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An Empirical Typology of Social Networks and Its Association With Physical and Mental Health: A Study With Older Korean Immigrants

Nan Sook Park,[1] Yuri Jang,[2] Beom S. Lee,[3] Jung Eun Ko,[4] William E. Haley,[4] and David A. Chiriboga[5]

[1]School of Social Work, University of South Florida, Tampa.
[2]School of Social Work, The University of Texas at Austin.
[3]Department of Mental Health Law and Policy,
[4]School of Aging Studies, and
[5]Department of Child and Family Studies, University of South Florida, Tampa.

Objectives. In the context of social convoy theory, the purposes of the study were (a) to identify an empirical typology of the social networks evident in older Korean immigrants and (b) to examine its association with self-rated health and depressive symptoms.

Method. The sample consisted of 1,092 community-dwelling older Korean immigrants in Florida and New York. Latent class analyses were conducted to identify the optimal social network typology based on 8 indicators of interpersonal relationships and activities. Bivariate and multivariate analyses were conducted to examine how the identified social network typology was associated with self-rating of health and depressive symptoms.

Results. Results from the latent class analysis identified 6 clusters as being most optimal, and they were named *diverse*, *unmarried/diverse*, *married/coresidence*, *family focused*, *unmarried/restricted*, and *restricted*. Memberships in the clusters of diverse and married/coresidence were significantly associated with more favorable ratings of health and lower levels of depressive symptoms.

Discussion. Notably, no distinct network solely composed of friends was identified in the present sample of older immigrants; this may reflect the disruptions in social convoys caused by immigration. The findings of this study promote our understanding of the unique patterns of social connectedness in older immigrants.

Key Words: Convoy model—Korean older adults—Mental health—Self-rated health—Social networks—Typology.

SOCIAL networks—the matrix of social relationships within which individuals operate—have been found to constitute an essential component of successful aging by providing individuals with social embeddedness and engagement (Cornwell, Laumann, & Schumm, 2008; Mendes de Leon & Glass, 2004). Networks, for example, serve as an interpersonal environment for transmission of information, social influences, and social support (Antonucci, Fiori, Birditt, & Jackey, 2010). Stronger and closer social ties also represent social resources in times of need (McPherson, Smith-Lovin, & Brashears, 2006), reduce a sense of isolation, and increase physical and mental functioning of older adults (Berkman & Glass, 2000; Park, Jang, Lee, Haley, & Chiriboga, 2013; Shaw, 2005). Thus, it is of concern that during the last two decades in the United States, the number of people reporting they lacked anyone to talk about important issues has tripled, and there has been a remarkable drop in the size of core social networks (McPherson et al., 2006).

Evidence suggests that certain robust types of social networks exist, and they are differentially associated with individuals' physical and mental health (Fiori, Antonucci, & Cortina, 2006). There are four general types of networks that have been identified as common in different societies: *diverse* (having a broad support base that spans family, friends, and neighbors, and involves participation in religious and organizational activities), *family* (living and maintaining close ties with immediate family with a relative absence of friends), *friend* (having close ties and contacts with friends but less with family), and *restricted* (involving a limited number of social ties and limited religious and social activities).

In addition to these more general types, researchers report network types unique to specific samples. For example, Litwin (2001), in a sample of adults aged 60 and older in Israel, identified a network type characterized by frequent contacts with adult children and neighbors but with fewer contacts with friends and a low likelihood of having a spouse. Fiori and colleagues (2006), in an American sample aged 60 and older, found two types of restricted networks: nonfamily (least likely to be married, to have children, and to have contact with them) and nonfriends (unlikely to have contact with friends and attend social meetings or religious services). Cheng, Lee, Chan, Leung, and Lee (2009), in a sample of Chinese older adults aged 60 and older

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in Hong Kong, identified two family-related networks: family (consisting of immediate family) and distant family (consisting of distant kin). More recently, Litwin and Shiovitz-Ezra (2011) found a congregant network type characterized by frequent attendance at religious services and minimal attendance in organized group meetings in a representative sample of Americans aged 57–85 years.

