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Research Article

Social Identity Processes Within Online Support Groups for People With Long Covid: A Longitudinal Survey

Freya Mills[1], **John Drury**[1], **Charles Symons**[2], **Dale Weston**[2], **Richard Amlôt**[2], **Holly Carter**[2]

1. University of Sussex, United Kingdom; 2. UK Health Security Agency, London, United Kingdom

Online support groups provide support to people with Long Covid in the absence of formal treatment, but their effects on health outcomes are unclear. In this longitudinal study, we examined the role of shared social identity with an online support group, external psychological resources (support and connection), internal psychological resources (meaning and control), and negative posting norms on the mental and physical health outcomes of individuals with Long Covid. Participants completed an online survey at three timepoints: June-July 2024 (n = 102), August–October 2024 (n = 95), and October–December 2024 (n = 95). Results showed that shared social identity consistently predicted external resources, but external resources did not predict health outcomes. Shared social identity did not predict internal resources, but internal resources predicted greater physical functioning, and lower depression and anxiety; but this effect was diminished when controlling for previous health outcomes. Interestingly, negative posting norms moderated the relationship in the longitudinal analyses, whereby at lower levels of negative norms external resources predicted greater internal resources. Overall, whilst online support groups may offer support and connection, there may be limitations to the benefits afforded by such groups for improving mental and physical health for people with Long Covid.

Introduction

In March 2024, 2.2 million people living in the UK were estimated to be experiencing Long Covid symptoms[1]. Long Covid is an infection associated chronic condition that affects multiple organs, with the most commonly reported symptoms being severe fatigue, shortness of breath, and cognitive dysfunction[2][3]. Individuals with Long Covid also experience greater depression, anxiety, and poorer quality of life compared to those who have never had COVID-19 or have recovered from the virus[2][4]. An interview study found that a deterioration in the mental health of those with Long Covid can be partly attributed to the uncertainty and severity of physical symptoms, the extreme disruption to daily life caused by physical symptoms, and the limited care and understanding from others[5]. With 69% of those with symptoms at 12 weeks still reporting symptoms at 52 weeks[2], it is vital that those with Long Covid receive adequate support. Despite this ongoing need for support, less than 40% of Long Covid services in the UK have confirmed that they are remaining open, and when these services accessed, patients are often discharged despite ongoing symptoms[6].

One way individuals with Long Covid are receiving support is through online peer support groups. A recent systematic review has shown that these groups are a source of informational and emotional support for those with other chronic conditions and can improve social wellbeing, adjustment, and health-related behaviour[7]. Such groups can be synchronous (e.g., audio or video calls) and/or asynchronous (e.g., social media platforms or direct messages). Online support groups have been involved in advancing the understanding of Long Covid and being a stable source of support, with this community being the first to use the term 'Long Covid'[8]. These groups can validate group members' experiences, provide information on symptom management, and can reduce social isolation, improve wellbeing, and, for some, lessen physical symptoms[9][10][11]. However, when the content of posts is negative, group members also report increased fear and reduced wellbeing, particularly given the constant access to group posts[12][10]. Whilst the current literature highlights the potential benefits, and possible limitations, of online support groups, there is a need to understand the possible underlying social psychological mechanisms for any effects and provide recommendations on how to optimise the experiences using these groups.

One possible mechanism for the effects of online peer groups is shared social identity amongst group members, which refers to viewing oneself, and others, as members of the same social group[13]. To date, studies have focused on quantitatively examining whether identifying with support groups predicts mental health and wellbeing outcomes in cross-sectional samples[14][15], qualitatively exploring whether support group members develop a shared social identity and what this means for group members[16][10], or analysing support group content[17][18]. The current study aimed to advance this research area by exploring, via a longitudinal survey, the effects of shared social identity with an online Long Covid support group on physical and mental health of group members.

Shared social identity within support groups

Membership of social groups can serve as a 'social cure', an independent factor that influences health, particularly when there is strong identification amongst group members[19]. Previous studies suggest that shared social identities are present within online support groups and may develop through shared experiences, shared values towards illness management, and pre-existing common identities[10], as well as through the actions of group moderators[16]. Shared social identities with support groups may have positive effects on mental health and wellbeing, as higher levels of identification with support group members is associated with lower levels of depression, anxiety, loneliness, and higher levels of satisfaction with life[15].

Shared social identity enables positive health outcomes through the psychological resources that it affords: support, connection, meaning and sense of personal control[19]. The roles of support, connection and control have been explored separately across a variety of groups[20][21][22][23][24], including among those with a chronic condition[25] and have been shown consistently to mediate the effects of social identity on mental health and wellbeing. Meaning, connection, and control have also been explored in combination with each other (sometimes alongside self-esteem) as a composite psychological resource[26][27]. One study also combined perceived support and connection into a single 'connectedness' variable, and found that priming group memberships, compared to interpersonal relationships, predicted connectedness, which in turn improved overall affect[28]. These studies suggest that rather than there being one "true" resource that mediates any 'social cure' effect, social identities satisfy a "suite" of needs[26]. Building upon this literature, this study distinguishes the 'external' (perceived support from, and connection with, online support groups) and 'internal' resources (feelings of meaning and personal control).

Given the experiences of individuals with Long Covid, it is plausible that online support groups may fulfil some of the unmet needs of group members, whilst they continue to pursue biomedical treatments. For example, many report not feeling supported or validated by friends, family and healthcare professionals[10][11] and feeling disconnected from existing relationships[9]. Furthermore, many may struggle to find meaning as they experience a loss of identity due to a disconnect between their former and current selves[29][30][11]. Also, the lack of available support from healthcare professionals, and the importance of developing a coherent self-narrative, has led many to take control of their health and identity, by reflecting on their experiences, conducting their own research on treatment options, and engaging with other people with Long Covid[29][9].

Influence of group norms on health outcomes

The social identity literature also suggests that group norms can influence the extent to which group members experience changes in their health and wellbeing[19]. Group norms can be descriptive, reflecting how group members typically behave, or they can be injunctive, reflecting how group members think they ought to behave[31]. The role of norms in support groups has previously been explored within two types of eating disorder support groups. Both groups provide support, but pro-eating disorder groups can normalise disordered eating through sharing weight-loss tips or affirming restrictions on food consumption, whereas recovery groups facilitate coping strategy development[17]. Therefore, the health outcomes of identifying with, and receiving support from, a support group, will differ according to each group's norms[32][17][33].

Whilst Long Covid itself is not associated with specific normative health behaviours, the posts made across the different online support groups for Long Covid vary. Interview studies suggest that groups with a higher proportion of negative content may increase fear and reduce wellbeing[12][10]. If normative posts are frequently negative, such as discussing treatment failures, expressing dissatisfaction, or sharing anxieties, they may have a negative impact on health and wellbeing compared to posts centred around finding joy or recovery strategies. Whilst the authors of such posts may receive support, and some readers may feel less alone by seeing others with similar experiences, high levels of negative content may result in a reduced sense of meaning and control, and therefore negatively influence health and wellbeing. This study will explore whether such negative content norms moderate any effects of shared social identity on health outcomes.

