnic similarity, and group size was also found, such that patients who were similar in age and ethnicity to their group had higher probabilities of adequate attendance in larger groups (p=.006).

Conclusions: These results suggest that socio-demographic comparison (a.k.a. relational demography) may consciously or unconsciously impact on patients' attendance at group psychoeducational interventions, particularly regarding indicators of socio-economic similarity. Clinical implications include structuring group composition and/or intervention content to maximise attendance and therefore clinical effectiveness.

Keywords

"similarity", "relational demography", "deprivation", "group intervention", "Improving Access to Psychological Therapies", "attendance"

Clinical and Methodological Significance of this Article

This article highlights novel effects on the attendance of patients in group interventions. It is the first to our knowledge in the context of psychological interventions to investigate the impact on an individual basis of socio-demographic similarity to the group, and it dovetails with occupational psychology research on relational demography. Clinical considerations around group composition and intervention content follow from the results, and these results demand new lines of research enquiry.

Word count: 6,115

Introduction

In the era of evidence-based psychological practice, cognitive behavioural therapy (CBT) in both low and high intensity formats is recommended as a first-line treatment for anxiety and depression problems. However, treatment outcomes are dependent upon patients attending and participating in CBT, which in turn is related to the extent to which the treatment is acceptable to individuals (Carter, 2008). Acceptability refers to the degree to which the treatment is deemed appropriate, fair and reasonable for the presenting problem (Tarrier, Liversidge, & Gregg, 2006). One common indicator of treatment acceptability is dropout from treatment. Dropout (a.k.a. unilateral termination) refers to a patient's decision to withdraw from therapy before they have received an adequate number of sessions, and can result in inadequate attendance for the patient to benefit. Dropout results in ineffective use of scarce mental health resources, inadequate exposure to treatment, and can be demoralizing for both patients and therapists (Werner-Wilson & Winter, 2010).

Studies that have used sessional outcome measurement have revealed that dropout often occurs early in treatment and before significant improvement is achieved (e.g., Ogrodniczuk, Joyce, & Piper, 2005). This implies that patients don't typically terminate treatment because they have improved and no longer need help. Fernandez, Salem, Swift, & Ramtahal (2015) meta-analysed dropout rates from 115 primary empirical studies of CBT (N=20,995) and found a weighted pre-treatment refusal rate of 15.9%, and a dropout rate of 26.2% during treatment. Therefore, approximately one in every four patients that start CBT do not finish treatment. Dropout was significantly associated with a depression diagnosis, the format of treatment delivery, the treatment setting, and treatment starters showed significantly reduced dropout rates as the number of sessions increased (confirming that most dropout events are observed in the earlier stages of treatment).

Group treatment formats are being increasingly used in routine service settings (Burlingame et al. 2015) because of potential efficiency savings and outcomes that have

proven to be largely equivalent when compared to individual therapy (Burlingame et al. 2016). Consistent with stepped care principles (Firth et al., 2015), a popular first line approach to group intervention is the delivery of large psychoeducational groups (Delgadillo, Kellett, et al., 2016). In these groups, therapists didactically teach coping strategies to patients based on well-established CBT treatment protocols. A well-established, evidence-based exemplar of large group psychoeducational groups is the White & Keenan (1990) *"stress control"* protocol, which is one of the most widely used stress management interventions within the United Kingdom National Health Service and Ireland Health Service Executive. In this approach, two co-facilitators teach a 6-week course to groups of up to 80-100 patients at a time. Basic CBT strategies are covered each week, including activity scheduling, cognitive restructuring, exposure and relaxation skills. Kellett, Clarke and Matthews (2007) reported a dropout rate of 31% for stress control groups. Although one trial has successfully used implementation intentions to improve and maintain stress control group attendance (Avishai, Oldham, Kellett, & Sheeran, 2018) there have been no previous studies investigating the reasons why patients do not complete stress control interventions in such high numbers.

There has been relatively little research on short-term, large group psychoeducation interventions, in contrast to group psychotherapy research (focusing on long-term, small group therapy interventions). Although group psychotherapy research may provide insights into potential group psychoeducation processes, it is important to note that the differences between these formats make generalisations difficult, and preclude assumptions of equivalence. Nevertheless, it is useful to consider the evidence for predictors of dropout in group psychotherapy, which may also be relevant to large scale psychoeducational interventions. These predictors include perceptions of poor therapeutic quality (Schneibel et al., 2017), low socio-economic status (Hamilton, Moore, Crane, & Payne, 2011), lower age, low educational level and current unemployment (Fenger, Mortensen, Poulsen, & Lau, 2011), problems with alcohol (MacNair & Corazzini, 1994) and low self-esteem (Davis, Hook, &

Page 2011). It has also been suggested that an unintended side effect of group formats is anticipated or perceived shame and embarrassment, and that this may lead to particularly high dropout rates (i.e. 25-40%; Schneibel et al., 2017). However, a moderator analysis of this claim in a meta-analysis found no difference in dropout rates when comparing group to individual psychotherapy (Swift & Greenberg, 2012). The majority of research to date has tended to investigate single factors as potential predictors of dropout, with relatively few studies investigating and controlling for multiple contributory factors. Furthermore, studies have typically focused on patient factors, neglecting the group context that sets group treatment apart from individual treatment.

