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An Empirically-based Theory of the Relationships Among Social Embeddedness, Economic Viability, Learned Recovery Skills and Perceived Quality of Life in Recovery Homes

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Abstract

Key characteristics of recovery homes include governance style (which can play a central role in structuring recovery mechanisms), social embeddedness (e.g., social relationships within the home), economic viability (e.g., the individual's ability to be self-supporting), and learned recovery skills (such as coping with stress, avoiding putting one's self in risky situations, etc.). These domains can have important associations with perceived quality of life (measured across physical, psychological, social relationships, and environmental domains). The current study investigated relationships among these key "active ingredients" (Moos, 2007) of recovery homes. In addition, we present dynamic model consistent with these observed relationships, to illustrate how relevant mechanisms interact over time to and affect system evolution. Data were collected from recovery home residents in three states. Findings supported our overall hypotheses indicating that social embeddedness, stress, and self-efficacy were related to quality of life, and policy and treatment-design implications are further examined by simulating system dynamics.

Alcohol and drug abuse are among the most expensive health problems in the U.S., totaling about \$428 billion annually (Sacks, Gonzales, Bouchery, Tomedi, & Brewer, 2015).

Although 8%–9% of the U.S. population has an alcohol or substance use problem at any given time, only 1.5% of the population seek and receive treatment each year for these disorders (about 3.8 million individuals; SAMHSA's National Survey on Drug Use and Health, 2011). Compounding this gap, even individuals who successfully complete treatment have high relapse rates (SAMHSA, 2017). Some who relapse will eventually end up in homeless shelters or jail; costs for temporary shelter beds range from \$19-\$85 per day (US Dept. of Housing and Urban Development, 2010), and costs to house a prison inmate is

approximately \$142 per day (California Legislative Analyst Office, 2013). Reducing relapse by supporting changes in social context may be one way to address this problem. For example, following release from a few weeks of acute treatment, follow-up stays in supportive, cohesive post-treatment settings encourage personal transformation, and have been shown to substantially reduce relapse rates (Schaefer, Cronkite, & Hu, 2011).

Sober living homes are the largest recovery-specific, community-based support options in the post-treatment period for individuals attempting to recover from drug and alcohol addiction (Jason, Olson, & Foli, 2008;). A variety of studies over the last several decades (e.g., Polcin, Korch, Bond, Galloway, & Lapp, 2010; Jason, Olson, Ferrari, Majer, Alvarez, & Stout, 2007) have demonstrated their effectiveness compared to the most typical alternative of simply being released back into the community. Despite this welcome news, many questions remain about how recovery home stay works, i.e., the intervening mechanisms responsible for improved outcomes such as better employment prospects, more stable housing, improved self-esteem and self-efficacy, better personal coping skills, and ultimately, better physical and mental health and continued sobriety. In the current study, we develop a theory of the recovery process as it is thought to unfold in a recovery home setting. This theory extends relatively recent work by Rudolf Moos (e.g. Moos, 2007; 2011; Moos & Moos, 2006) and is formulated to give system-level predictions of recovery home outcomes. Our objective is to frame the recovery process in these settings in dynamic terms—a framing implicit in recent thinking about recovery.

Oxford Houses (OH) comprise a distinct model of sober living homes where there are no associated professional staff. In these settings, residents run house meetings, enforce rules, make decisions regarding eviction due to rule violations, collect weekly rent, and oversee the overall operation of the houses. The OH network was the only alcohol and substance abuse recovery home model endorsed by SAMSHA (SAMSHA's National Registry of Evidence-Based Programs and Practices, 2011). Having begun in 1995 with only one house, Oxford Houses have expanded throughout the US, and today are the largest residential, self-help recovery organization, with a network of over 2,000 recovery houses. Our conceptual framework for understanding recovery homes includes economic viability, social embeddedness, learned recovery skills, and governance (Moos, 2007). This is consistent with SAMHSA's working definition of recovery (SAMHSA, 2011).

