Rheinland-Pfälzische Technische Universität Kaiserslautern Landau

Eine sekundäre Analyse motivierender und kognitiver Faktoren mit Zusammenhang mit der Integration von obdachlosen Veteranen mit und ohne psychotischen Störungen in die Gesellschaft: Fokus auf familiäre Beziehungen, Freundschaft und Arbeit

A Secondary Analysis of Motivational and Cognitive Factors Linked to Community Integration in Homeless Veterans With and Without Psychotic Disorders: Focus on Family Relationship, Friendship, and Work

Master's Thesis

von

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Abstract

Homelessness is a critical public health issue in the United States, especially among homeless veterans. While supported housing helps, community integration remains a challenge, particularly for those with psychotic disorders. Previous research demonstrated that cognitive abilities and motivation are key factors influencing community integration. Limited knowledge exists on determinants affecting social integration (i.e., family relationship, and friendship) and work for homeless veterans. Such information is crucial for tailored interventions. This study employed a secondary analysis to investigate differences in these factors' associations with family, friendship, and employment among homeless veterans with and without psychosis. Initially, a total of 97 homeless veterans with a psychotic disorder and 82 without psychosis were assessed before receiving housing, with 54 of the participants with psychosis and 41 of the participants without psychosis returning after 12 months. Cross-sectional and longitudinal analyses revealed various correlations between determinants and community integration in both samples. Notably, different potential causal relationships were observed in the groups. Motivation appeared to influence family relationships in participants with psychosis, while in those without, there was a trend that friends and work engagement influenced social cognition. Work engagement before receiving housing also positively impacted motivational attitudes at the 12-month mark in the non-psychosis group. These findings across samples emphasize the importance of considering the distinct needs and challenges faced by homeless veterans with and without psychosis in providing interventions for their social integration and employment.

Keywords: cognition, motivation, social integration, psychotic disorders

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1 Introduction

1.1 Homeless Veterans and Severe Mental Illness

In the United States, homelessness has emerged as a major and pressing public health problem in recent decades (Tsai et al., 2017; Wolitski et al., 2007), with veterans being identified as a high-risk group compared to other adults (Donovan & Shinseki, 2013). To address the problem of homeless veterans, the Department of Veterans Affairs (VA) has allocated substantial resources to intervene since 2009 (Balshem et al., 2011; U.S. Department of Veterans Affairs, Office of Public and Intergovernmental Affairs, 2009). In terms of interventions, the government provides supportive housing to homeless and vulnerable populations is obligatory and promising. For instance, the number of homeless veterans reduced by 55% between 2009 and 2022 (U.S. Department of Housing and Urban Development, 2022). However, findings from Lipton et al. (2000) revealed that 50% of their homeless participants did not maintain their supportive housing after five years. This indicates that housing is insufficient to solve the issue of homelessness among veterans. Moreover, addressing this issue is particularly challenging for homeless veterans with severe mental illness (i.e., schizophrenia and bipolar disorder; SMI; O'Connell et al., 2008). Therefore, preventing the housed veterans from returning to being homelessness is a crucial concern.

Enhancing community integration is one of the strategies employed to support permanent housing (La Motte-Kerr et al., 2020; Tsemberis et al., 2004; Wong & Solomon, 2002). Especially for homeless individuals with psychotic disorders, problems with community integration are an extensive challenge to residential stability (Friedrich et al., 1999; Green et al., 2022).

1.2 Community Integration Dimensions

Wong and Solomon (2002) presented a broad framework of community integration composed of three dimensions: (1) physical integration (participation in community activities and utilization of community services and resources), (2) social integration (establishment of social connection and positive interpersonal relationships), and (3) psychological integration (a deep sense of belonging to the community). However, previous studies have consistently observed that in the recently housed veterans both with and without mental disorders, their limited engagement in the utilization of healthcare services and social connections, as well as persistent challenges with unemployment (Gabrielian et al., 2014; Montgomery et al., 2016; Painter et al., 2018; Tsai et al., 2012). These results showed that all three dimensions of community integration do not increase automatically after homeless individuals are housed. To explore the lack of successful community integration among homeless veterans, especially those with psychosis, previous studies used three domains to assess community integration: (1) social integration (i.e., relationships with family and friends), (2) work and productive activities,

and (3) independent living (Brekke et al., 1993; Green et al., 2022; Wynn et al., 2021).

Community Integration Determinants

Before applying interventions to improve community integration, it is important to identify the determinants that contribute to integration. In the psychotic disorders research, ability variables, including social cognition (e.g., mentalizing, emotional processing), non-social cognition (e.g., memory, attention, problem-solving), as well as motivation variables (e.g., motivational negative symptoms, dysfunctional attitudes), have been recognized as three broad categories of predictors correlated with community integration (Campellone et al., 2016; Fett et al., 2011; Green & Harvey, 2014; Horan et al., 2012; Robertson et al., 2014). Furthermore, there is evidence that homeless veterans with SMI experience a more pronounced decline in cognitive function compared to those without SMI experience. (Adams et al., 1996; Bremner et al., 1996; Foster et al., 2012). Extensive research has been conducted to examine the factors associated with community integration following the provision of housing. For instance, many research has highlighted deficits in neurocognitive domains (e.g., cognitive flexibility and verbal learning memory) among homeless adults with SMI may have an impact on their ability to establish social connections, navigate complex routines, and address daily living activities, including housing issues (Gicas et al., 2023; Schutt et al., 2007; Stergiopoulos et al., 2011). In contrast, Stergiopoulos et al. (2019) found that there was no association

between neurocognitive functioning and housing stability in homeless veterans with mental illness. Some researchers have discovered that motivation variables, such as experiential negative symptoms (e.g., diminished interest and reduced emotional experiences), as well as dysfunctional attitudes (e.g., defeatist beliefs regarding one's ability to successfully engage in targeted behaviors), play significant roles in community integration (Beck & Rector, 2005; Campellone et al., 2016; Grant & Beck, 2009; Strauss et al., 2013).

1.3 Social Integration: Family Relationship and Friendship

As mentioned previously, community integration encompasses three domains: social integration, work and productive activities, and independent living. When it comes to social integration, it is a composite variable that consists of two types of relationships: family relationship and friendship. Several studies in the psychiatric literature have consistently reported positive associations between individuals' functioning and their relationships with both family and friends (Brooks et al., 2022; Evert et al., 2003; Howard et al., 2000). Furthermore, research beyond the scope of psychosis has demonstrated that individuals experiencing homelessness receive the most reliable practical and emotional support from family-like friends (Neale & Brown, 2015). Evert et al. (2003) reported that the nature of individuals' social networks with family and friends may have distinct associations with various aspects of their community participation and social circumstances; making it a beneficial topic to examine the impact of determinants on family relationship and friendship separately.