The current study

The literature suggests that shared social identity with an online support group may have a positive influence on health and wellbeing through perceived support and connection, and through personal control and meaning. However, these relationships may depend on group norms, specifically the extent to which negative posts are perceived as normative. Whilst a growing number of studies have explored the nuances of a potential role of shared social identity in online support groups, including underlying mechanisms of social identity[34][25], and the role of group norms[33], there are some limitations. Specifically: i) impacts on physical health have not been examined; ii) the processes have not been examined amongst individuals with Long Covid; and iii) studies have not assessed whether any effects persist in a longitudinal sample.

This study aims to address these gaps in a three-wave longitudinal online survey. Specifically, we aimed to i) explore the effect of shared social identity on physical health, physical functioning, depression, anxiety, and post-traumatic growth; ii) to identify whether such effects are mediated by internal and external psychological resources; and iii) to identify whether any effects are moderated by negative content within the groups. We developed the following hypotheses[1] (Figure 1):

H1: Shared social identity with an online support group will predict better health outcomes at both the same and subsequent timepoints, mediated by external (support and connection) and internal psychological resources (meaning and control)

H2: The relationship between external and internal psychological resources will be moderated by perceived levels of negative content, with high levels of negative content resulting in a negative relationship between external and internal resources. This will, in turn, result in reduced internal psychological resources and poorer health outcomes.

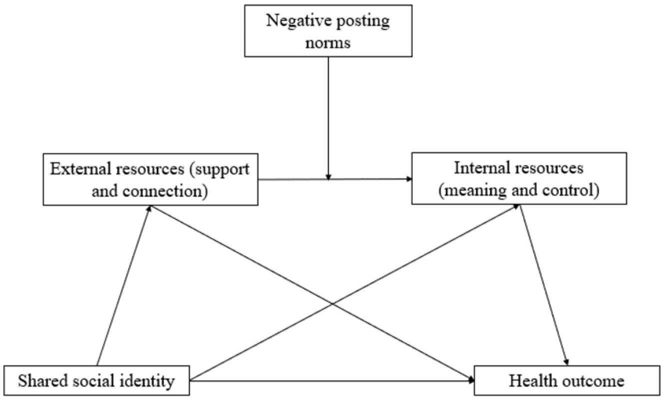

Figure 1. *The relationship between shared social identity and health outcomes (direct effect) will be mediated by external and internal psychological resources (indirect effect; Hypothesis 1). The mediation pathways are conditional on moderating negative group content (Hypothesis 2).*

Method

The study comprised an online questionnaire with a three-wave longitudinal design. Ethical approval was granted [BLIND] and the study was pre-registered on the Open Science Framework https://osf.io/thkv4/?view_only=f18188c1cbc049b8b41f840105c8430a

Patient and Public Involvement (PPI)

The reporting of PPI is in accordance with the short version of the Guidance for Reporting Involvement of Patients and the Public (GRIPP2-SF; Staniszewska et al., 2017). This study had a six-person (five female, one male) Patient and Public Involvement Panel. All panel members had symptoms of Long Covid and experience of using online support groups. The first author shared the draft questionnaire with panel members, before meeting them online (in two groups) for their feedback. The aim of the PPI was to gain feedback on the survey regarding its comprehensibility, suitability of the measures, and experiences of using the survey platform. Members also shared the recruitment details with their network and provided feedback on a draft report.

Following the feedback on the questionnaire, we changed the wording of the support scale to reduce ambiguity (see measures section). We also changed the wording of a question asking participants to name the online support group they "identify the most with" to "feel the strongest bond with". We also included a recommended physical functioning scale (FUNCAP-27; Sommerfelt et al., 2024), amended the physical health scale (see measures), and included an explanation of why we included both physical and mental health measures. Additionally, we amended the original list of included Long Covid symptoms, taken from the National Health Service (NHS, 2023), by re-framing loss-based symptoms (e.g., "loss of [smell]") to focus on symptom changes (e.g., "changes in [smell]") and broadening the list of symptoms to include those suggested by PPI members and included in the recommended Modified COVID-19 Yorkshire Rehabilitation Screening survey[35].

This feedback enabled us to understand how questions may be interpreted from the participant perspective. By making these changes we believe we have enhanced the validity of our study and have strengthened our contribution to the literature. PPI members also explained how traditional mental health measures (such as those used in this study) often don't reflect the experiences of people with Long Covid. There are currently no scales designed specifically for the experiences of depression and anxiety in Long Covid, so we have used standardised scales designed for clinical practice and research that have been used in previous studies with participants with Long Covid[4] (Ramírez-Vélez et al., 2023; Re'em et al., 2023).

Participants and procedure

Participants were recruited between 4th June and 29th July 2024 by sharing the study advert and description on X and on a private Facebook group set up to connect individuals experiencing COVID-19 and Long Covid with researchers, through the PPI panel, and by contacting online support group administrators. Participants were eligible to take part if they were: aged 18 or over, fluent in written English, experienced symptoms of Long Covid, and currently using an online support group for Long Covid. We aimed to recruit as many participants as possible within this timeframe. At T1 we recruited 195 participants but 76 were removed due to not providing contact details (n = 18), not meeting the inclusion criteria (n = 10), not selecting an online support group when asked which group they have used (n = 36), or not responding to any outcome measure (n = 11). Participants who did not complete all three timepoints were also removed from the final analysis (n = 17), leaving a final sample at T1 of 102 participants. At Time 2 (T2; 5th August – 7th October 2024), all participants were invited to complete the second survey, and we received 95 completed responses. At Time 3 (T3; 14th October – 9th December 2024) all participants from T1 were invited to complete the third survey and we received 95 completed responses. 88 participants completed all three waves. Informed consent was obtained, and participants were debriefed at the end of the survey. In exchange for their participation, participants were entered into a prize draw each time they completed the survey, with the chance to win a £30 Amazon voucher. If participants completed all three surveys, they were entered into a final draw with the chance to win a £75 voucher.

Table 1 presents an overview of participant demographics at each timepoint, Table 2 presents an overview of the symptoms experienced by participants, and Table 3 presents an overview of the types of online support groups used by participants. Most participants were White, female, living in the United Kingdom, and held an undergraduate or postgraduate degree. The most common symptoms reported were fatigue, changes in cognition, and post-exertional symptom exacerbation (i.e., when symptoms are made worse by exertion). Most participants reported using Facebook support groups, and most groups were reported to be moderated by people with Long Covid.

