

RESEARCH ARTICLE

Migration trajectories and their relationship to mental health among internal migrants in urban China: A sequence alignment approach

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Funding information

Chinese Scholarship Council (CSC), Grant/Award Number: 201507720038

Abstract

Although migration trajectories over people's life courses seem to be associated with mental health outcomes, previous studies have considered migration at only one point in time when correlating migration with mental health. However, people can migrate multiple times during their life courses. The decision to migrate can be triggered by several life course development events, such as education, entry to the labour market, marriage, or retirement. The present study addressed this research gap by focusing on the trajectories of migration and their relationship to mental health among internal migrants in China. Data were collected from a cross-sectional survey ($N = 534$) in Shenzhen, China, in 2017. People's migration trajectories were aligned into migration groups using sequence alignment method. Binary logistic regression models were estimated to assess the associations between each migration trajectory group and the prevalence of mental health problems, controlling for sociodemographics and self-reported physical health. The results show that migration trajectories—namely, the sequence of multiple migrations between migrants' places of origin and their final destinations—are significantly related to mental health outcomes. Our findings suggest that treating migration as a one-time transition could be problematic because many migrants undertake multiple migration trips.

KEYWORDS

China, mental health, migration trajectory, sequence alignment method

1 | INTRODUCTION

In 2018, 59% of China's population lived in urban areas (The World Bank, 2013). Among the reasons for rapid urbanisation in China is the large-scale migration of people from rural to urban areas in pursuit of, for example, better job opportunities and better living conditions (Chan, 2013). Although it has been extensively studied, the relationship between migration and mental health remains unclear in

international debates (Gatrell, 2011; Hilario, Oliffe, Wong, Browne, & Johnson, 2015; Li et al., 2014). Some scholars found that migrants are at higher risk for mental health problems due to acculturation stress, disconnected social networks, and unfamiliar environments (Rogler, 1994; Sirin, Ryce, Gupta, & Rogers-Sirin, 2012; Yoon et al., 2013), whereas others found the opposite. There are many reasons for the latter, including improved economic status, better life opportunities, and higher incomes than nonmigrants (Lu & Qin, 2014;

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Stillman, McKenzie, & Gibson, 2009). Unlike international immigrants, who face such problems as acculturation stress and integration difficulties, Chinese internal migrants may experience fewer sociocultural differences. However, adapting to a new environment and differences in culture and lifestyle remain a challenge (Li & Rose, 2017).

Previous studies on both international and internal migration had several limitations, which might be the cause of such contradictory results. Migration is commonly referred as a “transition point” in one's life course (Gong, Xu, Fujishiro, & Takeuchi, 2011) and is presented as a one-time move modelled as a binary variable in regression models, along with migration-related factors such as place of origin, socio-economic status, and—in the Chinese context—*hukou*¹ (Hilario et al., 2015; Pyakuryal, Tausig, Subedi, & Subedi, 2011; Wong, He, Leung, Lau, & Chang, 2008). This conceptualisation fails to address the multiple and shifting nature of migration, as people can be triggered by various motives to migrate from one place to multiple destinations multiple times throughout the course of their lives (Collyer & De Haas, 2012). Thus migration should be seen as a trajectory² that takes place within a period of time and involves a series of decisions throughout people's lives.

Although theoretical models in life course epidemiology have stressed the role of sequences on mental health outcomes (Kuh, Ben-Shlomo, Lynch, Hallqvist, & Power, 2003), such a notion of multiple migrations has scarcely been acknowledged; in fact, previous studies do not consider the possibility of multiple migrations throughout one's life course (Collyer & De Haas, 2012). A related challenge for life course research is to determine when and why a change in the overall direction of a trajectory occurs (Wingens, de Valk, Windzio, & Aybek, 2011). Of particular relevance for this study is that the timing and motivation of migration play a central role in people's psychological development and mental health (Gong et al., 2011; Li et al., 2014). Analysing the migration trajectories helps to unfold the sequence of risks and exposures that people experience over time and frames how mental health develops through their life courses (Thoits, 2010).

To address these research gaps, the present research explored (a) life course-based migration trajectories in China, by means of sequence alignment method (SAM), and (b) the relationship of such trajectories to mental health. The aim was to answer the following two research questions:

1. How do migration trajectories sequenced by migration motivations differ from one another?
2. What are the relationships between migration trajectories and mental health?