Burlingame, Strauss, and Joyce (2013) present a model of change mechanisms in small group psychotherapy treatments that includes emergent processes and imposed structure (among others) as contributors to group processes. Cohesion is one example of an emergent process, described by Burlingame, Fuhriman, and Johnson (2001) as the therapeutic relationship in group psychotherapy, and comprising member to group and member to member relationships in addition to relationships involving the therapist. Cohesion predicts clinical outcome in small group psychotherapy interventions, with specific effects involving levels of relatedness and acceptance experienced by patients in relation to their group (Burlingame et al., 2001). Cohesion may not be so relevant in large psychoeducational groups, or at least it will be experienced differently, but factors such as group composition (an example of imposed structure) and perceived relatedness may still be important. Evidence regarding the impact of heterogeneity versus homogeneity on clinical effectiveness has been mixed – specific factors investigated have included problem focus/diagnosis and ethnicity (Burlingame et al., 2013). Research has also identified effects regarding the proportional representation of variables such as gender (e.g. Greenfield et al., 2008; Wade & Goldman, 2006). Burlingame et al. (2013) conclude that the impact of group composition may depend on the context of the specific group intervention. In organisational research, self-

categorisation and relational demography theory suggests that people use socio-demographic characteristics and organisational membership to delineate psychological ingroups, which influence self-identity, attitudes, and behaviours. More diverse relational demography has been associated with reduced group psychological attachment, including differential effects for different genders and racial groups (Tsui, Egan, & Oreilly, 1992), although evidence about the positive or negative effects in organisational settings has been conflicting (Riordan, 2000). In line with this evidence, it is possible that inadequate attendance and/or dropout in group treatment may be influenced by factors related to the "imposed structure" of groups, such as the socio-demographic composition of groups and its influence on participants' sense of adherence and belonging to the group. Psychoeducational groups tend to differ from psychotherapy groups in aspects such as group size, treatment length, the interactions between the facilitator and participants, and those between the participants. However, it is possible that factors such heterogeneity between participants also influence attendance and dropout in psychoeducational groups.

In the present study, we investigated the potential influence of socio-demographic difference on adequate attendance to achieve patient improvement in stress control groups (see Measures). We hypothesized that socio-demographic difference as measured on key visible or pseudo-visible variables (age, gender, ethnicity, socio-economic deprivation) would influence the individual's sense of acceptance and engagement within the group (Ancona & Caldwell, 1992; Pelled, 1996; Torrente, Salanova, & Llorens, 2013), therefore predicting greater chance of inadequate attendance. We operationalised these socio-demographic differences by constructing similarity indices for each of the above variables, based on the relationship between the individual's characteristic, and those of the rest of the group.

Method

Study Dataset

The study sample was derived from routine clinical care records from five English primary care psychological therapy services affiliated to the *Northern IAPT Practice Research Network* (Lucock et al., 2017). Ethical approval to collect and analyse routine care records was obtained from the North East - Newcastle & North Tyneside NHS research ethics committee (REC ref: 15/NE0062). These five services provide evidence-based psychological interventions for depression and anxiety problems, organized in a stepped care model following national clinical guidelines (National Institute for Health and Care Excellence, 2011) and are part of the Improving Access to Psychological Therapies (IAPT; Clark, 2009) programme. Low intensity interventions, which were offered as first-line treatments at step two to most patients, included individual guided self-help and also *stress control* psychoeducational groups. Patients who required more intensive psychotherapies or do not respond to low intensity treatment have access to CBT, interpersonal psychotherapy, counselling and other interventions at step three (see further details in Lucock et al., 2017).

The present study sample was restricted to clinical care records for patients who accessed stress control (SC) groups. SC is a 6-session, group-based, didactic and highly structured intervention based on principles of CBT (White and Keenan, 1990). Participants are provided with printed booklets and lecture-style presentations covering self-help strategies including relaxation skills, problem solving, activity scheduling, recognition and challenging of negative automatic thoughts and sleep hygiene advice. Defining features of SC delivered in English IAPT services are that (1) minimal interaction takes place between participants and the group facilitators; (2) the intervention is delivered to large groups of participants in a "seminar" format; (3) participants' response to treatment is monitored by facilitators through the use of patient-reported depression and anxiety measures at each session (Delgadillo, Kellett, et al., 2016).

Inclusion criteria (Figure 1) required that (1) patients had attended at least one session of a SC group, (2) data were available for patients' age, gender, ethnicity, area-level

deprivation, anxiety severity, depression severity, and employment status; (3) it was possible to link patient records to identifiable SC groups. Group-level statistics and comparison indices were calculated using all patients meeting these criteria. The primary analysis also required that there was at least 80% data completeness per group (*k*) for all variables used in comparison indices (age, gender, ethnicity, area-level deprivation). Applying this criterion produced the primary sample (*N*=2,071, *k*=120). Sensitivity analyses required more stringent data completeness criteria of 90% (*N*=1,261, *k*=74) and 100% (*N*=493, *k*=45) per group.

[FIGURE 1 HERE]

Measures

The primary outcome of interest was *adequate (vs inadequate) attendance in order to result in patient improvement*, defined as a case that attended at least 4 sessions (more than half) of the SC intervention. A number of replicated findings in different studies indicate that the optimal dose of low intensity CBT interventions is between 4 and 6 sessions (Delgadillo et al., 2014, Delgadillo, Kellett, et al., 2016; Firth et al., 2015). A recent systematic review of this literature concluded that the probability of symptomatic remission is minimal in cases that access less than 4 sessions of low intensity CBT interventions (guided self-help), thus offering an evidence-based criterion to define adequate attendance (Robinson, Delgadillo, & Kellett, 2019). We considered that attendance of all 6 sessions was too strict a criterion to denote adequate engagement with SC, since it is common that patients miss one or two sessions due to practical obstacles such as work or childcare commitments, so our definition of adequate attendance is in line with the current evidence-base for the minimum recommended number of sessions for low intensity CBT (Robinson et al., 2019).