	T1, *n* = 102	**T2, *n* = 95**	**T3, *n* = 95**
Age: Mean (range)	47.3 (20 – 70)	47.36 (20 – 70)	47.9 (20 – 70)
Gender			
Woman	83 (81.37%)	76 (80%)	78 (82.11%)
Man	14 (13.73%)	14 (14.74%)	13 (13.68%)
Non-binary	1 (.98%)	1 (1.05%)	1 (1.05%)
Agender	1 (.98%)	0 (0%)	0 (0%)
Sex			
Female	86 (84.31%)	79 (83.16%)	80 (84.21%)
Male	14 (13.73%)	14 (14.74%)	13 (13.68%)
Ethnicity			
White	96 (94.12%)	89 (93.68%)	89 (93.68%)
Mixed or multiple ethnicities	2 (1.96%)	2 (2.11%)	2 (2.11%)
Latinx	1 (.98%)	1 (1.05%)	1 (1.05%)
Location			
United Kingdom	55 (53.92%)	50 (52.63%)	52 (54.74%)
United States of America	19 (18.63%)	18 (18.95%)	19 (20%)
Europe	14 (13.73%)	13 (13.68%)	12 (12.63%)
Canada	6 (5.88%)	6 (6.32%)	4 (4.21%)
Australasia	5 (4.90%)	5 (5.26%)	5 (5.26%)
Africa	1 (.98%)	1 (1.05%)	1 (1.05%)
Employment			
Full time employed	15 (14.71%)	14 (14.74%)	14 (14.74%)
Part time employed	22 (21.57%)	21 (22.11%)	21 (22.11%)
Self-employed	4 (3.92%)	4 (4.21%)	4 (4.21%)
Employed on long-term leave	12 (11.76%)	10 (10.53%)	12 (12.63%)
Full-time education	1 (.98%)	1 (1.05%)	1 (1.05%)
Retired	11 (10.79%)	11 (11.58%)	11 (11.58%)
Not in paid work	36 (35.29%)	33 (34.74%)	31 (32.63%)
Highest level of education			
GCSE or equivalent	0 (0%)	0	0
AS, A Level or equivalent	10 (9.80%)	9 (9.47%)	10 (10.53%)
Undergraduate degree	31 (30.39%)	29 (30.53%)	31 (32.63%)
Postgraduate degree	45 (44.12%)	43 (45.26%)	41 (43.16%)
Professional qualification	10 (9.80%)	10 (10.53%)	9 (9.47%)
Trade apprenticeship	2 (1.96%)	2 (2.11%)	2 (2.11%)
Living alone			
Yes	17 (16.67%)	15 (15.79%)	15 (15.79%)

	T1, *n* = 102	**T2, *n* = 95**	**T3, *n* = 95**
No	82 (80.39%)	77 (81.05%)	77 (81.05%)
Caring responsibilities			
Yes	36 (35.29%)	33 (34.74%)	34 (35.79%)
No	62 (60.78%)	59 (62.11%)	57 (60%)
Existing physical health condition			
Yes	35 (34.31%)	33 (34.74%)	34 (35.79%)
No	65 (63.73%)	60 (63.16%)	59 (62.11%)
Existing mental health condition			
Yes	29 (28.43%)	27 (28.42%)	26 (27.36%)
No	70 (68.63%)	65 (68.42%)	67 (70.53%)

Table 1. Participant demographics at each timepoint

Symptom	Number (%) at T1 (n = 102)	Number (%) at T2 (n = 95)	Number (%) at T3 (n = 95)
Breathlessness	65 (63.73%)	65 (68.42%)	63 (66.32%)
Changes in the sensitivity of your throat (e.g., troublesome cough or sore throat)	52 (50.98%)	44 (46.32%)	53 (55.79%)
Difficulties eating, drinking, or swallowing	22 (21.57%)	21 (22.12%)	20 (21.05%)
Changes in appetite	41 (40.20%)	33 (34.74%)	42 (44.21%)
Difficulties with mobility	73 (71.57%)	68 (71.58%)	64 (67.37%)
Fatigue	100 (98.04%)	93 (97.89%)	91 (95.79%)
Difficulties with your bowel or bladder (e.g., cramps, diarrhoea, increased urination)	59 (57.84%)	59 (62.11%)	55 (57.89%)
Changes in cognition (e.g., memory and attention)	95 (93.14%)	85 (89.47%)	83 (87.37%)
Changes to your voice (e.g., difficulty being heard, altered quality of voice, voice tiring by end of day, or inability to alter pitch)	34 (33.33%)	30 (31.58%)	33 (34.74%)
Changes in the way you communicate with others (e.g., difficulties putting thoughts into words, having a conversation, making sense of things people say to you)	83 (81.37%)	78 (82.11%)	71 (74.73%)
Changes in temperature regulation (e.g., increasing sweating or chills)	70 (68.63%)	62 (65.26%)	51 (53.68%)
Post-exertional symptoms exacerbation (i.e., where your symptoms are worsened by exertion)	95 (93.14%)	87 (91.58%)	81 (85.26%)
Orthostatic intolerance (i.e., symptoms that are presented when standing up that clear on lying or sitting down, e.g., Postural Tachychardia Syndrome – POTS)	62 (60.79%)	59 (62.11%)	62 (65.26%)
Tinnitus	53 (51.96%)	50 (52.63%)	56 (58.95%)
Changes to your allergies	27 (26.48%)	24 (25.26%)	19 (20%)
Headaches	72 (70.59%)	72 (75.79%)	70 (73.68%)
Pain	68 (66.67%)	62 (65.27%)	57 (60%)
Changes in sexual health	26 (25.50%)	22 (23.16%)	17 (17.89%)
Changes in menstrual cycle	21 (20.59%)	15 (15.79%)	12 (12.63%)

Table 2. Survey participants' experiences of Long Covid symptoms

	Number (%) at T1 (n = 102)	Number (%) at T2 (n = 95)	Number (%) at T3 (n = 95)
Platform of online support group			
Facebook groups	74 (72.55%)	72 (75.79%)	72 (75.79%)
Facebook messenger	8 (8.84%	15 (15.79%)	18 (18.95%)
Discord	10 (9.80%)	9 (9.47%)	9 (9.47%)
Reddit	3 (2.94%)	2 (2.11%)	3 (3.16%)
Message-based groups (e.g., WhatsApp, iMessage, Signal)	11 (10.78%)	14 (14.74%)	14 (14.74%)
Video platforms (e.g., Zoom, Teams, Google Meet)	14 (13.73%)	17 (17.89%)	18 (18.95%)
Slack	3 (2.94%)	3 (3.16%)	2 (2.11%)
Apps (e.g., Nura Community, Turnto, Mighty Network Platform)	4 (3.92%)	8 (8.42%)	5 (5.26%)
X/Twitter/Bluesky lists	5 (4.90%)	1 (1.05%)	2 (2.11%)
Instagram groups	0 (0%)	3 (3.16%)	3 (3.16%)
Email	0 (0%)	1 (1.05%)	0 (0%)
Moderation			
No, the group does not have formal moderation	10 (9.80%)	9 (9.47%)	8 (8.42%)
Yes, moderated by people with Long Covid	71 (69.61%)	72 (75.79%)	76 (80%)
Yes, moderated by people without Long Covid (e.g., healthcare professional)	4 (3.92%)	12 (12.63%)	8 (8.42%)
Yes, but I don't know who moderates the group	4 (3.92%)	3 (3.16%)	5 (5.26%)
I don't know if there is formal moderation	10 (9.80%)	6 (6.32%)	3 (3.16%)

Table 3. Online support group platforms used by survey participants

Measures

Participants were asked to write down the name of an online support group with which they felt the strongest bond. Questions relating to shared social identity, support, connection, and norms were asked in relation to this group. The full survey can be found on the Open Science Framework (https://osf.io/thkv4/?view_only=f18188c1cbc049b8b41f840105c8430a). Unless otherwise reported, response options were on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree), and a mean of the items for each variable was obtained for analyses.

