Social Isolation Predicts Frequent Attendance in Primary Care

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RUNNING HEAD: Social isolation and frequent attendance

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Abstract

Background. Frequent attenders in primary care have complex physical and mental healthcare needs as well as low satisfaction with their healthcare. Interventions targeting mental health or psychoeducation have not been effective in reducing attendance. Here, we test the proposition that both frequent attendance and poor health are partly explained by unmet social needs (i.e., limited social group support networks).

Methods. Study 1 (*N*=1752) was a large cross-sectional community sample of primary care attenders in Scotland. Study 2 (*N* = 79) was a longitudinal study of a group of young people undergoing a life transition (moving countries and commencing university) that increased their risk of frequent attendance. Study 3 (*N*=46) was a pre-post intervention study examining whether disadvantaged adults who joined a social group subsequently had reduced frequency of primary care attendance.

Results. All three studies found that low social group connectedness was associated with a higher frequency of primary care attendance. This was not attributable to poorer health among those who were socially isolated. In Study 3, joining a social group led to reduced primary care attendance to the extent that participants experienced a (subjective) increase in their social group connectedness.

Conclusions. Unmet social needs among frequent attenders warrant closer consideration. Interventions that target social group connectedness show promise for reducing overutilization of primary care services.

Keywords: frequent attenders; family practice; health services research; mental health; somatization; multiple group membership; social identity.

Social isolation predicts frequent attendance in primary care

Frequent attenders in primary care warrant research investigation for at least three reasons. The first is economic: the top 10% of attenders account for 30-50% of appointments with general practitioners (GPs; 1), and are therefore a considerable strain on the healthcare system. If the needs of this population could be served in less practitioner time, this would reduce waiting times and improve outcomes for all patients. A second reason for concern is that these patients are typically dissatisfied with the quality of healthcare they receive (2). This is reflected in their ongoing health profile, which is typically one of complex physical and mental illness and slow decline over time. This suggests that the primary care model is one that may not be optimally suited to the needs of the frequent attender population (3, 4). A third reason why frequent attenders warrant further research is that they are often cited by physicians as a cause of occupational stress and burnout (5, 6): these are "heartsink" patients who challenge one's sense of professional competence and efficacy.

Perhaps unsurprisingly, relative to other patients, frequent attenders are more likely to be experiencing poor physical health as well as poor mental health (7), usually reporting several comorbid chronic diseases that require ongoing management (2, 8). Frequent attendance in primary care is, of course, at least in part attributable to this health profile, although researchers have generally agreed that undiagnosed mental illness and somatization are also major contributors to frequent attendance (9-12). Demographically, frequent attenders are typically older women and they are more likely to be socioeconomically disadvantaged (13, 14).

Several interventions have been trialled to reduce frequent attendance, in the interests not only of triaging resources but also of improving patient outcomes and reducing physician burnout. A review (15) identified 5 randomised controlled trials that have been conducted to assess 4 different interventions, all of which focused either on mental health,

psychoeducation, or some combination thereof. Although two of these interventions led to a reduction in depression symptoms (16, 17), unfortunately, none improved quality of life. Moreover, none of these interventions reduced primary care attendance, and in fact, one intervention lead to a significant increase in frequency of attendance (16, see also 18). These disappointing results suggest the need for further research – not only to trial novel approaches to intervention, but also to test alternative hypotheses about the causes of frequent attendance and the specific needs of this population.

Social isolation and frequent attendance

It is interesting that, despite low satisfaction with health services, frequent attenders continue to present in primary care. A functional behaviour approach (19) would suggest that the persistence of attendance indicates that it meets some need of patients. A study by Carter and colleagues (20) is relevant here, although it targeted frequent attenders at Accident and Emergency, rather than primary care. This study found 8 regular "check in" postcards from hospital staff reduced suicidal readmissions by 50% over a five-year follow-up. This study hints that social factors and not merely medical factors may play a role for at least some frequent attenders.

Consistent with this, previous research has indicated that frequent attenders are more likely to be experiencing interpersonal problems (21, 22) and to be socially isolated, both objectively (i.e., divorced, unemployed) and subjectively (i.e., lonely; 23). This is also in line with epidemiological literature, which has found that social exclusion (often due to stigmatised group memberships) co-occurs with socioeconomic disadvantage and poor health, and that the vast majority of people affected by such exclusion are women (24, 25). This is relevant because there is a large and robust evidence base demonstrating that social isolation is aversive (26, 27), and that people engage in a variety of strategies to counteract it. We propose that for some marginalised members of the community, their primary care

physician may be one of the few forms of regular, supportive contact that is socially sanctioned and affordable. Social isolation may therefore directly predict increased frequency of attendance.