Economic viability borrows from behavioral economics (behavioral choice theory), a decision-theoretic perspective emphasizing rational choice (Moos, 2007). It addresses the central role that rewards from conventional activities play for people in recovery, and how these rewards act as an alternative to using alcohol and other drugs (Moos, 2011). Behavioral economics has become a cornerstone of community reinforcement approaches, which attempt to replace the reinforcing properties of alcohol and substance use with sobriety and abstinence by creating immersive environments that highlight the rewards of alcohol and drug-free living (Meyers & Miller, 2001). Individuals with alcohol and substance use problems are more likely to be unemployed (Treatment Improvement Protocol 38, 2000), and may, therefore, miss the benefits of employment which provide a source of income, promote time management, improve self-esteem, and increase social embeddedness;

each of which is associated with reductions in alcohol and substance use (Copeland & Hall, 1992).

Social embeddedness (Granovetter, 1985; Polanyi, 1944) describes the web of relationships within particular sociocultural contexts. It can be used to describe the multiple types of social linkages among residents--friendships, mentoring, helping, etc.--which influence current life satisfaction and a concomitant willingness to remain in the home. Social bonds emerge from interdependent activities which may lead to increasing levels of trust and self-disclosure (VanLear, 1987). Supportive social relationships can protect people in recovery from relapse and improve overall alcohol and substance use recovery rates (Beattie & Longabaugh, 1999; Groh, Jason et al., 2007; Moos, 2007; Vaillant, 1983).

Another element of Moos and Moos' (2006) social context perspective on addiction is social learning theory and dynamics. A recovery-supportive social context provides access to and reinforces what we will call learned recovery skills. Based upon Bandura's (1997) work, recovery skills may be learned through imitation of positive role models, following acceptable norms, and building self-efficacy and other knowledge, skills, and coping capacities to deal with challenges and stressors often encountered in recovery.

Governance involves the structure and rules by which a setting operates. These rules establish the boundaries for expected individual actions within the setting and provide norming of recovery attitudes and behaviors. Governance structure most likely affects perceptions of involvement. For example, because OH settings are self-run and require residents to perform duties normally handled by staff, these settings may increase resident interdependence, thus creating supportive social climates (Harvey & Jason, 2011). Governance is revealed through social control mechanisms that reactivated through the bonds individuals form with each other while living in recovery settings together under a common system of rules and regulations. Self-governance is more likely to give rise to group interdependence, which, in turn, tends to create cohesion (Gully, Devine, & Whitney, 1995) and higher self-efficacy (Kelly, & Greene, 2014). Moreover, actions perceived as voluntary—emerging through mechanisms of social responsibility versus simple rule adherence—are more likely to be attributed to one's self rather than external exigencies, thus possibly promoting personal change and learned recovery skills.

Our conceptual model is shown in Figure 1. We propose that house governance plays a central role in structuring recovery mechanisms, as OH self-run homes may create cohesion and increase resident interdependence. An individual's social embeddedness (e.g., social relationships within the home), economic viability (e.g., the individual's ability to be self-supporting), and learned recovery skills (such as coping with stress, avoiding putting one's self in risky situations, etc.) are hypothesized to be related to perceived quality of life (QOL) (measured across physical, psychological, social relationships, and environmental domains). Many of these system characteristics and dynamics that lead to effective social support in post-treatment community-based settings have been identified, but have generally been addressed in individual studies rather than comprehensively, thus precluding an understanding of how they interact over time to affect recovery. We do not yet know what specific residential experience (i.e., opportunities for employment, support, etc.) is better for

a resident to facilitate personal change that can sustain recovery. Our study examines the possible “active ingredients” responsible for recovery, with the goal of better understanding a transactional, dynamic interchange between the resident and the recovery home’s social environment. To do this, we use a path model based on available cross-sectional data, which we acknowledge as a limitation and we include length of stay in the OH as a proxy for the passage of time and the dynamic processes described above. We use wages as a proxy for economic viability and as previously described, an exogenous influence on stress, self-efficacy and social support, which in turn impact QOL, the end-point outcome and a proxy for successful abstinence.