Family Relationship, Friendship, and Severe Mental Illness

The topic of family relationship and friendship as independent constructs has received comparatively little attention within the existing body of scholarly literature on psychotic disorders. In a recent review conducted by Terry and Townley (2019), the significance of family and friends within the networks of people with SMI was highlighted. The findings revealed that a majority of participants acknowledged that both social relationships provide them with emotional and tangible support. Some individuals expressed that friends play a crucial role in helping them avoid hospitalization and maintain their community integration. However, while the family relationship was viewed as a reliable source of support and community integration, participants often reported conflicts with their family members, who sometimes struggled to allow them to be independent. Consequently, the current study aimed to fill these gaps by exploring the roles of family relationship and friendship in community integration among homeless individuals with a history of psychosis.

1.4 The Aims of the Current Study

In the previous studies, the authors have discussed the association between the determinants (i.e., social cognition, non-social cognition, and motivation) and community integration, specifically focusing on social integration and independent living measures (Green et al., 2022; Wynn et al., 2021). The current research undertook a secondary analysis of their

databases to seek the potential impact of these factors on family relationship and friendship in recently housed veterans with and without psychosis. In the current study, we focused on three measures of community integration: (1) family relationship, (2) friendship, as well as (3) work and productive activities (work from here).

The primary objective of this project was to understand the process of recovery and community integration, especially family relationship and friendship, among recently housed veterans with and without psychotic disorders as well as to identify potential targets for future intervention studies. There were four hypotheses within the current secondary analyses. Firstly, we evaluated participants' abilities (i.e., non-social cognitive, social cognitive, and motivational) and measures of community integration (i.e., family relationship, friendship, and work) at baseline, when the participants had received vouchers for housing but had not yet attained housing, to uncover whether there were differences in these variables between recently housed veterans with and without psychotic disorders. Secondly, we conducted within-group comparisons to further understand the improvement of individuals' functional outcomes before and after 12 months of housing within each group. Thirdly, we analyzed cross-sectional correlations between pre-housing abilities and community integration variables, as well as longitudinal relationships between pre-housing abilities and community integration variables after housing for 12 months Finally, for any pre-housing variable that showed a correlation with community integration after 12 months of housing, we performed cross-lagged panel

analyses to investigate whether the pattern supports the idea that one set of variables causally influencing another set of variables.

2 Methods

This study conducted a secondary analysis of data collected from two studies: Green et al. (2022; Study 1) and Wynn et al. (2021; Study 2).

2.1 Participants

This study included 179 baseline homeless veterans collected from two distinct VA-funded longitudinal studies focusing on community integration among homeless veterans in the United States. Study 1 included data from 97 participants obtained through a VA Merit grant on homeless veterans with a history of psychotic disorders, identified as the psychosis sample in this report (Green et al., 2022), and the data collection took place between 2013 and 2017. The baseline data were collected during the period when the participants had received a HUD-VASH voucher, provided by the Department of Housing and Urban Development and VA Supported Housing – HUD-VASH program, for housing but were not yet housed. Study 2 included 82 participants drawn from a project on homeless veterans without a history of psychotic disorders, considered as the non-psychosis sample here (Wynn et al., 2021), supported by the VA Research Enhancement Award Program (REAP) on Enhancing Community Integration for Homeless Veterans, and the data collection took place between 2015 and 2018. Both projects included a shared set of baseline assessments encompassing

abilities (i.e., non-social cognition and social cognition), motivation, and community integration measures (i.e., independent living (not reported here), social integration, and work), as well as assessments after 12 months of housing.

For the psychosis sample, a monthly query was conducted in the VA administrative database (VA Informatics and Computing Infrastructure; VINCI). This query aimed to identify all veterans who had enrolled in the HUD-VASH program at the VA Greater Los Angeles Healthcare System (GLA) in the preceding month and had received mental health care for a psychotic diagnosis in the preceding 5 years. Opt-out letters were sent to the veteran's last known address, and subsequent phone contact was initiated for those who did not respond to the letter. Furthermore, research assistants attended orientation sessions for the HUD-VASH program to distribute information about the study. For the non-psychosis sample, the research staff also attended the HUD-VASH orientation meetings to recruit the participants with non-psychosis, but the VINCI database was not utilized as part of the recruitment process.

The general inclusion criteria comprised individuals aged between 18 and 65 years old, with an estimated premorbid IQ greater than 70, and proficiency in English. The general exclusion criteria encompassed any medical, physical, cognitive, or language impairment of such severity that would adversely impact the data's validity.

With regard to specific diagnosis criteria, for the psychosis sample, a diagnosis of schizophrenia, schizoaffective disorder, an unspecified psychotic disorder, or a mood disorder

with psychotic features. These diagnoses were determined by using the Structured Clinical Interview for DSM–5 was required (a substance-induced psychotic disorder was not included). For the non-psychosis sample, the general exclusion criteria included any history of a psychotic disorder. All participants provided written informed consent in accordance with procedures approved by the Institutional Review Board at VA Greater Los Angeles Healthcare System.

2.2 Materials

2.2.1 Clinical Assessments

All interviewers were trained at the Treatment Unit of the VISN 22 Mental Illness Research, Education and Clinical Center (MIRECC) to a minimum kappa of 0.75 for key psychotic and mood items. Diagnoses were determined using the Structured Clinical Interview for DSM-5 (SCID-5; First, et al., 2015) mood disorder, psychotic disorder, post-traumatic stress disorder (PTSD), and substance use disorder modules, as well as all available medical records.

2.2.2 Non-social Cognition Assessments

Non-social cognitive abilities were evaluated using the Neurocognitive Composite of the MATRICS Consensus Cognitive Battery (MCCB; Nuechterlein and Green, 2006). The MCCB includes nine tests that assess six domains of non-social cognition, including speed of processing, attention/vigilance, working memory, verbal memory, and reasoning and problem-

solving. The standardized *T*-scores were calculated for each domain, correcting for age and gender. An MCCB: Neurocognition Composite, was derived by averaging the *T*-scores across the domains

2.2.3 Social Cognition Assessments

The MCCB also includes a social cognition measure, the Managing Emotions branch of the Mayer-Salovey-Caruso Emotional Intelligence Test 2.0 (MSCEIT; Mayer et al., 2003). This assessment explores the regulation of emotions in both personal and interpersonal contexts by presenting diverse situational vignettes and offering coping strategies for the emotions portrayed. A standardized *T*-score was calculated, correcting for age and gender.

2.2.4 Motivation Assessments

The assessments of motivation were conducted using the Clinical Assessment Interview for Negative Symptoms (CAINS). The CAINS (Kring et al., 2013) consists of two subscales that evaluate the primary subdomains of negative symptoms: (1) the motivation and pleasure (MAP) subscale (nine items), evaluating asociality, avolition, and anhedonia, and (2) the expression subscale (four items), which evaluates affective flattening and alogia. Our primary focus was on the MAP subscale, which integrates ratings based on patients' reports of motivation, interest, and emotional experiences, as well as assesses their involvement in social, vocational, and recreational activities. The assessment was conducted through a semi-

structured interview, with each item being rated on a scale ranging from 0 (no impairment) to 4 (severe deficit). Lower scores on the scale indicate higher levels of MAP.