Furthermore, social isolation is also a well-established risk factor for ill-health (28, 29), with some meta-analyses suggesting that social isolation is a stronger predictor of mortality than some more "common suspects" such as obesity and hypertension (30, 31). Much of this research has focused on social group connectedness, in the form of subjective self-definition in terms of particular group memberships (e.g., a teacher, a member of the church, a metalhead). Studies have suggested that group memberships not only protect against a decline in mental health (32), but that they are also associated with fewer health risk behaviours such as smoking (33, 34). The benefits of social group membership for health have been shown to also be strong among vulnerable communities, such as people experiencing homelessness (35) and people recovering from trauma (36).

The Current Project

We conducted three studies to test the degree to which social isolation might affect frequent GP attendance – either directly, or indirectly via its detrimental effect on health. Table 1 summarises the population, design, and analytic approach of each study. Across all three studies, we operationalised social isolation as the lack of subjectively meaningful connections to social *groups*. This approach is consistent with the emerging evidence base that social identity derived from membership in groups is the 'active ingredient' in social connectedness that provides its protective health benefit (e.g., 37, 38, 39). Study 1 was a cross-sectional study of all consenting patients at a stratified sample of five GP clinics from across Scotland. Study 2 involved a natural experiment looking at the longitudinal effect of a life transition (moving overseas to study) on social group connectedness, health, and primary care use.

Study 3 investigated the utility of an intervention with disadvantaged adults to increase social group connectedness as a means to improve health and reduce primary care attendance.

Analytic Approach

All three studies utilised hierarchical regression analyses to assess whether social group connectedness predicted frequency of primary care attendance (H1, H3 and H6). Study 3 additionally assessed whether frequency of attendance changed over time using a t-test (H5). All three studies then assessed whether this relationship could be accounted for by health status, conceptualised in terms of physical health (Study 1, H2), mental health (Study 2, H4), or subjective wellbeing (Study 3, H7). In all studies, health status was assessed both as a covariate in hierarchical regression analyses, then as a potential mediator in mediation analyses (using PROCESS Model 4, Hayes, 2012, 40).

Study 1

Study 1 involved a large community sample of Scottish adults and assessed the relationship between social group connectedness and frequency of primary care appointments: (1) over and above the effect of demographic factors known to be associated with frequent attendance (age, gender, and socioeconomic status); (2) over and above the effect of objectively measured indicators of chronic disease (systolic blood pressure, body mass index and the number of medications prescribed in the last six months). Systolic blood pressure (SBP) and body mass index (BMI) were chosen as measures of physical health for four reasons: (a) they are primary indicators of 'metabolic syndrome', including cardiovascular disease, diabetes and stroke, (b) they are established risk factors for frequent attendance, (c) data were available for the majority of people in the sample and (d) these are objectively measured indicators, which may be more reliable and valid than physician-recorded diagnoses or self-reported symptoms. Together with number of drug prescriptions each patient had received, these measures of health status were taken from patient's health

records as a proxy for the multiple chronic physical conditions that are often associated with frequent attendance.

The first hypothesis (H1) stated that social group connectedness would negatively predict the frequency of primary care attendance. The second hypothesis (H2) stated that the effect of social group connectedness on attendance would not be fully accounted for by the effect of health status. H2 was tested in two ways, first by adding indicators of health status to the regression model as covariates (H2a), and second using a mediation analysis whereby we expected the direct effect of social group connectedness on frequency of attendance to remain significant after accounting for any indirect effect via health status (H2b).

Study 1 Method

Participants were patients from five GP surgeries in three diverse locations across Scotland (some rural, some urban, some high SES, some low SES). Each GP surgery posted participation invitations to all their patients for whom the study was deemed suitable (those over the age of 18 who did not possess terminal illnesses or conditions such as dementia or Alzheimer's disease). This was a total of 21,165 patients. Of these, 2508 patients (11.85%) returned the reply slip included with the invitation. These patients received a consent form and a questionnaire via post. 1824 patients (henceforth participants) completed and returned this questionnaire (1054 females; 770 males, M_{age} = 57.55 years, *SD* = 14.57, range = 18-97 years); 1752 provided sufficient information on the variables of interest to be included in our analyses. Shortly afterwards, the second author visited each of the GP surgeries and collected relevant medical data for each of the participants from the surgery databases.

Measures.

Frequent attendance. Patients' attendance records at primary care were accessed for the preceding 6 months. On average, patients had visited their primary care clinic 3.83 times

in the last six months (*SD* = 5.50; range 0–70 visits). In total, 74.3 percent of patients had visited their doctor in the last six months.

Social group connectedness. We measured identification with the family, the local community, and a third group of the participant's choice. For each of the three groups, participants completed the four-item Group Identification Scale (33), which has been widely used in the investigation of the relationship between social groups and health (e.g., 41, 42). Each item was rated on a 1-7 scale (higher values = stronger identification), and the overall mean was found for each group. In accordance with validation studies, a participant was considered to identify with a particular social group if they scored 5 or more for that group (34, 43). We then counted the number of groups with which the participant identified (ranging between 0 and 3; *M* = 2.18, *SD* = .90).

