

The relationship between hope and patient activation in consumers with schizophrenia: Results from longitudinal analyses

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This is the author's manuscript of the article published in final edited form as:

Oles, S. K., Fukui, S., Rand, K. L., & Salyers, M. P. (2015). The relationship between hope and patient activation in consumers with schizophrenia: Results from longitudinal analyses. *Psychiatry Research*, 228(3), 272–276. <http://doi.org/10.1016/j.psychres.2015.05.100>

## **Abstract**

Hope (goal-directed thinking) and patient activation (knowledge and skills to manage one's illness) are both important in managing chronic conditions like schizophrenia. The relationship between hope and patient activation has not been clearly defined. However, hope may be viewed as a foundational, motivating factor that can lead to greater involvement in care and feelings of efficacy. The purpose of the present study was to understand the prospective relationship between hope and patient activation in a sample of adults with schizophrenia ( $N = 118$ ). This study was a secondary data analysis from a study on Illness Management and Recovery (IMR) – a curriculum-based approach to schizophrenia self-management. Data were collected at baseline (prior to any intervention), and at 9 and 18-month follow-up. As predicted, hope and patient activation were significantly related with each other, showing large positive concurrent correlations. Demographics and background characteristics were not significantly related to patient activation or hope. Longitudinal analyses found no specific directional effect, yet suggested that hope and patient activation mutually influence each other over time. Our findings add flexibility in designing recovery-based interventions -- fostering hope may not be a pre-requisite for activating consumers to be more involved in their own care.

**Keywords:** hope; patient activation; schizophrenia; longitudinal design; cross-lagged panel model

## **1. Introduction**

Schizophrenia is often a chronic and debilitating mental illness, and can be associated with feelings of hopelessness (Lysaker et al., 2008). Yet, current mental health policies in the U.S. support a recovery-oriented system where consumers are not passive recipients of care but are encouraged to partner with mental health providers and actively engage in treatment (President's New Freedom Commission on Mental Health, 2003). Hope is considered a critical factor that may motivate people with schizophrenia to become engaged in treatment. Although correlational research suggests a relationship between hope and patient activation, little is known about the relationship between hope and activation over time and whether one may be necessary for the other to grow. Establishing the stability and predictability between these two variables over time is critical for developing effective interventions. The purpose of this study was to assess possible connections between hope and patient activation over time with a long-term goal of improving outcomes in individuals with schizophrenia.

### *1.1. Hope*

Hope is frequently defined as a set of goal-focused cognitions consisting of pathways and agency thinking (Snyder, 1994; Snyder et al., 1998). Pathways thinking refers to goal-focused planning and generating strategies for reaching goals. Agency thinking involves motivating oneself to use these strategies to achieve one's goals. The interaction between the two is necessary for successful pursuit of one's goals. According to Snyder et al. (1998), a person high in hope tends to generate more strategies for pursuing goals and is more likely to use the strategies, making goal attainment more probable.

Consumers of mental health services refer to hope not only as an important foundation for recovery from severe mental illness, but, as a ‘turning point’ for recovery (Kirkpatrick et al., 2001) and even “a matter of life and death” (Deegan, 1996). Mental health professionals can play an important role in fostering hope and maintaining supportive relationships with consumers. For example, interviews of consumers with schizophrenia found that setting and achieving goals, either long or short term, facilitated hope; other strategies included maintaining relationships, having control over one’s illness, and spiritual beliefs (Kirkpatrick et. al. 2001). Similar conclusions of setting and pursuing goals and increasing motivation were identified in interviews with consumers with psychotic illnesses, their significant others, and mental health nurses (McCann, 2002). Alternatively, hopelessness has been linked with being less likely to take action (Lysaker et al., 2008; Hoffman et al., 2000). Together, these findings are consistent with Deegan’s (1988) earlier contention that regaining hope is critical for treatment engagement.

