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Building addiction recovery capital through online participation in a recovery community

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Abstract

The study examines how online participation in a recovery community contributes to personal journeys to addiction recovery. We investigate whether recovery capital building - as indicated by increased levels and quality of online social interactions - and markers of positive identity development predict retention in a recovery program designed around fostering community involvement for early stage recovery addicts. We predicted that high levels and quality of online participation on the group's Facebook page and positive identity development predict retention in the program. To map how participants interact online we conducted social network analysis (SNA) based on naturally occurring online data on the Facebook page of a recovery community. We used computerised linguistic analysis to conduct a sentiment analysis of the textual data (capturing social identity markers). We used linear regression analysis to test whether our indicators of recovery capital predict program retention. To illustrate our findings in the context of the recovery community, we also present case studies of two key participants who moved from the periphery to the centre of the social network. By conducting in-depth interviews with these participants we were able to explore personal experiences of social media usage in the context of their recovery journeys for group members who have undergone some of the most significant changes since joining the community. We found that retention in the program was determined by a) the number of comment 'likes' and 'all likes' received on the Facebook page; b) position in the social network (degree of centrality); and c) linguistic content around group identity and achievement. In conclusion, positive online interactions between members of recovery communities support the recovery process through helping participants to develop recovery capital that binds them to groups supportive of positive change.

Keywords

online social interactions, recovery capital, social identity, recovery community

Building addiction recovery capital through online participation in a recovery community

"…the longer people are on the Internet, the more likely they are to use the Internet to engage in social-capital-building activities" (Kavanaugh and Patterson, 2001, p. 507)

Introduction

Building recovery capital through social networks

Traditional (offline) social networks are now recognised as helping make recovery more sustainable (White and Kelly, 2010) by providing people with opportunities to develop their recovery capital, i.e., "the sum total of one's resources that can be brought to bear on the initiation and maintenance of substance misuse cessation" (Cloud and Granfield, 2009, p. 1972). Recovery capital can be developed through several avenues: a) building social capital through developing and strengthening links with both group members (other people in recovery), and outgroup members (reaching out to the broader community), referred to as bonding and bridging capital respectively; and b) building community and cultural capital (Best and Laudet, 2010; Groshkova et al., 2013). Based on the work of Robert Putnam (2001), the concept of social capital has become a key theoretical framework around support and resources and has been applied to addiction recovery populations (Cloud and Granfield, 2009). The accumulation of greater recovery capital is considered a marker of recovery progress and a predictor of sustained recovery, therefore taking the form of a currency for measurement in recovery research (Groshkova et al., 2013).

Being part of many supportive social networks of addiction recovery was shown to have positive effects on wellbeing (Jetten et al., 2012; Litt et al., 2009; Longabaugh et al., 1998; 2010). Here we aim to extend this evidence by examining the role of supportive *online*

social networks in helping people in recovery. We propose that online social networks can assist recovery by helping build *recovery capital* at the same time supporting the development of a positive identity. A positive identity can in turn further support efforts to maintain a drug-free lifestyle.

Social identity in recovery

While we know that supportive social networks are beneficial for recovery and help the development of recovery capital, to understand the underlying processes we turned to theoretical resources from social psychology, specifically to Social Identity Theory (SIT, Turner et al., 1987; Turner, 1982). Increased recognition of the importance of developing positive social identities in the recovery process stems from the SIT proposition that group membership is fundamental to understanding adherence to the norms, values and rules of social groups, in particular, identification and engagement with valued groups that shape individuals' behaviour, through a desire to be a part of the group and therefore aspiring members will increasingly adhere to its norms and values. Applied to health, these ideas lead to developing a 'social cure' approach (Jetten et al., 2012) in which group belonging is beneficial not only because it can provide access to emotional support and practical assistance from other group members, but also through a direct (positive) influence on behaviour. The benefits of belonging to one or more groups are translated into positive effects on health and wellbeing (Cruwys et al., 2013; 2014: Haslam et al., 2014).