Body Mass Index. BMI was calculated from physician-recorded height and weight. Only participants who had their weight recorded by their primary care physician a maximum of 365 days (i.e., 12 months) beforehand were coded as having valid BMI data (N=687). Of these participants, 36.5% were obese (BMI of 30 or greater).

Systolic blood pressure. SBP was recorded from chart data. Only participants who had their blood pressure recorded by their primary care physician a maximum of 365 days (i.e., 12 months) beforehand were coded as having valid SBP data (N = 944). Of these participants, 28.9% were hypertensive (i.e., had SBP of 141 or more for patients under 79 years of age, or 151 or more for patients aged 80 or over; or diastolic blood pressure of 90 or more, or both).

Drug prescriptions. The number of drug prescriptions made each participant by their GP in the last six months was recorded, including repeat prescriptions. Outliers were recoded so the maximum value on this measure was 10, resulting in a mean number of prescriptions of 3.29 (SD = 3.22).

Socioeconomic status. The location of each participants' GP surgery was used as a proxy measure of socioeconomic status. Specifically, practices were categorized on the basis of postcode as lowest status (1), medium status (2) or high status (3).

Study 1 Results

Of the 1752 participants, 57.3% were female and 49.4% were in employment of some form. Descriptive statistics for all the focal variables are presented in Table 2.

To assess the primary hypothesis (H1), a regression analysis was run with frequency of attendance as the dependent variable (see Table 3). The three key demographic variables (gender, age, and socioeconomic status) were entered at Step 1, and social group connectedness was entered at Step 2. Step 1 accounted for five per cent of variance in appointment frequency, with age (β = .22, p < .001) and socioeconomic status (β = -.10, p < .001) both significant predictors. At Step 2, social group connectedness was added (β = -.06, p = .009), which led to a significant increase in the percentage of variance explained by the model (F_{change} (1, 1747) = 6.81, p = .009). This effect was such that a patient with no important group connections had attended their primary care provider an average of 4.69 times in the past six months, compared to an average of 3.52 appointments among those patients with three important group connections.

To assess H2a, the regression analysis for H1 was repeated adding the three indicators of physical health to Step 1: BMI, SBP and drug prescriptions. Only participants who had valid blood pressure and weight data from the past 12 months available were included in the analysis (N = 645). In this analysis, only number of drug prescriptions contributed significantly to the model at Step 1 (β = .52, p <.001), with the six covariates combined explaining 24 per cent of the variance in appointment frequency. Step 2 of the model added social group connections (β = -.08, p =.021), which led to a significant increase in the percentage of variance explained by the model, F_{change}(1, 637) = 5.37, p = .021. Therefore,

social group connectedness was associated with reduced appointment frequency over and above three key indicators of chronic disease: BMI, SBP and drug prescriptions.

Finally, to test H2b, a mediation model was run (N = 645; PROCESS model 4; 40). This model tested whether the effect of social group connectedness on frequency of attendance could be fully explained via its effect on physical health status. Social group connectedness was included as the independent variable, with number of drug prescriptions, BMI and SBP included as the mediators and appointment frequency as the dependent variable. In each mediation model, all variables have been standardised to provide beta coefficients. The same covariates of gender, age and socioeconomic status were also included. This analysis revealed no significant effect of social group connectedness on BMI (β = .02, CI: -.06, .10, p = .677), SBP (β = -.03, CI: -.10, .05, p = .487), or number of drug prescriptions (β = -.02,CI: -.09, .05, p = .622). In keeping with this, the indirect effects of social group connectedness on frequent attendance via BMI (β = .00, CI: -.01, .01), SBP (β = .00, CI: -.01, .01) and drug prescriptions (β = -.01, CI: -.07, .03) were also non-significant. There was, however, a significant direct effect of social group connectedness on frequent attendance in the final model (β = -.10, CI: -.19, -.02, p = .021). The direct effect of drug prescriptions was also significant (β = .62, CI: .53, .71, p < .001). Therefore, and consistent with H2b, the effect of social group connectedness on frequency of attendance was not attributable to its relationship with physical health status.

Importantly, the tests of H1 and H2 were robust, yielding comparable results when alternative approaches to the regression models were tested. For instance, the results were substantively the same if: (a) covariates are not included in the analysis, (b) categorical indicators are used for obesity and hypertension, or (c) depression status, as measured using the Major Depression Inventory, is included as an additional covariate in Step 1.