The secondary outcome variables were patients' post-intervention depression and anxiety symptom severity scores. An analysis of outcome predictors has previously been published (Delgadillo et al, 2016). However, these outcomes were analysed in the current study specifically in relation to similarity index effects, in order to make sure that any effects

of relative demography were acting directly on session attendance, rather than indirectly via outcome. For example, difference from the group might arguably reduce the effectiveness of the intervention due to factors such as cultural incongruence, indirectly causing patients to disengage. We therefore expected no significant effects of similarity indices on these outcomes. Depression symptoms were assessed using the Patient Health Quesionnaire-9 (PHQ-9; Cronbach's $\alpha = 0.89$, intraclass correlation = 0.84) (Kroenke, Spitzer, & Williams, 2001). The PHQ-9 is scored from 0-27, with higher scores indicating greater depression symptom severity. Anxiety symptoms were assessed using the Generalised Anxiety Disorder-7 (GAD-7; Cronbach's $\alpha = 0.92$, intraclass correlation = 0.83) (Spitzer, Kroenke, Williams, & Löwe, 2006). Both measures are routinely collected by IAPT services.

De-identified demographic characteristics available for analysis included patients' gender, age, unemployment status (unemployed yes/no), and ethnicity ((categorized as "White", "Mixed", "Asian", "Black", "Chinese", and "Other"). In addition, patients' home postcode was matched to the English index of multiple deprivation (IMD) to obtain a measure of neighbourhood deprivation (Department for Communities and Local Government, 2015). The IMD yields a deprivation score between 0-100 for each neighbourhood in the UK, with higher scores indicating greater deprivation.

The primary explanatory variables of interest in this study were *socio-demographic similarity indices*. These measured the relative similarity of a patient to the rest of the group members, on the basis of their gender, ethnicity, age, and IMD score. For some similarity indices, alternate specifications were compared statistically to determine optimal predictive fit. These are described below.

Development of Similarity Indices

Two similarity indices (gender and ethnicity) were derived from categorical variables. The gender similarity index was specified as the percentage of other group members who

shared the same gender as the individual. The ethnic similarity index was specified in two alternative ways. Both calculated the percentage of other group members who shared the same ethnic category as the individual, but specification *A* used six categories ("White", "Mixed", "Asian", "Black", "Chinese", or "Other"), whilst specification *B* used two categories ("White" or "Minority ethnic group"). Because 87% of the UK population is White (Office for National Statistics, 2011), this specification was considered as a statistically parsimonious measure of similarity, reflecting ethnic majority/minority status rather than specific ethnic backgrounds with relatively few cases. Each index specification was entered into a linear regression model predicting *adequate attendance* (attended ≥4 sessions), to test for best fit. Markov Chain Monte Carlo estimated deviance information criterion values (DIC; Spiegelhalter, Best, Carlin, & van der Linde, 2014) indicated that specification *B* (DIC = 2548.93) had comparable or marginally better predictive fit than specification *A* (DIC = 2549.70). For these reasons, specification *B* was preferred as the primary measure, and a further sensitivity analysis tested specification *A*.

Two similarity indices (age and IMD) were derived from continuous variables. A number of potential specifications were considered for these indices. Specifications calculating distance from the mean, median, or mode (adjusting for group variance using the standard deviation, interquartile range, etc.) were discounted due to the potential for oversimplifying complex distributions of people (e.g., over- or under-compensating for outliers). For these reasons, we decided to use a weighted measure of categorical similarity. This divided the continuous scale into categories, and weighted the percentage of people within each category by the distance between the individual and that category (see Figure 2). Rather than modelling variability in the group solely by one or two group-wide parameters, this method models the similarity of the individual to every other individual, also taking group size into account. Exploring and sense-checking different boundaries informed

decisions regarding category boundaries. The final category sizes were defined as 0.5SD of the variable (6.97 years for age, and 8.52 points for IMD).

[FIGURE 2 HERE]

Two weighting functions were considered – a fraction-based function, and a polynomial function. The fraction-based function weighted group members by 1/(category distance), whilst the polynomial function weighted by 1/(2^(category distance)). The polynomial function gives greater penalties for larger differences, making it more "conservative". MCMC DIC values again indicated that both functions had comparable predictive power (age DIC polynomial = 2552.40, fraction-based = 2552.49, IMD DIC polynomial = 2527.23, fraction-based = 2527.42). The polynomial function was therefore used in subsequent analyses, to maximize sensitivity.

The formula for the similarity index of a given individual for continuous variables and using polynomial weighting is defined as follows (where GroupSize is the total number of people in the group including the individual, IndividualValue is the value of the variable for the individual in question, MemberValue is the value of the variable for a given *n*th other group member, and CategorySize is the size of category into which the continuous variable has been divided):

$$SimilarityIndex = \left(\sum_{n=1}^{GroupSize-1} \frac{1}{2^{\left\lceil \frac{|IndividualValue - MemberValue_n|}{CategorySize} \right\rceil - 1}} \right) \Big/ GroupSize - 1$$

Figure 3 shows a summary of the distributions of each similarity index across the current sample of patients, indicating a reasonable distribution of values. A full range of values were generated for each index. Central tendencies approximated to the midpoint of the possible range (i.e. around 50%) in 3 out of 4 cases. Inspection of these values and the interquartile ranges show that the indices have generally comparable distributions, with the exception of the ethnicity similarity index. This is expected, given that the proportions of White and non-White patients were greatly imbalanced in this binary variable. With the exception of the

ethnicity similarity index, inspection of Figure 3 along with frequency histograms indicates that each similarity index conforms roughly to a normal distribution.

[FIGURE 3 HERE]

Sample Characteristics

The primary patient sample (n = 2071) was 62.4% female, 14.8% unemployed, and 93.0% White (with 3.7% Asian, 1.5% Mixed, 1.4% Black, 0.2% Chinese, 0.3% Other). Mean age was 42.8 years (SD = 13.6). Mean IMD score was 23.6 (SD = 16.2), and mean IMD decile was 5.1 (SD = 2.8).