In addition to the CAINS, the participants also completed the Dysfunctional Attitudes Scale (Weissman, 1979). This self-report scale consists of 40 items and is designed to assess the presence and intensity of dysfunctional attitudes. Similar to previous studies in community integration (Green et al., 2022 & Wynn et al., 2021), we focused on the two subscales: (1) the defeatist performance attitudes subscale (DPAS) and (2) the dysfunctional need for acceptance subscale (DNAS). The DPAS comprises 15 statements describing overgeneralized conclusions about one's ability to perform tasks (e.g., "If I fail partly, it is as bad as being a complete failure"), while the DNAS consists of 10 statements that evaluate the exaggerated importance of being accepted by others (e.g., "I cannot be happy unless most people I know admire me"). These attitudes are associated with amotivation and negative symptoms (Campellone et al., 2016). Each statement uses a 7-point rating scale from 1 (totally agree) to 7 (totally disagree) with lower scores indicating better motivational function.

2.2.5 Community Integration Assessments

In the present study, we included three types of assessments of community integration: a scale for work and productive activities, a family composite for family relationship, and a friends composite for friendship.

The measure of work and productive activities was conducted using the Role Functioning Scale. The Role Functioning Scale (RFS; Goodman et al., 1993) includes 4 distinct domains, with our specific focus on the rating for working productivity. The rating was based on a semi-structured interview with standardized probe questions. The domain is evaluated on a 7-point rating scale from 1 (productivity severely limited) to 7 (optimal performance). Higher scores on the scale represent better functioning.

The social integration was separated into two social networks, family relationship and friendship. To measure these two domains (i.e., family composite and friends composite), we employed two complementary scales: (1) family network relationship and social network relationship from the RFS (Goodman et al., 1993) and (2) the Lubben Social Network Scale (LSNS; Lubben, 1988). The LSNS includes 12-item self-report items assessing social engagement, with 6 items dedicated to the family relationship and 6 items focusing on friendship. To create composite scores for the family and friend domains, we standardized scores for each scale and then averaged them. The family composite was derived from the average of the family network relationship scale from the RFS (Goodman et al., 1993) and the family ratings from the LSNS (Lubben, 1988). Similarly, the friends composite score was obtained by averaging the scores from the social network relationships scale of the RFS (Goodman et al., 1993) and the friendship ratings from the LSNS (Lubben, 1988). Higher composite scores on each domain indicate better integration within family or friend networks.

3 Results

3.1 Cross-sectional Analyses Before Receiving Housing

3.1.1 Descriptive Characteristics

For the participants without a history of psychotic disorders (N = 82), 44.6% had lifetime PTSD, 8% had lifetime bipolar I disorder, and 60% had lifetime major depressive disorder.

For the participants with a history of psychotic disorders (N = 97), a history of lifetime psychotic disorders was as follows: schizophrenia (33.7%), schizoaffective disorder (11.2%), other specified-unspecified schizophrenia spectrum disorder (36.7%), delusional disorder (2%), bipolar I disorder with psychotic features (11.2%), and major depressive disorder with psychotic features (4.1%).

Table 3.1 presents the demographic baseline characteristics of the study participants. The table is divided into two sections: the left side displays the non-psychosis sample (N = 82) and the psychosis sample (N = 97) at baseline. The participants exhibited a predominant representation of middle-aged individuals, with a substantial majority being male, of black ethnicity, and reporting being single.

Table 3.1 Mean (standard deviation) for demographics in the non-psychosis and psychosis samples for those with and without 12-month follow-up data

	Baseline		12 Month	
Demographics	Non-psychosis (*N* = 82)	Psychosis (*N* = 97)	Non-psychosis (*N* = 41)	Psychosis (*N* = 54)
Age (years)	50.84 (11.0)	48.97 (10.7)	50.66 (10.8)	49.39 (10.6)
Gender (M:F)	74:8	93:4	35:6	51:3
Personal education (years)	13.23 (2.0)	12.91 (1.4)	13.17 (2.2)	13.09 (1.4)
Parental education (years)	13.39 (2.6)	12.86 (3.0)	13.24 (3.0)	12.92 (2.9)
Marital status (S:M:D:W:Sep)	30:7:29:3:13	41:7:30:6:12	16:4:14:2:5	22:3:19:3:6
Ethnicity (H:Non-H)	10:72	16:78	5:36	7:45
Race (B:W:O)	45:23:14	56:27:13	24:10:7	37:13:3

Marital: S = single, M = married, D = divorced, W = widowed, Sep = separated.

Ethnicity: H = Hispanic, Non-H = Non-Hispanic

Race: B = black, W = white, O = other.

Note: some declined to answer or provide information.

3.1.2 Cognitive Abilities, Motivation, and Community Integration

Results for between-group comparisons at baseline are summarized in Table 3.2. For ability, on both the non-social cognition and social cognition measures from MCCB, the non-psychosis group had significantly better ability than the psychosis group at baseline. Regarding motivation, the non-psychosis sample had significantly higher levels of motivation (i.e., lower MAP scores) than the psychosis sample. Compared to the psychosis group, the non-psychosis group had a significantly higher rating on the DPAS (i.e., lower DPAS score). However, the groups did not significantly differ on the DNAS. For the community integration, the non-

psychosis sample had significantly higher social integration (i.e., family composite and friends composite) and work than the psychosis sample.

Table 3.2 Cognition, motivation, and community integration variables in the non-psychosis and psychosis samples at baseline

	Non-psychosis sample		Psychosis sample			
Variable	*M*	*SD*	*M*	*SD*	*t*-test	*df*
Non-Social cognition						
MCCB: neurocognition composite	41.09	9.98	36.13	11.52	2.97**	168
Social cognition						
MSCEIT: managing emotions	40.81	12.24	36.87	12.64	2.06*	169
Motivation						
CAINS: motivation and pleasure	12.24	7.67	17.24	8.46	-4.09***	175
Defeatist performance attitudes subscale (DPAS)	42.65	17.69	49.99	15.46	-2.89**	168
Dysfunctional need for acceptance subscale (DNAS)	31.50	12.58	34.14	9.46	-1.56	168
Community integration						
Social integration						
Family composite	0.22	0.77	-0.19	0.71	3.65***	175
Friends composite	0.17	0.74	-0.13	0.69	2.83**	175
RFS: working and productive activities	3.20	1.50	2.27	1.30	4.39***	174

Note. MCCB = MATRICS Consensus Cognitive Battery; MSCEIT = Mayer-Salovey-Caruso Emotional Intelligence Test 2.0; CAINS = Clinical Assessment Interview for Negative Symptoms; RFS = Role Functioning Scale.

*p <.05. ** p <.01. *** p < .001.

3.1.3 Correlations Between Ability, Motivation and Community Integration

We examined correlations between baseline measures of non-social cognition, social cognition, and motivation to the baseline work, family composite and friends composite in participants with non-psychosis and psychosis in Table 3.3.