Study 1 Discussion

Study 1 found a significant relationship between social group connectedness and reduced frequency of primary care attendance after controlling for established predictors of frequent attendance such as age, gender, and socioeconomic status. This relationship remained significant after controlling for measures of physical health status taken by the primary care physician (specifically, BMI and SBP), as well as the number of drug prescriptions received in the last six months. The fact that the association remains significant even when accounting for the number of drug prescriptions a person has received is particularly surprising, given that receipt of most prescriptions requires an appointment with a physician. Furthermore, the effect of social group connectedness on attendance was not attributable to the protective effect of social group connectedness on health. In sum, Study 1 established that lack of social group connectedness may warrant further investigation as a risk factor for frequent attendance in primary care.

Study 1 had several strengths, including its large, diverse sample, and the availability of GP records for measures of attendance, prescriptions, BMI and SBP (rather than relying on patient report). Ideally, however, patient histories across several years might have been extracted, rather than only six months of data as was available for this study. Another drawback of Study 1 is that the response rate was relatively low, and so we cannot be confident that it is representative of the Scottish population of general practice attendees more generally. Based on previous research using similar recruitment strategies, we expect that our sample may underrepresent people who rarely attend primary care (only registered patients could be invited to participate) and overrepresent middle-aged, middle-class women (44). It is also the case that our sample is older and less healthy than a general population sample, but this is to be expected given that these characteristics are associated with attendance in general practice (45). Nevertheless, our participants were not at high risk of

frequent attendance, and the cross-sectional design of our study means that causality cannot be inferred. It is, however, worth noting that the reverse causal pathway, whereby frequent attendance in primary care leads to less social group connectedness, does not seem plausible. However, a third variable, such as poor mental health, might feasibly lead to both increased GP attendance and social isolation. Study 2 aims to address these weaknesses by investigating the hypothesized relationships longitudinally.

Study 2

Study 2 was a longitudinal study of a population going through a life transition that is known to compromise both social group connectedness and health: beginning university in a foreign country (46,47). Study 2 focused particularly on mental health status and its relationship with service use, as among young adults, poor psychological health is a much more common reason for frequent attendance in primary care than poor physical health (48). The sample comprised international students (N = 79) commencing university at a large Australian university, surveyed at the beginning and end of semester. This pre-post transition design was used as a natural experiment to assess whether decreased social group connectedness over time correspond to increased health service use (H3). We further assessed whether any increase in primary care attendance could be fully attributed to worsening health status, or whether there is a direct protective effect of social group connectedness on primary care attendance (H4).

Study 2 Method

Participants were from diverse backgrounds and reported 20 different countries of origin. The majority had a South-East Asian background (25% from Malaysia, 19% from Indonesia, 15% from Singapore). Two-thirds of the sample were female, with an average age of 22 years (SD = 3.97; range 17-37). Full descriptive statistics are presented in Table 2.

Participants were eligible if they were international students in their first semester of study at a large Australian university, and were recruited in the first three weeks of semester through university social media, advertisements at halls of residence and events for international students. Participants completed measures of social group connectedness, mental health and primary care attendance at Time 1 (T1; in the first three weeks of semester) and Time 2 (T2; in the last three weeks of semester; approximately four months later).

Measures.

Social group connectedness. Unlike Study 1, participants were not prompted with specific social groups, but were instead asked to generate up to six groups to which they felt psychologically connected (following 49; see also 43). Participants were given the following definition of what constitutes a social group:

> Please think about **all the groups that you belong to**. These groups can take **any form**, for example, they could be broad opinion-based or demographic groups (e.g., feminist; Australian); leisure or social groups (e.g., book group or gardening group); community groups (e.g., church group); sporting groups (e.g., rugby or tennis club); work groups (e.g., sales team); professional groups (e.g., trade union); or any others you can think of."

After writing the names of up to six groups, participants were then asked to rate the importance of each group to them on a scale from 1 "Not at all important" to 7 "Extremely important". As in previous research, the number of groups that received an importance rating of 5 or higher were summed to provide an index of social group connectedness (37, 43).

Primary care attendance. Participants were asked how many times they had visited their General Practitioner in the last month. This time period was chosen because the participants in Study 2 had moved countries a varying amount of time prior to commencing university, and we aimed to keep *access* to primary care in the new country comparable across participants and across time periods. Therefore, we chose a short time period for

retrospective recall of frequency of attendance so that, for the majority of participants, the recall window would be entirely post-relocation at both time points (1, 50).

Mental ill-health. The Depression Anxiety Stress Scales – 21 item short-form (DASS; 40) total score was used as a global indicator of mental ill-health. This self-report measure includes questions about depression, anxiety, and stress symptoms (e.g., "I find it hard to wind down"). The DASS has been found to be reliable and valid in both clinical and non-clinical samples (51, 52). Reliability in the current study was also high (α_{T1}= .92; α_{T2}= .95). Study 2 analyses yield virtually identical results if the DASS depression and DASS anxiety subscales are used as our indicators of mental health, entered into the models either separately or together. Therefore, we used the DASS total score, both because we had no hypothesis regarding whether one presentation was more relevant to frequent attendance than the other, and to preserve power by reducing our number of variables in the analyses.