This approach was applied to addiction recovery in the Social Identity Model of Recovery (SIMOR, Best et al., 2016) which proposes that recovery is associated with transitioning from the more excluded social group membership of 'using groups' to groups that are supportive of recovery, and by doing so transitioning to more positive values, beliefs, attitudes and ultimately to behaviours. In this model, the transition from active addiction to

recovery is a staged process that takes place over time, and through exposure to recovery groups at a time of disenchantment with addiction lifestyles (with the ensuing dissonance between addiction group membership and other valued life goals such as relationships and parenting). Such dissonance experiences can loosen the bonds to groups involved in addictive behaviours and support a gradual transition to engagement with recovery groups, and the internalisation of their norms, values and rules. These ideas are consistent with findings from the Alcoholics Anonymous (AA) literature where the importance of facilitating positive changes in social networks through a move to health-promoting social networks have been well-recognised (Kaskutas et al., 2002; Kelly et al., 2009; 2012).

The role of online social interactions in recovery

As new technologies enable a variety of ways of communication, the ways in which social support in recovery is delivered and received has expanded to include online modes (Moorhead et al., 2013; White and Dorman, 2001). From a social interaction point of view, there are both advantages and limitations in using new technologies for communication. The access to social support is facilitated through online communication which is particularly useful in cases of social, geographical or mobility-related isolation (Rodham et al., 2009; Savic et al., 2013). However, despite some evidence of similar outcomes (Shahab and McEwen, 2009), it is still debated whether the quality of social support received online is comparable with its face-to-face alternatives (Chung, 2013, Finfgeld, 2000). The ability to interact online with people facing similar issues regardless of their physical proximity promotes the creation of significantly broader, borderless 'online communities of support' that can include not only those people recovering from addiction, but also their supporters and advocates. Therefore, these communities have the potential not only to support individual change, but also social change either as an alternative to or a supplement to face-to-face

support networks. As online social interactions become more common across all groups in society, more evidence of significant health benefits linked to online engagement is emerging. For example, recent research by Hobbs et al. (2016) based on a large US dataset (i.e., 12 million social media profiles) suggests that people who are well integrated in online social networks such as Facebook are likely to have lower mortality rates.

As in many other areas of research, the use of technology in accessing support in recovery has also opened new possibilities in terms of how we collect data in the field of addiction recovery. The recognition that recovery is a dynamic and long-term process goes hand in hand with more dynamic ways of approaching research which the use of new technologies make possible. In agreement with Shneiderman's comments on 'Science 2.0', that "traditional scientific methods need to be expanded to deal with complex issues that arise as social systems meet technological innovation" (Shneiderman, 2008, p. 1349), here we complement the use of more traditional scientific methods such as social network analysis and the use of in-depth interviews, with approaches designed to capture the rich and dynamic context of online interactions in the addiction recovery field (such as computerised linguistic analysis that can be applied to large textual datasets). Conceptually, this allows us to test Social Identity Theory and, in particular, the Social Identity Model of Recovery by mapping changes in belonging and engagement in recovery-supportive groups as a consequence of linguistic style and network location, and to map these predictors of social identity against a recovery outcome, retention in a recovery community.

Context of research

We focus on a particular program in the UK, Jobs, Friends and Houses (JFH) - a recovery initiative that incorporates social engagement and identity change supported by an overarching process of building recovery capital. JFH is a social enterprise that engages

addicts in early recovery in apprenticeships in building professions while working on the renovation and construction of recovery housing in the north of England town of Blackpool. Participants in the program are actively involved in employment and training, are provided with recovery housing and many of them also attend recovery mutual aid meetings together as a part of a lifestyle change program. The program illustrates particularly well some key SIT principles, as social identity change is enabled by providing participants with a highly visible and attractive 'ready-made' positive social identity (a previous publication has outlined how the model of JFH incorporates SIT principles, Best et al., 2016). This positive social identity is constructed around work and the re-invigoration of a deprived community that has resulted in a strong sense of engagement and bonding among program participants and staff members (Best, 2016). Individuals who engage with JFH are able to challenge their own and others' negative perceptions and prejudices through the adoption of a uniform of work and through engagement in activities in a group that contributes to and is positively valued in the local community. A further research paper has shown how the actions of JFH staff prevented a serious assault in the town and describes the impact on bonding capital within the group and bridging capital to the wider community (Best, 2016).

As part of the building of the recovery community, JFH has set up a Facebook page to perform two primary functions: to create a recovery-supportive online community for participants; and to allow the outside world (including a range of community stakeholders) to engage with JFH. The community together with its online platform provides an excellent opportunity to examine the role of online social interactions in supporting recovery capital development and the transitioning to a successful recovery identity, which in turn should predict positive outcomes in terms of retention in the program.