Findings of network studies suggest that social network types are differentially associated with physical and emotional health. In general, more diverse, friend-focused networks are linked with better physical and emotional health, whereas restricted and family-focused networks are related to poor physical and emotional health (Cheon, 2010; Fiori, Antonucci, & Akiyama, 2008; Litwin, 2011; Litwin & Shiovitz-Ezra, 2006). For example, Fiori and colleagues (2006) identified two restricted networks—nonfamily restricted and nonfriends restricted in that individuals in the nonfriends network had much greater depressive symptoms than those in the nonfamily network. Similarly, diverse and friend-focused networks were associated with a higher morale (Litwin, 2001) and a lower risk of mortality (Litwin & Shiovitz-Ezra, 2006) among older adults in Israel. Interestingly, in a cross-national study, Fiori and colleagues (2008) found that the relationship between network types and physical and emotional health (e.g., restricted types being associated with poorer physical and mental health) was much stronger in their sample in the United States than the one in Japan.

The extent of literature on social networks across racial/ethnic groups in the United States is limited in the range of groups studied (Mendes de Leon & Glass, 2004). Racial/ethnic minorities tend to have smaller social networks than non-Hispanic whites, with membership likely to be concentrated on family/kin relationships (Barnes, Mendes de Leon, Bienias, & Evans, 2004; Fiori et al., 2006; McPherson et al., 2006). Of a few studies that examined the social networks of elders in different cultures, results suggest that racial/ethnic minority elders are more likely than non-Hispanic whites to be isolated (McPherson et al., 2006) and that family-focused networks are central across Asian cultures (Cheon, 2010; Fiori et al., 2008). Yet, none of the studies on network typologies have focused on older immigrants. The increasing number of older immigrant populations in the United States (Terrazas, 2009) and their unique life experiences call attention to the better understanding of social networks and health in diverse populations.

One group about whom particularly little is known are Korean Americans. Korean Americans represent the fifth largest Asian American subgroup in the United States. (U.S. Census Bureau, 2011). Most of the current generations of Korean American elders were born in Korea and either came to the United States in the early years of their lives for education or work or immigrated in later life to reunite with family members who had previously immigrated to the United States. Perhaps due to their recent immigration history, older Korean immigrants tend to hold traditional cultural beliefs and values (Jang & Chiriboga, 2010; Wong, Yoo, & Stewart, 2007). The role of strong social ties has been suggested as especially critical for older immigrant populations because they experience disruptions in traditional social networks in the process of immigration and settling into the society that is linguistically and culturally different from their native countries (Dong, Chang, Wong, & Simon, 2011; Litwin, 2006). Korean American elders in particular are described as a high-risk group, with higher rates of depressive disorder compared with other racial and ethnic groups (Jang & Chiriboga, 2010; Min, Moon, & Lubben, 2005); their reported levels of depressive symptoms were highest among five ethnic groups of Asian Americans (Kim et al., 2010).

The convoy model was used as a guiding theory to understand the underlying role of social networks on an individual's physical health and well-being. The convoy model highlights the interplay of dynamic social interactions of individuals with social environment over the life course (Antonucci, 2001; Kahn & Antonucci, 1980, 1981). Individuals are likely to be immersed in networks of people that move with them across time (i.e., convoy), and the convoy provides a protective base for individuals to navigate the world. For immigrant populations, however, the social convoy may be disrupted, with the disruption being greater if the immigrants are from cultural groups whose social networks are more family oriented.

The purposes of this study were to (a) develop an empirical typology of the social networks in older Korean immigrants in the United States and (b) examine the relationship of the social network types to self-rating of health and depressive symptoms. To facilitate comparability with findings from other cultural groups, this study used variables similar to those utilized in an Israeli sample (Litwin, 2001) and a representative American sample (Fiori et al., 2006). Although little is known about social network typologies in the target population, we hypothesized that the four general network types commonly identified in other network studies (e.g., diverse, family, friend, and restricted; Cheng et al., 2009; Fiori et al., 2006; Litwin, 2001) would be identified. Additionally, we expected to find variations in network types associated with unique cultural and environmental contexts in the sample. In line with results from other studies (Cheon, 2010; Fiori et al., 2006; Fiori & Jager, 2012; Litwin & Shiovitz-Ezra, 2011), we hypothesized that more diverse network types would be associated with higher ratings of health and fewer depressive symptoms compared with more restricted network types.

Method

Participants

Survey data collection was conducted with Korean Americans aged 60 and older in West Central Florida and New York. To be eligible for the survey, participants had to

be Korean adults aged 60 or older who had sufficient cognitive ability to understand and complete the survey. Several sampling methods were combined in order to recruit a more representative sample of an immigrant population that is often hard to locate. These methods included contacting local Korean churches, other religious groups, senior centers, senior housing, and elder associations. To solicit participation of individuals who were not affiliated with those groups or organizations, referrals from respondents as well as other individuals associated with the primary data collection sites were sought.