Study 2 Results

Descriptive statistics are presented in Table 2. A significant increase in frequency of attendance and mental ill-health was apparent over time, along with a significant decrease in social group connectedness.

H3 was tested in a regression model predicting frequency of primary care attendance at T2, see Table 4. Step 1 included T1 frequency of primary care attendance and T1 social group connectedness. Step 2 added T2 social group connectedness, in order to model how change in a person's degree of connectedness over a four-month period affected frequency of attendance.

Step 1 accounted for five percent of the variance in primary care attendance, with frequency of attendance at T1 the only significant predictor (β = .25, p = .030). The addition of T2 social group connectedness (β = -.26, p = .024) led to a significant increase in the percentage of variance explained by the model (F_{change} (1, 75) = 5.29, p = .024). Consistent

with H3, this effect was such that the odds of being a frequent attender (more than one appointment in the last month) was six times higher for those who had 0 important groups compared to those who had three or more important groups.

A follow-up analysis to test H4a expanded the regression model adding T1 mental ill-health (at Step 1) and T2 mental ill-health (at Step 2) to the model. Unexpectedly, neither mental ill-health at T1 (β = .04, p = .759) or T2 (β = -.08, p = .557) significantly predicted primary care attendance after accounting for baseline frequency of attendance. However, T2 social group connectedness remained a significant predictor, (β = -.29, p = .023).

To assess H4b, a mediation model (PROCESS model 4; 40) was run with T2 social group connectedness as the independent variable, mental ill-health at T2 as the mediator, and T2 appointment frequency as the dependent variable. T1 measures of all three variables were included as covariates, and hence this model is best interpreted as testing how change in social group connectedness leads to change in primary care use (via change in mental ill-health). This analysis revealed a significant effect of social group connectedness on mental ill-health (β = -.26, CI: -.46, -.06, p = .012). There was also a significant direct effect of social group connectedness on frequency of attendance, β = -.29, CI: -.53, -.04, p = .023. However, there was no significant effect of mental ill-health on attendance (β = -.08, CI: -.36, .19, p = .557), and therefore the indirect effect of social group connectedness on frequency of attendance was also non-significant (β = .02, CI: -.03, .14). Therefore, and consistent with H4b, the effect of social group connectedness on frequency of attendance was not attributable to its relationship with mental health status.

Study 2 Discussion

Study 2 found a significant increase over time in frequency of primary care attendance among this sample of students transitioning to university in a foreign country. Consistent with H3, the increase was predicted by a decline in social group connectedness

over the same time period. In line with H4, the link between low social group connectedness and frequent attendance was not attributable to a concurrent decline in mental health.

A strength of Study 2 was its culturally diverse sample, which strengthens our confidence that the link between social group connectedness and primary care attendance are not limited to Western samples. Study 2 also allowed the investigation of this relationship among a population who were transitioning through a period of high risk, both for their health and their social group connections. Primary care physicians may be a particularly important point of contact for East Asian people experiencing mental illness, as research has indicated that this sample is more likely to experience and report physical symptoms (e.g., tiredness), rather than emotional symptoms (e.g., sadness, 53).

A weakness of the study, however, was that the very life transition which placed participants at risk (moving to a new country and commencing university) may also have made it challenging to access primary care during the study period (which is why we asked about GP appointments only across the past month). The lack of relationship between mental health and frequency of attendance was also unexpected, and should be interpreted with caution given it is inconsistent with prior findings (although none exist with a comparable sample). Nevertheless, Study 2 supports previous research suggesting that transition to university is a high-risk period for mental health and high use of primary care, and indicates that a reduction in social group connectedness may be a shared determinant of these outcomes. This suggests that a fruitful avenue in reducing frequent attendance among vulnerable populations may be social or community interventions that aim to increase and maintain social group connectedness. Study 3 investigates this possibility. Additionally, Study 3 includes a measure of participants' *subjective* evaluation of their health status, which, in capturing a person's awareness of and responsivity to their symptoms, may be particularly likely to drive frequent attendance.

Study 3

Study 3 was a small intervention pilot study (N = 46), which assessed whether joining a community recreational group can reduce primary care utilisation three months later. The sample was a disadvantaged population who were at high risk of complex health problems, and were mostly high users both of primary care as well as specialist and emergency health services.

Three hypotheses were proposed. First, we hypothesized that joining a recreational group would lead to an overall reduction in primary care attendance at follow up (H5). Second, we hypothesised that the mechanism of this reduction would be an increase in social group connectedness over the same time period (H6). Third, we hypothesised that the relationship between increased social group connectedness and reduced frequency of attendance would not be fully accounted for by improved health status (H7). Study 3 focused on subjective wellbeing as an indicator of health, a variable which has been widely used in epidemiological research and has been found to be a reliable predictor of primary care consultations and longevity (54).