*Rationale and approach*To examine the role of supportive online interactions in recovery, we focus on understanding the intragroup and intergroup dynamics as a whole (looking at the structure of the online social network), as well as changes in the 'agents' of the network (looking at changes within individuals in the group). As such, the study necessitates a mixed-methods approach. At the same time, the increased widespread use of technologies for online communication enabled us to gain access to more data sources in more varied formats. We make use of these affordances by using social network and textual data extracted from the Facebook's group page that is complemented by qualitative data from in-depth interviews with key agents in the network, and quantitative retention data. By using a diverse and complementary range of data sources and a mixed methods approach (Denscombe, 2008) we seek to be able to capture the complex and dynamic processes that underpin a successful recovery journey – while the quantitative components of our study will provide structural data and aggregated linguistic information regarding the online social interaction in the recovery community, the qualitative data will give us an insight into the subjective experience of positive change.

As a first measure of online engagement in the community of support we look at the growth in the online activity as captured by the number of posts and comments on the Facebook page. To examine how recovery capital is developed in the online community we identity specific markers of recovery capital development by charting the first eight months of activity in the JFH Facebook page in terms of its growth and change over this eight months. We do so by examining the online community of support as made up of three primary groups of members and the interactions between them: a) JFH program participants; b) JFH staff, and c) external individuals (broader community members).

By examining the connections between the members of the online community and how they change in the eight months of our investigation we are able to identify variations in the

dynamics of the group at an internal level (intragroup). Social network analysis (SNA) represents a comprehensive approach to understanding relational features in groups (i.e., contacts, ties, connections, group attachments and encounters that relate one group member to another) so it provides an ideal tool to capture intragroup and inter-group dynamics and communication in our online community (Scott, 2012). Theoretically, SNA can be seen as derived from a form of social exchange theory (Emerson, 1976) and more recently it has been linked to Putman's social capital theory (where social networks are seen as a specific form of social capital). However, "SNA provides a vocabulary and set of measures for relational analysis but it does not imply the acceptance of one particular theory (…)" (Scott, 2012, p.8). For instance, the centrality of a group member in the network would denote increased communications with the other group members – in SNA the more linkages an 'agent' has the more central its position in the network would be. This means that we can use centrality coefficients derived from SNA as measures of the *quality of online engagement.* Centrality coefficients can also be used to capture prototypicality (i.e., how representative a group member is for the whole group), and influence within the group. Thus, SNA allows us to identify those group members who have undergone the most change in their location in the social network, reflected by movement from the periphery to the centre of the social network, as shown in SNA maps. As a result, we were then able to validate and further examine how recovery capital is developed by conducting in-depth interviews with two of the most representative members of the group (identified as the most central agents in the online social network towards the end of the eight months period from among the JFH participant cohort) who were then identified and participated in in-depth interviews described below.

Changes in the social identity of the group members are captured through conducting a computerised analysis of the language used by participants in their contributions to the Facebook page. By using the computerised language analysis software LIWC (Linguistic

Inquiry and Word Count) we can identify the levels (and changes in these) of identification with the recovery group (Pennebaker, 2011), emotions (Chung and Pennebaker, 2014; Gill et al., 2008), and social and cognitive processes of the participants (Pennebaker et al., 2007; 2015).

Indicators of recovery capital and identity change are used to examine whether they are predictive of retention in the program - retention data being accessed from the JFH administrative team in the form of joining and departing dates for each member of the JFH housing and employment program. As a positive outcome of recovery, we used program retention as *duration of staying in the recovery program* because this has previously been found to be associated to long-term positive recovery outcomes (Zhang et al., 2003). Across a range of treatment outcome studies (e.g., the Drug Abuse Reduction Programme; Simpson and Sells, 1990 in the US, and the National Treatment Outcome Research Study, Gossop et al., 2001, in the UK), there is a strong evidence base that longer retention in specialist treatment services is associated with better outcomes across a range of outcome indicators. Similarly, for recovery-oriented mutual aid groups, Kelly (2016) has reported on the importance of both the intensity and the extensity of meeting attendance on reductions in substance use and improvements in psychological health.

Our approach can be divided into two parts: a) examining how recovery capital is built through online interactions, at the same time investigating changes in social identity; and b) testing whether online social engagement and the indicators of recovery capital and social identity change predict retention outcomes.