The survey consisted of a standardized questionnaire in the Korean language. Because all participants were first-generation immigrants born in Korea, their native language was used. The survey questionnaires were developed through a translation/back translation process that also included pilot testing with 20 Korean American older adults who were representative of the anticipated sample.

In places where visits were made, surveys were self-administered in a small group context but with trained Korean-speaking interviewers available for those needing assistance. For those who were recruited through means other than visits (e.g., individuals listed in the directory of Korean residents or identified through referrals), a mail survey approach was used. Detailed information on sampling procedures and validation of the strategy of using multiple methods for recruitment is available elsewhere (Jang, Chiriboga, Allen, Kwak, & Haley, 2010; Roh et al., 2011).

The survey for the Florida sample (n = 675) was conducted in the Tampa and Orlando areas in 2008. The Florida survey was replicated with Korean American older adults in the New York metropolitan area (n = 433) in 2010. After deleting individuals who had more than 10% of missing information in their response, the final sample consisted of 1,092 participants (n = 672 in the Florida sample and n = 420 in the New York sample).

Measures

Social network variables.—Social networks were measured with eight variables; some items were identical to other network studies (Fiori et al., 2006; Litwin, 2001) including marital status, religious service attendance, and attendance of social meetings. Marital status was dichotomously measured (0 = *not married*; 1 = *married*). Living arrangement was also coded dichotomously (0 = *living alone*; 1 = *living with others*). Four questions on family and friend networks were adopted from Lubben's Social Network Scale (Lubben, 1988): how many relatives do you have whom you feel at ease and call on for help? (1 = *0* to 6 = *9 or more*); how often do you see or hear from the relative whom you feel closest (1 = *less than monthly* to 6 = *everyday*); how many close friends do you have whom you feel at ease and call on for help? (1 = *0* to 6 = *9 or more*); and how often do you see or hear from the closest friend? (1 = *less than monthly* to 6 = *everyday*). Additionally, two questions dealt with social participation: how often do you participate in religious meetings and how often do you participate in social gatherings such as elder association and alumni association. Each question was measured with a 4-point response item (0 = *never* to 3 = *everyday or almost everyday*).

Dependent variables.—Self-rated health was measured with a single question asking how participants would rate their health, using a 4-point scale (1 = *poor*, 2 = *fair*, 3 = *good*, and 4 = *excellent*). Depressive symptoms were measured with a 10-item short form of the Center for Epidemiologic Studies-Depression Scale (CES-D; Andresen, Malmgren, Carter, & Patrick, 1994; Radloff, 1977). The scale assessed the frequency of symptoms of depression experienced during the past week on a 4-point scale (0 = *rarely or none of the time* to 3 = *most or all of the time*). The total scores ranged from 0 (*no depressive symptoms*) to 30 (*severe depressive symptoms*). The CES-D has been translated into the Korean language, and its psychometric properties in that language have been validated (Cho, Nam, & Suh, 1998; Noh, Avison, & Kaspar, 1992). Cronbach alpha for the present sample was 0.78.

Background variables.—Demographic information included gender (0 = *male*; 1 = *female*), education (0 = < *high school*; 1 = ≥ *high school*), and age (in years). Participants were also asked the number of years they had lived in the United States. The level of acculturation was assessed with a 12-item list of acculturation including English proficiency, frequency of English use, consumption of audiovisual media in English, consumption of printed media in English, types of food consumed at home, types of food consumed outside the home, ethnicity of friends, social gathering, sense of belonging, getting along, familiarity to culture and custom, and celebration of holidays (Jang, Kim, Chiriboga, & Kallimanis, 2007). Each response was coded from 0 to 3, with the total score ranging from 0 to 36 with a higher score indicating a greater level of acculturation to mainstream American culture. Internal consistency for the present sample was 0.91. Finally, geographic location was coded dichotomously (0 = *New York*; 1 = *Florida*).