This article is structured as follows. The following section briefly reviews the literature, and the subsequent one introduces the research design. This is followed by details of eight migration trajectory groups that were aligned and tested in regression models to investigate the factors that affect migrants' mental health. The final two sections discuss the findings and present the conclusions, respectively.

2 | RELATED WORK

Using the life course approach to understand the link between migration and mental health has only recently been embraced (Colman & Atallahjan, 2010). Life course epidemiology emphasises how the timing (i.e., critical/sensitive periods), duration (i.e., accumulation), and temporal sequence (i.e., triggers/interactions) of particular experiences affect mental health (Wingens et al., 2011).

The timing of life course transitions may affect people's mental health in both their present and their later lives (Bernard, Bell, & Charles-Edwards, 2014). Studies focusing on how age at migration affects migrants' mental health found that younger migrants, namely, migrants who moved during their childhood or early adolescence, are more likely to experience mental health problems later in life (Mendelson, Turner, & Tandon, 2010; Montes de Oca, Ramírez García, Saenz, & Guillén, 2011; Wong, Chang, & He, 2009). Others argue that migrant adolescents do not necessarily have poorer mental health compared with local residents or migrant adults (Cheung, 2013; Mao & Zhao, 2012; Mendelson et al., 2010). These studies emphasise the importance of migration experiences that occurred in specific periods across people's development stages. Such experiences at critical life stages may affect mental health in later life (Wingens et al., 2011). Previous research has highlighted the importance of certain life stages for psychosocial developments, including entering the labour market, leaving the parental home, and job insecurity and instability (Heckhausen, Wrosch, & Schulz, 2010).

Life course development stages are closely related to migration decisions. After spending the childhood and adolescent stages at the parental home, migration can be triggered by, for example, the desire to pursue an education elsewhere, to seek employment, or to get married (Findlay, McCollum, Coulter, & Gayle, 2015). For example, an increase in family size is one of the motives for residential mobility (Brazil & Clark, 2017). Migration motivations may interact with the timing and sequence of moving and, in turn, affect mental health because the same motivation may have different meanings for people at different life stages (Gong et al., 2011). For instance, when migrating for family reasons, a migrant child may have experiences that are very different from those of her parents because the voluntary or involuntary nature of migration and the cost of leaving the existing environment and adapting to the new one have different impacts at different life stages (Chen, Hall, Ling, & Renzaho, 2017; Yoon et al., 2013). However, previous studies assume that migration is a single transition that takes place at one point in time in a person's life course trajectory (Angel & Angel, 1992; Findlay et al., 2015; Heckhausen et al., 2010; Hilario et al., 2015). Robette (2010) argued that such a conceptualisation disregards the fact that a transition between stages is a complex, long-term process. For instance, the transition from school to work can involve several periods of temporary employment and unemployment before a stable occupational position is found (Murphy, Blustein, Bohlig, & Platt, 2010). Similarly, migrants might move to several places before they reach their final destination (Schapendonk et al., 2018). Previous studies are therefore limited by considering the migration trajectories as representing the

accumulated migration experiences through time and space (Morris, Manley, & Sabel, 2018; Schapendonk & Steel, 2014; Schapendonk, van Liempt, & Spierings, 2015), challenging empirical results on the basis of experiences at a single point in time (Helbich, 2018).

The notion of “migration trajectory” overcomes the limitation of treating migration as an action that takes place at the exact moments of departure and arrival. For instance, a migration trajectory may involve information about multiple attempts to reach the final destination or decisions concerning future migrations (Collyer & De Haas, 2012; Phillips & Missbach, 2017; Schrooten, Salazar, & Dias, 2016). Montes de Oca et al. (2011) analysed migration groups in relation to their health outcomes on the basis of the time of the first migration and the development of the migration trajectories to the United States. They showed that age at first migration and the conditions under which the migration trajectory developed influence the elderly's health and quality of life differently. Integrating life course epidemiology into migration studies explicitly recognises the role of time and the latency effects of migration experiences over people's life courses (Colman & Atallahjan, 2010). The health of migrants is influenced by accumulated experiences during their migration trajectories that are not experienced by the rest of the population. Migration is frequently reported to be associated with specific reasons during specific life course stages, for example, migrating with parents in childhood or adolescence or leaving the parental home in early adulthood (Gong et al., 2011). Analyses have shown that positive and negative experiences during migration accumulate over time and influence migrants' psychological attributes (World Health Organization and Calouste Gulbenkian Foundation, 2014). The overall balance between the accumulated positive and negative experiences during migration contributes to shaping an individual's mental health outcome, leading to different mental health performance across individuals. In addition, people who migrate more frequently may cope more easily with new environments on the basis of their past experiences, and their mental health status may be less disrupted compared with people who migrate less often. On the other hand, a higher mobility rate may affect mental health negatively due to the unstable living experiences (Oishi, 2010).