Methods

Study participants

The study population (total $N = 609$) consists of all participants in the online JFH Facebook community and includes JFH program participants ($N = 23$), JFH staff ($N = 5$), and

community members (N = 581) who contributed to the online discussions over a period of eight months since the establishment of the JFH Facebook page. Of the JFH program participants, 91% were male and their ages ranged from 19 to 60 (M = 34.57, SD = 10.86); 32% left school with no qualifications, 26% had a high-school certificate, 16% A Level (Advanced) Education Certificate, and 26% had other types of educational qualifications. Regarding their employment status, 15% of the participants were never employed, 25% were previously employed but no longer working, 45% employed for periods of time with breaks in between, and 5% were in continuous employment.

Outcome and predictor variables

We seek to examine the effects of online engagement with a recovery community on retention in a recovery program. Specifically, as predictors of retention, we examine the following indicators:

- Overall levels of participation in the online community - captured by levels of online activity on the group's Facebook page (i.e., number of posts and comments made);
- Quality of participation in the online community - captured by centrality network coefficients derived from conducting social network analysis (SNA) by mapping the linkages between members of the online network through their online interactions (the underlying assumption is that, being a result of number and type of connections in the network, centrality coefficients capture the quality of online interactions); and
- Social identity markers - captured through word usage during the online interactions.

Analytic strategy

1. Social network analysis (SNA) – SNA is based on a conceptualisation of social structures as a network with ties connecting members and channelling resources (Wetherell et al., 1994). Therefore, we used the network coefficients of 'degree' centrality (i.e., the total number of connections connecting a node, Scott, 2012) and 'betweenness' centrality (i.e., how much a specific node can act as an intermediary between two other nodes, Scott, 2012) as indicators of quality of online interaction. This choice of coefficients is based on the assumption that in a social network, betweenness and degree centrality are the most relevant indicators of a person's influence in the communication within the group (for example, the person with the highest betweenness centrality will be the most influential communicator in the network). SNA enabled us to identify those members of the online network that are the most influential agents in the group (through their position in the network). The centrality coefficients were calculated using the software R using the 'SNA' package, and were based on the online activity and interactions on the group's Facebook page in the first eight months since its creation. All interactions between two members within the Facebook group (i.e., commenting on posts, liking posts, and liking comments) were classified as links (edges). The analysis was divided by months (from month 1 to month 8) and includes all contributions during this timeframe (i.e., posts, comments to posts, and likes of posts and comments). SNA maps were also created using the R software using the igraph package.

2. Computerised linguistic analysis - Linguistic Inquiry Word Count (LIWC) software was used for sentiment analysis of the online communications between the group members (including staff members and broader community members). Online communication data in the form of text was extracted from the group's Facebook page (all online text exchanges between participants). LIWC is a linguistic analysis software package designed by social psychologists James Pennebaker and colleagues (2015) to capture a number of linguistic and

psychological categories underpinning language. These categories include: use of various function words, cognitive mechanisms, social processes, emotions, etc. The software was used and validated in a range of health related contexts including alcohol consumption (Lowe et al., 2013), depression (Baddeley et al., 2013; Rude et al., 2004), and suicide (Stirman et al., 2001). The software's dictionary includes over 80 categories, but the most relevant in this context are: achievement (given the core purpose of the group – to support members to achieve sustainable behavioural change), collective (or social) identity (use of first-person plural pronouns as opposed to first-person singular pronouns), as well as emotions such as affect and positive emotions (as further indicators of the quality of the online engagement).

3. Correlation and linear regression analyses – in a first stage we conducted correlational analysis on all key variables, followed by linear regression analysis with the following variables entered as predictors:

- Network centrality coefficients (betweenness centrality and degree centrality);
- Number of posts and comments;
- Number of post likes given and received;
- Number of comment likes given and received;
- Number of all likes given and received;
- Client-Client comments received, given and total;
- Client-Staff comments received, given and total;
- Total usage of LIWC categories in posts;
- Total usage of LIWC categories in comments;
- Total usage of LIWC categories in both posts and comments.