Data Analysis

In the first step of our analyses, we derived social network types using latent class models with two binary (marital status and living arrangement) and six continuous indicators (the number/frequency of contact with close family members, the number/frequency of contact with close friends, participation in religious meetings, and participation in organized meetings) based on the assumption that the latent variable (network types) is categorical, whereas observed variables (criterion variables) can be either categorical or continuous. That is, an unobserved heterogeneity of social

networks should be manifested through typologies using different social network variables (Muthén, 2001; Muthén & Shedden, 1999; Nylund, Asparouhov, & Muthén, 2007). After assessing the distribution of criterion variables across derived network types, we examined the association of network types to background and dependent variables (self-rated health and depressive symptoms) using a series of chi-square tests and analyses of variance. In the final step of our analyses, we conducted two multiple regression analyses to examine the effect of network types, one for self-rated health and one for depressive symptoms. Six dichotomous variables were created for social network types; among them five types—diverse, unmarried/diverse, married/coresidence, family focused, and restricted—were entered in the regression model excluding the unmarried/restricted group as a reference. A set of covariates (gender, education, age, and the number of years in the United States; acculturation; and location) was controlled. Analyses were performed using Mplus and SPSS statistical programs.

Results

Social Network Types

To find the optimal number of clusters, we compared solutions ranging from a 2-cluster model through a 10-cluster model. For the final selection of a model, we evaluated several model-fit criteria including the Bayesian Information Criterion (BIC), entropy, the Lo–Mendell–Rubin likelihood ratio test (LMR-LRT), the bootstrap likelihood ratio test (BLRT), and posterior probabilities. The optimal cluster solutions can be identified by lower BIC values and higher entropy (i.e., an index of classification quality) values when comparing models (Muthén & Muthén, 2000). The two likelihood ratio tests (LMR-LRT and BLRT) compare two adjacent models, the (c–1)-cluster model versus the c-cluster model, with significant p values suggesting that the current model performs better than the prior model. Another consideration for determining the number of clusters was to evaluate posterior probabilities, which contains the matrix of conditional probabilities for cases to be placed in their respective cluster; classification quality is good when diagonal values are high and off-diagonal values are low. It is important to note that there is no "one-size-fits-all" approach to determine the number of classes or class enumeration (Nylund et al., 2007; Tofighi & Enders, 2007) and that some scholars argue model solutions may be evaluated according to whether they are practically useful (Everitt, Landau, & Leese, 2001; Muthén & Muthén, 2000). For this reason, we considered class sizes and meaningfulness of classes based on substantive evidence in addition to several statistical indices of fit (Miche, Huxhold, & Stevens, 2013).

Table 1 presents the results of latent class analyses for each of the eight different types of cluster models. The results from the 9- and 10-cluster models are not presented because those models failed to converge to a single solution despite using different sets of multiple starting values to prevent the local maximum likelihood solution. The BIC values continuously decreased, and BLRT showed improvements from the two-cluster solution through the eight-cluster solution. Although BIC and BLRT demonstrated superior performances in simulation studies (Nylund et al., 2007), we considered other criteria such as entropy, LMR-LRT, and class size as well. As an example, the eight-cluster model was dropped because it contained two groups of relatively small size (n = 51 and n = 30). The six-cluster solution attained the highest entropy values followed by the four-cluster solution. LMR-LRT also favored the four-cluster model over the three-cluster model and the six-cluster model over the five-cluster model; the decreases in the BIC values were the largest in the four-cluster compared with the three-cluster solution and the six-cluster compared with the five-cluster solution. The diagonal posterior probabilities (not shown in the table) were more than 0.86 in both four-cluster and six-cluster models. However, one factor mitigating against selection of the four-cluster solution was that the latter contained one cluster with a very large sample size (n = 637). Taken together, we selected the six-cluster model as the most optimal based on various fit indices, balanced class distributions, and substantive meaningfulness of classes.

Table 1. Model Selection Criteria

Model	BIC	Entropy	LMR-LRT ($H_0 = k - 1$ classes)	BLRT ($H_0 = k - 1$ classes)
Two clusters	22,415.89	0.75	$p = .00$	$p < .01$
Three clusters	22,087.56	0.80	$p = .00$	$p < .01$
Four clusters	21,998.10	0.81	$p = .01$	$p < .01$
Five clusters	21,962.78	0.74	$p = .24$	$p < .01$
Six clusters	21,889.47	0.82	$p = .02$	$p < .01$
Seven clusters	21,873.20	0.79	$p = .24$	$p < .01$
Eight clusters	21,859.76	0.80	$p = .14$	$p < .01$

Notes. BIC = Bayesian Information Criterion; BLRT = bootstrap likelihood ratio test; LMR-LRT = Lo–Mendell–Rubin likelihood ratio test.

The best cluster solutions can be achieved with low BIC values and high entropy (i.e., an index of the classification quality). Additionally, the LMR-LRT and BLRT compare the current model (c-cluster) with prior model (c–1 cluster). The significant p value suggests that the current model performs better than the prior model.