Study 3 Method

Participants were 46 disadvantaged community members (75% female, mostly not employed, *M* age 45) who were facilitated to join a recreational social group. Participants joined a social group that best matched their interests and circumstances (e.g., indoor soccer, sewing), from a variety of groups run by a non-government organization (*Reclink*). Groups were run weekly in a disadvantaged regional area and mostly facilitated by social workers. Referral pathways to the groups included discharge from psychiatric hospital, domestic violence services, drug and alcohol services, and housing services. Therefore, participants' healthcare needs were typically high and complex. Importantly, participants' use of healthcare services was not discussed or discouraged in the social groups, which focused

entirely on social connection and recreational activity. Participants were surveyed when they commenced attending the group (at the first session; T1) and three months later (T2).

Measures

Primary care attendance. Participants responded to a self-report question which asked how often they had visited their general practitioner over the past three months. This time period was chosen because it corresponds to the time delay between T1 and T2. Study 3 participants had more than double the average number of primary care visits found in Study 1 or 2, with an average of 3.74 visits in the last three months at T1 (range 0-15).

Social group connectedness. As in Study 2, the group listing task was used. Social group connectedness was operationalised as the sum of the number of important groups (i.e., groups rated 5, 6 or 7 out of 7) from 0 to 6.

Subjective wellbeing. In Study 3, subjective health status was measured using the following two items (referencing the social recreational intervention activity): "Since joining this activity, has your physical health and fitness…" and "Since joining this activity, has your mental health and wellbeing…" Both questions had three response options: "Gotten worse" (0), "Stayed the same" (1), or "Improved" (2). Responses to these two items were summed to form a 0-4 scale in which higher scores indicated a greater degree of improvement in subjective wellbeing. Study 3 analyses yield virtually identical results if the two individual items are used as separate indicators of subjective wellbeing, entered into the models either separately or together. Therefore, we used the sum score, both because we conceptualized subjective wellbeing as encompassing both physical and mental wellbeing, and to preserve power by reducing our number of variables in the analyses.

Study 3 Results

A paired samples *t*-test was conducted to assess H5. Results indicated that primary care attendance reduced significantly following social intervention, $t(45)$ 3.28, $p = .002$.

Overall, 41.3% of participants experienced a reduction in the frequency of primary care attendance, which represents a Number Needed to Treat of 2.4 (i.e., the average number of people who would need to be exposed to this intervention in order for one person to experience a benefit). While we cannot confidently attribute this to the intervention in the absence of a control group, we can investigate whether there is evidence for our theorized mechanism. Specifically, does an increase in important group memberships predict the reduction in GP attendance? Confirming H6, this is exactly what we found.

A regression analysis was run to predict frequency of attendance at T2, see Table 5. Step 1 included T1 frequency of attendance and T1 social group connectedness. Only frequency of attendance at T1 was an independent significant predictor (β = .71, p < .001). Step 2 added T2 social group connectedness (β = -. 36, p = .042), which in accordance with H6, led to a significant increase in the percentage of variance explained by the model, F_{change} (1, 42) = 4.39, p = .042. This effect was such that a participant who gained one (psychological) group membership (25% of the sample) after commencing the social intervention was likely to have one fewer primary care appointment over the intervening three months than a participant who lost one group membership over the same period (11.4% of the sample).

To explore the robustness of this finding in line with H7a, the regression model used to assess H6 was repeated with subjective welbeing included as a covariate (at Step 1). Eighty percent of participants reported some degree of improvement in their subjective wellbeing. Social group connectedness at T2 remained a significant predictor of frequency of attendance at T2, (β= -.36, p = .012).

Finally, to assess H7b, a mediation model (PROCESS model 4; 40) was run with T2 social group connectedness as the independent variable, subjective wellbeing as the mediator, and T2 appointment frequency as the dependent variable. T1 measures of social group

connectedness and appointment frequency were included as covariates, and hence the results are best interpreted as modelling how change in social group connectedness (following the social intervention) affects subjective wellbeing and primary care use. This analysis revealed a significant direct effect of social group connectedness on frequency of attendance, β = -.36, CI: -.63, -.08, p = .012. There was a marginally significant effect of social group connectedness on subjective wellbeing (β =. 35, CI: -.03, .73, p = .067), as well as a marginally significant effect of subjective wellbeing on attendance (β = .21, CI: -.01, .43, p = .059). The indirect effect of social group connectedness on frequency of attendance (via subjective wellbeing) was significant (β = .07, CI:-.001, .25). Therefore, the effect of social group connectedness on frequency of attendance acted partially (though not entirely) through it effect on subjective wellbeing.