Primary diagnoses were available for 76.1% of patients (n = 1577). The most common diagnosis was mixed anxiety and depression (60.9%). A further 22.2% had a primary anxiety diagnosis (generalized anxiety disorder, social phobia, panic disorder, agoraphobia, specific phobia, obsessive compulsive disorder, post-traumatic stress disorder, hypochondriasis), and a further 13.6% had a primary depressive diagnosis (depressive episode, recurrent depression). Mean GAD-7 score pre-intervention was 11.8 (SD = 5.3), and post-intervention was 8.1 (SD = 5.5). Mean PHQ-9 score pre-intervention was 12.1 (SD = 6.0), and post-intervention was 8.6 (SD = 6.2). Mean number of sessions attended was 4.2 (SD = 1.7, mode = 6), with 69.5% of patients completing an adequate dose of treatment. There were 120 SC groups in the primary sample. These groups had a group size mean of 21 (SD = 15.2, range 4 to 69) patients per group attending at least one session, and a mean of 17 (SD = 12.1, range 2 to 57) patients per group meeting criteria for inclusion in the primary sample.

Analysis

Analyses of adequate attendance (primary outcome) used logistic multilevel models, with restricted iterative generalized least squares (rIGLS) estimation and a logit link function. Linear approximation procedures were applied in a two-step process, using 1st order MQL

and then 2nd order PQL procedures (Rasbash, Steele, Browne, & Goldstein, 2012). Analyses of post-intervention symptom scores (secondary outcomes) used linear multilevel models with rIGLS estimation.

All models had two levels – patients at level 1, nested within groups at level 2. Models were tested over several stages. First, the level-2 random intercept was tested. An intra-class correlation coefficient (ICC, a.k.a. variance partition coefficient) was derived using a linear threshold model approach (Rasbash et al., 2012). Second, patient-level case-mix control variables were tested (age, gender, unemployment status, ethnicity, IMD, depression severity, anxiety severity, group size). Case-mix control variables were included in the model if they were significant *or* if their derivative similarity index was significant. Third, explanatory variables were tested (age similarity, gender similarity, ethnic similarity, & IMD similarity). Fourth, interactions were tested. Interactions were tested between each significant variable. In addition, two sets of planned interactions were tested to determine any contextual effects. The first tested interactions between each similarity index and group size, to answer the question of whether being different matters more if one is in a large or a small group. The second tested interactions between each similarity index and its corresponding variable (e.g. age similarity * age).

The intercept, case-mix control variables, explanatory variables, and interactions between significant variables were tested at a standard 5% significance level ($p<.05$). Because of the high number of planned interactions, the significance of these planned interactions was determined at the more stringent 0.625% level ($p \leq .00625$), in accordance with the Bonferroni method to correct for familywise type I errors.

Three sensitivity analyses were conducted. Two required more stringent data completeness criteria – respectively, 90% and 100% data completeness per group (k) for all variables used in comparison indices (age, gender, ethnicity, area-level deprivation). The

final sensitivity analysis used the number of sessions attended as the outcome variable. This analysis used a log link function in a Poisson distribution model.

Results

Primary outcome (adequate vs inadequate attendance)

A Wald test ($\chi^2(1) = 6.824$, p=.009) found a significant random intercept at the group level, indicating a group effect on adequate attendance (ICC = 0.034). Next, case-mix control variables were tested. Patient age (p<.001), depression severity (p=.002), unemployment (p=.001), and IMD (p=.008) were all significant predictors of adequate attendance. Patients who were younger, unemployed, more depressed, and living in more deprived neighbourhoods were less likely to attend an adequate dose of treatment. In contrast, gender, anxiety severity, and group size were all non-significant. Patient ethnicity was also non-significant, whether it was treated as a 6 category variable (White, Mixed, Asian, Black, Chinese, Other), or as a 2 category variable (White, minority ethnic group).

Explanatory variables were tested next. Similarity indices for gender, ethnicity, and age were all non-significant. The main effect of the IMD similarity index was significant (p=.026), such that patients who came from areas of similar deprivation to the rest of the group were more likely to have adequate attendance. The addition of this variable made the effect of patient IMD non-significant (p=.966). Analysis indicated a significant correlation between patient IMD and IMD similarity (-.75, p<.001), such that patients in higher deprivation neighbourhoods had lower IMD similarity indices. Interactions between significant variables were all non-significant (all p>.05).

Finally, two sets of planned interactions were tested to investigate potential contextual effects, using Bonferroni correction due to the number of tests (alpha value 0.625%; p<.00625). The first set tested interactions between each similarity index and its corresponding patient-level variable (e.g. IMD similarity * IMD). These were all non-

significant (all p>.007). The second set tested interactions between each similarity index and group size. The only significant interaction was a single three-way interaction: age similarity * ethnic similarity * group size (p=.006). The interaction represents a cumulative effect, such that patients who are demographically similar to their peers in age and ethnicity are more likely to complete treatment if they are in a larger group, compared with a smaller group. As there were no main effects for this planned interaction, a new main variable was calculated for the patient's *weighted demographic similarity*. This represents the patient's age similarity * ethnic similarity indices weighted by their group size, and is mathematically identical to the interaction term.

The final model is shown in Table 1. Note that due to log-transformation, direct comparisons cannot be made between the coefficients of each variable.

[TABLE 1 HERE]

Table 2 shows the relative impact of each variable on the predicted probability of completion. An average (and therefore employed) patient was predicted a 72.5% chance of completion, whilst an otherwise average unemployed patient was predicted a 62.8% chance of completion. An average patient aged 20 was predicted a 56.3% chance of completion, compared with 89.4% for an average patient aged 80. A one standard deviation increase in age (13.6 years) was associated with an average 7.5% increase in completion probability. An average patient with a PHQ-9 score of 10 (at the clinical cut-off) was predicted a 73.6% chance of completion, compared with 63.9% for a PHQ-9 score of 27 (maximum severity). A one standard deviation increase in depressive symptom severity (6.0 points) was associated with an average 3.2% decrease in completion probability. An average patient with an IMD similarity index of 0.10 was predicted a 63.5% chance of completion, compared with 78.6% for an IMD similarity index of 0.90. A one standard deviation increase in IMD similarity (0.188) was associated with an average 3.5% increase in completion probability.