After assessing the distribution of the criterion variables across the six clusters, each cluster type was named. Table 2 presents profiles for the total sample and for each of the six social network types: diverse, unmarried/diverse, married/coresidence, family focused, unmarried/restricted, and restricted. With 29.3% of the sample, the diverse group was one of the two largest. The majority were married and lived with others. This group was characterized by greater numbers and frequent contact with close family/relatives as well as friends. The group also maintained high attendance in religious meetings and organized group meetings. The unmarried/diverse group, comprising 7.8% of the sample,

Table 2. Profiles of Social Network Types

Network variables[a]	The total sample (N = 1,092)	Social network types						Test statistic and group comparison[b]
		Cluster 1: diverse (n = 320)	Cluster 2: unmarried/ diverse (n = 85)	Cluster 3: married/ coresidence (n =388)	Cluster 4: family focused (n = 99)	Cluster 5: unmarried/ restricted (n = 95)	Cluster 6: restricted (n = 105)	
	% or *M* (*SD*)	% or *M*	% or *M*	% or *M*	% or *M*	% or *M*	% or *M*	
Married	70.6	82.4	*0.0*	**90.4**	72.7	*0.0*	81.0	χ^2 = 531.4***
Living with others	81.6	97.2	*0.0*	**99.5**	91.8	11.6	88.6	χ^2 = 840.0***
Number of close family/relatives	3.68 (1.26)	**4.33** [3, 4, 5, 6]	4.08 [4, 5, 6]	3.95 [1, 4, 5, 6]	2.86 [1, 2, 3, 6]	2.75 [1, 2, 3, 6]	*1.95* [1, 2, 3, 4, 5]	*F* = 125.4***
Frequency of contact with close family/relatives	3.65 (1.51)	**5.05** [3, 4, 5, 6]	**5.05** [3, 5, 6]	2.75 [1, 2, 4, 6]	4.76 [1, 3, 5, 6]	2.61 [1, 2, 4, 6]	*1.51* [1, 2, 3, 4, 5]	*F* = 581.2***
Number of close friends	3.26 (1.30)	**3.96** [3, 4, 5, 6]	3.82 [4, 5, 6]	3.59 [1, 4, 5, 6]	*1.41* [1, 2, 3, 5]	2.91 [1, 2, 3, 4, 6]	1.53 [1, 2, 3, 4, 5]	*F* = 197.4***
Frequency of contact with close friends	3.37 (1.59)	4.43 [3, 4, 5, 6]	**4.78** [3, 4, 5, 6]	3.02 [1, 2, 4, 5, 6]	2.02 [1, 2, 3, 5, 6]	3.47 [1, 2, 3, 4, 6]	*1.45* [1, 2, 3, 4, 5]	*F* = 154.8***
Attendance of religious meetings	1.67 (0.83)	**1.84** [3, 5, 6]	1.69	1.59 [1]	1.82 [6]	1.49 [1]	*1.42* [1, 4]	*F* = 6.86***
Attendance of organized group meetings	0.84 (0.78)	**0.99** [4, 5, 6]	0.92 [4, 5]	0.91 [4, 5, 6]	*0.44* [1, 2, 3]	0.58 [1, 2, 3]	0.66 [1, 3]	*F* = 11.9***

Notes. The number of close family/relatives (1 = *0*; 6 = *9 or more*). Frequency of contact with close family/relatives (1 = *less than monthly*; 6 = *everyday*). The number of close friends (1 = *0*; 6 = *9 or more*). Frequency of contact with close friends (1 = *less than monthly*; 6 = *everyday*). Attendance of religious meetings (0 = *never*; 3 = *everyday or almost everyday*). Attendance of organized group meeting (e.g., elder association, alumni association; 0 = *never*; 3 = *everyday or almost everyday*).

[a]Highest %/mean are presented in the bold and lowest %/mean are italicized.

[b]Statistically different groups in the post hoc Tukey comparison at $p < .05$ are listed in brackets under mean values.

***$p < .001$.

was distinguished by their status of being not married and living alone. Other than that, the group was similar to the diverse group with respect to the number of close family/relatives and friends and frequency of contact with them. Individuals in the group were also likely to be involved in religious and other community meetings. The married/coresidence type was the largest group and included 35.5% of the sample. The group was characterized by the highest proportions of individuals being married and not living alone. The group maintained medium levels on the other social network variables. The family-focused type composed of 9.1% of the sample who were likely to be married and living with others. The frequency of contact with close family/relatives was high and the group was highly involved in religious group activities. The unmarried/restricted type, consisting of 8.7% of the sample, included individuals who were not married and likely to live alone. Comparatively, the group maintained closer relationships with friends than family. Involvement in religious meetings and organized group activities was minimal. Lastly, the restricted type made up 9.6% of the sample. Although individuals in this group were likely to be married and living with others, their contacts with family/relatives and friends and involvement in religious/group meetings were minimal.