To summarise, this paper focuses on how migration trajectories are formed and how they are related to migrants' mental health. This is done by putting a strong emphasis on a reconceptualization of migration towards a temporal and sequential progress that involves the possibility of multiple migrations.

3 | RESEARCH DESIGN

3.1 | Study area

The data used for this research were derived from a cross-sectional survey conducted in Shenzhen, China, between January and April 2017. The survey adopted a multistage sampling procedure. Because inner cities and suburban neighbourhoods have different characteristics in terms of physical and social environments (Nelson, Gordon-

Larsen, Song, & Popkin, 2006), two inner-city districts (Nanshan and Futian) and two suburban districts (Baoan and Longgang) were chosen as the sampling areas. Within each sampling area, five neighbourhoods differing in size and type of location, and whose populations had different socio-economic compositions, were selected. These neighbourhoods can broadly be classified as work unit compound, inner-city village, commodity housing community (a private real estate development), social housing, and factory dormitory. Households in each neighbourhood were then randomly sampled without replacement to avoid repeated measurements. Heads of households who were older than 18 years were invited to participate.

In total, 855 people were approached for the data collection. Because the survey covered both the migrant and the nonmigrant population, nonmigrants were removed from analysis using the criteria of “birthplace.” This allowed us to include those migrants who had successfully transferred their hukous to Shenzhen. This resulted in 591 participants (i.e., migrants). Due to missing data on the migration trajectory, 57 were excluded, which resulted in a final sample of 534 migrants.

3.2 | Data

Data on migration trajectories were collected by asking people to report the name of each place they had lived in for more than 6 months, starting with their birthplace and ending with Shenzhen, as well as the start and the end year of their stay in each place.

Respondents were also asked to indicate why they had migrated, namely, to pursue education, to find a new job, transfer of workplace, family reasons (e.g., moving with family or family reunion), to marry, or other reasons. These life course-based migration reasons are grounded in previous studies (Clark & Maas, 2015; Heckhausen et al., 2010). To minimise recall bias, we limited the number of retrospective questions. In the analyses, we considered such data as the year of migration, main motivation, and destination, which can be validated by relevant documents (e.g., job offers, hukou transfer documents, and travel tickets). The information acquired was transformed into sequential data, whereby a letter was assigned to birthplace and each migratory motivation (i.e., b = birthplace, e = education, n = new jobs, t = transfer of workplace, f = family reasons, m = marriage, and o = other reasons). Sequences were recorded on an annual basis. The frequency of migration derived from this data also served as another key factor for this analysis.

Data on people's mental health status were collected through the General Health Questionnaire (GHQ-12), which contains 12 items measuring potential mental health problems. It is a self-administered screener that is used to identify the psychological distress experienced by an individual within the previous 4 weeks. The GHQ-12 is brief, easy to administer, and has shown good validity and reliability (Baksheev, Robinson, Cosgrave, Baker, & Yung, 2011; Gouveia, Barbosa, & Andrade, E. de O., & Carneiro, M. B., 2010; Politi, Piccinelli, & Wilkinson, 1994). The well-tested Chinese version (Ye, 2009) was utilised on the basis of the purpose of this research. The

total score is obtained by summing up the individual item scores, which range from 0 (*low risk of mental health problem*) to 12 (*high risk of mental health problem*). Subsequently, a binary scoring method was used for case identification, whereby 0 refers to an absence of mental health problems and 1 refers to possible mental health deficits (Goldberg et al., 1997). Because the threshold of the GHQ-12 varies across studies, the mean GHQ score for the respondents has been suggested as the appropriate cut-off point (Goldberg, Oldehinkel, & Ormel, 1998). In our case, the 534 participants had a GHQ-12 mean score of 2.01 ($SD = 2.14$), which resulted in a cut-off point between 2 and 3. A value ≤ 2 means that it is unlikely that a person faces mental health problems, whereas a value ≥ 3 indicates a high likelihood of mental health problems.

