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Structural Typologies of Personal Support Networks for Urban Indigenous Peoples

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Abstract

This study investigated typologies of personal networks for various types of social support, including support in terms of discussing important or private matters and emotional, instrumental, and informational support, for urban Indigenous Peoples and compares network typologies between first-generation and second-generation Indigenous Peoples. K-means clustering is employed to group the data into clusters based on the structural characteristics of networks for a sample of 300 urban Indigenous Peoples. The findings highlight the diversity of intimate networks for the four types of social support. Diverse network typologies, including star, single, multiple subgroups, kite, and pearl collar types, were identified. Network characteristics are linked to network attributes. Moreover, the results reveal consistency in role relations in personal networks. For all types of social support, relatives and friends are the most frequently indicated role relationships. This study provides social workers with a better understanding of support networks in Indigenous communities. The results of the study suggest that social policies should focus on Indigenous social connections and relational structure from a culturally sensitive perspective. By understanding these specific network typologies, social workers can more effectively identify and leverage the support systems of urban Indigenous Peoples within a culturally sensitive framework.

Indigenization Statement

As a non-Indigenous researcher, I acknowledge my position of privilege in academic knowledge production. This study concerned Indigenous populations residing in urban areas of Taiwan and was founded on ethical commitments to respect Indigenous knowledge systems. The study adhered to an ethical framework that included relevant institutional review and consultation with the Council of Indigenous Peoples. Indigenous partners were closely engaged in the research. For example, they reviewed the research instrument to ensure its cultural appropriateness. Additionally, partners from Indigenous community organizations participated in focus group discussions in which they shared insights into social support networks and provided critical interpretations. These efforts demonstrate my dedication to building connections with and fostering mutually beneficial relationships within the community.

This study consulted with the Council of Indigenous Peoples and received ethical approval from the Human Research Ethics Committee of National Chung Cheng University (Approval No.: CCUREC111102602). Informed consent was obtained from all participants.

Introduction

Since 1960, many Indigenous Peoples in Taiwan have migrated from tribal areas to urban areas because of changes in the industrial structure (Yu, 2019). Research has indicated that migration of Indigenous Peoples is driven by economic factors (Cooke & Bélanger, 2006). For example, Indigenous Peoples move to cities for better livelihoods, jobs, or human capital investments in children. Social mobility can improve living standards (Côté & Evans, 2023). After such migration, Indigenous Peoples considerably rely on social networks and connections (Liu & Lin, 2008, 2010). A study conducted in Mexico suggested that social networks are a significant factor facilitating the decision of Indigenous people to migrate (Skoufias et al., 2010). Thus, people tend to migrate to a destination where they have more interpersonal contacts (Blumenstock et al., 2023). Social networks not only play a key role in the decision to migrate from tribal areas to cities but also provide opportunities for seeking better jobs in urban areas (Cooke & Bélanger, 2006).

Indigenous Peoples have collective values, and social relationships are emphasized within Indigenous communities (Podsiadlowski & Fox, 2011). Regarding the residential pattern, spatial clustering has been found for Indigenous Peoples living in tribal areas; this residential pattern fosters social support and strong connections (Fu, 1993; Su, 2007). However, after migration to urban areas, the residential pattern becomes highly dispersed, potentially leading to weakened connections and reduced social support for Indigenous Peoples (Fu, 1993). Additionally, with frequent migration from tribal to urban areas, people become disconnected from their Indigenous community (Cooke & Bélanger, 2006). Therefore, the personal networks of urban Indigenous Peoples should be further explored.

Personal networks (also known as egocentric networks) have been a popular research topic (Aboutalebi Karkavandi et al., 2022; Chang et al., 2022; de Miguel Luken & Tranmer, 2010; Rhoades et al., 2021). Personal social networks enable the building of bridges between individuals and organizations. An individual's position within a social network and the structure of the social network are relevant factors (Vonneilich, 2022). One study on personal networks examined network compositions, the strength of relationships, and types of resources or social support (Wellman, 2007). Another study found that personal characteristics, such as education, household income, and family type, are linked to the compositions of personal networks for Tehranis. The results revealed that gender differences are present in personal networks, and that personal networks are mainly composed of same-sex people (Bastani, 2007). Similarly, a study on relational models of friendship networks among adolescents revealed same-sex reciprocal relationships (Chang et al., 2022).

Another research focus is the structure of social networks for various populations and their effects on an individual's outcomes (Bianchi et al., 2023; Lubbers et al., 2010; Martí et al., 2017). Ramírez Ortiz et al. (2004) examined the associations between centrality positions and academic performance among adolescents in Mexico. The study indicated that closeness and betweenness predict high academic performance among adolescents. Other structural measures, such as network cohesion and homophily, have also been proven to play important roles in personal networks. For example, network cohesion significantly influences the types of social support available to an individual (Martí et al., 2017). Network homophily has been associated with high social status in friendship networks (An, 2022).