Social network types were further compared with respect to background characteristics, self-rated health, and depressive symptoms. The associations between network types and study variables are presented in Table 3. All background variables were statistically significant except the number of years in the United States. Women made up 62.5%–82.4% of the diverse, unmarried/diverse, family-focused, and unmarried/restricted types. The married/coresidence and restricted types included a higher proportion of men. Proportions of individuals with high school and more education were higher in all network types (53.5%–79.0%) except the unmarried/restricted type (49.5%). The unmarried/diverse type consisted of individuals who are significantly older than those in the married/coresidence type. Individuals in the diverse and married/coresidence types were most acculturated, whereas those in the family-focused type were the least acculturated. Finally, the distribution of network types varied across the two geographic locations. The New York sample was disproportionately overrepresented in three groups: the unmarried/diverse (54.1%), unmarried/restricted (53.7%), and restricted (48.6%). These three groups may include individuals who experienced difficulties in re-creating the more typical Korean social convoy.

Lastly, associations between social network types and both dependent variables were statistically significant. The diverse had the most favorable self-rated health and lowest level of depressive symptoms, whereas the unmarried/restricted had the poorest health rating and greatest level of depressive symptoms.

Table 3. Background Characteristics, Self-Rated Health, and Depressive Symptoms by Network Types

Variables	The total sample (N = 1,092)	Social network types						Test statistic and group comparison[a]
		Cluster 1: diverse (n = 320)	Cluster 2: unmarried/ diverse (n = 85)	Cluster 3: married/ coresidence (n =388)	Cluster 4: family focused (n = 99)	Cluster 5: unmarried/ restricted (n = 95)	Cluster 6: restricted (n = 105)	
Gender (%)								
Male	44.0	37.5	17.6	55.2	35.4	26.3	68.6	χ^2 = 89.8***
Female	56.0	62.5	82.4	44.8	64.6	73.7	31.4	
Education (%)								
<High school	30.0	28.9	36.1	21.0	46.5	50.5	26.9	χ^2 = 49.0***
≥High school	70.0	71.1	63.9	79.0	53.5	49.5	73.1	
Age, M (SD)[b]	70.73 (7.18)	70.41 (6.94)	**72.81** (8.15) [3]	*69.81* (6.25) [2]	71.25 (6.96)	72.11 (9.0)	71.63 (8.09)	F = 4.0**
Number of years in the United States, M (SD)	26.62 (11.27)	26.72 (10.96)	28.85 (8.72)	25.80 (12.41)	24.46 (11.27)	26.91 (10.05)	27.22 (10.35)	F = 1.8
Acculturation, M (SD)	13.85 (7.21)	14.43 (7.29) [4]	13.89 (7.58)	**14.51** (7.06) [4]	*11.18* (6.86) [1, 3]	13.04 (6.73)	12.89 (7.36)	F = 4.47***
Location (%)								
Florida	61.5	67.2	45.9	64.4	70.7	46.3	51.4	χ^2 = 31.8***
New York	38.5	32.8	54.1	35.6	29.3	53.7	48.6	
Health/mental health								
Self-rated health,[c] M (SD)[b]	2.58 (0.85)	**2.73** (0.81) [4, 5]	2.46 (0.87)	2.65 (0.84) [4, 5]	2.30 (0.81) [1, 3]	*2.29* (0.87) [1, 3]	2.47 (0.86)	F = 7.6*
Depressive symptoms,[c] M (SD)[b]	8.02 (4.82)	*6.81* (4.32) [2, 4, 5, 6]	8.65 (4.84) [1]	7.66 (4.59) [1]	8.80 (5.0) [1]	**10.28** (4.63) [1, 3]	9.75 (5.77) [1, 3]	F = 12.5***

Notes. [a]Statistically different groups in the post hoc Tukey comparison at $p < .05$ are listed in brackets under mean values.
[b]The highest mean value is presented in bold and the lowest mean value is italicized.
[c]Measurement ranges: self-rated health (1 = *poor;* 4 = *excellent*), depressive symptoms (0 = *no depressive symptoms*; 30 = *severe depressive symptoms*).
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 4. Regression Models of Self-Rated Health and Depressive Symptoms by Background Characteristics and Network Types