The following control variables were considered. Age and gender, which are closely related to migration decisions and individuals' health status (Gong et al., 2011; Takeuchi et al., 2007). Education level, occupational type, and personal monthly income (in RMB) were also included. Respondents' current hukou type served as an institutional factor for migrants in China (Chen, 2011). Data on people's general physical health were obtained from a self-rated question on a Likert scale of 1 (*poor*) to 5 (*excellent*; Emerson & Llewellyn, 2008; Lu & Qin, 2014).

3.3 | Data analysis

The analysis was carried out in two stages. First, SAM was conducted to analyse the sequential data on migration trajectories and to compute typology groups for the sequences. Briefly, SAM groups sequences that are similar to each other. This is done by utilising three basic operations: insertion, deletion, and substitution (Shoval, McKercher, Birenboim, & Ng, 2015). SAM compares two strings of sequences and makes the two strings identical by adding or deleting characters and/or switching the order of certain characters. The idea is to count how many operations it takes to make one string of sequences identical to another string: the more operations needed, the larger the distance between the two sequences and vice versa (Wilson, Harvey, & Thompson, 1999). This operation of comparing two sequences ("pairwise alignment") is the basis for the algorithm of multiple alignments that compares more than three sequences. The multiple alignment process comprises four phases. In Phase 1, pairwise alignment for all data sequences is conducted, which produces a sequence distance matrix. In Phase 2, a dendrogram showing the similarity between sequences is constructed on the basis of a neighbour-joining method. The dendrogram is used for the progressive multiple alignment of the sequences into groups in Phase 3. Finally, information about the groups of the sequences is extracted, as in Phase 2 (Aiyar, 2000; Higgins & Sharp, 1988; Thompson, Gibson, Plewniak, Jeanmougin, & Higgins, 1997). The Clustal software package was utilised for sequence alignment (Higgins & Sharp, 1988).

Second, to explain associations between our binary outcome good/bad mental health and the migration sequences, we fitted logit regression models with increasing complexity. Model 1 examined the

relationship between migration trajectory groups and migration frequency with prevalence of mental health problems. Model 2 tested the same relationship while also controlling for sociodemographic characteristics and physical health. Model 3 added to Model 2 an extra interaction effect between migration trajectory and migration frequency. By doing so, it helps to understand the relationship between migration frequency and mental health across different migration trajectory groups.

4 | RESULTS

The descriptive statistics of the respondents are shown in Table 1. The prevalence of mental health problems (GHQ-12 score ≥ 3) was 26.8% for the sample using the cut-off point of 2/3. The gender ratio of our sample was 56% male and 44% female, which is close to the gender ratio of Shenzhen's general population in 2016 (53% male and 47% female). The mean age of our sample was 31.63 years, whereas it was 32.5 years for Shenzhen's general population in 2016 (Shenzhen Municipal Bureau of Statistics, 2018).

The typical migrant had moved more than once over the life course. Most respondents had a university education and a personal monthly income of RMB 4,001–8,000 or higher. One third of the respondents had managed to transfer their hukous after migrating to Shenzhen; the rest still held non-Shenzhen hukous. The GHQ-12 showed that more than 73% of the respondents had relatively good mental health, and most respondents (46%) self-rated their physical health as poor or fair.