Table 3.3. Correlations between cognition-motivation variables and community integration variables for both samples at baseline

	Non-psychosis sample			Psychosis sample		
Variables	Family Composite	Friends Composite	Working and Productive Activities	Family composite	Friends composite	Working and Productive Activities
Non-social cognition						
MCCB: neurocognition composite	0.14	0.25*	0.18	0.03	0.25*	0.10
Social cognition						
MSCEIT: managing emotions	0.32**	0.35**	0.45**	0.25*	0.22*	0.19
Motivation						
CAINS: motivation and pleasure	-0.62**	-0.52**	-0.32**	-0.63**	-0.54**	-0.42**
Defeatist performance attitudes subscale (DPAS)	-0.22	-0.29*	-0.04	-0.28**	-0.23*	-0.23*
Dysfunctional need for acceptance subscale (DNAS)	-0.29**	-0.23*	-0.11	-0.27**	-0.18	-0.20

Note. MCCB = MATRICS Consensus Cognitive Battery; MSCEIT = Mayer-Salovey-Caruso Emotional Intelligence Test 2.0; CAINS = Clinical Assessment Interview for Negative Symptoms.

*p <.05. ** p <.01.

On the ability measures, the non-social cognition composite was significantly correlated with the friends composite in the non-psychosis group (r = 0.25, p = .03) and the psychosis group (r = 0.25, p = .02). The social cognition measure was moderately correlated with the family composite and friends composite in both samples. Furthermore, there was a significant correlation between social cognition and work in the non-psychosis sample (r = 0.45, p < .001).

For the motivation, there were a few significant negative correlations with community integration measures for either sample, indicating that those measures with higher levels of motivation (i.e., lower MAP, DPAS, and DNAS scores) had better community integration. The MAP subscale from the CAINS was highly correlated with family composite (r's = -0.62 and = -0.63, respectively), friends composite (r's = -0.52 and = -0.54, respectively), and work (r's = -0.32 and = -0.42, respectively) in the psychosis and non-psychosis groups. There was a correlation between DPAS and friends composite (r = -0.29, p < .01) in the non-psychosis sample. Furthermore, the DPAS was correlated with family composite (r = -0.28, p < .01), friends composite (r = -0.23, p = .03), and work (r = -0.23, p = .03) in the psychosis group. In the non-psychosis sample, the DNAS was correlated with the family measure (r = -0.29, p < .01) and friends measure (r = -0.23, p = .04); while that was a correlation between DNAS and family composite (r = -0.27, p < .01) in the psychosis sample.

3.2 Longitudinal Analyses

3.2.1 Within-group Changes Over Time

The 12-month follow-up characteristics for demographics are shown on the right side of Table 3.1 with non-psychosis (N = 41) and psychosis (N = 54) samples. We examined the improvements in ability, motivation, and community integration after housing for 12 months. As shown in Tables 3.4 and 3.5, there were no significant improvements in non-social cognition, social cognition, dysfunctional attitudes subscales, family relationship, and friendship after the 12-month follow-up in both samples. While there was no significant improvement in work among the non-psychosis sample, the psychosis sample's work significantly improved after receiving housing for 12 months. Moreover, there was a decrease in motivation (i.e., higher MAP score after housing) in the non-psychosis sample (discussed in Wynn et al., 2020).

3.2.2 Correlations Between Variables at Baseline and Community Integration at 12 Months

Table 3.6 shows the correlation between the baseline predictors of non-social cognition, social cognition, and motivation to 12-month measures of family relationship, friendship, and work in the non-psychosis and psychosis groups who had assessments at both time points.

Although baseline cognitive ability and dysfunctional attitudes subscales were not correlated with 12-month community integration measures, there were correlations between MAP subscale at baseline and social integration at 12 months in both samples showing better ratings on the MAP (i.e., lower scores) at baseline were highly correlated with better ratings of 12-month family composite and friends composite. Despite there was not a significant

correlation between the baseline MAP measure and work at 12 months in the non-psychosis group (r = -0.26, p = .11), the baseline MAP subscale was modestly correlated with 12-month work in the psychosis group (r = -0.34, p = .016).

Table 3.4 Comparison of cognition, motivation, and community integration variables at baseline and 12 months for the non-psychosis sample who completed testing at both time points

	Non-psychosis sample					
	Baseline		12-month			
Variable	*M*	*SD*	*M*	*SD*	*t*	*df*
Non-Social cognition						
MCCB: neurocognition composite	40.5	11.23	39.68	11.42	-0.8	37
Social cognition						
MSCEIT: managing emotions	41.27	12.32	42.97	11.6	1.15	32
Motivation						
CAINS: motivation and pleasure	12.74	7.95	15.59	6.94	2.56**	38
Defeatist performance attitudes subscale (DPAS)	41.92	14.48	40.08	15.09	-0.95	38
Dysfunctional need for acceptance subscale (DNAS)	31.05	10.57	28.26	10.29	-1.61	38
Community integration						
Social integration						
Family composite	0.09	0.84	0.04	0.78	-0.49	40
Friends composite	0.11	0.82	0.1	0.77	-0.11	40
RFS: working and productive activities	3.03	1.61	3.26	2.00	0.70	38

Note. MCCB = MATRICS Consensus Cognitive Battery; MSCEIT = Mayer-Salovey-Caruso Emotional Intelligence Test 2.0; CAINS = Clinical Assessment Interview for Negative Symptoms; RFS = Role Functioning Scale.

** p <.01.

Table 3.5 Comparison of cognition, motivation, and community integration variables at baseline and 12 months for the psychosis sample who completed testing at both time points

	Psychosis sample					
	Baseline		12-month			
Variable	*M*	*SD*	*M*	*SD*	*t*	*df*
Non-Social cognition						
MCCB: neurocognition Composite	36.5	11.68	36.58	11.79	0.07	51
Social cognition						
MSCEIT: managing emotions	37.26	11.29	37.48	12.61	0.11	49
Motivation						
CAINS: motivation and pleasure	16.67	8.44	16.16	8.23	-0.48	50
Defeatist performance attitudes subscale (DPAS)	50.85	13.5	48.61	15.97	-1.04	47
Dysfunctional need for acceptance subscale (DNAS)	35.25	8.26	34.16	9.20	-1.05	47
Community integration						
Social integration						
Family composite	-0.07	0.68	0.00	0.74	0.69	52
Friends composite	-0.07	0.74	-0.06	0.78	0.04	52
RFS: working and productive activities	2.21	1.39	2.91	1.92	2.46**	52

Note. MCCB = MATRICS Consensus Cognitive Battery; MSCEIT = Mayer-Salovey-Caruso Emotional Intelligence Test 2.0; CAINS = Clinical Assessment Interview for Negative Symptoms; RFS = Role Functioning Scale.

** p <.01.

Table 3.6 Correlations between cognition-motivation variables at baseline and community integration variables at 12 months for the non-psychosis and psychosis samples

	Non-psychosis sample			Psychosis sample		
Variables	Family composite	Friends composite	Working and productive activities	Family composite	Friends composite	Working and productive activities
Non-social cognition						
MCCB: neurocognition composite	0.11	0.23	0.03	0.04	0.17	0.10
Social cognition						
MSCEIT: managing emotions	0.08	-0.07	0.08	0.01	0.15	0.05
Motivation						
CAINS: motivation and pleasure	-0.53**	-0.36*	-0.26	-0.60**	-0.40**	-0.34*
Defeatist performance attitudes subscale (DPAS)	-0.14	-0.05	0.15	-0.22	-0.09	-0.18
Dysfunctional need for acceptance subscale (DNAS)	-0.16	-0.12	0.001	-0.23	-0.17	-0.09

Note. MCCB = MATRICS Consensus Cognitive Battery; MSCEIT = Mayer-Salovey-Caruso Emotional Intelligence Test 2.0; CAINS = Clinical Assessment Interview for Negative Symptoms.