### *1.2. Patient activation*

Patient activation is defined as the knowledge, skills, and confidence necessary to manage one’s illness (Hibbard et al., 2004). All of these factors play a key role in managing chronic health conditions. In developing a measure of patient activation, Hibbard et al. (2004) emphasized patients’ beliefs about their active involvement in care as a crucial first step to self-management. With knowledge and confidence, patients can play an active role in managing their conditions in collaboration with healthcare providers, and gain valuable skills and behaviors to not only maintain that functioning but also prevent any health declines. The Patient Activation Measure has been widely used, and has been translated into a number of different languages (Alegria et al., 2009; Maindal et. al., 2009; Rademakers et. al., 2012). Moreover, patient activation is associated with a variety of health behaviors and outcomes.

In a study of consumers with chronic conditions, including diabetes, asthma, heart failure, coronary artery disease, and chronic pain, Mosen et al. (2006) found that higher patient activation was associated with better medication adherence, more involvement in self-management services, and better quality of life and physical and mental functioning. Hibbard et al. (2007) studied similar populations and found that the amount of self-management behaviors increased in consumers with high activation, and the change in behaviors lasted over time. Similar findings have been reported for patient activation in mental health settings. Green et al. (2010) found high activation was related to better medication adherence, better physical and mental health, higher recovery rates, and fewer symptoms. Positive aspects of patient activation were also supported by another study of mental health consumers conducted by Salyers et al. (2009), who found high patient activation related to better self-management and recovery outcomes.

### *1.3. Hope and patient activation*

While hope and patient activation may constitute important factors in treatment outcomes for people with chronic illnesses, few studies have examined the relationship between these constructs. Skolasky et al. (2009) measured patient activation and psychological variables, including hope, optimism, self-efficacy, and locus of control in 283 people prior to surgery. Although the focus of that study was on the psychometric properties of a specific measure of activation, they found strong positive correlations between patient activation and psychological factors, including hope. Similarly, Green et al. (2010), who tested psychometric properties of the Patient Activation Measure, found a strong positive correlation between patient activation and hope, as a subscale of Recovery Assessment Scale (Corrigan et al, 2004). Focusing on a sample of people with schizophrenia, Kukla et al. (2013) found that greater hope and recovery attitudes

were associated with greater involvement in managing one's illness. However, only cross-sectional analyses were conducted, and longitudinal analyses are useful to better understand the predictive relationship between the two constructs. Furthermore, understanding the longitudinal process would potentially inform interventions. For example, if hope is truly foundational and found to be a precursor to patient activation, this would suggest that hope inducing interventions would need to come prior to other activating interventions. Yet, studies have shown hope to be difficult to instill (Weis and Speridakos, 2011). A finding suggesting that hope is not a precursor to patient activation might support alternative approaches, focusing more on enhancing knowledge and skills directly related to illness management. Thus, a better understanding of the likely direction between hope and patient activation could help clarify where and when to best intervene.

Using data from the Kukla et al. (2013) study, the purpose of the current study was to examine the prospective relationship between hope and patient activation over time. Given the primacy of hope in the aforementioned literature, we hypothesized that hope would be a stronger predictor of subsequent patient activation than the reverse. To the authors' knowledge, this is the first study to investigate the relationship between hope and patient activation longitudinally in consumers with schizophrenia.

## **2. Methods**

### **2.1. *Setting and Participants***

The present study used data previously collected from a study on Illness Management and Recovery (IMR), a structured program that helps consumers effectively deal with severe mental illness by raising awareness about the illness and teaching them new ways to cope with their illness (Mueser and Gingerich, 2005). Data were collected at baseline (prior to any

intervention), at 9 and 18 months later, through interviews with a trained project manager and/or research assistant. Participants were at least 18 years old, currently receiving mental health services at a VA Medical Center or a community mental health center in [City], and diagnosed with schizophrenia spectrum disorders (schizophrenia or schizoaffective disorder) according to the Structured Clinical Interview for DSM-IV (SCID; First et al., 1996). Participants with any condition that would inhibit taking part in a study for a period of 18 months were excluded. These included physical health or cognitive dysfunction as measured by a cognitive screener (Callahan et al., 2002). The Institutional Review Boards at the [VA and University] approved the study.