[TABLE 2 HERE]

The weighted demographic similarity index represented a significant interaction between age similarity index, ethnic similarity index, and group size. The larger the group, and the more similar the patient was to the rest of the group in terms of age and/or ethnicity, the higher the predicted chance of completion. An average patient with an age similarity index and ethnic similarity index each of 0.1 in a group size of 5 was predicted a 67.8% chance of completion. This compares with an average patient with an age similarity index and ethnic similarity index each of 0.9 in a group size of 80, with a predicted 86.8% chance of completion.

Two sensitivity analyses were conducted with samples requiring groups to have 90% and 100% data completion. The 90% data completion model (N=1261, k=74) was identical to the primary model, except that the weighted demographic similarity term was non-significant. The 100% data completion model (N=493, k=45) found that the only significant variables were age ($p<.001$) and the IMD similarity index ($p=.008$).

Post-hoc analyses on all three samples tested the effects of group IMD mean and standard deviation for the purposes of hypothesis testing and interpretation, although these variables were not included in the final model. These analyses found that group IMD mean and group IMD standard deviation were both non-significant predictors, whether or not patient IMD was included.

A final sensitivity analysis tested the primary model using number of sessions attended as the outcome variable (median = 5). In this model, only age ($p<.001$), depression severity ($p=.010$), and unemployment status ($p<.001$) were significant – the group effect, weighted demographic similarity, IMD similarity index, and IMD were all non-significant (although both the IMD similarity index and IMD were significant when only one of them was included).

Post-treatment symptom scores (secondary outcomes)

Models were constructed using the same procedure as for the primary outcome. Significant variables in both the depression and anxiety outcome models were as follows: pre-treatment depression severity, pre-treatment anxiety severity, unemployment, and inadequate attendance (all $p<.001$, with the exception of unemployment $p=.012$ in the anxiety model). All were associated with higher post-treatment depression and anxiety symptom scores. Patient age was initially significant in both models, and patient IMD was initially significant in the depression model, but both became non-significant after the inclusion of inadequate attendance. No similarity indices or planned interactions were significant.

Discussion

This study found that the socio-economic similarity (IMD) of an individual to others in a group receiving a psychoeducational group intervention was a significant predictor of adequate vs inadequate attendance. This has been the first study to analyse the role the socio-demographic difference plays in terms of attendance at a group treatment. This effect was comparable in size to the effect of depressive symptom severity, and remained significant after controlling for individual and group-mean IMD. Although employment status was controlled for, further research is recommended to rule out confounding from other individual-level deprivation factors (such as individual levels of income and education). In addition to the effect of socio-economic similarity, patients were less likely to complete an adequate treatment dose if they were younger, unemployed, or had higher depressive symptom scores.

Contrary to expectations, main effects from more visible similarity indices (age, gender, ethnicity) were not statistically significant. However, patients' cumulative socio-demographic similarities to other group members (in this case taking age and ethnicity into account) were found to influence attendance, and this effect is more pronounced in larger groups. Also, there was no significant effect of similarity indices on clinical outcomes. This

suggests that the effect is isolated to attendance, reinforcing the theory that these effects are direct and not a consequence of poorer outcomes leading to a poorer engagement and dropout.

Therefore, we conclude that participants' difference from the group in terms of socio-demographic factors influences their attendance in the group. In summary, patients who are socio-demographically different to most other group members (particularly in relation to socio-economic status) were less likely to attend an adequate dose of treatment. One explanation may be that group members who do not perceive they fit well with the other participants feel a sense of stigma (Liamputtong & Kitisriworapan, 2012) and cope with this by absenting themselves from the group context and drop out of treatment. We recognise that this conclusion demands further research, in order to increase confidence in these novel findings, and test alternative explanations.

Although treatment acceptability (Tarrier et al. 2006) has tended to focus on the treatment itself and less on the context in which the treatment is delivered, the above findings fit within a wider evidence-base which highlights the adverse impact of socio-economic factors on psychological treatment utilisation (Delgadillo, Asaria, Ali, & Gilbody, 2016; Delgadillo, Farnfield, & North, 2018) and clinical outcomes (see review by Finegan, Firth, Wojnarowski, & Delgadillo, 2018). These studies consistently indicate that patients living in socio-economically deprived neighbourhoods are less likely to access and to benefit from psychological treatment. However, the mechanisms whereby socio-economic deprivation moderates the effects of treatment are not currently well understood. Studies have suggested that patients may feel better understood and therefore have a more favourable therapeutic alliance where there is less perceived social class disparity with the therapist, or where the therapist is able to recognize and mitigate the effects of such disparity (Krause, Espinosa, Tomicic, Córdoba, & Vásquez, 2018; Trott & Reeves, 2018). Group psychotherapy researchers have proposed an analogous process, where the extent to which group

psychotherapy members feel related and attuned to each other tends to influence their attendance and outcomes (Burlingame, Fuhriman, & Johnson, 2001).