	Self-rated health[a]		Depressive symptoms[a]	
Variables	*b*	*SE*	*b*	*SE*
Social network types				
Diverse	0.36***	0.10	–3.11***	0.55
Unmarried/diverse	0.20	0.12	–1.62*	0.69
Married/coresidence	0.25*	0.10	–2.25***	0.54
Family focused	0.04	0.12	–1.68*	0.67
Restricted	0.11	0.12	–0.67	0.67
Background characteristics				
Gender (female)	–0.18**	0.05	–0.10	0.30
Education (>high school)	–0.10	0.06	0.12	0.35
Age	0.00	0.00	–0.05*	0.02
Number of years in the United States	–0.00	0.00	0.04*	0.01
Acculturation	0.04***	0.01	–0.20***	0.03
Location (Florida)	0.14**	0.06	–1.11***	0.32

Notes. Diverse, unmarried/diverse, married/coresidence, family focused, and restricted represent dummy codes for the network types. Unmarried/restricted is used for a reference group and is left out of the analysis.

[a]Measurement ranges: self-rated health (1 = *poor*; 4 = *excellent*), depressive symptoms (0 = *no depressive symptoms*; 30 = *severe depressive symptoms*).

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

Multiple Regression Analyses

Results from regression analyses are summarized in Table 4. The unmarried/restricted that had the poorest ratings of health and greatest level of depressive symptoms was used as a reference group and omitted from analyses. Membership in the diverse and married/coresidence groups predicted more favorable reports of health, in comparison to the reference group. For background characteristics, women rated their health more poorly and a higher level of acculturation was associated with better rating of health. Also individuals from Florida had a higher rating of health. For depression, membership in the diverse, unmarried/diverse, married/coresidence, and family-focused groups predicted lower levels of depressive symptoms. Regarding background variables, younger age, a lower level of acculturation, and the New York sample were associated with greater depressive symptoms.

Discussion

To our knowledge, this is the first study to develop typologies of social networks in older immigrants in the United States. Using step-by-step latent class analyses, we confirmed the presence of several robust social network types in a sample of Korean older adults in two geographic locations: the diverse, family, and restricted. One difference from previous findings is that our analyses broke the two commonly reported types—diverse and restricted—into two subtypes. Another difference was that there was no distinct type involving a network of friends, one of the most robust types reported in other network typology studies (Cheng et al., 2009; Fiori et al., 2006, 2008; Litwin, 2001). As hypothesized, individuals categorized as embedded in the diverse types of networks tended to have positive ratings of health and lower levels of depressive symptoms than those in the two restricted network types.

We think that the lack of distinctive friend network in the present sample may in part be explained by the relative importance of the role of adult children and having spouse in Asian cultures. Influenced by Confucianism, filial piety plays a key role in defining social relationships between the young and old in certain Asian cultures (Sung, 2001). Family provides a fundamental source of instrumental and emotional support for its members; as parents provide such support to their children, in return, adult children are expected to provide care to their aging parents. Studies among Chinese older adults who share many cultural values with the Korean elderly find that family support including intergenerational relationship, rather than support from friends, is a critical determinant of reducing psychological distress (Chou & Chi, 2003; Dong et al., 2011). In studies with older Korean Americans, higher satisfaction with the relationship with adult children was associated with better mental health (Jang, Roh, & Chiriboga, in press), whereas family conflicts play a significant role in predicting greater levels of depression (Lee, Moon, & Knight, 2005). Similarly, marital status and quality of the marital relationship have been linked with health and well-being in older Koreans and Korean Americans (Jang et al., 2009; Yoo & Zippay, 2012).

Another explanation for the lack of a discrete friendship type may reflect the fact that this sample, and indeed the majority of the population of older Korean Americans, was comprised entirely of immigrants. Their immigrant status may have compounded the effect of familism—a factor that is worth exploring in other populations of immigrants. At issue here is what might be called a "broken" convoy effect, where the social group, with which one would normally expect to follow one over time, is disrupted by one's departure from the country of origin. Although the results of the present analyses could not provide a definitive answer, they suggest that disruption of social convoy may vary as

a function of the social characteristics of the host region. It may be, for example, that those who immigrated to the New York area were less likely to immigrate with family members, and hence had fewer opportunities to reestablish a social network similar to that of the country of origin. The larger number of Koreans living in New York may also have provided more network options that were not family oriented. Such contextual differences in the formation of social networks have been observed in the comparison of people from Mediterranean versus non-Mediterranean countries. Results suggest that social convoys may pursue different routes in consequence of differing social and cultural settings (Litwin, 2009).