Method

Participants

Social network information was collected from 229 participants from 42 OHs. There were 6.14 participants per house, and we recruited an average of 5.45 of them (88.8% of potential participants). The sample included 55% males and 44.5% females, with a mean age of 38.4 years (standard deviation [*SD*] = 10.8). Participants were European American (82.1%), African American (9.2%), Hispanic (6.5%), Alaskan Native (6.5%), American Indian (1.3%), and Pacific Islander (.4%). The average length of stay in an Oxford House for participants was 10.3 months (*SD* = 12.55, range from 7 days to 6.8 years).

Procedures

Data were collected from Oxford Houses located in North Carolina, Texas, and Oregon. OH statewide organizations were strong and well-developed in these areas, which facilitated communication with residences about possible participation. Further, including residences from different geographical regions provided some ability to address generalizability of findings. State organizations helped field staff assemble lists of residences to approach, and recruitment attempts were made in approximately the order that residence contact information became available. Member-elected house presidents were asked to introduce the study by reading a description of it from a project-provided script; houses were accepted into the study if the house president and all other members (or all but, at most, one member) agreed to participate. The first thirteen consenting houses from each state were accepted, and three more houses were added because of temporal overlap, for a total of 42.

Once houses were recruited, field research staff recruited participants via face-to-face meetings. Individuals were informed about the purpose, objectives, and methodology of the study and were advised of the voluntary nature of the study before signing and returning a consent form. Interviews were scheduled and conducted that included self-report measures of QOL, stress, social networks, self-efficacy, and other demographic information. Participants were compensated \$20 for completing their assessment. Permission to do this study was granted by the DePaul University Institutional Review Board. Measures were selected in order to be able to test the theoretical notions that were described in the introduction section.

Measures

The **Quality of Life (QOL)** measure used was the World Health Organization Quality of Life Assessment Brief Version (WHOQOL Group, 1998), a 26-item instrument measuring quality of life across four domains (physical, psychological, social relationships, and environment) using 5-point Likert-type scoring. The individual subscales have demonstrated good reliability, exhibit strong discriminant and convergent validity (Skevington, Lotfy, & O'Connell, 2004), and have been used across a broad constellation of populations, for instance individuals with an alcohol use disorder (da Silva Lima, Fleck, Pechansky, de Boni, & Sukop, 2005), the homeless, and substance dependent persons (Garcia-Rea & LaPage, 2010). Subscale reliability varied in our sample (α s = .66 for the 3-item social relationship subscale, .75 for psychological, .80 for environment, and .82 for physical). The QOL scale was analyzed as a whole measure (α = .89).

The **Perceived Stress Scale-Brief Version** (Cohen, Kamarck, & Mermelstein, 1983) consists of four items (e.g., "In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?"). The brief version of this scale has exhibited acceptable reliability in our sample (α = .72). Learned recovery skills were inferred from proximal measures of self-efficacy and stress, and the more distal measure of experienced stress.

The **Drug Taking Confidence Questionnaire-8** (Sklar & Turner, 1999) is a brief version of the 50-item Drug-Taking Confidence Questionnaire (DTCQ), a widely used self-report measure of situation-specific coping self-efficacy for both alcohol and drug users. Respondents are instructed to imagine themselves in each situation and indicate how confident they are that they would resist the urge to use alcohol and substances in that situation. (e.g., "I would be able to resist the urge to use if other people treated me unfairly or interfered with my plans.") The eight-item version of the DTCQ accounted for 95% of the variance in the total DTCQ-50 score. Reliability and construct validity were assessed using alpha and correlation coefficients. Reliability for the DTCQ-8 as a global indicator of coping self-efficacy has been found, as have content, criterion, and construct validity.

The **Addiction Severity Index-Lite** (ASI-Lite; McLellan et al. 1992) assesses problem severity in commonly affected areas of alcohol and substance abuse: medical and psychiatric problems, alcohol use, drug use, illegal activity, family relations, and family history. The coefficient alpha of the ASI-Lite is good ($> .80$), and the ASI-Lite has excellent predictive and concurrent validity (McLellan et al., 1992). **Economic Viability** was measured by the natural log of wages (the data were transformed because they were not normally distributed).