Shared social identity

Shared social identity with an online support group was measured by three items adapted from Alnabulsi and Drury[36] (e.g., “I feel part of this online support group”)

Psychological resources

External resources included perceived support from, and connection with, online support group members[28]. An exploratory factor analysis confirmed that these measures formed one factor (Supplementary File 1). Perceived support was measured using an adapted version of the four-item social support scale[37]. Participants were asked “Do people in the online support group offer emotional support / help / resources / advice”. The scale was adapted to apply to the context of online support groups and, following discussions with PPI, was changed from “do you get the [help] you need…” to reduce ambiguity regarding whether support needed to be deemed effective. The phrase “you need” was also removed as they often cannot provide the help that is ‘needed’ (i.e., access to treatments). Connection was measured using three items adapted from Greenaway et al.[26], such as “I feel disconnected from the online support group”. Items were re-coded so that a higher score reflected a stronger connection.

Internal resources included meaning and control[26][27]. An exploratory factor analysis confirmed that these measures formed one factor (Supplementary File 1). Meaning was measured using the three-item Meaning in Life Questionnaire (e.g., “My life has a clear meaning or purpose”[38]). Control was measured using three-items (e.g., “I feel in control of my life”[21]).

Group norms

A scale was created to measure the descriptive norms around negative content of online support groups using a descriptive norm scale[39], the norms described in previous research[12][10] and through discussions with the PPI panel. 7-items were used (e.g., “how often do group members post about their worries or anxieties?”) .

Health outcomes

Physical health

Physical health was measured using the wording of a single-item physical health measure from 1 (poor) to 5 (excellent; e.g., “how would you rate your overall physical health?”[19]). Participants were asked to rate their overall physical health ‘before getting Long Covid’ and ‘now’, in line with the Modified COVID-19 Yorkshire Rehabilitation Screening survey[35]. A score was generated by calculating the difference between the two items.

Physical functioning

Physical functioning was measured using 10-items from three sub-scales of the FUNCAP-27[40], a functional capacity scale designed with Myalgic Encephalomyelitis (ME) patients. The survey used the items included in the following sub-scales: i) walking/movement; ii) activities in the home; and iii) activities outside the home. Participants were asked to rate whether they could do each activity on a scale of 0 (I cannot do this) to 6 (Unproblematic).

Depression

Depression was measured using the 10-item Center for Epidemiologic Studies Short Depression Scale (CES-D-R-10)[41]. Participants were asked to rate the frequency in response to statements, such as “I was bothered by things that usually don’t bother me”, on a scale from 0 (rarely) to 3 (most of the Time). Participants’ responses were summed.

Anxiety

Anxiety was measured using the 7-item Generalised Anxiety Disorder Assessment (Spitzer et al., 2006). Participants were asked to rate the frequency of experiencing symptoms, such as “becoming easily annoyed or irritable”, from 0 (not at all) to 3 (nearly every day). Participants’ responses were summed.

Post-traumatic growth

Post-traumatic growth refers to a positive change that can occur through the experience of trauma and adversity. It was measured using the 10-item Post-Traumatic Growth Inventory-Short Form[42]. Items (e.g., I changed my priorities about what is important in life) were rated on a 6-point Likert scale from 0 (“I did not experience this change”) to 5 (“I experienced this change to a very great degree”). Participants’ responses were summed.

Analysis

To test the hypotheses, a moderated mediation analysis was conducted using Model 91^2 in version 4.2 of the PROCESS macro for SPSS[43]. When probing the moderation, we used the percentile method as recommended[43]. For cross-sectional analyses, the variables from the same timepoint were included, and a separate model was conducted for each health outcome. For longitudinal analyses, T1 shared social identity was the predictor, T2 external and internal psychological resources were sequential mediators, T2 negative norms was the moderator of external and internal psychological resources, and T3 health outcomes were the outcomes. For cross-sectional analyses at T2 and T3, and longitudinal analyses, health outcomes at previous timepoints were included as controls, as in similar research[44]. The analyses involved 5000 bootstrapping samples with 95% confidence intervals using the percentile method. Values were mean centred for the construction of products. Listwise deletion was used for missing data. This was suitable as the test result from Little’s MCAR was non-significant ($X^2(109) = 95.52$, $p = .82$), suggesting that the missing data were random.

An effect-size sensitivity analysis was conducted using G*Power[45] to determine if we had sufficient power to detect effects[46]. Also, the Benjamini-Hochberg procedure was applied to control the false discovery rate (set at 0.1)[47].

Results

False discovery assessment and sensitivity checks

The largest *p* value that was equal to or less than its Benjamini–Hochberg critical value was <.001. The interpretation of the analyses did not change. We conducted a sensitivity analysis, which indicated that the smallest detectable effects are $f^2 = .19$ (converted to $R^2 = .16$), therefore some of the analyses are underpowered (see Supplementary File 1).

Descriptives and correlations

Table 4 provides an overview of descriptive statistics and internal reliability estimates for measures at each timepoint. Table 5 shows the correlations between each social cure component and health outcomes. As expected, there was a positive correlation between shared social identity and post-traumatic growth at most timepoints, but there was no association between shared social identity and other health outcomes. As expected, there was a negative correlation between internal resources and depression and anxiety, and a positive correlation between internal resources and physical functioning at all timepoints. There was a positive association between T1 internal resources and T1 and T3 post-traumatic growth. There was also a consistent positive correlation between negative norms and depression and anxiety.

Table 6 shows the correlations between each social cure component. There was a positive association between shared social identity and external resources consistently and T2 and T3 external resources were both positively associated with T3 negative norms. The correlations between internal resources and negative norms were inconsistent.