The parent study recruited 118 participants and randomly assigned them to one of two treatment conditions: IMR (N=60) or problem-solving (N=58). In the original study, there were no experimental differences on outcomes over time; details on the study conditions are described in more detail elsewhere (Salyers et al., 2014). Services were delivered to participants at either the VA (N = 52, 44.1%) or the community mental health center (N = 66, 55.9%). The mean age was 47.6 years (SD = 8.9). Most participants were male (N = 94, 79.7%). Seventy two (61.0%) were African American, 40 (33.9%) were Caucasian, and 6 (5.1%) were of other race. Educational level varied from less than high school (N = 40, 33.9%), to high school diploma (N = 39, 33.1%), and some college or college degree (N = 37, 31.3%). At 9 months, 84 participants (71%) were located and interviewed at follow-up. Dropouts did not significantly differ from the 9-month sample on any demographic except for age. Dropouts were younger ( $M = 45.0$ ,  $SD = 9.9$ ) than non-dropouts ( $M = 48.7$ ,  $SD = 8.2$ ),  $t(116) = -2.11$ ;  $p = .037$ .

## **2.2. Measures**

Patient activation was assessed with the Patient Activation Measure for mental health (PAM-MH; Hibbard et al., 2005). This 13-item scale that specifically focuses on mental health (e.g., “I am confident that I can take actions that will help prevent or minimize some symptoms or problems associated with my mental health condition”). Scores range from 0 (least activated) to 100 (high activated). The PAM-MH has shown strong test-retest reliability, reliability in Rasch analyses, and correlation with similar concepts (Green et al., 2010). The scale has been successfully used in other samples with schizophrenia (Druss et al., 2010; Green et al., 2010; Salyers et al., 2009). Cronbach’s alpha was .88 for the present study.

Hope was assessed with the State Hope Scale (Snyder et al., 1996), a six-item measure asking consumers to indicate the extent of their agreement with statements related to pathways thinking (e.g., “I can think of many ways to reach my current goals”) and agency thinking (e.g., “At the present time, I am energetically pursuing my goals”) on a 4-point scale ranging from “Definitely False” to “Definitely True.” Internal consistency, convergent and discriminant validity, and sensitivity have been established (Snyder et al., 1996). Although psychometric properties were established in a college-student sample, the scale has been successfully used in individuals with schizophrenia, major depression, and bipolar disorder (Dickerson, 2002; McGrew et al., 2004). The state version of the hope scale was selected for the parent study because it was hypothesized that hope among consumers with schizophrenia could change across time, particularly in response to the IMR intervention. In this sample, Cronbach’s alpha was .82.

### **2.3. Data Analyses**

Preliminary analysis involved examination of the distribution of scores on hope, patient activation, and demographics. We created a correlation matrix to examine bivariate relationships among baseline demographics (i.e., gender, age, race, educational level), and hope and patient



activation, (baseline, 9 months, and 18 months). We examined the relationship between hope and patient activation over time through a sequence of cross-lagged panel models (Bollen, 1989; Little et al., 2007; Wu et al., 2013). All outcome variables were standardized so the path coefficients can be interpreted as standardized regression coefficients. First, we freely estimated all hypothesized path coefficients (the base model). Second, we imposed some constraints to test whether the assumption of stationarity held for the data. More specifically, we constrained to equality the structural path coefficients linking adjacent measurements of the same variable (i.e., the coefficients linking baseline to 9 mo. and 9 mo. to 18 mo. measurement of hope; likewise for patient activation). In addition, we constrained the within-occasion residual correlation between hope and patient activation to be equal across time (9 mo., and 18 mo.). The model with these constraints is labeled model 1. We used a likelihood ratio test (i.e., chi-square difference test) to test if model 1 provided worse fit to the data than the base model. If the likelihood ratio test is not significant, then the constraints in model 1 are plausible. Note that this test is an omnibus test which controls familywise Type I error (Little, 2013).