The **Social Network Instrument** was developed from a house network study (Jason et al., 2014). It measures residents' theoretically-significant relationships within the house, comprising the house social structure. Types of relationships include friendship (how friendly, how strong, personal conversation, helping), trust (how much money you would lend), and mentoring (going to the person for advice on recovery and other important life issues). Each is rated on a 5-point (0–4) scale appropriate to the relationship type (e.g., friendship goes from "close friend to "adversary"). Social network relationships that use ordinal ratings, as proposed here, have been found to be reliable (Hlebec & Ferligoj, 2002).

In our work with this instrument, Cronbach's alpha was .85, a confirmatory factor analysis found excellent fit statistics with all items having substantial ($> .70$) factor loadings, and it was sensitive to the length of stay in OHs and quality of life (Jason & Stevens, 2017). These items were used to measure Social Embeddedness for each participant.

Results

Figure 2 is meant to convey hypotheses regarding direct and indirect relationships for the cross sectional sample described above. Length of stay is log-transformed, and economic viability is measured by the natural log of wages. Social embeddedness was measured by a social network scale that is described above. Learned recovery skills was measured by stress levels and self-efficacy.

A multi-level path model using Mplus was developed to test the relationships between length of stay, wages, self-efficacy, stress, and social network on quality of life, where house was treated as a random intercept. There was no significant linkage/nesting among the participants based on their residence to a specific OH (QOL = .028; Self-Efficacy = .085). Thus, there was no evidence of individual house effects on an individual's QOL. Among the dependent variables in Figure 2, there was little to low intraclass correlations. Regarding model fit, the chi-square value was $\chi^2_{(5)} = 5.078$, $p = .4065$, and the fit statistics were excellent (RMSEA = .008, CFI = .999, TLI = .998, SRMR = .028). The absolute path coefficients varied from .161 to .333, and the effect sizes from small/moderate to moderate, with p values of .01 or less. This was a correlational model, and the only indirect path that was examined and reported on was self-efficacy mediating the relationship between length of stay and quality of life. Longer length of stay in an OH was associated with higher income, less stress, and greater self-efficacy. Greater economic viability was predictive of higher self-efficacy, less stress, and more social embeddedness (social network), which in turn predicted higher quality of life. The combination of the three direct effects (social network, stress, self-efficacy) resulted in a large effect size ($R^2 = .223$, $t(223) = 4.47$, $p < .001$) for QOL.

Toy Simulation

Given the relationships above, we hypothesized that these and other observed correlations arise from the types of interconnected changes represented in our conceptual model. To show what such a model looks like in practice, and how the theoretical and practical inferences it allows extend more typical multivariate statistical models, we illustrate with a 'toy' example, which imagines how standardized (mean = 0) values of social support (S), abstinence self-efficacy (A) and stress (T) might be related to each other in a recovery-generating dynamic process, and how such a model can be utilized to draw inferences to suggest policy or treatment changes. Suppose these variables are related in the following system of differential equations, where X' denotes the derivative dX/dt :

$$S' = 0 + .03A - .2T \quad (1a)$$

$$A' = .05S + 0 - .1T \quad (1b)$$

$$T' = -.2S - .05A + 0 \quad (1c)$$

In this example, equation 1a states that change in perceived social support (S') is positively related to abstinence self-efficacy with a coefficient of $+.03$, but is negatively related to stress (-0.2). Equation 1b, in turn, relates the change in abstinence self-efficacy (A') positively to perceived support ($+.05$) but negatively to stress (-0.1). Finally, equation 1c posits that change in stress (T') is inversely related to (attenuated by) both social support (-0.2) and abstinence self-efficacy (-0.05). Note that these coefficients are theoretically plausible but are not empirically based. They were arbitrarily decided upon, while making sure that the sign (+ or -) was theoretically matching our hypotheses. A real model would also probably include exogenous predictors (e.g. employment status) and might have other features such as non-zero 'momentum' terms (e.g. the effect of S on S' , etc.). A reasonable set of starting values for an individual entering a recovery house would be some above-average level of social support ($S=.5$), an average abstinence self-efficacy ($A=0$), and somewhat above average stress ($T=.5$). Given these boundary conditions, the above model leads to the scenario for an individual's recovery shown in Figure 3a. In this scenario, the initial attenuation of stress through social support is not strong enough to improve abstinence self-efficacy, which leads to lessening social support, which in turn causes a sharp increase in stress and abstinence self-efficacy to drop precipitously. We might call this a 'classic relapse' scenario.