4. Qualitative analysis – the qualitative data obtained through the in-depth interviews with the two group members selected on the basis of being the most prototypical/influential group members in the social network (as indicated by SNA). The individuals who were identified as

central by the end of the study window who had been peripheral at the start were approached to participate in an in-depth interview. We used a deductive approach broadly derived from thematic analysis (Braun and Clarke, 2006), and framework approaches as described by Pope et al. (2000). More specifically, we first familiarised ourselves with the data by independently reading and re-reading the transcripts of the in-depth interview several times. To analyse the data we used a thematic framework (i.e., comprising of the key concepts and themes by which the data can be examined) a-priori drawn from our research questions. The outcome of next step of the analysis was the classification of qualitative data into the relevant categories and themes around the research question about how recovery capital is developed in the program through experiences of both online and face-to-face interactions which were shared, agreed upon and further refined collectively. The final themes were labelled, and the most illustrative quotes for each theme were identified.

Results

Descriptive statistics

Overall online engagement was captured by computing the number of posts, comments and likes made by staff, clients and community members. Table 1 illustrates a breakdown by type of contribution made by each category of participant across our timeframe of eight months. The counts indicate that the participants from the broader community are particularly active in terms of comments and likes to the posts – which are mostly contributed by staff and clients.

Insert Table 1 about here

General levels of activity on the Facebook group are shown in Table 2.

Insert Table 2 about here

Determinants of retention in the program

We expected that retention would be associated with the indicators of recovery capital development (quantity and quality of online interaction), and indicators of a positive recovery identity development. In quantitative terms, online interaction was captured through the number of: a) posts made; b) comments made; c) post likes received; d) comment likes received; and e) all likes received. The quality of online interaction was captured by network structure, that is, degree and betweenness coefficients, and linguistic indicators of positive affect. In addition, different types of recovery capital were captured by: a) number of connections (posts and comments) between members/clients (bonding capital); b) number of connections between members and staff (internal level of support - bonding capital), and c) number of connections between members and broader community/others (bridging capital).The development of a positive social identity (identification with the recovery community) was captured through the use of the pronoun 'we' and achievement words. Retention in the program was coded in terms of total number of days in the program (range of 464 to 86 days).

Among indicators of online interaction, in-group validation as captured by the number of likes received (for both posts and comments) is the strongest determinant of retention (see Table 3). The position occupied in the social network by participants (the centrality in the network) is also a good indicator of program retention. In particular, degree centrality is significantly associated with retention. Regarding the content of communication, the computerised linguistic analysis revealed that collective identity markers such as the use of

the pronoun 'we' in posts as well as achievement words (used in both posts and comments) are the best determinants of retention in the program (see Table 3). Other marginally significant predictors include affect and positive emotions words.

Insert Table 3 about here

We expected that these findings will be consistent with data collected through in-depth interviews. The participants in the interviews were selected based on the SNA based on the online interaction between group members on the JFH's Facebook page. The two interviewees have been identified as the most prototypical members of the community based on their central position in the online network, and their transition from the periphery to the centre of the network over the course of the eight months of the study. Figure 1 illustrates configurations of the social networks for each of the eight months of our analysis. The different types of network members are color-coded, so we can observe the dynamic evolution of the network in our set timeframe – i.e.., the movement of the 'clients' from the periphery to the centre of the network, and in particular the movement of the two selected participants (identified as 614 and 93 in Figure 1). We were able to identify the individuals and ask them to participate in an interview about their social networks with both agreeing to take part.

Both our participants were male, aged 30 and 45. Participant 1 started with JFH in mid-January 2015, and in his own words, before joining the community, he was addicted and homeless, living in a shelter. Participant 2 joined JFH from the start of the community (01/11/2014), and before that he was "on the sick [Disability Living Allowance] and working part-time - abstinent about one year - living in a recovery house - not a lot of support in the

house - working in services taking clients on prescriptions to the gym, 16 hours a week" (Extract 1)

Insert Figure 1 about here

Qualitative data findings – Bonding capital: reaching to the other group members

Bonding recovery capital refers to resources which are made available through linkages between group members. In this context (of online social interaction), we found that our interviewees value the availability of online means of communication with other group members ('*live social connectivity'*) and they see it an asset that supports their recovery:

> Extract 2: "It's good, sometimes you get notifications like 'has anyone seen T?' - and you get five phone calls. It is a really good support network (…) it's visible … it reminds me that you are part of something" (P1)

Another aspect of online communication that is seen as supporting bonding recovery capital development is the capacity of not only enabling live group interaction, but also continuous access to relevant (potentially 'life saving') information and instant access to a supportive network:

> Extract 3: "JFH is not just 9-5; it continues - you get on with each other and you do the messaging to support – it's about looking after each other whether you are in work or not…(I) use it 24/7 - even during the day, it's like information at your finger-tips" (P2)
>
> Extract 4: **"(…)** It is a support page but it also puts information out there. It is a support network - I am friends with everyone in JFH who has a Facebook account

(…). You get a lot of support - people recognise if you are not on, it is good because you can interact with a lot of people quicker."(P2)

Qualitative data findings – Bridging capital: reaching to the wider community

Bridging capital in the context of recovery refers to those resources that are built based on linkages with outgroup members, or the wider community in our case. Based on our interview data, being part of an online recovery community helps build bridging recovery capital through being able to *access wider support* which in turn further helps group members to create a sense of hope in their recovery success:

Extract 5: "(…) what excites me more is when other people comment. It just gives me a really good feeling. (…) It shows the support from the people who are out there. (…) It's like the ripple effect - instead of parents writing off their children, they are starting to have some sense of hope" (P1)

The opportunity to reach to the wider community as a key resource to support recovery is also mentioned:

Extract 6: "It's like the wider community coming in. (…) It's about the recovery community getting in touch with the wider community - and it's important that it is about the wider community and them understanding - like that incident with the woman" (reference to an incident when several members of the groups intervened and saved a woman in a domestic incident)

Qualitative data findings - Recovery social identity

According to theories of addiction that draw on social identity theory (SIMOR and SIMCM), developing a strong recovery identity is likely to enable a sustainable, long-term recovery journey. Therefore, we looked for themes around identity development through the interview

data, and found that the importance of visibility of identity change as a way of helping others in their recovery was highlighted:

> Extract 7: "You will go out your way if you need to bring other people on board (…) a lot of guys, it has given them hope. A lot of people are touched through addiction, and now they can see that there is hope. They are looking at them differently and they can see that there is hope. (…) Really important (to be seen as successful); we are visible - we can recover and we can deal with everyday stuff - without individuals to show that it does work, it wouldn't seem the same…Where you are now and where you were two years ago…" (P1)

The visibility of being part of JFH (a positively valued social identity) comes with a sense of pride in this identity – that further helps development and maintenance of the recovery identity:

> Extract 8: "Positive things - there was not one bad thing - we are trying to do our best - public see it as a really good thing, Withnell Road - built up relationships - turned people around (…) 261 properties coming on from the 14th of December"(P2).

Discussion and Conclusions

The study contributes to our understanding of group processes in addiction recovery by using naturally occurring online data and subjecting this to SNA, standard statistical analyses, and computerised linguistic analysis. These online data are supplemented by two case studies where qualitative data from face-to-face in-depth key informant interviews are used to bridge the gap between online activity and personal report and reflection on social networks. This mixed methods approach has allowed unique insights into how online social networking and social identity processes can affect retention in a recovery program. Our findings support the proposition that program retention is significantly predicted by SNA centrality coefficients such as degree (the more central people are in the online network, the longer they stay in the

program), indicating the importance of prototypicality in group engagement, and the dynamic processes through which centrality and prototypicality are achieved.

Using computerised linguistic analysis, we found that retention in the group was not only significantly predicted by the pronoun "we" use (a social identity marker – the more they talk about 'we' the longer they stayed in the program), but also by the extent of affirmation or ingroup validation – reflected in the number of comments and post 'likes' received (i.e., other people liked their post), comment 'likes' received, and all 'likes' received.

The focus on retention as the dependent variable in this study is based on evidence suggesting that not only recovery maintenance but also thriving is predicted by retention in recovery groups (Zhang et al., 2003). The design has provided us with a new method of measuring how group processes can impact upon retention with four aspects of network location and social interaction predictive – being active in the network, being central in the network, being positive about belonging to the network, and being endorsed by others for contributions to the network, as well as dynamic changes in these things. These findings are entirely consistent with the two social identity models of recovery. SIMOR (Best et al., 2016) would suggest that the active participation and increased sense of belonging to recovery groups is protective against involvement with using groups (and so relapse). Similarly, the SIMCM (Frings and Albery, 2015), which focuses specifically on group processes and social identification in therapeutic settings and in the wider community (including mutual aid groups), have argued that active identification with the group (as indicated in our study by the use of 'we' language) binds people to the group and to the resultant recovery values. It is important to note that while collective personal pronoun use ('we') is predictive of retention, individual personal pronoun ('I') was not. What this implies is that the salience of the group and the individual's commitment and belonging are associated with greater endorsement by the group and longer engagement in it. Our findings support the argument that developing a