Regarding network typologies, research has mainly applied the support network typology developed by Wenger (1991) for the classification of personal networks (Burholt & Dobbs,

2014; Giannella & Fischer, 2016; Szabó et al., 2024). For instance, a study investigated the types of support networks among older people after migration to New Zealand. Four types of support networks were identified: private-restricted, family-dependent, locally integrated, and wider community-based. Restricted networks were the primary network type. Social support available to older immigrants diminishes due to their restricted networks (Szabó et al., 2024).

Over the past few decades, several studies have focused on developing structural typologies using social network analysis (Agneessens et al., 2006; Bidart et al., 2018; González-Casado et al., 2024; Vacca, 2020). Network typologies facilitate the systematic analysis and comparison of social networks on the basis of structural characteristics (Bidart et al., 2018). According to Vacca (2020), typologies enable comparisons across countries, groups, populations, and time, uncovering similarities and differences. In addition, network typologies can capture the associations between network characteristics and attributes, and detect rules that influence an individual's network (Giannella & Fischer, 2016).

Limited empirical studies have examined personal network typologies for urban Indigenous Peoples (Skoufias et al., 2010). Social networks are not only closely related to the migration of Indigenous Peoples to cities but also linked to urban Indigenous Peoples' access to economic and social resources. The social connections and networks of Indigenous Peoples who have migrated to cities may change. Indigenous Peoples may also establish new connections and networks with urban communities. Moreover, the profiles of social relations and network typologies differ between first-generation Indigenous Peoples with migration experience and second-generation Indigenous Peoples growing up in urban cities. To fill the knowledge gap in the personal networks of Indigenous Peoples, this study (1) identified the typologies of personal networks of social support based on structural characteristics and (2) explored the differences in typologies of

networks between the aforementioned generations. Understanding support network typologies among urban Indigenous Peoples can enhance cultural competence in social work and allow for a reevaluation of social connections in urban settings. This study concludes with a discussion of the research on this topic and the practical implications of the current findings.

Personal Networks and Typologies

Some studies on personal networks have explored the structural characteristics of networks. McCarty (2002) recruited 46 respondents and asked them to list 60 alters (network members). The networks contained 1,770 pairs of relationships. Six structural characteristics of the networks, namely density, degree centrality, closeness centrality, betweenness centrality, cliques, and components, were measured. The study presented the variability of the personal network structure according to cohesion and subgroup measures.

Recent studies have applied social networks to examine the structure of relationships among migrants (Brandes et al., 2010; Klvaňová, 2010; Ryan, 2011). For example, Ryan and D'Angelo (2018) examined the dynamic relationships in migrants' networks on the basis of spatial and temporal factors to determine how migrants' networks change over time. A study on Peruvian migrants in Switzerland explored how migrants establish and maintain connections with other Peruvians while integrating into local networks. The study provided insights into the formation, maintenance, and eventual disappearance of relationships within migrant networks (Seminario, 2022).

Studies have also analyzed structural characteristics to construct varying types of personal networks and provide relational visualization (Bidart et al., 2018; Brandes et al., 2010; Vacca, 2020). Typologies of personal networks can capture network structures and their cross-cultural variations (Cheng et al., 2009). Bidart et al. (2018) conducted a longitudinal qualitative survey to

develop varying types of personal networks. In the survey, young people in France were interviewed every three years from 1995 to 2004. Six types of personal networks were constructed on the basis of structural indicators, such as density, betweenness centrality, and diameter. These networks were: regular dense network, centered dense network, centered star network, segmented network, pearl collar network, and dispersed network. Bidart et al. (2018) developed a typology approach for identifying ego-network types, which can be applied for analyzing personal network datasets (see Vacca, 2020).

Fiori et al. (2008) identified cross-cultural variations in social network types between the United States and Japan. Four common network types were found: diverse, friend-focused, family-focused, and restricted networks. The compositions of the network types differed between the countries. For instance, diverse networks were the most common type in the United States. Most people in a diverse network were married and had higher levels of social support than average. By contrast, diverse network types were less common in Japan. Married people maintained close contact with friends and received emotional support from them.

Studies have indicated that various types of social networks can affect an individual's mental health outcomes (Choi & Jeon, 2021; Fiori et al., 2006; Kim et al., 2017; Litwin & Shiovitz-Ezra, 2011). A study in adults in the United States aged 60 years or older found that the diverse network and friend network could help relieve depression. However, restricted networks, such as nonfriend and nonfamily networks, were associated with an increased risk of depression. Family, diverse, and friend networks all facilitated depression relief in older adults, with diverse and friend networks being more predictive of depression relief than family networks (Fiori et al., 2006).

Methods

Participants

The Social Support Networks of Urban Indigenous People Survey was conducted in 2023. Indigenous partners were engaged in reviewing the research instrument and modifying the questionnaire to ensure its cultural appropriateness. Additionally, partners from Indigenous community organizations participated in focus group discussions during which they shared their insights on social support networks and provided critical interpretations.

The survey collected data on participants' demographic characteristics. In addition, face-to-face interviews were conducted to collect information on four types of social support networks: support in terms of discussing important or private matters, and emotional, instrumental, and informational support. A total of 300 urban Indigenous Peoples (mean age = 47.4 ± 20.74 years, range = 17–84 years) residing in Tainan City (n = 75) and Kaohsiung City (n = 225) were recruited from Indigenous organizations, such as Indigenous churches and nongovernmental organizations[1]. First-generation Indigenous Peoples numbered 182 (mean age = 56.43 ± 18.41 years, range = 18–84 years), and second-generation Indigenous Peoples numbered 118 (mean age = 33.47 ± 15.88 years, range = 17–84 years).