Given the results of this simulation, we developed an alternative model. If prior to house entry, we conducted a telephone aftercare intervention with ongoing support (White & Godley, 2003), or perhaps a brief motivational interview with the prospective resident, it could result in this person having a higher level of abstinence self-efficacy upon entry. We represent this by changing the initial value of A from 0 to $.25$. With only this change, the new result is shown in Figure 3b. In this case, initial abstinence self-efficacy helps to maintain the duration and strength of perceived social support, resulting in increased abstinence self-efficacy and lower stress over time, as well as enhanced social support. Clearly, this is a more optimistic scenario for a successful recovery.

Discussion

Our study investigated possible mechanisms responsible for the key "active ingredients" (Moos, 2007) of Oxford House recovery settings. These included governance style (which can play a central role in structuring recovery mechanisms), social embeddedness (e.g., social relationships within the home), economic viability (e.g., the individual's ability to be self-supporting), and learned recovery skills (such as coping with stress, avoiding putting one's self in risky situations, etc.). We hypothesized that these domains can have important associations with perceived quality of life. Findings from our study provide some support for our model in Figure 1, as we did find that social embeddedness, stress, and self-efficacy were significantly related to quality of life. Our dynamic model is somewhat speculative, but provides a *specific* proposal for how house-level factors may interact. The dynamic model that we think it implies—based on the correlations presented here, but also prior studies and

extant theory—provides support for a specific, enhanced theory of recovery dynamics within recovery homes.

Social embeddedness was significantly related to quality of life. A highly embedded individual has strong friendship, trust, and role model relationships with other house residents, who provide resources and support recovery. Conversely, an individual isolated from the residential social network perceives few recovery resources and may be prone to drop out. There is evidence that house residents who are friends with at least one other resident are less likely to leave recovery homes early (Jason, Stevens, Ferrari, Thompson, & Legler, 2012). Brereton et al. (2014) found that the presence of recovery home members in personal social networks predicted retention in the recovery home. A pilot study of five OHs with 31 total residents found that involvement in recovery-related activities (e.g. attending AA meetings) led to increased trust of other residents and increased the likelihood of having a “confidant” within the house (Jason, Light, Stevens, & Beers, 2014). Taken together, these findings strongly point to resident social integration in the house system/culture as a major factor in preventing early dropout and facilitating a sustained recovery and increasing the quality of life.

Stress and self-efficacy were also significantly related to quality of life. Early sobriety often is characterized by stressful financial and/or legal troubles, problematic relationships with family, friends, and peers, a lack of alternatives to alcohol and substance use, and limited opportunities for work and community reintegration (Drake, Wallach, McGovern, 2005). The OH self-governance model of recovery encourages new residents to learn from those with more recovery experience (i.e., allowing residents more opportunities to model stress management strategies for each other or share recovery resources for managing stress), and thereby decrease stress and the potential for relapse. Many recovery home residents have never learned to live life without alcohol, and learning how to do so is a major task of their recovery. Professional staff can provide conceptual direction, but actually observing coping methods of peers may provide clearer, more practical direction. Besides the likely greater efficacy of modeling recovery-supportive behavior, the OH self-governance model implies a flatter authority structure, where residents model, monitor, and encourage each other’s behavior. Thus, behavioral change may be perceived as more voluntary than if such prescriptions were coming from a professional supervisor. Attribution theory (e.g. Kelley, 1967) would predict that under such circumstances, behavioral changes are more likely to be attributed internally, and lead to less stress, higher self-efficacy and improved quality of life.