	T1			**T2**			**T3**		
Measure (score range)	**Mean**	**SD**	**α**	**Mean**	**SD**	**α**	**Mean**	**SD**	**α**
Shared social identity (1 – 7)	6.10	1.05	.89	5.91	0.97	.92	6.41	0.90	.92
External resources (1-7)	6.22	0.75	.79	6.05	0.74	.71	6.12	0.78	.76
Internal resources (1 – 7)	3.05	1.20	.81	3.32	1.31	.85	3.29	1.28	.85
Negative posting norms (1 – 7)	5.01	1.39	.91	4.86	1.50	.94	4.80	1.51	.93
Physical health (0 – 4)	2.82	0.85	N/A	2.78	0.98	N/A	2.61	1.07	N/A
Physical functioning (0 – 6)	2.82	1.16	.90	2.91	1.28	.91	2.85	1.29	.91
Depression (0 – 30)	16.22	5.84	.80	14.97	6.87	.86	15.45	6.57	.83
Anxiety (0 – 21)	6.37	5.42	.89	5.62	5.38	.91	6.13	5.55	.89
Post-traumatic growth (0 – 50)	15.44	9.54	.83	17.61	10.56	.87	16.9	10.02	.84

Table 4. Descriptive statistics and reliability estimates at each timepoint

	T1 Physical functioning	T1 Physical functioning	T3 Physical functioning	T1 Physical health	T2 Physical health	T3 Physical health	T1 Depression	T2 Depression	T3 Depression	T1 Anxiety	T2 Anxiety	T3 Anxiety	T1 Post-traumatic growth	T2 Post-traumatic growth
T1 Shared Social Identity	-.11	-.12	-.09	.10	.08	.08	.10	.09	.006	.10	.10	.07	.24*	.17*
T2 Shared Social Identity	-.04	-.01	.09	.13	.02	.11	-.05	-.04	-0.2	-1.44	-1.93	-.12	.18	.03
T3 Shared Social Identity	-.18	-.17	-.14	.05	.07	.12	.004	.06	.03	.02	.03	.05	.21*	.19
T1 External resources	-.05	-.05	.01	.23*	.09	.09	.001	.006	-.07	.07	.07	.07	.12	-.03
T2 External resources	-.09	-.01	.03	.09	.04	.11	-.04	-.11	-.14	.05	-.05	.03	.19	.009
T3 External resources	.05	.05	.04	.15	.13	.17	-.09	-.10	-.12	.09	.04	.07	.19	.17
T1 Internal resources	.33**	.32**	.35**	.13	-.08	-.02	-.52**	-.50**	-.45**	-.29**	-.29**	-.27*	.24*	.15
T2 Internal resources	.26*	.35**	.30**	.11	-.05	.000	-.52**	-.56**	-.49**	-.29**	-.35**	-.30**	.03	.16
T3 Internal resources	.37**	.35**	.40**	.03	-.22*	-.13	-.50**	-.55**	-.57**	-.35**	-.38**	-.37**	.09	.09
T1 Negative norms	-.09	.014	-.07	-.11	-.05	-.17	.35**	.32**	.29**	.30**	.37**	.33**	-.07	.03
T2 Negative norms	.02	.05	.06	-.10	.05	.001	.27**	.27**	.23*	.25*	.32**	.28**	-.11	-.15
T3 Negative norms	.03	.10	.07	-.13	.03	-.09	.32**	.27*	.24*	.35**	.34**	.25*	-.14	-.15

Table 5. Correlations between ‘social cure’ components and health outcomes

*Note: ** p <.01, * p <.05.* The correlation table involves pairwise deletion, so the sample-size for each correlation varies.

	1	2	3	4	5	6	7	8	9	10	11	12
1. T1 Shared Social Identity		.49**	35**	59**	.47**	.21*	.14	.18	.003	.06	.07	.05
2. T2 Shared Social Identity			.42**	.37**	.37**	.24*	.05	.05	.08	-.06	-.13	-.16
3. T3 Shared Social Identity				.40**	.36**	.33**	.04	.08	.01	.16	-.06	.003
4. T1 External resources					.65**	.52**	.06	.15	.02	.10	.10	.13
5. T2 External resources						.66**	.06	.11	.07	.07	.13	.24*
6. T3 External resources							.03	.03	.09	.04	.14	.21*
7. T1 Internal resources								.76**	.71**	-.29**	-.19	-.27**
8. T2 Internal resources									.71**	-.15	-.12	-.18
9. T3 Internal resources										-.22*	-.18	-.20
10. T1 Negative norms											.64**	.68**
11. T2 Negative norms												.82**
12. T3 Negative norms												

Table 6. Correlations between each of the ‘social cure’ components

*Note: ** p <.01, * p <.05.* The correlation table involves pairwise deletion, so the sample-size for each correlation may vary

Does shared social identity with an online support group for Long Covid predict better health outcomes at the same and subsequent timepoints, via external and internal psychological resources?

Supplementary File 2 contains the regression coefficient for the full proposed model of moderated mediations for each health outcome at each time point.

Time 1

In all models, shared social identity positively predicted external psychological resources (*Coeff* = .42, *SE* = .06, *t* = 7.22, *p* = <.001, *LLCI* = .30, *ULCI* = .53). Neither shared social identity nor external psychological resources predicted internal psychological resources.

External psychological resources positively predicted change in physical health (*Coeff* = .31, *SE* = .14, *t* = 2.25, *p* = .03, *LLCI* = .03, *ULCI* = .58), but did not predict physical functioning, depression, anxiety, or post-traumatic growth. Internal psychological resources positively predicted physical functioning (*Coeff* = .34 , *SE* = .09, *t* = 3.70, *p* = <.001, *LLCI* = .16 *ULCI* = .52) and post-traumatic growth (*Coeff* = 1.70, *SE* = .77, *t* = 2.19, *p* = .03, *LLCI* = .16, *ULCI* = 3.23), and negatively predicted depression (*Coeff* = -2.69, *SE* = 41, *t* = -6.49, *p* <.001, *LLCI* = -3.52, *ULCI* = -1.87), and anxiety (*Coeff* = -1.39, *SE* = .44, *t* = -3.17, *p* = .002, *LLCI* = -2.26, *ULCI* = -.52).

There was a direct effect of shared social identity on depression (*Coeff* = .42, *SE* = .06, *t* = 7.22, *p* = <.001, *LLCI* = .30, *ULCI* = .53), whereby shared social identity predicted greater depression. There was no direct effect of shared social identity on any other health outcome.

There was an indirect effect of shared social identity on physical health, via external psychological resources (*Effect* = .13, *SE* = .09, *LLCI* = .004, *UCLI* = .34), whereby shared social identity predicted greater external psychological resources, which in turn predicted a bigger change in physical health after developing Long Covid. There were no indirect effects of shared social identity, via external psychological resources, on physical functioning, depression, anxiety, or post-traumatic growth. There were no indirect effects on any health outcome via internal psychological resources.

Time 2

In all models, shared social identity positively predicted external psychological resources (*Coeff* = .28, *SE* = .07, *t* = 3.74, *p* < .001, *LLCI* = .13, *ULCI* = .42), and this was maintained when controlling for T1 health outcomes (*p* <.001). Neither shared social identity, nor external psychological resources predicted internal psychological resources.