sense of collective selfhood (a positive recovery identity) helps the recovery process. Our findings provide some support for the SIMOR model in that linguistic analysis markers of group belonging (use of we language) and SNA indicators of group centrality were predictive of retention, suggesting that greater active identification with a recovery group and greater prototypicality with a recovery group is associated with longer retention in that group. These findings were also supported (as a form of triangulation) by the two in-depth interviews. The design has allowed us to map the underlying processes of group immersion and how it is experienced and why it was valued by our interview participants.

By using a staged mixed-method approach, we found that retention outcomes can be understood as a process of fostering social identity change that is also supportive of recovery capital development. While indicators of specific types of capital (bonding and bridging) were only marginally significant, we found that both the specific model of recovery community (build around participation and social engagement) and the use of technology enhanced positive recovery outcomes. Our findings explain how these two elements effected psychological change in the JFH participants as also evidenced in the qualitative reports of the two individuals who were interviewed following their identification as having transitioned from the periphery to the centre of the group. Thus, there is a clear sense that the adoption of the values of the group, identifying oneself strongly with it and being endorsed widely for one's contributions has a positive impact on centrality (and so influence over the group) and on the likelihood of enduring involvement with the group. These findings were also present in the narratives described in the case studies. For instance, these narratives highlight the importance of establishing positive identities and making the achievements associated with these identities visible in the broader community – that in turn supports recovery through creating a sense of pride and hope, and that may challenge exclusionary and stigmatising attitudes and beliefs.

This has important implications for recovery group participation, both face-to-face and online. To encourage new group members to engage effectively in recovery groups, it is critical that they are endorsed and supported to feel that they are part of the group and that their contributions to the group are acknowledged and valued. It would also imply that those whose views are not endorsed and supported by other group members are more likely to become peripheral and as a result to drop out of the recovery group. What is clear from the findings is that this transition from the periphery to the centre of a social network (and the reverse) is a gradual process and that there may be opportunities for group coordinators to identify and prevent drop-out from groups through endorsement and support for group identification, and including and assertively engaging new members of the network.

Limitations of the research

Our findings are based on an in-depth case-study of intragroup dynamics in a specific recovery community, therefore they are not meant to be extrapolated to other groups and populations and no inferences can be drawn about the prevalence of the relationships observed beyond JFH. Further research should be conducted to replicate the methodology and approach in other recovery communities, and assess outcomes of different approaches based on comparisons between different communities (based on different approaches to recovery). While retention is recognised in specialist addiction treatment services as a proxy indicator of outcomes, it is an assumption of the paper that the same is true of online recovery groups, and the impact will need further testing with prospective outcome analysis including a more diverse range of indicators (e.g., levels of recent substance use/abstinence, well-being measures, etc.). We describe two case studies that include findings derived from in-depth interviews conducted with only two group members selected because they undertook significant changes in their position in the online social network - reflecting a positive recovery journey. A broader and more diverse sample would have been ideal but including

participants with less positive trajectories would have raised ethical issues around the use of data from open social media sites and the linking of these online data to personal data. Further examination of other individuals who moved from the centre to the periphery of the online network (in other online communities) represents another research option that needs to be explored in future studies.

Recommendations for future research

This study has used a mixed methods approach to study in real time the changes that take place in a recovery community that are underpinned by processes of social networking, social identity and recovery capital development. We have established that online engagement represents an effective way of supporting the process of recovery. More research is needed, however, to identify the socio-economic and individual factors that facilitate or hinder the engagement with online forums in the first place. We have determined that there are three key factors that determine retention in the recovery group that relate to centrality and commitment to the group and to endorsement by other members of the group. These findings provide a basis for further research to examine group dynamics using online naturally occurring data to asses a combination of 'fit' with the values of the group and the resulting affirmation by fellow group members for the possibility of interventions to prevent drop-out by peripheral members of recovery communities and groups.