*p <.05. ** p <.01.

3.2.3 Cross-lagged Panel Association Between Predictors and Community Integration

In the non-psychosis sample, significant correlations between longitudinal predictors and a 12-month functional outcome were further examined with cross-lagged panel analysis. As shown in Figure 1 (A, a), better baseline friends composite was associated with 12-month better social cognition ratings (r = 0.35, p = .05) but not the other way around; the significant difference between the cross-correlations (z = -2.16, p = .031) indicated that the friends composite at baseline might be driving social cognition ability at 12 months. There was an association between the baseline work and 12-month social cognition (A, b; r = 0.41, p = .02) but the reverse association was not significant (r = 0.08, p = .65). While there was no significant difference between these two cross-correlations (z = -1.76, p = .078), it is a trend that baseline work might be an influential factor in the 12-month social cognition.

Regarding the motivational measures, the DPAS at baseline was not significantly associated with work at 12 months (A, c; r = 0.15, p = .39); while the baseline work was associated with the 12-month DPAS (r = -0.41, p = .01). The difference between the cross-correlations was significant (z = 3.01, p = .003). Moreover, there was no association between the baseline DNAS and 12-month Work (A, d; r = 0.00, p = .98) but there was a significant association between the work at baseline and 12-month follow-up DNAS (r = -0.47, p = .004). The difference between those cross-correlations was significant (z = 2.44, p = .015). Overall, these results suggested that the baseline work may have a causal influence on the MAP, DPAS,

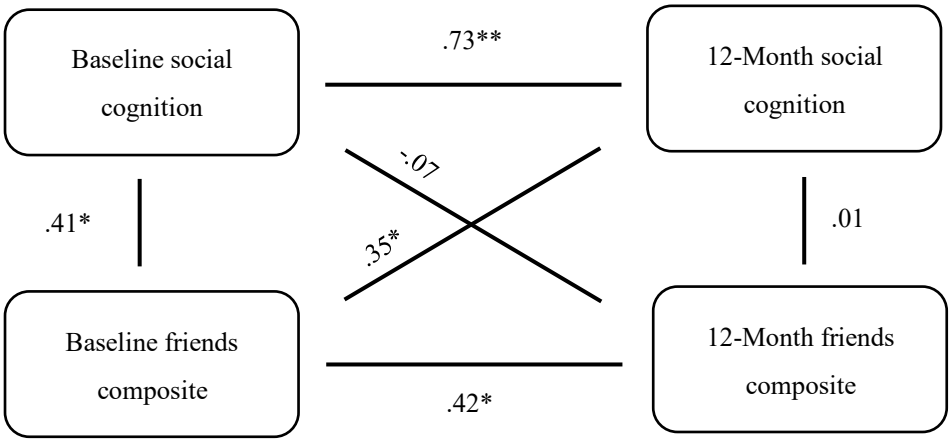
and DNAS at 12 months.

In the psychosis sample, better ratings of MAP at baseline were associated with community integration outcomes (i.e., family composite, friends composite, and work) at 12 months in both samples. Additionally, some of those community integration variables at baseline were significantly associated with 12-month MAP respectively (Supplementary material Appendix A and B). Figure 3.1 (B) shows the MAP at baseline was significantly associated with family composite at 12 months and vice versa. There appears to be a trend for the difference between these cross-associations (z = -1.75, p = .081), revealing a potential causal influence of the better MAP at baseline on improved 12-month follow-up family composite.

Figure 3.1 Cross-lagged panel analysis of the longitudinal association in (A) non-psychosis sample between (a) social cognition and friends composite; (b) social cognition and work and productive activities; (c) DPAS and work and productive activities; and (d) DNAS and work and productive activities as well as in (B) psychosis group between MAP and family composite.

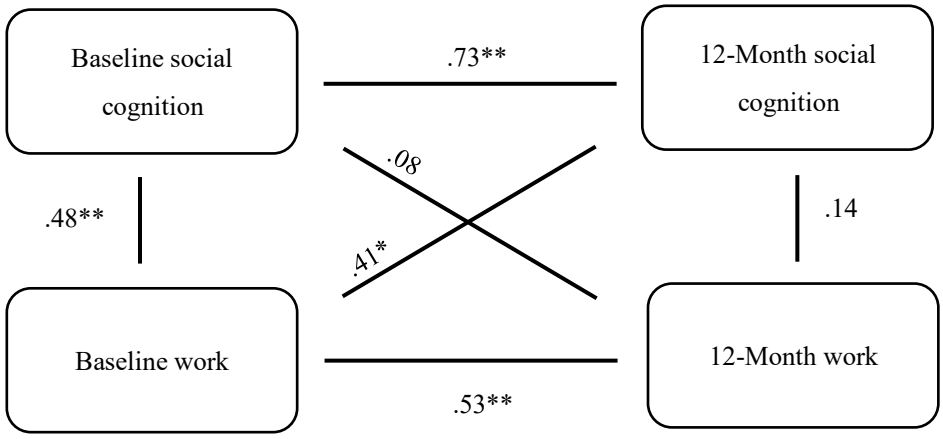
(A) Non-psychosis sample

(a)



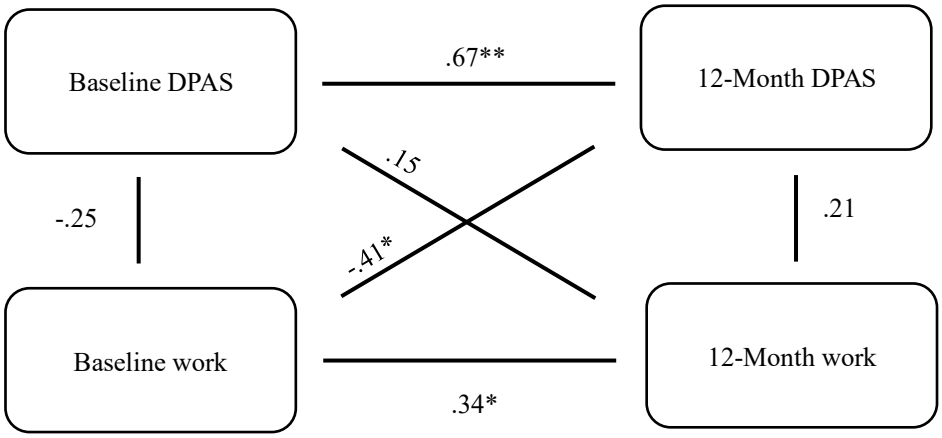
z = -2.16, p = .031

(b)