External psychological resources did not predict any health outcome. Internal psychological resources positively predicted physical functioning (*Coeff* = .35, *SE* = .10, *t* = 3.57, *p* = <.001, *LLCI* = .16, *ULCI* = .55), and negatively predicted depression (*Coeff* = -2.89, *SE* = .47, *t* = -6.18, *p* = <.001, *LLCI* = -3.81, *ULCI* = -1.96) and anxiety (*Coeff* = -1.43, *SE* = .40, *t* = -3.51, *p* = <.001, *LLCI* = -2.24, *ULCI* = -.62). When controlling for T1 health outcomes, internal psychological resources continued to positively predict physical functioning (*Coeff* = .12, *SE* = .04, *t* = 2.49, *p* = .01, *LLCI* = .02, *ULCI* = .21) and negatively predict depression (*Coeff* = -.97, *SE* = .08, *t* = 10.16, *p* = .01, *LLCI* = -1.70, *ULCI* = -.23), but it no longer predicted anxiety (*p* = .07). When controlling for T1 health outcomes, internal psychological resources also positively predicted post-traumatic growth (*Coeff* = 1.18, *SE* = .53, *t* = 2.23, *p* = .03, *LLCI* = .13, *ULCI* = 2.23).

There was no direct effect of shared social identity on physical health, physical functioning, depression, or anxiety. There were no indirect effects of shared social identity on any health outcome via external or internal psychological resources.

Time 3

In all models, shared social identity positively predicted external psychological resources (*Coeff* = .28, *SE* = .09, *t* = 3.31, *p* = .001, *LLCI* = .11, *ULCI* = .45), and this was maintained when controlling for T1 health outcomes (*p* < .004). Neither shared social identity nor external psychological resources predicted internal psychological resources.

External psychological resources did not predict any health outcome. Internal psychological resources positively predicted physical functioning (*Coeff* = .40, *SE* = .10, *t* = 4.2, *p* < .001, *LLCI* = .21, *ULCI* = .60), and negatively predicted depression (*Coeff* = -2.91, *SE* = .44, *t* = -6.59, *p* = <.001, *LLCI* = -3.79, *ULCI* = -2.03) and anxiety (*Coeff* = -1.65, *SE* = .42, *t* = -3.91, *p* = <.001, *LLCI* = -2.49, *ULCI* = -.81). However, when controlling for T1 and T2 health outcomes, internal psychological resources no longer predicted these outcomes. Instead, it only positively predicted post-traumatic growth (*Coeff* = 1.00, *SE* = .47, *t* = 2.12, *p* = .04, *LLCI* = .06, *ULCI* = 1.95).

There was a direct effect of shared social identity on post-traumatic growth (*Coeff* = 2.38, *SE* = 1.19, *t* = 2.01, *p* = .05, *LLCI* = .02, *ULCI* = 4.74), but this was not maintained when controlling for T1 and T2 post-traumatic growth (*p* = .37). There were no direct effects of shared social identity on physical functioning, physical health, depression, or anxiety. There were no indirect effects of shared social identity on any health outcome via external or internal psychological resources.

These findings partially support Hypothesis 1 as in all cross-sectional analyses we found that shared social identity predicted greater external psychological resources, but external psychological resources did not internal resources. Before controlling for health outcomes, internal psychological resources predicted greater physical functioning, and lower depression and anxiety. When controlling for previous health outcomes, internal psychological resources only consistently predicted greater post-traumatic growth.

Longitudinal analyses

In all models, T1 shared social identity positively predicted T2 external psychological resources (*Coeff* = .23, *SE* = .07, *t* = 3.23, *p* = .001, *LLCI* = .08, *ULCI* = .37), and this was maintained when controlling for T1 and T2 health outcomes (*p* <.002). T1 shared social identity did not predict T2 internal psychological resources, except for when controlling for T1 and T2 depression whereby shared social identity positively predicted internal psychological resources (Coeff = .27, SE = .12, t = 2.16, p = .03, LLCI = .02, ULCI = .52). External psychological resources did not predict internal psychological resources.

T2 internal psychological resources positively predicted T3 physical functioning (*Coeff* = .32, *SE* = .11, *t* = 2.96, *p* = .004, *LLCI* = .10, *ULCI* = .53), and negatively predicted T3 depression (*Coeff* = -2.48, *SE* = .49, *t* = -5.07, *p* = <.001, *LLCI* = -3.45, *ULCI* = -1.51) and T3 anxiety (*Coeff* = -1.35, *SE* = .45, *t* = -3.00 *p* = .003, *LLCI* = -2.25, *ULCI* = -.46). However, these effects were not sustained when controlling for T1 and T2 health outcomes.

There was no direct effect of shared social identity on any health outcome. There were no indirect effects of shared social identity on any health outcome via external or internal psychological resources.

Longitudinal analyses were repeated for T2 health outcomes (with T1 social cure predictors) and T3 health outcomes (with T2 social cure predictors). Full details of this analysis can be found in Supplementary File 2. The findings echo the included longitudinal analyses regarding the relationships between shared social identity and external psychological resources, and between internal psychological resources and anxiety, depression, and physical functioning. However, T1 shared social identity positively predicted T2 depression and post-traumatic growth (but not when controlling for previous health outcomes). Furthermore, T2 shared social identity also predicted T3 post-traumatic growth (even when controlling for previous health outcomes).

These findings partially support Hypothesis 1 because we found that shared social identity predicted greater external psychological resources at the subsequent timepoint, but external resources did not predict internal psychological resources. Before controlling for health outcomes, internal psychological resources predicted greater physical functioning, and lower depression and anxiety at the subsequent timepoint, but this was not sustained when controlling for previous health outcomes.

Do negative norms moderate the relationship between external and internal psychological resources?

Cross-sectional analyses

In the cross-sectional analyses at T1, T2, and T3, the external psychological resources /negative norms interaction did not predict internal psychological resources in any model (before and after controlling for health outcomes at previous time points). There was also no significant conditional indirect effect of shared social identity, via external and internal psychological resources, on any health outcome at any level of negative norms. Therefore, Hypothesis 2 was not supported in cross-sectional analyses as negatively oriented posts did not moderate the relationship between external and internal psychological resources.

Negative norms negatively predicted internal psychological resources at T1 (*Coeff* = -.26, *SE* = .09, *t* = -3.06, *p* = .003, *LLCI* = -.42, *ULCI* = -.00) and T3 (*Coeff* = -.19, *SE* = .09, *t* = -2.16, *p* = .03, *LLCI* = -.37, *ULCI* = -.02). At T3, this was not maintained when controlling for T1 and T2 health outcomes, except for when controlling for T1 and T2 physical functioning (*Coeff* = -.22, *SE* = .09, *t* = -2.56, *p* = .01, *LLCI* = -.39, *ULCI* = -.05). Negative norms did not predict internal psychological resources at T2.

Longitudinal analyses

In the longitudinal analyses, negative norms did not predict internal psychological resources (before and after controlling for health outcomes at previous timepoints).