Wages (the proxy for economic viability) and length of stay were significantly related to self-efficacy. Economic viability is a requirement for residency that acts as the means through which benefits are provided to individuals directly through a system of contingency management enforced by interpersonal relationships within the home, but also indirectly by the requirement of employment. Economic viability affects the likelihood that an individual will have the resources to make housing choices. In other words, the individual is not just concerned with paying weekly rent to a recovery home, but also with having sufficient financial resources to fund their own recovery progress as well as transportation, food, and medical care. In a recovery home context, economic viability could frame recovery-supportive choice sequences; high viability implies access to financial resources, and greater

self-sufficiency possibly leading to higher self-efficacy. Wages was also related to both stress reduction and increased social support, net of length of stay. The strong impact on stress is not surprising but the strong impact on social support within the OH is interesting. This suggests a rather important and central role for wages on QOL, although it may be mediated by stress, self-efficacy and social support. Helping a new resident get a job also seems like a straightforward way to increase a resident's chances of long-term success.

The findings of this study help us better understand recovery home social dynamics and personal (ego-based) social support networks, but it might relate most to settings that foster the type of self-governance that exist in OHs. Another study by Jason et al. (2014) found that trust within groups tends to develop over time, in part as a function of inter-individual exposure, especially when the individuals in the group are dependent on each other for desired outcomes (Schachter, 1951). OH recovery homes with a self-governance structure might promote such interdependence. We proposed in our model that the governance system serves as an underlying regulatory framework, rewarding recovery-enhancing individual behavior and correcting recovery-risking behaviors. Social interaction thus teaches participants the purpose of the regulatory system and the consequences of failing to abide by it. In OH, house members themselves take ownership of regulatory action and therefore may develop stronger connections with their peers and a deeper sense of accountability for themselves and their peers. In addition, past studies have pointed to the importance of individual change being the best predictor of individual outcomes over time (Chavarria, Stevens, Jason, & Ferrari, 2012). Walt, Stevens, Jason, and Ferrari (2012) found that steady improvement in personal gain scores (e.g., self-esteem, abstinence self-efficacy) over time predicted lower relapse rates. Our study provides more support for integrative models that illustrate this dynamic effect of resource loss and gain.

While only an example, our 'toy' simulation model shows how a dynamic process model is specified and how it can be analyzed. Furthermore, it clarifies that the outcomes of such models are difficult to predict without additional mathematical analysis or (as in this case) simulation. Sometimes small changes (such as the seemingly small added endowment of abstinence self-efficacy) can produce dramatically different outcomes, precisely because such changes may be amplified by their linkages to other endogenous factors. In this way, it becomes possible to identify possible interventions (i.e., changes to house operations, individual support and preparedness, etc.) that might have particularly beneficial effects for recovery trajectories either by adjusting initial conditions of incoming residents, or by altering the linkages that act to suppress or amplify modifiable recovery-oriented characteristics of residents. The linkages were specified so that it would be easy to demonstrate the sensitivity to initial conditions but that's an important point because those linkages could in fact exist, at least in some homes or at some times.

However, one might ask the usefulness of such a simulation model for staff in an inpatient treatment program that might only have one type of program available. We believe there is a clear need for this model, and below we will provide the rationale. Of the 1.75 million treatment admissions in 2012 counted by the US Department of Health and Human Services (SAMSHA, 2012) for alcohol and substance use disorders, over 370,000 individuals were treated in a residential program (SAMSHA, 2012); 73% of these individuals have usually