Study 3 Discussion

Study 3 found that vulnerable members of the community who join a recreational group experience a significant reduction in their frequency of primary care attendance three months later. Those participants who subjectively experienced a gain in their social group connectedness were most likely to exhibit this reduction in attendance. Furthermore, participants did experience a gain in their subjective wellbeing over the same time period, and the relationship between social group connectedness and frequency of attendance was partially attributable to their subjectively improved health status.

A strength of Study 3 was its longitudinal design in a vulnerable population, with the intervention conducted in a realistic community setting. This increases the likelihood that a social intervention such as this would be affordable and feasible in practice. However, weaknesses of Study 3 were its small sample and the fact it was not a controlled trial. The subjective wellbeing measure also relied on retrospective recall. Study 3 therefore provides only preliminary evidence for the effectiveness of this particular intervention for frequent

attendance. Nevertheless, this study speaks to the promise of interventions for frequent attendance that target the *unmet social needs* of patients, rather than purely educational or mental health-focused interventions such as those previously trialled.

General Discussion

Across three studies, we found that social group connectedness was associated with reduced primary care attendance. This was found among a large and diverse sample in Scotland recruited from primary care registers (Study 1), among a sample of students transitioning to university in a foreign country (Study 2); and among a vulnerable population with complex health needs who joined a community recreational group (Study 3). Furthermore, each study also found that the link between social group connectedness and frequent attendance could not be explained by the fact that those with lower social group connectedness had poorer health in general. In other words, while positive changes in social group connectedness did predict better health in Studies 2 and 3, this was not the only reason why people with more social group connectedness attended their primary care physician less often. Instead, to understand the link between social group connectedness and frequent attendance, we need to consider the psychological needs that frequent attending might meet.

Specifically, the evidence presented here suggests that frequent attendance is not solely the result of one's poor physical or mental health status. This is consistent with the literature indicating that interventions targeting psychoeducation or mental health have been ineffective in reducing the number of primary care consultations. Instead, frequent attenders are more likely to be isolated from meaningful social groups, from which they can derive emotional support (55) and contribute meaningfully to their community (56). This alienation from typical sources of social connection may increase the likelihood that, in times of stress (whether related to compromised health or not), a person will draw upon the support of their primary care physician. This constitutes 'inappropriate' use of healthcare resources, in the

sense that providing such support does not require the specialist medical training of a primary care physician. However, the psychological need for social connection is fundamental (57), and thus it is not surprising that people may seek to meet this need in any manner that is available to them.

It is therefore of particular significance that in Study 3, we were able to demonstrate that by meeting the social needs of patients through other means (i.e., recreational groups facilitated by a community organisation), the frequency of primary care attendance could be reduced. We consider this a very promising avenue for future research, given the cost-effective nature of such (social) interventions. These findings are also consistent with other evidence that disadvantaged adults experience health and wellbeing benefits from arts-based groups (e.g., 58). Clinical interventions that target social isolation, or assist patients to meet their social needs (e.g., 59) may also be appropriate for frequent attenders. Of course, this is not to suggest that social interventions should or could replace appropriate healthcare, but rather that when social needs are met, one factor leading to frequent attendance is removed. The main implication of this research for clinical practice is that physicians who seek to better meet the needs of frequent attenders may find benefit in attending to the social worlds of their patients – and discussing appropriate means through which unmet needs could be addressed.

The studies presented here have several strengths, particularly in the diversity of their samples: Study 1 was a large and broad survey of primary care patients in Scotland, Study 2 was a culturally diverse sample of young adults surveyed at the beginning and end of a major life transition, and Study 3 examined the effect of a social intervention for a sample of vulnerable members who were at risk due to social disadvantage and complex health issues. Furthermore, each study conceptualised and measured health status in a different way (objectively measured physical health indicators in Study 1, mental health in Study 2,

subjective wellbeing in Study 3). However, while these studies were able to establish the relationship between social group connectedness and frequent attendance and rule out some alternative explanations, a strong causal argument would require experimental evidence. For instance, a next step for future research might be to conduct a randomised controlled trial of a social intervention among a sample of frequent attenders.

Conclusions

In sum, this research has demonstrated frequent primary care attendance is not a simple function of poor health or somatization, as has been suggested by the literature to date. Instead, frequent attendance is probably motivated by *social* needs, as well as by health needs. While the pain and distress of feeling alienated may not be a medical issue, it is nevertheless a significant problem which compromises quality of life, and one that might be addressed through social intervention. Furthermore, such social intervention may be a better fit for the healthcare needs of frequent attenders, with consequent benefits for mental and subjective physical health. This is an important finding for primary care physicians in particular, as they are often one of the few available points of social connection among isolated people. To the extent that group-based social connection can be supported through other means, this may have benefits not just for a person's health, but also for the effective and cost-effective functioning of the healthcare system.

Table 1.
Summary of Population, Methodology and Analytic Approach for Studies 1, 2 and 3.