Third, we introduced five time-invariant covariates (i.e., randomized condition, baseline age, gender [male = 1], race [white = 1], education [beyond high school = 1]) to control for potential confounding factors. Note that the number of treatment sessions attended was unrelated to outcomes in the parent study and was not included in this model. The covariates, allowed to be correlated with the baseline measures, were used to predict the outcomes at 9 and 18 months. Finally, two path coefficients (i.e., the effect of hope on patient activation; the effect of patient activation on hope) were constrained to be equal to examine whether the two effects had the same magnitude of strength. Again, a likelihood ratio test was performed to test if the constraint was tenable.

Each model was evaluated using the multi-index approach (Hu and Bentler, 1999), based on the Comparative Fit Index (CFI; values  $>.90$  are acceptable but values  $>.95$  are preferred), Tucker-Lewis Index (TLI; values  $>.90$  are acceptable but values  $>.95$  are preferred), Root Mean Square Error of Approximation (RMSEA; values  $<.08$  are acceptable, but  $<.05$  are preferred), and Standardized Root Mean Square Residual (SRMR; values  $<.08$  are acceptable but values  $<.06$  are preferred). Mplus version 7.11 (Muthén and Muthén, 1998-2013) with full information maximum likelihood estimation was used for the analyses.

### 3. Results

Overall patient activation reported by participants was moderate, with a mean = 54.7 ( $SD = 16.1$ ). Participants' level of hope was above the scale's theoretical mean of 2.5 ( $M = 2.9$ ,  $SD = .66$ ). As predicted, hope and patient activation were significantly related with each other (see Table 1), showing a large positive concurrent correlations at baseline ( $r = .57$ ,  $p < 0.001$ ), 9 months ( $r = .62$ ,  $p < 0.001$ ), and 18 months ( $r = .67$ ,  $p < 0.001$ ). Demographics and background characteristics, including gender, race, education, age were not significantly related to hope or patient activation.

The final cross-lagged panel model is model 1, shown in Fig. 1. The base model showed acceptable fit [ $\chi^2_{(4, n=118)}=3.059$ ,  $p=.55$ , RMSEA= 0.0 (90%CL=0 - 0.123), CFI=1.00, TLI=1.00, SRMR=0.022]. The likelihood ratio test indicated that the constraints on the corresponding path coefficients and residual correlations (model 1) were tenable [ $\chi^2_{(dif=5)}=1.165$ ,  $p=.95$ ], and the confidence interval for RMSEA became appreciably narrower. Model 1 provided adequate fit to the data [ $\chi^2_{(9, n=118)}=4.224$ ,  $p=.90$ , RMSEA=0.0 (90%CL=0 - 0.046), CFI=1.00, TLI=1.00, SRMR=0.032] (the final model). On the other hand, inclusion of time-invariant covariates did not improve the model fit [ $\chi^2_{(dif=30)}=30.29$ ,  $p=.45$ ], and none of the covariate effects was

significant. Thus, these covariates were removed. Lastly, the equality constraint on the two effects (i.e.,  $\beta_3=\beta_4$  in Fig. 1) was tenable [ $\chi^2_{(dif=1)}=0.239, p=.62$ ] indicating that the magnitudes of the two effects were not statistically different.

#### **4. Discussion**

This is the first study to examine hope and patient activation longitudinally, and to attempt to sort out potential directionality in these relationships over time. Given the theoretical relevance of both constructs to recovery, combined with the lack of empirical data in people with schizophrenia-spectrum disorders, this study contributes important new knowledge to the field. We found a large positive correlation between hope and patient activation at each time period. Our cross-lagged panel models revealed that consumers with greater hope tended to become more activated in their treatment over time. In addition, activation was also associated with improved hope over time. Contrary to our expectation, hope was not a stronger predictor of changes in patient activation over time. That is, hope and patient activation were not just concurrently related (Kukla et al, 2013), but both constructs predicted the future status of consumers, and the influence was reciprocal and consistent over time.

Our correlational findings are similar to Green (2010), who found positive relationships between hope and patient activation in another sample of people with mental illness, and to Skolasky et al. (2009) who found positive relationships between hope and patient activation in another health condition (i.e., chronic back pain). That hope and patient activation are empirically related is consistent with studies emphasizing hope as an important factor for consumers' active engagement in recovery (Kirkpatrick et al., 2001; McCann, 2002). Similarly, prior research (Hoffman et al., 2000; Lysaker et al., 2008) has shown that individuals with low

hope tend to give up easier and are less involved in their recovery. It is plausible that hope can lead to increased activation and involvement in recovery.