Although we did not find a distinctive friend network, we found four spouse/family-related networks: unmarried/diverse, married/coresidence, family focused, and unmarried/restricted. Such finding might reflect distinctive social formations in Asian cultures. For example, Cheon (2010) found three social network groups (diverse, family, and restricted) but not a friend typology in a study of older Koreans. In other studies with more complete network typologies, researchers have consistently found that family-focused network groups (e.g., being married and having children) constituted a larger proportion in Asian cultures, whereas friend-focused network groups have been more prominent in the United States and other Western samples (Cheng et al., 2009; Fiori et al., 2008). Taken together, such findings strongly suggest that the role of family, in particular, adult children and spouse, may be more pronounced in Asian cultures, whereas the role of friends and neighbors is more positively related with health and well-being in Western cultures (Huxhold, Miche, & Schüz, 2013).

This study also found two restricted types: unmarried/restricted and restricted, both of which were more evident in the New York sample. The unmarried/restricted type consisted mostly of individuals who were not married and lived alone, who did maintain moderate ties with family and friends, but who participated in few religious or organized group meetings. The restricted type was represented by people who, while being likely to be married and living with others, maintained weak ties and contacts with family and friends and participated in few religious and organized group activities. Findings that those in the unmarried/restricted group rated their health poorly and had more depressive symptoms compared with those in the restricted type suggest that being married and living with others may be more significantly linked with health and mental health than other indicators of social networks. In contrast to the assumption that being invested in one relationship (e.g., partner relationship) may block other relationships and make people exposed to vulnerability (de Jong Gierveld & Hagestad, 2006), our finding suggests that a partner relationship or a coresidence may counter the lack of involvement in other relationships.

The study presents some limitations. First, although focusing on one ethnic immigrant sample (Korean Americans) provides insights on the growing minority group, it may limit generalizability of findings. However, by examining the level of acculturation and comparing two geographic locations of high density versus low density of Korean populations, the study identified variations in acculturation and geographical location in social network types within the group. Second, the study uses the cross-sectional data and therefore there is no possibility of drawing causal inferences. For example, we assume that social network types influence individuals' health and mental health. Yet, without looking at the longitudinal trend, such assumption may be difficult to establish. Future studies should examine the dynamic interplay between individuals and their responses to changing social resources over the life course and throughout the acculturation process. Lastly, we used social network variables focusing on structural aspects (e.g., the number of relationships, frequency of contacts, attendance frequency of social meetings) to compare and contrast with the results from other network typology studies (Fiori et al., 2006; Litwin, 2001; Litwin & Shiovitz-Ezra, 2011). The structural variables, however, cannot tell the quality or nature of relationships (e.g., supportive vs. unsupportive; Yoo & Zippay, 2012). Future studies should include network variables related to perceptional aspects such as quality and satisfaction with a relationship. On the other hand, the lack of the friend network type in our study could result from the fact that we used the number of "close" friends and the frequency of contact with the "close" friend, whereas other studies used only the number of friends (Litwin & Shiovitz-Ezra, 2011) or contact with friends (Fiori et al., 2006).

The social network types identified in this study have implications for understanding what we previously referred to as a "broken" convoy effect that results from immigration. Older immigrants may lack some of the social resources of friendship available to those who age in place. Older adults who migrate within the United States have been found to develop new friendships as part of developing a bond to their new homes (Sharma, 2012; Zhang & Ta, 2009); however, this process may be difficult for older Korean immigrants. As noted previously, it is noteworthy that the unmarried/diverse, unmarried/restricted, and restricted were overrepresented in the New York sample. New York is considered as a high Korean density area, whereas the central-western region of Florida, from which the other sample was drawn, is an area of low Korean density (Jang et al., in press). Individuals in low ethnic–density areas may be more dependent on family and close friends and may therefore reestablish their social convoy in a way more similar to what they had in Korea, whereas the role of family may be diluted where ethnic-oriented resources are available and individuals can easily find those who speak the same language. The ethnic enclave, on the other hand, may provide the social and environmental context for older immigrants to live alone, yet some may be at a greater risk of being socially isolated.

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Correspondence

Correspondence should be addressed to Nan Sook Park, PhD, School of Social Work, University of South Florida, 13301 Bruce B. Downs Boulevard, MHC 1400, Tampa, FL 33620. E-mail: nanpark@usf.edu.

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