However, these assumptions from individual and group psychotherapies may not necessarily extend to the context of large-group psychoeducational interventions such as stress control. In group psychoeducation such as stress control, because the therapeutic input is didactic, participants may never get the chance to correct any perceptions they may harbour regarding difference between participants. Previous research has shown from weekly therapist ratings of patient participation that those who dropped out during group CBT for depression participated significantly less than completers during the group sessions (Oei & Kazmierczak, 1997). During stress control, participation is not encouraged, as listening is championed. The notions of alliance and group cohesion, as commonly understood in the psychotherapy literature, are unlikely to reflect the type of (or lack of) relationship that stress control participants develop with the group. The stress control group context is more akin to that of educational interventions in academic settings, where participants develop a quasi-alliance with the "course" (i.e., tacit agreement / disagreement with the goals and tasks of a course), the "teacher" and other "students" (i.e., a tacit relational bond or affective reaction towards the teacher and/or other students). The present findings may possibly reflect the latter aspect of the group participant's affective experience: the extent to which a group participant feels related or unrelated to the other participants. In a context where discussions with other group members are limited, observable similarities and differences may implicitly lead to perceptions about *ingroup* or *outgroup* status, with little opportunity for any corrective experiences.

Meta-analytic studies have shown that the experience of ingroup-outgroup bias becomes intensified in contexts where an ingroup (a more homogeneous subgroup) is made salient by proportionate size or status (Mullen, Brown, & Smith, 1992). Furthermore, stronger ingroup membership perceptions enhance the experience of *social projection*, which

is a tendency to expect similarities between oneself and others, known to enhance group adherence and cooperation (Robbins & Krueger, 2005). Our findings fit within this wider social psychology research, since stress control group attendance was associated with socio-demographic similarity in larger groups (where ingroup status is made more salient by proportionate representation), and since socio-economic similarity (a marker of social status) was particularly relevant. From this viewpoint, it is plausible that stress control participants who perceived themselves to be similar and of equal socio-economic status to most other group members could have an enhanced sense of identification with others (social projection), which in turn may serve to promote commitment to the group and attendance of sessions.

Clinical implications

The current study suggests three clinical changes that could be acted upon to potentially reduce perceptions of socio-demographic difference and hence improve attendance rates. There is previous evidence that selecting stress control participants based on presenting problem severity can improve outcomes (Kellett, Newman, Matthews & Swift, 2004). The current research suggests that selecting and matching patients based on socio-demographic variables may assist in creating a greater sense of togetherness in the group. The second is in terms of the clinical vignettes that are used to demonstrate the change methods during stress control. If these could be adapted to portray a wide range of differing socio-demographic contexts, participants could feel less alienated in the group. Lastly, group facilitators could emphasize and normalize that participants may be perceiving the differences between themselves, but it would be useful to concentrate on the psychoeducative clinical materials if they want to get the best out of the group. There could also be a greater emphasis early in the program on the common and shared ways in which stress, anxiety and depression are experienced.

Strengths, limitations and future directions

To our knowledge, this is the first detailed examination of the influence of socio-demographic group composition on attendance of psychoeducational interventions for common mental health problems. We were able to examine this in a large (n > 2000 patients within k > 100 groups), multi-service, and socio-demographically diverse sample. Further strengths included the application of multilevel modelling, which adequately partitions the variability in outcome (adequate vs inadequate attendance) that may be attributable to group and individual-level variables.

An important limitation is that the current study used an area-level measure of socio-economic deprivation, rather than an individual or household-level measure (e.g. income). Therefore, it is possible that this IMD similarity index may partly or wholly encapsulate an unmodelled effect of geographic similarity. Further studies may benefit from controlling for other geographic factors (e.g. patients' distance from the treatment location; see Packness et al., 2017). Furthermore, the finding that individual IMD was initially significant, but later became non-significant with the inclusion of IMD similarity index has implications for interpretation. It may suggest that patients living in more deprived areas may be more likely to experience negative impact related to their difference to the rest of the group. This would fit with social psychology literature on the important influence of perceived lower social status (Mullen, Brown, & Smith, 1992).

Stability of effects. Sensitivity analyses on smaller, more conservative sub-samples suggested that the effect of IMD similarity index in particular appears to be robust. In contrast, a sensitivity analysis using the number of sessions attended as an outcome variable found no significant effect for IMD similarity index (or weighted demographic similarity). Our hypothesis is that this finding reflects an operational and conceptual difference between early dropout and number of sessions attended. In particular, the majority of variability in the

number of sessions attended was distributed towards the higher end of the scale (e.g. median attendance was 5 of 6 sessions), and this variable expressed more variability in this range due to the discrete operationalisation used (compared with the primary, binary outcome variable defined at the 1-3 vs 4-6 sessions cut-off). Many patients may miss one or two sessions due to external factors (such as conflicting schedules, short-term illness, etc.), meaning these variables may have a greater contribution in explaining this variability. In contrast, our outcome of interest (analogous to early dropout) may be less dependent on such factors and/or more dependent on factors related to engagement and group process.

Future studies need to replicate the findings, but also explore attendance and dropout rates in low intensity interventions that involve interaction between group members to see whether this ameliorates the effect detected here. Qualitative studies need to explore what difference means to people when they are attending a large group psychoeducation such as stress control. Future studies need to also explore and investigate whether intervening to reduce perceptions of difference and stigma impacts on attendance rates. There is some evidence that implementation intentions reduce drop out from stress control groups (Avishai et al. 2018), and the role of this low cost and easy to implement intervention could be explored in terms of reducing perceptions of difference and stigma.

Conclusions

Previous research in group psychoeducational interventions shows that adequate attendance (at least 4 to 6 sessions) is associated with better treatment outcomes (e.g. Delgadillo, Kellett, et al., 2016). Adequate attendance is influenced by patient characteristics such as age, employment and depression severity. After controlling for these individual features, we found that adequate attendance may also be influenced by the socio-demographic composition of psychoeducational groups, such that patients who are more socio-demographically similar to the rest of their group are more likely to attend adequate

intervention doses. In particular, socio-economic similarity (according to a neighbourhood index of deprivation) was associated with the likelihood of adequate attendance / dropout. This suggests that context matters to the attendees of this large group treatment format, and participants are experiencing the group as well as the intervention.