	Study 1	**Study 2**	**Study 3**
N	1752	79	46
Population	Attendees at 5 Scottish GPs (low, medium and high SES).	Students transitioning to university in a foreign country	Disadvantaged community members with complex health needs
Design	Cross-sectional	Longitudinal	Pre-post intervention
Main IV	Social group connectedness: Number of highly identified groups (0-3)	Social group connectedness: Number of important groups (0-6)	Social group connectedness: Number of important groups (0-6)
Main DV	Appointment frequency last 6 months (chart data)	Appointment frequency last month	Appointment frequency last 3 months
Covariates	Age, gender, socioeconomic status *(hypotheses assessed with and without these included)*		
Health measures	Physical health: • Body mass index (BMI) • Systolic blood pressure (SBP) • Number of prescription medications	Mental health: • DASS total score	Subjective wellbeing: • Self-reported improvement from T1 to T2
Hypotheses and analytic approach	H1: Social group connectedness will predict frequency of attendance: hierarchical regression model H2a: Effect of social group connectedness on frequency of attendance will hold with health measure included as a covariate: hierarchical regression analysis H2b: Effect of social group connectedness on frequency of attendance will not be fully mediated through health status: mediation analysis	H3: Social group connectedness will predict frequency of attendance: hierarchical regression model H4a: Effect of social group connectedness on frequency of attendance will hold with health measure included as a covariate: hierarchical regression analysis H4b: Effect of social group connectedness on frequency of attendance will not be fully mediated through health status: mediation analysis	H5: Frequency of attendance will reduce following intervention: t-test H6: Social group connectedness will predict frequency of attendance: hierarchical regression model H7a: Effect of social group connectedness on frequency of attendance will hold with health measure included as a covariate: hierarchical regression analysis H7b: Effect of social group connectedness on frequency of attendance will not be fully mediated through health status: mediation analysis

Table 2.
Descriptive statistics for Studies 1, 2 and 3.

	Study 1 (N = 1752)			Study 2 (N = 79)			Study 3 (N = 46)		
	M	SD	Range	M	SD	Range	M	SD	Range
1. Social group connectedness (T1)	2.18	0.90	0-3	2.63	1.73	0-6	2.02	1.63	0-6
2. Social group connectedness (T2)				2.23*	1.58	0-6	2.61*	1.63	0-6
3. Frequency of primary care attendance (T1) [a]	3.83	5.50	0-70	0.25	0.65	0-4	3.74	4.05	0-15
4. Frequency of primary care attendance (T2) [a]				0.70*	1.39	0-7	2.28*	2.63	0-10
Demographics									
5. Age	57.47	14.50	18-97	22.04	3.97	17-37	44.67	13.87	19-70
6. Gender (female = 0; male = 1)	57.5% female			67.1% female			73.9% female		
7. Social status	2.42	0.62	1-3						
Health measures									
8. Body mass index *N* = 687	28.99	5.74	16–52						
9. Systolic blood pressure *N* = 944	132.51	15.78	90-186						
10. Number of prescription medications	3.29	3.21	0-10						
11. Mental ill-health (T1)				30.19	21.54	0-94			
12. Mental ill-health (T2)				36.34+	24.50	0-84			
13. Subjective health status (T2)							5.35	0.80	4-6

* Significant change from T1 to T2 at $p < .05$

a. Frequency of primary care attendance was measured across the previous six months in Study 1, across the last month in Study 2, and across the last three months in Study 3.

Table 3.
Study 1: Regression analysis to whether social group connectedness predicts frequency of GP attendance (H1).

		β	*B*	*F* change	R^2 change
Step 1				32.62	.053*
	Age	.22*	.08		
	Gender	.03	-.35		
	Socioeconomic status	-.10*	-.87		
Step 2				6.81	.004*
	Social group connectedness	-.06*	-.39		

N = 1752
Dependent variable = Frequency of GP attendance over last six months
* $p < .0533$

Table 4.
Study 2: Regression analysis to assess whether change in social group connectedness can account for reduced GP attendance in students transitioning to university (H3).

		β	*B*	*F* change	R^2 change
Step 1				3.14	.076*
	Frequency of GP attendance over last month, T1	.25*	.12		
	Social group connectedness, T1	.10	.04		
Step 2				5.29	.061*
	Social group connectedness, T2	-.26*	-.11		

N = 79
Dependent variable = Frequency of GP attendance over last month, T2.
* $p < .05$

Table 5.
Study 3: Regression analysis to assess whether increased social group connectedness following a social intervention can account for reduced GP attendance (H6).

		β	*B*	*F* change	R^2 change
Step 1				20.73	.491*
	Frequency of GP attendance over last 3 months, T1	.71*	.46		
	Social group connectedness, T1	.21	.34		
Step 2				4.39	.048*
	Social group connectedness, T2	-.28*	-.46		

N = 46
Dependent variable = Frequency of GP attendance over last 3 months, T2.
* $p < .05$

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