Yet our model shows that it is similarly plausible that patient activation leads to increased hope. Hence, it suggests both pathways impact one another and they will likely influence each other going forward. One of the clinical implications of our findings is that when designing interventions to foster recovery from mental illness, starting with either (or both) hope or patient activation may be equally desirable for improvements in the other across time. This gives treatment providers greater flexibility in how to design and implement interventions, depending on what is most practical at the time.

One may emphasize hope in interventions, as hope has been related to therapy outcomes. For example, Irving et al.'s (2004) research shows that pathways and agency present at the beginning of the psychotherapy lead to more positive outcomes of therapy sessions. However, Schrank et al. (2011) looked closely at interventions designed to increase hope in mental health consumers and found that studies with hope as a primary outcome were almost missing. In their systematic review, they reported one pilot study that was a hope-instilling group therapy session in mental health consumers (Cheavens et al., 2005). Although their intervention did not yield overall significant change in hope, the agency component did improve. Another study conducted by Tollet and Thomas (1995) was a nursing intervention to increase hope, self-efficacy, and self-esteem, and decrease depression in homeless veterans. Hope was the only measure showing statistically significant improvement.

Conversely, one may emphasize patient activation given links to greater self-management of mental illness in people with medical conditions (Mosen et al., 2006; Hibbard et al., 2007) as well as mental health conditions (Salyers et al., 2009; Green et al., 2010; Kukla et al., 2013). For

example, Alexander et al. (2012) noted that as little as establishing patient-physician relationships might help foster patient activation. Alegria and colleagues (2008) found increases in patient activation following three sessions coaching consumers to ask questions in treatment, and Druss et al. (2010) found increases in patient activation following a peer support intervention for managing comorbid medical conditions in schizophrenia. Given the difficulty in targeting hope specific-interventions (Weis and Speridakos, 2011), combined with our findings that hope is not necessarily a precursor, patient activation interventions may be a more promising avenue.

Our study is limited in the ability to make causal conclusions. Our cross-lagged panel models suggest a plausible model whereby hope and patient activation mutually influence each other over time. However, further research is needed to look more closely at this relationship, and experimental designs could be used to better understand the relationship between the two variables. For example, an intervention specifically designed to instill hope could be experimentally manipulated to examine the impact on patient activation and recovery outcomes. Furthermore, our sample included primarily male participants, all of whom had enrolled in a study to improve illness self-management. This can limit the generalizability of our findings.

Despite these limitations, this study provides new information that hope and patient activation may be related to each other for consumers with schizophrenia, and the relationships may remain constant over time. The recovery process is highly individualized, and our findings support different potential pathways to recovery. Interventions involving multifaceted approaches (including hope-instilling and patient-activation enhancement strategies) may be more effective at impacting the different driving-forces toward recovery. The study also suggests that evaluating mutually influencing outcome variables may be better suited for facilitating our understanding of the interactive processes and mechanisms of recovery pathways.

### **Author Contributions**

Authors Oles and Salyers were involved in the study design. Salyers designed and directed the parent study from which the data were obtained. Authors Fukui and Rand were involved in data analysis and writing up the results. Oles wrote the first draft of the manuscript. All authors contributed, edited, and approved the manuscript and subsequent revisions.

### **Conflict of interest**

None of the authors have any conflicts of interests to declare.

### **Acknowledgement**

The research reported here was supported in part by the Undergraduate Research Opportunity Program grant and the Department of Veterans Affairs, Veterans Health Administration, Health Services Research & Development Service (IAC 05-254-3; Illness Management and Recovery for Veterans with Severe Mental Illness). The views expressed in this paper are those of the authors and do not necessarily represent those of the Department of Veterans Affairs.