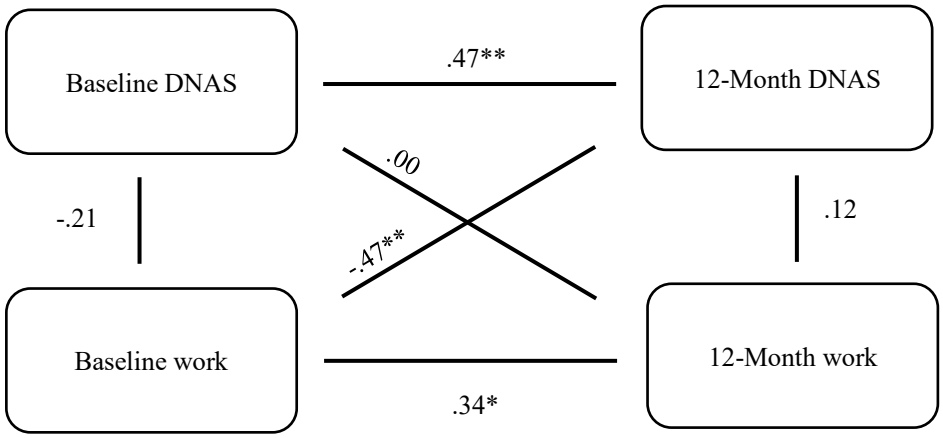
z = -1.76, p = .078

(c)



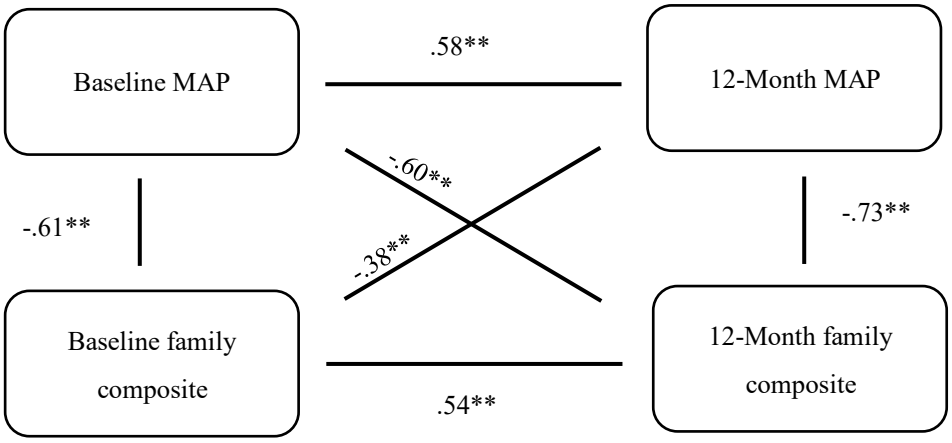
z = 3.01, p = .003

(d)



z = 2.44, p = .015

(B) Psychosis sample



z = -1.75, p = .081

4 Discussion

Previous studies have explored the impact of various determinants, such as social cognition, neurocognition, and motivation, on community integration among homeless veterans with and without a history of psychosis (Gicas et al., 2023; Green et al., 2022; Schutt et al., 2007; Wynn et al., 2021). However, there remains a gap in understanding how these factors specifically correlate with independent constructs of social relationships such as family relationship and friendship. Therefore, the aim of the present research was to examine whether individuals' cognitive abilities (i.e., non-social cognition and social cognition) and motivation relate to and predict family relationship, friendship, and work in homeless veterans with and without a history of psychotic disorders.

4.1 The Housing Impact on Cognitive Abilities, Motivation, and Community Integration

This study is a secondary analysis of data obtained from two previous studies: Green et al. (2022) and Wynn et al. (2021). The baseline assessments were conducted after the homeless veterans received vouchers for HUD-VASH housing, but before they used them for rental units. Prior to being housed, individuals without psychosis exhibited better cognitive abilities, motivation, family relationships, friendships, and work compared to participants with psychosis., these findings align with the previous studies by Adams et al. (1996), Bremner et

al. (1996), and Foster et al. (2012), which have consistently indicated that individuals with psychosis face worse functional implication compared to those with non-psychosis. After receiving housing for 12 months, there was no significant improvement in relationships with family and friends among both groups. The only significant improvement was observed in the work and productivity activities in the psychosis group. These outcomes align with the findings from Tsai et al. (2012). Furthermore, our results also revealed that determinants including cognitive functioning and dysfunctional attitudes (i.e., the defeatist performance attitudes and the dysfunctional need for acceptance) generally remained stable after homeless veterans received housing for 12 months, regardless of their psychosis status. Based on these findings, we suggest that housing is important to the veterans to maintain stability of their cognitive abilities, motivation, family relationship, and friendship, but it is insufficient to increase their levels of these variables.

4.2 Cross-sectional and Longitudinal Associations

In the cross-sectional analyses, we observed significant correlations between nearly all pre-housing predictors (i.e., cognitive and motivational measures) and outcomes related to family relationship, friendship, and work. These findings are in line with previous research (Campellone et al., 2016; Fett et al., 2011; Green & Harvey, 2014; Horan et al., 2012; Robertson et al., 2014). However, in the longitudinal analyses, only a few associations were found between a pre-housing measure of motivation and 12-month follow-up measures of social

integration and work. Among both groups, the strongest longitudinal associations were between motivation and pleasure as well as family relationship. Notably, we could find longitudinal associations between pre-housing motivation and pleasure and friendship at 12 months of housing in both groups, while a weaker association occurred in the non-psychosis sample. Meanwhile, the association between motivation and pleasure before receiving housing and work at 12 months was observed in the psychosis group but not in the non-psychosis one. These results are consistent with Grant & Beck (2009) and Campellone et al. (2016), which showed the important association between the negative symptoms and the social and vocational function of individuals with psychosis. One interpretation is that negative symptoms (e.g., asociality and avolition) are core deficits influencing social engagement in psychotic disorders (Beck & Rector, 2005; Grant & Beck, 2009; Kirschner et al., 2019); therefore, they could have a greater influence to associate with family relationship, friendship, and work compared to the non-psychosis sample. Overall, these findings suggest that the interaction between motivation and friendship as well as work may vary between the individuals with psychosis and those without psychosis. In addition, they further reveal the importance of discussing the impact of motivation on distinct social relationships (i.e., family relationship and friendship) among the different samples.

4.3 Causal Relationships Between Pre-housing and 12-month Housing Outcomes

Building upon our cross-sectional and longitudinal analyses, our research interest was to

investigate the causal relationship between the motivation and pleasure measure and three key domains: family relationship, friendship, and work. We observed one association that exhibited a consistent pattern suggestive of a causal relationship: the motivation and pleasure before receiving housing and the family composite after 12 months of housing in the psychosis sample. This finding indicates that individuals with psychotic disorders who had fewer negative motivational symptoms before receiving housing experienced an improved family relationship after 12 months of housing. In the broader context of overall motivation and its association with community integration (Campellone et al., 2016; Strauss et al., 2013), our study also highlights the specific relevance of motivation in impacting the family relationship of individuals with psychosis. This potential association may be attributed to the caregiving role that family members often undertake for individuals with psychosis (Terry & Townley, 2019). Therefore, it seems that when individuals with psychotic experience less negative motivational symptoms, they may be more willing to engage and interact with their primary caregivers, typically family members, first. These findings emphasize the importance of considering motivation as a crucial factor in understanding the influence of family relationship on individuals with psychotic disorders.