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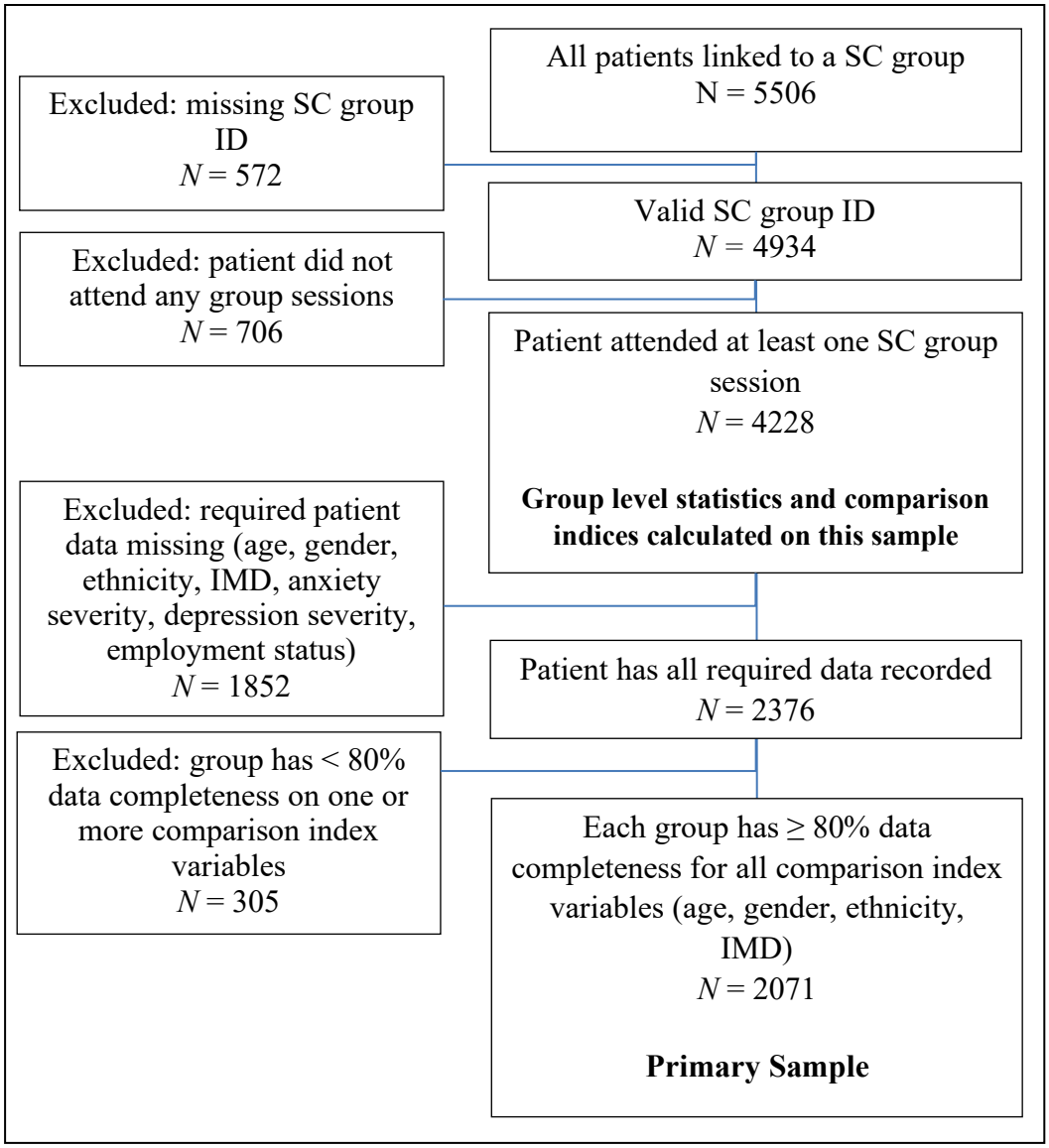

Figure 1. Inclusion and exclusion of patients for analysis. IMD = Index of Multiple Deprivation, SC = Stress Control.