## References

- Alegria, M., Polo, A., Gao, S., Santana, L., Rothstein, D., Jimenez, A., Lyons Hunter, M., Mendieta, F., Oddo, V., Normand, S. L., 2008. Evaluation of a patient activation and empowerment intervention in mental health care. *Medical Care* 46,247-256.
- Alegria M., Sribney W., Perez D., Laderman K., Keefe K., 2009. The Role of Patient Activation on Patient–Provider Communication and Quality of Care for US and Foreign Born Latino Patients. *Journal of General Internal Medicine* 24, 534-541.
- Alexander, J. A., Hearld, L.R., Mittler, J. N., Harvey, J., 2012. Patient-physician role relationships and patient activation among individuals with chronic illnesses. *Health Services Research* 47, 1201-122.
- Bollen, K.A., 1989. *Structural equations with latent variables*. Wiley, New York.
- Callahan, C. M., Unverzagt, F. W., L., H. S., Perkins, A. J., Hendrie, H. C., 2002. A six-item screener to identify cognitive impairment among potential subjects for clinical research. *Medical Care* 40, 771-781.
- Cheavens, J., Feldman, D., Gum, A., Michael, S., Snyder, C., 2006. Hope therapy in a community sample: a pilot investigation. *Social Indicators Research* 77, 61-78.
- Corrigan, P.W., Salzer, K., Ralph, R.O., Sangster, Y., Keck, L., (2004). Examining the factor structure of the Recovery Assessment Scale. *Schizophrenia Bulletin* 30, 1035-1041.
- Dickerson, R. J., 2002. Hope and self-esteem as outcome measures of a psychiatric inpatient cognitive-behavioral treatment program. *Dissertation Abstracts International: Section B. Sciences and Engineering*, 63 (6-B), 3004.
- Deegan, P. E., 1988. Recovery: The lived experience of rehabilitation. *Psychosocial Rehabilitation Journal* 11, 11-19.

- Deegan, Patricia E. "There's a Person In Here." The Sixth Annual Mental Health Services Conference of Australia and New Zealand. Brisbane, Australia. 16 Sept. 1996.
- Druss, B. G., Zhao, L., Esenwein S. A., Bona J. R., Fricks, L., Jenkins-Tucker, S., Sterling, E., DiClemente, R., Lorig, K., 2010. The health and recovery peer (HARP) program: A peer-led intervention to improve medical self-management for persons with serious mental illness. *Schizophrenia Research* 118, 264-270.
- First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W., 1996. Structured Clinical Interview for DSM-IV Axis-I Disorders - Patient Edition (SCID-I/P, Version 2.0). Biometrics Research Department, New York.
- Green, C. A., Perrin, N. A., Polen, M. R., Leo, M. C., Hibbard, J. H., Tusler M., 2010. Development of the Patient Activation Measure for mental health. *Administration and Policy in Mental Health and Mental Health Services Research* 37, 327-333.
- Hibbard, J. H., Stockard, J., Mahoney, E. R., Tusler, M., 2004. Development of the Patient Activation Measure (PAM): Conceptualizing and measuring activation in patients and consumers. *Health Services Research* 39, 1005-1026.
- Hibbard, J. H., Mahoney, E. R., Stockard, J., Tusler, M., 2005. Development and testing of a short form of the Patient Activation Measure. *Health Services Research* 40, 1918-1930.
- Hibbard, J. H., Mahoney, E. R., Stock, R., Tusler, M., 2007. Self-management and health care utilization: Do increases in patient activation result in improved self-management behaviors? *Health Services Research* 42, 1443-1463.
- Hoffmann, H., Kupper, Z., Kunz, B., 2000. Hopelessness and its impact on rehabilitation outcome in schizophrenia-an exploratory study. *Schizophrenia Research* 43, 147-158.