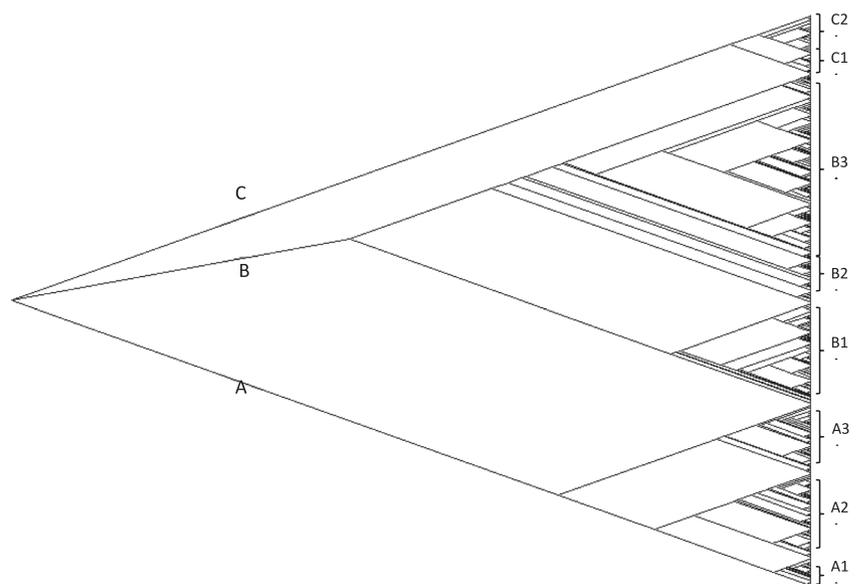
The alignment of all sequences resulted in a dendrogram that divided the samples into eight groups according to the order and length of stay in each place for different migration reasons (Figure 1). Three major groups (A, B, and C) were identified from the taxonomic tree. Subgroups were divided on the basis of first-level nodes in each major group. Group B2 is the result of a merger of multiple small groups because each group aligned only a small number of cases, and the distance between the nodes is relatively small. In addition, Table 2 shows descriptive statistics for each trajectory group. The majority of migrants (41%) are allocated to Group B3, and the remaining sample is spread across the other groups, with percentage values ranging from 4 to 15. The average migration frequency varied from 1.69 for Group C2 to 2.53 for Group C1. This result suggests that many of our respondents had multiple migration experiences, which has not been reported by previous studies. Although the sample distribution is uneven across the trajectory groups, the Hosmer–Lemeshow test result indicates a good model fit to the data ($p > .05$).

Figure 2 summarises the taxonomy of migration trajectory groups. It shows the average duration of stay in each place triggered by life course events, starting from birthplace. The segments of the diagram's bars are assigned letters representing birthplace and migratory motivation. Group C2 had the longest mean length of stay in their birthplaces compared with other groups. Therefore, Group C2 was labelled "old movers," as they had left their birthplaces at a relatively old age. Group C1 was labelled "marriage movers" because the people in the

TABLE 1 Profile of respondents

Variable	Category	Whole sample/mean	Percentage/(SD)
Prevalence of mental health problems (GHQ-12 score ≥ 3)	Low risk	391	73.2%
	High risk	143	26.8%
Migration frequency		2.28	0.84
Age (in years)		31.63	7.73
Gender	Male	297	56%
	Female	237	44%
Education level	High school and lower	154	29%
	Bachelor's degree	346	65%
	Postgraduate	34	6%
Hukou type	Shenzhen hukou	169	32%
	Non-Shenzhen hukou	365	68%
Personal monthly income	<RMB 4,000	112	21%
	RMB 4,001–8,000	233	44%
	>RMB 8,000	189	35%
Occupation type	Public sector	46	9%
	Private enterprise	215	40%
	Self-owned business	39	7%
	Blue-collar worker	100	19%
	Unemployed and other	134	25%
Physical health	Poor and fair	244	46%
	Good	157	29%
	Very good	91	17%
	Excellent	42	8%

Abbreviation: GHQ, General Health Questionnaire.

**FIGURE 1** Dendrogram showing types of migration trajectories

group had migrated to get married. Group B shows a typical trajectory of labour migrants with adequate training and education. People allocated to Group B1 had lived for a relatively short period near their first workplace and had then moved because of job transfer; this

group was therefore labelled “job transfers.” In contrast, people in Group B3 were more likely to have held on to their first jobs and so this group was labelled “new job.” Group B2 had a similar average composition of migration for new job and job transfer, as shown in

TABLE 2 Sample distribution and average migration frequency over groups of migration trajectories

Groups of migration trajectories		Sample distribution	Age	Gender		Migration frequency
		Count (%)	Mean	Male (%)	Female (%)	Mean (times of migration trips)
Groups of migration trajectories	C2 (old movers)	36 (7%)	27.44	26 (72%)	10 (28%)	1.69
	C1 (marriage movers)	19 (4%)	32.26	5 (26%)	14 (74%)	2.53
	B3 (new job)	218 (41%)	32.56	115 (53%)	103 (47%)	2.33
	B2 (work-related)	26 (5%)	38.19	16 (61%)	10 (39%)	2.42
	B1 (job transfer)	67 (13%)	36.06	37 (55%)	30 (45%)	2.15
	A3(family movers)	64 (12%)	29.69	44 (69%)	20 (31%)	2.27
	A2 (educational movers)	78 (15%)	28.69	41 (53%)	37 (47%)	2.41
	A1 (college graduates)	26 (5%)	24.85	13 (50%)	13 (50%)	2.31