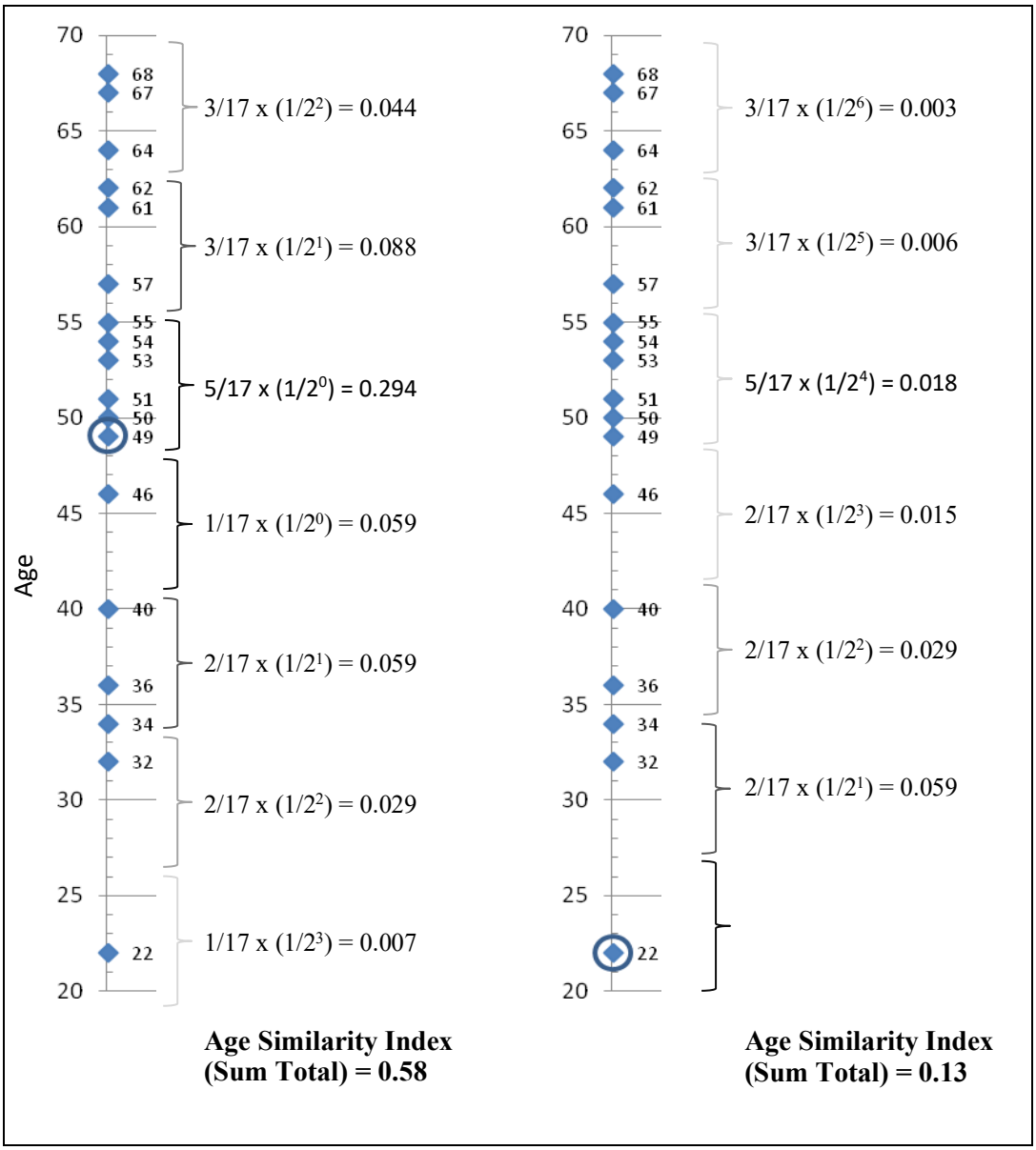

Figure 2. Age similarity indices for two patients (age 49 and age 22 respectively) in an example group of 18 patients, using a polynomial weighting function of 1/(2^(category distance)) and a category size of 0.5SD (6.97).

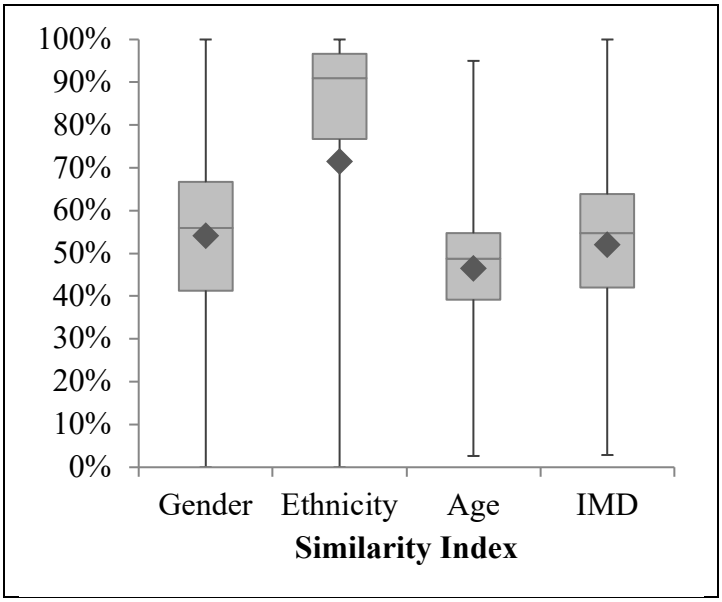

Figure 3. Box plot of similarity index summary data. Means are shown by diamonds, medians by horizontal lines, inter-quartile ranges by boxes, and ranges by whisker lines.

Table 1. *Primary multilevel model specification.*

Fixed Effect	**Coefficient[a]**	**S.E.**	**p value**	**95% CI**		
Age	0.0314	0.0039	<.001	0.024	to	0.039
Depression Severity	-0.0266	0.0086	.002	-0.043	to	-0.010
IMD	0.0002	0.0047	.966	-0.009	to	0.009
IMD Similarity	0.9334	0.4205	.026	0.109	to	1.758
Unemployed	-0.4455	0.1360	.001	-0.712	to	-0.179
W. Demog. Similarity	0.0176	0.0070	.006	0.004	to	0.031

[a]Due to log-transformation, direct comparisons cannot be made between the coefficients of each variable

IMD = Index of Multiple Deprivation. W. Demog. Similarity = Weighted Demographic Similarity, a composite variable comprised of Age Similarity x Ethnic Similarity x Group Size.

Table 2. *Relative impact of variables on the predicted probability of completing an adequate dose of treatment.*

Categorical Variable	**Values**		**Average change in completion probability if value is "yes"**
Unemployed	yes/no		-9.7%
Continuous Variable	**Possible range**	**sample SD**	**Average change in completion probability associated with a 1 SD increase in variable**
Age	0+	13.56 years	+7.5%
PHQ-9 pre score	0-27	6.04 points	-3.2%
IMD similarity index	0-1	18.85%	+3.5%
IMD	0-100	16.17 points	+0.05% (not significant)
Age similarity index*	0-1	13.53%	+1.3%
Ethnic similarity index*	0-1	22.57%	+1.2%
Group size*	1+	22.31 people	+2.9%

* compound interaction term only – no main effect of each variable