Before controlling for T1 and T2 health outcomes, the external psychological resources /negative norms interaction predicted internal psychological resources, suggesting that external psychological resources may positively predict internal resources at low levels of negative norms, but this was not significant (p = .07). Nevertheless, there was an indirect effect of shared social identity on physical functioning via external and internal psychological resources at low levels of negative norms (15th percentile; *Effect* = .04, *SE* = .03, *LLCI* = .001, *UCLI* = .12), but not at high levels (84th percentile; *Effect* = -.02, *SE* = .03, *LLCI* = -.085, *UCLI* = .03). The index of moderated mediation was significant (*Index* = -.02, *SE* = .01, *LLCI* = -.05, *UCLI* = -.001). There was also an indirect negative effect of shared social identity on depression via external and internal psychological resources at low levels of negative norms (15th percentile; *Effect* = -.31, *SE* = .22, *LLCI* = -.87, *UCLI* = -.01), but not at high levels (84th percentile; *Effect* = .15, *SE* = .21, *LLCI* = -.19, *UCLI* = .66). The index of moderated mediation was significant (*Index* = .14, *SE* = .11, *LLCI* = .005, *UCLI* = .42). These findings partially support Hypothesis 2, as they indicate that at low levels of negative norms, shared social identity predicts greater external psychological resources which in turn predicts greater internal psychological resources, and in turn predicts lower depression and higher physical functioning.

When controlling for previous health outcomes, negative norms was not a significant predictor of internal psychological resources, but the external psychological resources /negative norms interaction was a significant predictor of internal psychological resources in the physical health model (Coeff = -.26, SE = .13, t = 1.98, p = .05, LLCI = -.52, ULCI = .002) and a near-significant predictor in models for post-traumatic growth (Coeff = -.26 SE = .13, t = -1.92, p = .06, LLCI = -.53, ULCI = .008) and anxiety (Coeff = -.24, SE = .12, t = -.19, p = .06, LLCI = -.49, ULCI = .006). When probing this interaction further, external psychological resources positively predicted internal psychological resources at low levels of negative content (15th percentile) in the post-traumatic growth model (Effect = .62, SE = .31, t = 1.99 p =.05, LLCI = .0009, UCLI = 1.23). This pattern also occurred in the physical health and anxiety models but did not reach significance. However, there was no significant conditional indirect effect of shared social identity, via external and internal psychological resources, on any health outcome at any level of negative norms. Therefore, Hypothesis 2 is only partially supported because whilst negative norms moderated the relationship between external and internal psychological resources, these findings suggest that the effects do not affect health outcomes.

Longitudinal analyses were repeated for T2 health outcomes (with T1 social cure predictors) and T3 health outcomes (with T2 social cure predictors). Full details of this analysis can be found in Supplementary File 3. For T2 health outcomes there was no moderating role of negative norms, but for T3 health outcomes the external psychological resources/negative norm interaction was close to significance (Coeff = -.03, SE = .16, t = -.20, p = .07, LLCI = -.52, ULCI = .02) and external psychological resources positively predicted internal psychological resources at low levels of negative content (15th percentile) in the post-traumatic growth model (Effect = .63, SE = .30, t = 2.08, p =.04, LLCI = .03, UCLI = 1.23). This interaction was sustained when controlling for anxiety and physical health at previous time points, but not when controlling for physical functioning, depression, and post-traumatic growth.

Discussion

We examined whether shared social identity with online Long Covid support groups predicts better health outcomes at the same and subsequent time points through external and internal psychological resources (Hypothesis 1). We also examined whether this effect is moderated by negative group norms, hypothesising that a greater number of negative posts would weaken the relationship between external and internal psychological resources, which in turn would predict poorer health outcomes (Hypothesis 2). The findings are discussed below.

What is the effect of shared social identity on health outcomes?

We found no direct effect of shared social identity on anxiety, physical health, or physical functioning. In some analyses, shared social identity with online support groups unexpectedly predicted greater depression, but this was only at T1 and in one of the exploratory longitudinal analyses. This contrasts with previous research that found associations between support group identification and lower levels of depression and anxiety[15]. One possible explanation for this difference is that while previous research focused on social identification (i.e., viewing oneself as a member of a social group), the current study focused on shared social identity (i.e., viewing oneself, and others, as members of the same social group); however, this is unlikely given there is often overlap in the items used to measure social identification and shared social identity. Alternatively, shared social identity was high amongst participants; it may not have been possible to detect the specific role of shared social identity on health outcomes, although there was not low variance amongst participants. It is also likely that identifying with an online Long Covid support group is not sufficient in shaping health outcomes for people with Long Covid, as the health outcomes were similar at all three time points. Therefore, whilst there may be some benefits to being in online Long Covid support groups, it may not be enough to change physical and mental health.

There is some evidence to suggest that shared social identity may be associated with higher levels of post-traumatic growth. We found a pattern within the findings to suggest that shared social identity may positively predict post-traumatic growth, although this was not significant in all analyses. This finding is important as previous research has highlighted the need to understand whether peer support programmes can be useful in facilitating post-traumatic growth[48]. This is in line with findings from qualitative studies suggesting that online support group members have changed their careers and had opportunities to participate in academic research by using online support groups[10]. However, it is important to acknowledge that individuals with Long Covid may have no other choice but to adjust to a new perspective as it is often difficult to return to their pre-illness life. Similarly, this adaptation is likely to be influenced by several personal factors, such as symptom severity, periods of symptoms remission, experiences with healthcare professionals, and offline support.

What is the relationship between shared social identity, psychological resources, and health?

The social identity approach to health argues that shared social identity improves health and welling by providing support, connection, meaning and control[19]. Each of these resources can independently mediate the relationship between shared social identity and health, but previous research has also combined the resources into a ‘suite’ of needs[26]. We found that the resources can be separated into external (connection and support) and internal resources (meaning and control), with high internal reliability. However, we did not find support for Hypothesis 1, as external and internal psychological resources did not mediate the effects of shared social identity on health outcomes. Rather, shared social identity predicted external, but not internal psychological resources, and whilst external resources did not predict health outcomes, internal resources predicted lower depression, anxiety, and physical functioning (before controlling for previous health outcomes).

The relationship between shared social identity and external psychological resources was expected and is in line with previous research reporting that community identification with others predicts perceived support and increased connection[20][49]. However, contrasting previous research, shared social identity did not predict internal psychological resources[21][26]. As mean scores for internal resources were below the scale mid-point at each time point, this could be explained by the high degree of uncertainty experienced by those with Long Covid. Indeed, many report an ability to control their circumstances as they lack treatment options and experience fluctuating symptoms, and they also struggle to find meaning in their post-illness life due to limitations and loss of their former identity[29]. Similarly, many have lost livelihoods, relationships and have increasing financial stress, therefore it is possible that the high levels of shared social identity amongst participants was not sufficient in restoring personal control and helping group members to find meaning. Alternatively, the online support groups may not be perceived as agentic (i.e., do not have concerted goal-directed action). Relke et al[25] found that group identification increased perceived personal control when the group was perceived to be agentic. Long Covid online support groups vary greatly with regards to their aims and focuses with some groups specifically aimed to co-ordinate advocacy, whilst others offer broader support. Furthermore, even when action is co-ordinated, it may be difficult to make a change in the face of funding cuts and lack of recognition[6][50][51]. Therefore, it could be that the groups chosen by participants were not perceived as agentic.