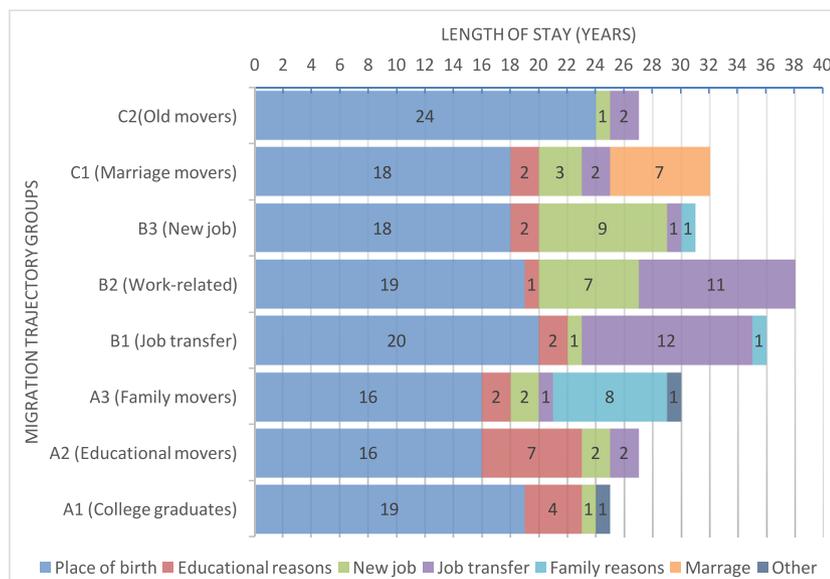


FIGURE 2 Patterns of migration trajectories in divided groups

Figure 2. We labelled this group “work-related” movers. Migrants in Group A had lived for a relatively short period in their birthplaces. This applies especially to Groups A2 and A3, meaning that they migrated at a younger age compared with other groups. In addition, as indicated by the lengths of the bars, Group A comprised relatively young people compared with the other groups. Group A1 shows a standard pattern of a fresh university graduate who left home to attend university at the age of 18 or 19, graduated 4 years later, and found a job somewhere else. This group (A1) was labelled “college graduates.” Group A2 was labelled “educational movers,” as they spent longer than average in the place they had migrated to for educational purposes. Finally, on the basis of the composition of the trajectory, Group A3 was labelled “family movers.” The migration trajectory groups were then included in a regression analysis to test group differences in mental health.

Table 3 presents the results of the binary logistic regression models. Nagelkerke’s R^2 for the model fit improved from 0.464 in Model 1 to 0.577 in Model 3. This indicates that the migration

trajectory plays a role in explaining migrant’s mental health. In Model 1, Group C2 (old movers) had a higher risk of mental health problems compared with Group A1 (college graduates). Groups B3 (new job), B1 (job transfer), A3 (family movers), and A2 (educational movers) were less likely to have mental health problems than Group A1 (college graduates). The relationships remained significant for Groups C2 (old movers) and A2 (educational movers) after controlling for sociodemographic characteristics and physical health and the interaction effect between migration trajectory groups and migration frequency. No significant correlations were found for migration frequency and the prevalence of mental health problems.

Apart from migration trajectory and frequency, hukou status was significantly related to the prevalence of mental health problems: Non-Shenzhen hukou holders were less likely to have mental health problems than those who had Shenzhen hukous. Occupation types were associated with mental health: The “unemployed and other” group were found less likely to have mental health problems

TABLE 3 Binary logistic regression on migration trajectory groups and prevalence of mental health problems