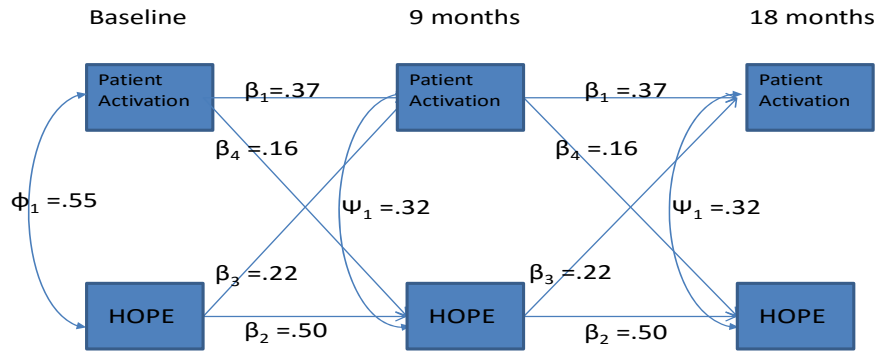
- Hu, L., Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling* 6, 1-55.
- Irving, L. M., Snyder C. R., Cheavens, J., Gravel, L., Hilberg, P., Nelson, N, 2004. The relationships between hope and outcomes in the pretreatment, beginning, and later phases of psychotherapy. *Journal of Psychotherapy Integrations* 14, 419-443.
- Kirkpatrick, H., Landeen, J., Woodside, H., Byrne, C., 2001. How people with schizophrenia build their hope. *Journal of Psychosocial Nursing and Mental Health Services* 39, 46-53.
- Kukla, M., Salyers, M., Lysaker, P. H., 2013. Levels of patient activation among adults with schizophrenia. *Journal of Nervous and Mental Disease* 201, 339-344.
- Little, T. D., Preacher, K. J., Selig, J. P., Card, N. A., 2007. New developments in SEM panel analyses of longitudinal data. *International Journal of Behavioral Development* 31, 357-365.
- Little, T. D., 2013. *Longitudinal Structural Equation Modeling*. Guilford Press, New York.
- Lysaker, P. H., Salyers M. P., Tsai J., Yorkman Spurrier L., Davis L.V., 2008. Clinical and psychological correlates of two domains of hopelessness in schizophrenia. *Journal of Rehabilitation Research and Development* 45, 911-920.
- Maindal, H. T., Sokolowski I., Vedsted, P., 2009. Translation, adaptation and validation of the American short form Patient Activation Measure (PAM13) in a Danish version. *BMC Public Health* 9, 209-207.
- McCann T. V., 2002. Uncovering hope with clients who have psychotic illness. *Journal of Holistic Nursing* 20, 81-99.

- McGrew, J. H., Johannesen, J. K., Griss, M. E., Born, D., Vogler, T., 2004. Results-based Funding in Indiana: Process, Outcomes and Caveats. Paper presented at the National Conference of the Association of Persons in Supported Employment, Indianapolis, IN.
- Mosen, D. M., Schmittiel J., Hibbard, J., Sobel, D., Remmers C., Bellows, J., 2006. Is Patient Activation associated with outcomes of care for adults with chronic conditions? *Journal of Ambulatory Care Management* 30, 21–29.
- Mueser, K. T., Gingerich, S., 2005. Illness Management and Recovery (IMR) Scales, in: Campbell-Orde, T., Chamberlin, J., Carpenter, J., Leff, H.S. (Eds.), *Measuring the Promise: A Compendium of Recovery Measures*, Evaluation Center @ Human Services Research Institute, Cambridge., pp. 124-132.
- Muthén, L. K., Muthén, B. O., 1998-2013. *Mplus user's guide*, sixth ed. Muthén & Muthén, Los Angeles.
- President's New Freedom Commission on Mental Health. *Achieving the promise: transforming mental health care in America*. Final report. DHHS Pub. No. SMA-03-3832. 2003. Rockville, MD, Substance Abuse and Mental Health Services Administration.
- Rademakers J., Nijman J., Hoek L., Heijmans M., Rijken M., 2012. Measuring patient activation in the Netherlands: translation and validation of the American short form Patient Activation Measure (PAM13). *BMC Public Health* 12, 577.
- Salyers, M. P., Matthias, M. S., Spann, C. L., Lydick, J. M., Rollins, A. L., Frankel, R. M., 2009. The role of patient activation in psychiatric visits. *Psychiatric Services* 60, 1535-1539.
- Salyers, M. P., McGuire, A. B., Kukla, M., Fukui, S., Lysaker, P.H., Mueser, K. T., 2014. A randomized controlled trial of Illness Management and Recovery with an active control condition. *Psychiatric Services* 65, 1005-1111.