We did not find other determinants (except for the motivation and pleasure measure) before receiving housing that directly caused changes in social integration and work after 12 months of housing. However, our analyses revealed interesting opposite patterns among

recently housed veterans without psychosis. We observed several influences of pre-housing friendship and work variables on individuals' cognition and motivation at the 12-month follow-up. Firstly, we found a significant difference in the cross-lags for friends composite, suggesting that the pre-housing relationship with friends was driving later social cognition. This implies that individuals without psychotic disorders who have better friendship before receiving housing may exhibit stronger social-cognitive ability and thus enhance interactional skills. Consequently, they are more likely to secure housing later on. Secondly, we observed a noticeable trend in the cross-lagged analyses particularly concerning work. The pattern revealed that engagement in work before receiving housing potentially led to improvements in social cognition at a later point. It is possible that homeless veterans without a psychotic disorder who actively participate more in work may demonstrate better social cognition and thereby are more likely to be housed later. Finally, we identified significant differences in the cross-lags for work, indicating that pre-housing work engagement was influencing subsequent motivational attitudes (i.e., the defeatist performance attitudes and the dysfunctional need for acceptance) in the non-psychosis sample. This suggests that the individuals without psychotic disorders who show a higher level of work engagement before receiving housing may also likely display more positive motivational attitudes and beliefs (i.e., lower scores of the defeatist performance attitudes subscale and the dysfunctional need for acceptance subscale). In other words, active involvement in work may positively affect their motivational mindset. One

possible explanation could be that homeless veterans often express feelings of exclusion by the rest of society, leading them to perceive themselves as invisible and experiencing failures driven by their low self-esteem (Daiski, 2017). However, work engagement may serve as a potential avenue for homeless veterans without psychosis to gain inclusion in society, raise their self-esteem and subsequently improve their social-cognitive abilities. Furthermore, work engagement may also lead to amotivation and negative symptoms being mitigated in this population. Caution is advised when interpreting the findings from cross-lagged panel analyses, as they depend on when sampling occurs. Conducting more frequent sampling or a longer follow-up period could produce different causal patterns or alter significant effects.

4.4 Limitations and Future Directions

This study had several limitations. First, it was a secondary analysis study of homeless veterans including those with or without a history of psychotic disorders, which may limit the generalize of the findings to homeless non-veterans. Second, due to minimal changes in variables of cognitive ability and motivation and measures of community integration over the 12 months, we were limited in detecting causal relationships. Third, the databases did not include other important factors (social-environmental or neurological factors, etc.), which are related to community integration. Therefore, we were not able to explore the impact of these factors on social integration. Fourth, the study only examined two aspects of social integration, family relationship and friendship, while there are additional social relationships important to

be considered such as neighborhood, mental health servers, and colleagues. Lastly, data on some clients who had received or attained additional support programs, such as mental health care and psychological therapy, were not collected, which may influence their ability, motivation, family relationship, friendship, or work. Campellone et al. (2016) illustrated that incorporating additional interventions, such as psychosocial interventions and social network interventions, tailored to meet the specific needs of those with or without a history of psychotic disorders is also important. Additionally, as England et al. (2015) suggested, these interventions may also positively impact their interpersonal relationships (e.g., family and friends). These combined interventions have the potential to yield better outcomes in terms of their functioning, motivation, and overall community integration, encompassing aspects like physical integration, psychological integration, and housing. Future research may delve further into the roles of various interventions in the association between cognitive and motivational abilities and various social relationships.

4.5 Conclusion

The present paper showed interpretable results. Firstly, some of our findings align with previous studies that have demonstrated the factors (e.g., neuro-social cognition and motivation) are associated with social interaction, daily living activities, and community integration (Campellone et al., 2016; Gicas et al., 2021; Schutt et al., 2007; Stergiopoulos et al., 2011; Strauss et al., 2013). The interactions between functioning (i.e., non-social and social cognition)

and motivation as well as community integration (i.e., family relationship, friendship, and work) appear to manifest differently in distinct populations depending on whether homeless veterans are diagnosed with psychotic disorders or not. Secondly, the interaction between determinants and community integration seems to have bidirectional causal relationships. For instance, we found a potential causal relationship showing higher motivation may drive better family relationship in the psychosis sample. Meanwhile, friendship and work may act as factors leading to the cognition and motivation of the non-psychosis sample. Thirdly, to the best of our knowledge, this is the first paper that specifically examined family relationship and friendship as separate variables in this context. Based on the above results, we found subtle differences in the influence of family relationship and friendship between the two populations, consistent with suggestions from Evert et al. (2003), Neale and Brown (2015), and Terry & Townley (2019). These differences highlight the importance of considering the unique needs and challenges faced by homeless veterans with and without a psychotic disorder in providing interventions for their community integration. Our findings suggest that providing housing and improving the cognitive functioning as well as the motivation of homeless veterans are important to fostering their social integration.

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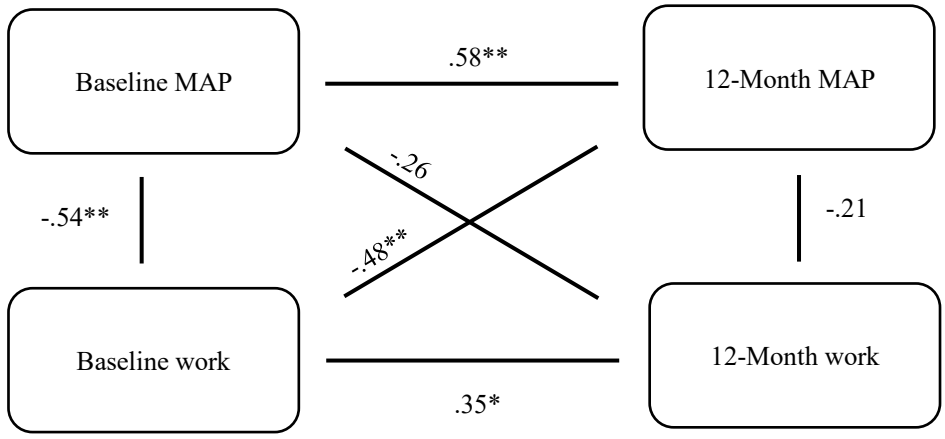
Supplementary Material Appendix A

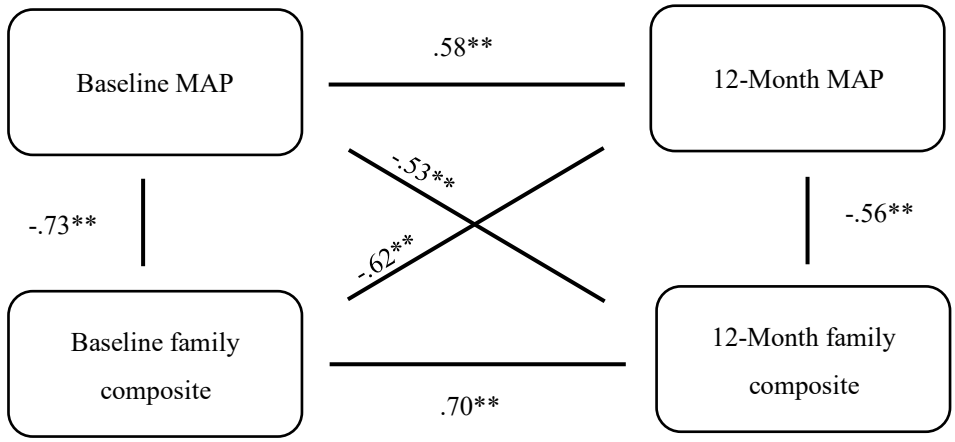
Cross-lagged panel analysis of the longitudinal association in the non-psychosis sample between (a) MAP and work and productive activities; (b) MAP and family composite; and (c) MAP and friends composite.