	Model 1		Model 2		Model 3	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Migration trajectory groups (reference: A1)						
C2 (old movers)	3.733**	1.031	4.804**	1.115	6.769*	3.214
C1 (marriage movers)	0.368	0.534	1.389	0.727	1.122	1.858
B3 (new job)	-1.254**	0.3	-0.552	0.494	0.352	0.924
B2 (work-related)	0.097	0.471	0.652	0.666	3.433	2.383
B1 (job transfer)	-1.202**	0.384	-0.449	0.574	-3.964*	1.712
A3 (family movers)	-1.135**	0.391	-0.26	0.538	-0.201	1.137
A2 (educational movers)	-1.456**	0.404	-1.156*	0.530	-2.921*	1.385
Migration frequency	-0.104	0.107	0.09	0.144	0.167	0.366
Gender (reference: female)			0.073	0.246	0.103	0.255
Age			-0.009	0.016	-0.016	0.019
Education level (reference: high school and lower)						
Bachelor's degree			0.131	0.303	0.117	0.324
Postgraduate			0.329	0.548	0.318	0.583
Hukou type (reference: Shenzhen hukou)						
Non-Shenzhen hukou			-0.608*	0.276	-0.644*	0.303
Personal monthly income (reference: <RMB 4,000)						
RMB 4,001-8,000			0.487	0.354	0.545	0.367
> RMB 8,000			0.327	0.418	0.388	0.428
Occupation type (reference: public sector)						
Private enterprise			-0.089	0.402	-0.140	0.434
Self-owned business			-0.095	0.554	0.079	0.581
Blue-collar worker			-0.014	0.453	0.016	0.488
Unemployed and other			-1.155*	0.485	-1.228*	0.509
General health (reference: poor and fair)						
Good			-1.383**	0.308	-1.296**	0.315
Very good			-1.635**	0.408	-1.625**	0.424
Excellent			-0.938	0.481	-0.905	0.486
Migration groups* migration frequency						
C2* migration frequency					-1.070	1.529
C1* migration frequency					0.129	0.719
B3* migration frequency					-0.403	0.408
B2* Migration frequency					-1.136	0.982
B1* migration frequency					1.508*	0.699
A3* migration frequency					-0.035	0.495
A2* migration frequency					0.697	0.555
Nagelkerke R ²	0.464		0.555		0.577	

*.05 significance level.

**.01 significance level.

compared with people who worked in the public sector. Good physical health was found to be negatively associated with the prevalence of mental health problems. Finally, the interaction effect between the migration trajectory Group B1 (job transfer) and migration frequency showed a significant positive association with the prevalence of mental health problems.

5 | DISCUSSION

The present research investigated migrants' mental health in relation to their migration trajectories. It contributes to the mental health literature as previous studies often disregarded migration histories over people's life courses (Li et al., 2014).

Multiple migration trips were generally confirmed through our descriptive analyses. Instead of considering migration as “departure and arrival,” people migrated to a number of places before reaching the final destination. Our SAM results show that distinguishing migration trajectories is important to understand migrants' mental health. Life course events—such as starting vocational training or a university study, starting or changing jobs, and household formation in terms of cohabitation or marriage—were found to trigger the decision to migrate (Wingens et al., 2011). Analysing migration trajectories triggered by these events provides an opportunity to link migration to people's life course development and thus to better interpret the occurrence of each migration. For instance, “educational migration” is widely combined with “job migration” (Collyer & De Haas, 2012). We incorporated the sequence of transitions (migration) to reveal the actual trajectories of each migrant's experiences. In line with Schwarz's (2018) idea of a trajectory approach, the differences in mental health performance between migration trajectory groups were identified from our results.

Our investigation into migrants' mental health across different groups of migration trajectories addressed the missing component of “trajectory” in existing migration studies by sequencing movements through people's life courses. The regression analysis shows that Group C2 (old movers) were more likely to have mental health problems than Group A1 (college graduates), whereas Groups B1 (job transfer) and A2 (educational movers) had better mental health than Group A1 (college graduates) after adjusting for control variables. A possible explanation for the poor mental health of people in Group C2 (old movers) is the age at migration: Migrating at an older age may be associated with more costs, including the loss of existing social networks and of certain physical or economic resources (Zhao, 2003), which is negatively related to mental health. Others found that poor health performance was related to an increased age at migration (Leão, Sundquist, Johansson, & Sundquist, 2009). In addition, some studies reported better initial health among younger migrants than among older ones, which could affect their mental health performance in later life (Chen, 2011; Qiu et al., 2011). The compositions of each migration trajectory group may reflect their socio-economic status and other health-related factors. According to the accumulation model from life course epidemiology, the initial advantages or disadvantages of each migrant may determine his or her migration trajectory later in life (Burton-Jeangros et al., 2015).