- Schrank, B., Bird, V., Rudnick, A., Slade, M., 2012. Determinants, self-management strategies and interventions for hope in people with mental disorders: Systematic search and narrative review. *Social Science and Medicine* 74, 554-564.
- Skolasky, R. L., Mackenzie, E. J., Riley, L. H., Wegener, S. T., 2009. Psychometric properties of the patient activation measure among individuals presenting for elective lumbar spine surgery. *Quality of Life Research* 18, 1357-1366.
- Snyder, C. R., 1994. *The psychology of hope: You can get there from here*. Free Press, New York.
- Snyder, C. R., Sympson, S. C., Ybasco, F. C., Borders, T. F., Babyak, M. A., Higgins, R. L. 1996. Development and validation of the State Hope Scale. *Journal of Personality and Social Psychology* 70, 321-335.
- Snyder, C. R., LaPointe, A. B., Crowson, Jr. J. J., Early S., 1998. Preferences of High- and Low-hope People for Self-referential Input. *Cognition and Emotion* 12, 807-823.
- Tollett, J. H., Thomas, S. P., 1995. A theory-based nursing intervention to instill hope in homeless veterans. *Advances in Nursing Science* 18, 76-90.
- Weis, R., Speridakos, E. C., 2011. A Meta-Analysis of hope enhancement strategies in clinical and community settings. *Psychology of Well-Being: Theory, Research and Practice*, 1:5.
- Wu, W., Selig, J. N., Little, T. D., 2013. Longitudinal data analysis. In Little, T.D. (Eds.) *Handbook of Quantitative Methods*. Oxford.

Fig. 1.

Cross-lagged panel model (the final model).



$\chi^2_{(9, n=118)}=4.224, p=.90$ , Root Mean Square Error of Approximation =0.0 (90%CL=0 - 0.046), Comparative Fit Index =1.00, Tucker-Lewis Index =1.00, Standardized Root Mean Square Residual =0.032

$\beta_s$  can be interpreted as standardized regression coefficients.  $\beta_1$  and  $\beta_2$  are autoregressive coefficients equated across time, showing the effect of a previous measure on a subsequent measure of the same variable.  $\beta_3$  and  $\beta_4$  are cross-lagged regression coefficients, showing the effect of a previous measure on the subsequent measure of the different variable.  $\beta_3$  shows the effects of hope on subsequent patient activation, while  $\beta_4$  shows effects of patient activation on subsequent hope. The finding that  $\beta_3$  and  $\beta_4$  were not significantly different from each other indicates mutual influences.  $\phi/\Psi$ s are standardized covariances and can be interpreted as correlations. The failure to reject the null hypothesis in  $\chi^2$  indicates that the observed model and the hypothesized model are not significantly different (i.e., the model fits the data). The upper limit of the CI for RMSEA was less than .05 indicating a good fit (the value is approximately zero because the model is close to being saturated). Both CFI and TLI are comparative fit indices, with a value of 1.0 indicating a good fit. SRMR is an absolute fit index, with closer to zero implying a good fit.

Table 1.  
Correlations among hope, patient activation and background variables.

	1	2	3	4	5	6	7	8	9	10
1. Gender (Female)	1									
2. Age	-.01	1								
3. Race (White)	-.14	-.16	1							
4. Education (Beyond College)	-.07	.10	.29 **	1						
5. Hope BL	.10	.03	-.14	-.12	1					
6. Patient Activation BL	-.03	-.04	.01	.02	.57 **	1				
7. Hope 9 mo	.02	.12	-.09	-.07	.61 **	.46 **	1			
8. Patient Activation 9 mo	-.09	.01	-.13	-.08	.43 **	.51 **	.62 **	1		
9. Hope 18 mo	-.06	-.13	-.17	-.07	.47 **	.36 **	.59 **	.49 **	1	
10. Patient Activation 18 mo	-.06	-.02	-.16	.03	.33 **	.34 **	.50 **	.53 **	.67 **	1

Note \*\* $p < .01$