had prior treatment for alcohol or drug disorders. A simulation tool might help answer the following question for the individual suffering from alcohol or drug disorders and planning their transition out of residential treatment: “which next step in residential settings is likely to maximize my likelihood of maintaining a positive recovery trajectory and thereby, best improve my quality of life longer term?” Today, this decision lacks a strong empirical foundation; although research has found improvements for 24-month abstinence for OH vs. usual care (Jason, Olson et al., 2007), relationships with alternative recovery housing, decisions related to maintaining residency, and the overall impact on quality of life are insufficiently understood. The most typical transition post-treatment is back to the community. A credible evidence-based decision-making simulation tool for patients preparing for transition would likely motivate capacity and utilization changes in aftercare residences that facilitate recovery and reduce system costs. This type of research could help patients in making better choices as well as clinicians in providing evidenced-based advice. For example, given the post-treatment psychosocial profile of a person in recovery (e.g., likelihood of obtaining work, etc.) who is bound for a recovery residence, a well-tuned simulation model could suggest the type of setting that maximizes the chances of successful recovery. In addition, this simulation could define or describe a post-treatment trajectory with a greater likelihood of success and with a larger opportunity set. But there are considerable implications of this simulation for more traditional alcohol treatment facilities, for there is considerable variability in recovery, and if we can better understand the mechanisms, even those who are in treatment settings could potentially develop better paths and outcomes for the clients.

One might also wonder whether the recovery house systems themselves could be changed in light of the findings from this study. In particular for OH where the governance structure is relatively flat and does not utilize professional staff, one might ask how would knowledge gleaned from the proposed complex system model be incorporated into practice? Only about 50% of individuals in OHs remain in these houses for six or more months, but staying for six or more months is connected to relapse reduction (Jason et al., 2012). While the OH model seems to be effective for some residents, we do not specifically know why some residents stay for six or more months, nor do we understand hypothesized OH-specific mechanisms (Jason, Davis et al., 2007). If we better understand these mechanisms, we might be able to find better ways for recovery homes to address their residents’ needs. For example, our findings could potentially be used to enhance a resident’s social support network, which might be done by encouraging more interaction when a person first becomes a resident of the recovery house. We might better understand how housing type (e.g., governance) plays a role in economic viability and this may lead to recommendations for identifying opportunities, securing jobs, and maintaining employment.

There are a number of limitations in this study. First, the data are cross-sectional making it complicated to draw causal inferences. Second, the simulation tool was based on loosely translated prior knowledge, and thus could be enhanced considerably if fit to an appropriate data set. Future studies might provide ratings on a daily or weekly basis, which could then be used to start fitting some dynamic models. And a brief daily assessment delivered on a smart phone or laptop could be designed to be adaptive. Third, the data are from only one type of recovery home, one with a self-run ideology. There certainly is a need to compare

this type of governance structure with one that is from more traditional recovery homes, ones that have staff assuming major responsibilities for governance.

While our article makes a case, both theoretically and empirically, for the factors examined, there are other more external factors that could be considered in future studies, such as continuity of care, external relationships and community capital. In addition, concepts compatible with the ideas in this paper include social and recovery capital, for example, the idea of bonding capital and group centrality (Bliuc et al., 2017). Another limitation of this article is that while social embeddedness and social learning theory help explain why certain aspects of Oxford Houses may be effective, it is not clear that they comprise a consistent (i.e., non-self-contradictory) set of underlying principles. Nevertheless, we believe that progress along this line can best be achieved incrementally, by attempting to combine empirically-inspired mechanisms in a way that takes account of the types of dynamics that must exist among them. The dynamics specifically represented in our model will probably be updated, or maybe even replaced entirely, by future work, but the model nevertheless calls attention to the need for a more sophisticated, genuinely dynamic conceptual framework within which such progress can occur.

Our research could have important, real-world policy implications for best housing practices as well as patient-centered decision making to direct future research, which could be helpful for the needs of policymakers, clinicians, and patients. For example, this information could aid patient centered decision making as well as treatment centers providing discharge planning and advice. Such a model will lead to recommendations for better ways to organize houses, including possibilities such as screening methods to ensure “readiness”, a formula for an optimal mix of residents, onboarding procedures for new residents, and potentially many more efficacious adaptations to current treatment practices. For example, if these types of self-run settings lead to better outcomes over time, this could serve to introduce more self-governing principles within more traditional recovery homes as well as other recovery settings. Therefore, we believe that our findings could be applied to improve and change recovery house settings and the recovery housing system more broadly, which could then impact policy at the national level.

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Figure 1.
Conceptual Model

Figure 2:
Empirical Cross-Sectional Path Model of Proposed Constructs and Relationships

Figures 3a (left side) and 3b (right side):
Toy Simulations