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689 **Table 1**

690 Descriptive statistics of JFH Facebook page activity across the eight time periods, cumulative

691 numbers in parenthesis

		Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8
All	Posts and comments	382	388 (770)	579 (1349)	369 (1718)	530 (2248)	581 (2829)	796 (3625)	674 (4299)
	Post likes give	1167	878 (2045)	1856 (3901)	1440 (5341)	1880 (7221)	1756 (8977)	2667 (11644)	1857 (13501)
	Comment likes given	784	970 (1604)	825 (2429)	171 (2600)	634 (3234)	970 (4204)	825 (5029)	171 (5200)
Staff	Posts and comments	129	106 (235)	170 (405)	96 (501)	185 (686)	176 (862)	227 (1089)	316 (1405)
	Post likes give	188	147 (335)	302 (637)	209 (846)	385 (1231)	372 (1603)	567 (2170)	511 (2681)
	Comment likes given	168	303 (471)	237 (708)	69 (777)	168 (945)	303 (1248)	237 (1485)	69 (1554)
Clients	Posts and comments	145	155 (300)	214 (514)	132 (646)	208 (854)	286 (1140)	419 (1559)	253 (1812)
	Post likes give	365	252 (617)	415 (1032)	303 (1335)	549 (1884)	529 (2413)	898 (3311)	576 (3887)
	Comment likes given	143	318 (461)	235 (696)	33 (729)	143 (872)	318 (1190)	235 (1425)	33 (1458)
Other	Posts and comments	108	127 (235)	195 (430)	141 (571)	137 (708)	119 (827)	150 (977)	105 (1082)

Post likes give	614	479 (1093)	1139 (2232)	928 (3160)	946 (4106)	855 (4961)	1202 (6163)	770 (6933)
Comment likes given	473	349 (672)	353 (1025)	69 (1094)	323 (1417)	349 (1766)	353 (2119)	69 (2188)

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Table 2

Connections made in JFH Facebook page broken down by type (bonding vs. bridging), cumulative numbers in parenthesis

	Month 1	**Month 2**	**Month 3**	**Month 4**	**Month 5**	**Month 6**	**Month 7**	**Month 8**
All connections	834	581 (1415)	809 (2224)	469 (2693)	597 (3290)	577 (3867)	617 (4484)	419 (4903)
Connection: post-comments	140	126 (266)	139 (405)	105 (510)	136 (646)	120 (766)	186 (952)	108 (1060)
Client-to-client (bonding)	93	54 (147)	40 (187)	106 (293)	192 (485)	200 (685)	465 (1150)	192 (1342)
Staff-to-client (bonding)	48	40 (88)	36 (124)	74 (198)	128 (326)	126 (452)	279 (731)	176 (907)
Other-to-client (bridging)	115	96 (211)	118 (329)	282 (611)	250 (861)	240 (1101)	615 (1716)	275 (1991)
Connection: post-likes	528	429 (957)	590 (1547)	328 (1875)	461 (2336)	398 (2734)	567 (3301)	295 (3596)
Client-to-client	23	40 (63)	20 (83)	38 (121)	41 (162)	109 (271)	198 (469)	87 (556)
Staff-to-client	7	9 (16)	2 (18)	13 (31)	31 (62)	50 (112)	67 (179)	59 (238)
Other-to-client	14	11 (25)	9 (34)	30 (64)	25 (89)	29 (118)	63 (181)	19 (200)
Connection: comment-likes	385	256 (641)	1029	1223	1458	1746	1973	2193
Client-to-client	115	82 (197)	108 (305)	61 (366)	127 (493)	151 (644)	172 (816)	78 (894)

Staff-to-client		113	119	44	89	140	114	107
	123	(236)	(355)	(399)	(488)	(628)	(742)	(849)
Other-to-client		109	109	52	61	68	68	
	52	(161)	(270)	(322)	(383)	(451)	(519)	25 (544)

699 **Table 3**

700 Retention time as predicted by Facebook page activity, network statistics, and LIWC

701 categories

Variable	***B***	***SE***	***ß***	***R^2***
Comment likes received	.43	.18	.47*	.22
Likes received (all)	.08	.03	.43*	.18
Comment-like difference	1.09	.50	.43*	.19
Network degree	.01	.001	.43*	.18
LIWC We (Post)	3.89	1.76	.43*	.19
LIWC Achievement (Post)	.56	.26	.43*	.18
LIWC Achievement (All)	.14	.07	.42*	.17

702 * $p < .05$

703