Our findings also suggest that hukou status is significantly associated with mental health status: Non-Shenzhen hukou holders were less likely to have mental health problems compared with those who held Shenzhen hukous. This finding seems to contradict previous studies (Cheung, 2013; Wong et al., 2008). During the fieldwork, a relatively low interest in transferring hukou to Shenzhen among skilled migrants and intraprovincial migrants was observed because they were able to utilise social resources provided by their employers and the provincial administration. For this group of migrants, a local hukou may not be as important as it is for other groups of migrants. For instance, some highly skilled

migrants were provided with high-quality accommodation by their employers. In addition, urban life in China has been found to be stressful and challenging for residents' physical and mental health (Li et al., 2007). Our sample contained both rural–urban and urban–urban migrants. Because hukou migrants tend to originate in urban areas and most non-hukou migrants were born and raised in rural areas (Chan, Liu, & Yang, 1999), their initial health status may differ because of their original living environment. Despite the results and possible explanations, hukou still serves an important role in analysing migration and mental health in urban China because it is broadly acknowledged as the key institutional factor determining migrants' health in an urban setting (Chen, 2011; Liu, Dijst, & Geertman, 2015; Tao, Hui, Wong, & Chen, 2015). Although multiple migration trips were generally observed, they were insignificantly related to migrant's mental health problems in our multivariate models. This result may be explained by minor differences in the mean migration frequency across the migration trajectory groups.

Several limitations should be considered when interpreting the results. First, although our data reconstruct the migration trajectories of people, we did not have longitudinal measurements of respondents' mental health. Therefore, due to the cross-sectional nature of this study, we cannot make statements about causalities. Second, we emphasised the “when” and “why” of migration in our research and did not address the “where” due to the limited sample size. Adding spatial characteristics to the analysis will certainly contribute to a better understanding of migration trajectories in relation to geographical attributes. Third, measures of environmental exposures during each stage of migration were not included in this research because our respondents' migration trajectories covered the whole of China, and a retrospective environmental assessment on the basis of people's memories has been reported to be inaccurate, potentially inducing a measurement bias (Findlay & Li, 1999). This problem may also apply to our retrospective data on migration history, despite the efforts we made to restrict the recall errors by focusing on the occurrence of migration only. We suggest that future research should address these limitations by conducting longitudinal research using indicators that describe both pre- and post-environmental exposures and incorporate geographical analysis.

Several strengths also need to be highlighted. First, this research represents an initial effort to break migration down into individual sequences of movement. We utilised SAM to align similar migration trajectories into trajectory groups, something that has rarely been done. Second, our research bridges the life course and migration literature by acknowledging the importance of migration trajectories formed by the sequence of movements. Our finding on multiple migration experiences among internal migrants in China calls for attention in migration studies to such multiple experiences, an aspect that has so far been overlooked by scholars. Third, as we aligned different migration trajectory groups, different mental health performances across trajectory groups were explored for the first time.

6 | CONCLUSIONS

Migration trajectories play a significant role in understanding migrants' mental health. In contrast to other studies, this paper provides evidence that migration, which is usually treated as a one point in time life course transition, should be seen as a trajectory involving sequential changes over time. This is particularly essential when multiple migration trips are considered. We showed through sequence analysis coupled with regressions that different migration trajectories are correlated with different mental health outcomes. People who had migrated due to job transfer or for educational purposes had better mental health than those who had stayed longer in their birthplaces and had migrated fewer times for work purposes. We suggest that scholars should pay more attention to migration trajectories formed by multiple migration journeys.

ACKNOWLEDGEMENTS

This study was supported in part by grants from the Chinese Scholarship Council (CSC) (No. 201507720038). The authors gratefully acknowledge support from the Department of Human Geography and Spatial Planning of Utrecht University.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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ENDNOTES

¹ Hukou refers to China's household registration system. In host cities, migrants—especially those who migrate from rural areas to urban areas—have limited access to hukous, on which social welfare and political participation are based (Huang, Dijst, Weesep, Jiao, & Sun, 2017). Although difficult to achieve, a hukou can be transferred to the host city by, for example, pursuing higher education, working in the public sector, purchasing an urban dwelling, or having family connections (Cui, Geertman, & Hooimeijer, 2015).

² A migration trajectory refers to a spatiotemporal process comprising multiple journeys to various places (Schapendonk, van Liempt, Schwarz, & Steel, 2018).

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How to cite this article: Yang M, Dijkstra M, Helbich M.

Migration trajectories and their relationship to mental health among internal migrants in urban China: A sequence alignment approach. *Popul Space Place*. 2019;e2304. <https://doi.org/10.1002/psp.2304>