(a)



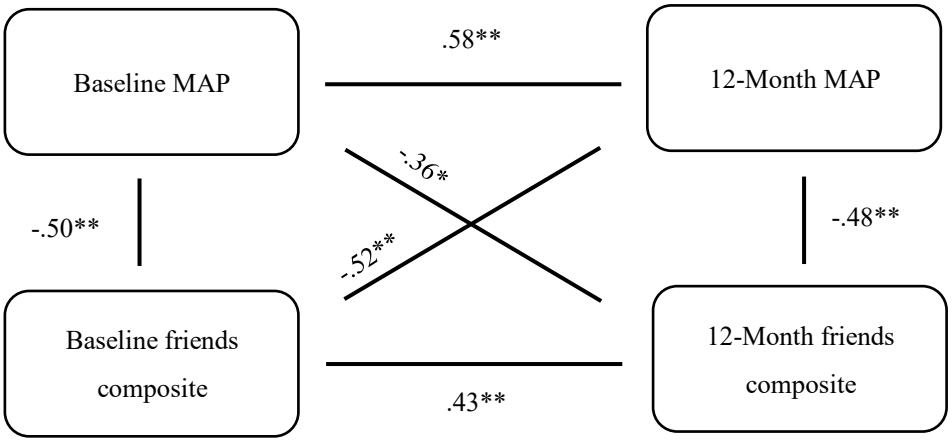
$z = 1.23$, $p = 0.218$

(b)



$z = 0.70$, $p = 0.487$

(c)

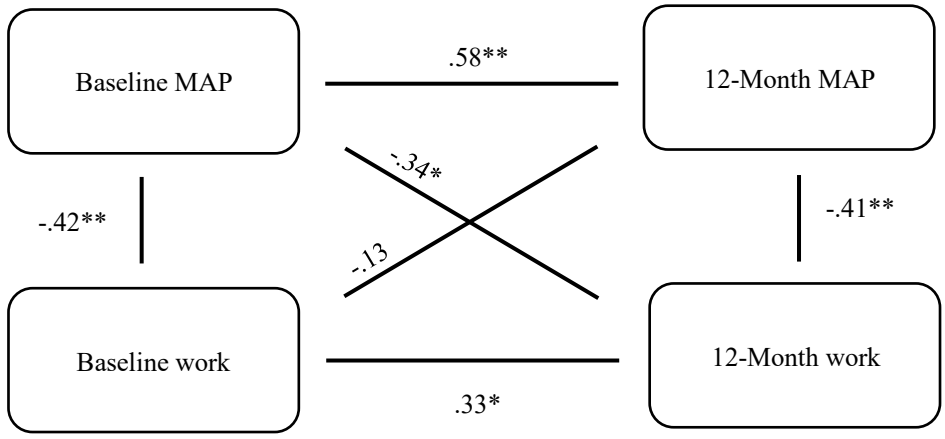


$z = 0.952$, $p = 0.341$

Supplementary Material Appendix B

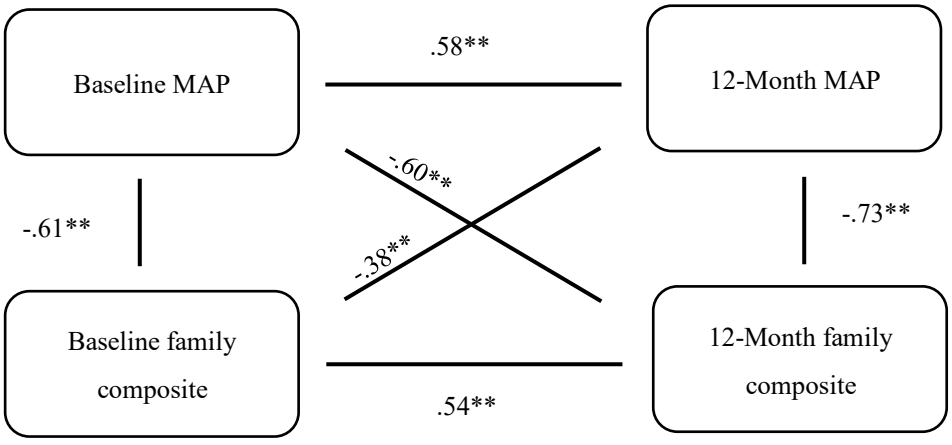
Cross-lagged panel analysis of the longitudinal association in the psychosis sample between (a) MAP and work and productive activities; (b) MAP and family composite; and (c) MAP and friends composite.

(a)



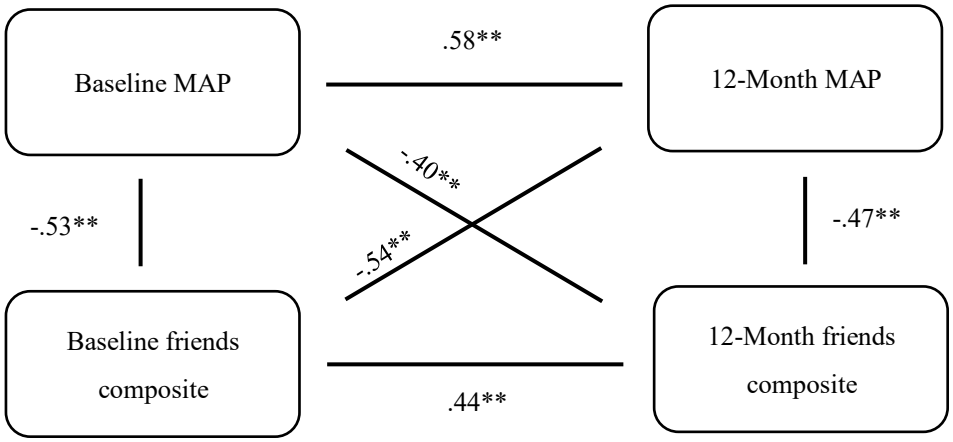
z = -1.24, p = 0.216

(b)



z = -1.75, p = 0.081

(c)


Baseline MAP
.58**
12-Month MAP
-.40**
-.53**
-.54**
-.47**
Baseline friends composite
.44**
12-Month friends composite

$z = 1.06$, $p = 0.291$