The lack of relationship between external psychological resources and health outcomes contrasts with previous research findings, which report positive effects of perceived support and connection on depression, anxiety, post-traumatic growth, and physical health[20][24]. This suggests that whilst shared social identity with online Long Covid support groups can facilitate perceived support from others and feeling connected with the group, these factors were not sufficient in shaping physical and mental health outcomes. Instead, they may be more relevant for forms of subjective wellbeing, such as social wellbeing, feeling less alone, or acceptance[10][12]. Internal psychological resources, on the other hand, did predict better physical functioning, lower depression, lower anxiety, and (sometimes) better post-traumatic growth in cross-sectional and longitudinal analyses. As internal psychological resources (a measure without specific reference to online support groups) predicted better health outcomes whilst external psychological resources (a measure with specific reference to online support groups) did not, it suggests that the needs of individuals with Long Covid are greater than the support provided in online support groups. However, when controlling for previous health outcomes these effects often disappeared, suggesting that previous health outcomes have a greater effect than internal psychological resources on future health outcomes.

Do negative norms moderate the relationship between external and internal psychological resources?

In the longitudinal analyses, we found that at low levels of negative content, external psychological resources may predict greater internal psychological resources. Interview studies suggests that high levels of negatively-oriented posts can increase fear, anxiety and distress amongst group members[10]. We found that low levels of negative content enhanced the positive relationship between external and internal psychological resources, which partially supports Hypothesis 2. When there are fewer negatively oriented posts it is possible that the perceived support and connection within groups can increase meaning and control as the foundations of such resources are less focused on aspects such as treatment failures, and instead may be focused on positive aspects of support such as joy and encouragement. However, it is important to note that by sharing such negative experiences can often result in the receipt of needed support and can make people feel less alone[12]. Therefore, group members should be aware of the extent to which they are engaging with these posts and be mindful of the potential impact on their health and wellbeing.

However, the effect of this moderation on health outcomes is unclear. Before controlling for previous health outcomes, the longitudinal analyses supported Hypothesis 2. Indeed, at low levels of negative content shared social identity predicted greater external psychological resources, which predicted greater internal psychological resources, which predicted greater physical functioning and lower levels of depression. As these findings were only present in longitudinal models it suggests that these effects may not be immediate, and instead the benefits are experienced over time. However, when controlling for these outcomes at previous time points the moderation and effect on health outcomes is not sustained, therefore Hypothesis 2 was not supported. This suggests that the effects of physical functioning and depression scores at previous timepoints on the same health outcomes at later timepoints are greater than the effect of shared social identity. Instead, when controlling for previous health outcomes, the interaction between external psychological resources and negative norms was significant (or close to significant) in the physical health, post-traumatic growth, and anxiety models, again at low levels of the norms, with no impact on health outcome. Taken together, there is a clear pattern within the longitudinal findings that at low levels of negative norms, external psychological resources predicts greater internal psychological resources, but the extent to which this affects health outcomes is unclear. This may be explained by the low power within some of the analyses. It may also be explained by the complexity of online Long Covid support groups. Indeed, negative posts are often accompanied by positive comments offering emotional support. Also, whilst this study suggests that low levels of negative content may be protective, some group members may find high levels of positive content discouraging[52].

Strengths, limitations, and future research

The longitudinal design, with low attrition, is a strength of the present study as it allowed us to explore the relationships between the social cure processes and health outcomes over time. However, there are also limitations that must be considered. Firstly, existing mental health scales often overlap with symptoms caused by Long Covid itself, therefore they do not reflect the true experiences of mental health of people with Long Covid. Furthermore, the sample was mostly White women with an undergraduate or postgraduate degree. Whilst female gender is a predictor of Long Covid[53], the results might not reflect what's happening in the wider population. Additionally, the sample was self-selected, so there could be differences between those who took part and those who did not take part, particularly in terms of symptom severity, or perceptions of online support groups.

Furthermore, there may have been some effects that were undetected due to the chosen design. Indeed, participants were not new to online support groups so it could be that benefits had plateaued. Similarly, this study had a small sample size, and some analyses were under-powered, so it is possible that some relationships between variables were not identified. Finally, the chosen analysis did not enable exploration of alternative pathways, nor did it account for within participant variation.

Future research could address these limitations by using a larger sample size and developing mental health scales that reflect the experiences of depression and anxiety for those with Long Covid, and other chronic conditions. Furthermore, as online support groups are heterogenous (e.g., video- and/or text-based), future research could explore whether the type of platform influences the extent to which certain benefits occur as previous research has shown that different platforms afford different benefits[54]. Similarly, the relationship between shared social identity, psychological resources, and agency[25] could be explored within online Long Covid support groups. Also, shared social identity was high in the sample, therefore future research could explore the differences between high and low levels of shared social identity with online support groups. Future research must also explore biomedical support available to those with Long Covid beyond online support groups to alleviate symptoms.

Conclusions and implications

Our findings show that shared social identity with online Long Covid support groups predicted greater perceived support and connection (external psychological resources) with group members, but the extent to which it affects health outcomes is limited. The findings indicate that there may be a positive relationship between shared social identity with online support groups and post-traumatic growth, but it is unlikely to influence physical health, physical functioning, depression, or anxiety. Furthermore, longitudinal analyses suggest that groups with lower levels of negative content may strengthen the meaning and control (internal psychological resources) afforded by shared social identity and external psychological resources. However, when accounting for health outcomes at previous timepoints there is no effect on health outcomes. Overall, the relationship between shared social identity with online support groups and health outcomes is complex, and future research should explore the conditions under which support groups are most effective.

Footnotes

[1] Please note, the hypotheses deviate from the pre-registered hypotheses. After further reading of the literature, the current hypotheses were deemed to reflect more accurately what we would expect to occur in online Long Covid support groups.

[2] Due to the changes in hypotheses, the analysis plan deviates from the pre-registration. Specifically, rather than using model 83, we used model 91. Also, as the sample size was smaller than anticipated in the planned analyses, no demographic factors were controlled for.

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Supplementary data: available at https://doi.org/10.32388/BYF1FU

Declarations

Funding: This study was funded by the National Institute for Health and Care Research Health Protection Research Unit (NIHR HPRU) in Emergency Preparedness and Response, a partnership between the UK Health Security Agency, King’s College London and the University of East Anglia. The funders had no role in study design, data collection and analysis, decision to publish or preparation of the manuscript. The views expressed are those of the author(s) and not necessarily those of the NIHR, UKHSA or the Department of Health and Social Care.

Potential competing interests: No potential competing interests to declare.