Measures

Each participant was asked to list five people who provided social support and to indicate whether close relationships existed between these individuals and themselves and between these individuals. Ego was included in the support network[2]. The four types of social support were support in terms of discussing important or private matters, emotional, instrumental, and informational support. A total of 1,200 personal network matrices were analyzed.

[1] The urban Indigenous populations in Tainan City and Kaohsiung City were 28,292 and 8,999, respectively, in 2023.

[2] Occasionally, the network is named an "egocentric network" if ego is not included. By contrast, the network is called "personal network", if ego is included in the network (González-Casado et al., 2024).

Data Analysis

Social support networks were analyzed using UCINET 6 and visualized using NetDraw. K-means clustering was employed to categorize the data into homogeneous clusters based on structural characteristics. From various empirical studies (Bidart et al., 2018; Maya-Jariego, 2021), six structural indicators were selected: network density, betweenness centrality, centralization index, geodesic distance, diameter, and clique. Some observations had zero values for all six structural indicators—these observations were excluded. Table 1 provides the final sample sizes for the four types of social support typologies.

Table 1

Sample Size by Social Support and Generation

	Total	First-generation	Second-generation
Discussing important or private matters	294	177	117
Emotional support	294	176	118
Instrumental support	296	178	118
Informational support	286	174	112

Network density refers to the interconnectedness of the nodes (actors) in a network. Network density is defined as the ratio of the number of actual links to the number of possible links (Himelboim, 2017), with values ranging from zero (no relationships in a network) to one (all possible relationships in a network; Scott, 2012). Compared with sparse networks, information flows easily in dense networks (Chang et al., 2022).

Betweenness centrality is a measure of the shortest paths, known as geodesic distances, in a network (Hansen et al., 2011; Hogan, 2011). An actor who lies on the shortest path between two actors plays a bridging role and thus has control over the interactions between the two actors in a network (Wasserman & Faust, 1994). Thus, betweenness centrality is also measured as information control (Hansen et al., 2011; Hogan, 2011). A network with high betweenness centrality reflects the weak connections of social capital; this implies that a person in the network plays a role in mediating the flow of resources or support between the actors in a network (Burt, 1995).

Centralization refers to the centrality of the whole network. The centralization index, which ranges from zero to one, indicates the extent to which the connectedness of a network is centered on a specific or single actor (Hansen et al., 2011; Scott, 2000). The specific or single actor dominates the highly centralized network. For example, the specific actor has connections to all other actors in a star network. The other actors in a network exhibit no connection to each other (Borgatti et al., 2018; Scott, 2000).

Geodesic distance and diameter pertain to the path between two actors. The term geodesic describes the shortest path between two actors. Geodesic distance denotes the length of a geodesic between two actors (Wasserman & Faust, 1994). Geodesic distance reflects the most efficient connection between two actors (Hanneman & Riddle, 2005). Diameter represents the largest geodesic distance between any two actors in a network (Hanneman & Riddle, 2005; Wasserman & Faust, 1994).

A clique is a closely connected group composed of at least three actors. All actors in the closely connected group exhibit mutual connections (Wasserman & Faust, 1994). According to Scott (2012), “A clique …… is a set of points in which each point is directly and reciprocally

connected to all other points" (p. 47). A clique can include actors from another clique. Thus, a network graph presents overlapping cliques (Wasserman & Faust, 1994).

In this study, discriminant analysis was conducted to confirm the classification results from K-means clustering and to determine whether the data were correctly classified into separate clusters. High classification accuracy was found for five clusters regarding support in discussing important or private matters (98%) and emotional support (98%). Regarding instrumental support and informational support, the highest classification accuracies of 96.3% and 99.7% were found for four clusters, respectively. Finally, the clusters were named based on their structural characteristics and the visualization of networks.

Results

Size of Social Support Networks

Table 2 provides the size of social support networks. The support network for discussing important or private matters had the largest size (M = 2.83). The network for instrumental support had the smallest size (M = 2.31). The networks for the four types of social support for second-generation Indigenous Peoples were larger than were those for first-generation Indigenous Peoples. Except for emotional support, significant differences were observed in the average sizes of the networks for the other types of support between the two generations.

Table 2

Network Size by Social Support and Generation

	Total	First-generation	Second-generation	t
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	
Discussing important or private matters	2.83 (1.51)	2.67 (1.47)	3.06 (1.54)	-2.171*
Emotional support	2.54 (1.41)	2.41 (1.41)	2.74 (1.40)	-1.965
Instrumental support	2.24 (1.33)	2.09 (1.25)	2.47 (1.42)	-2.397**
Informational support	2.31 (1.34)	2.17 (1.29)	2.54 (1.39)	-2.254*

*$p < .05$, **$p < .01$

Typologies of Personal Networks

Table 3 presents the typologies of personal networks by social support. The personal networks for support in terms of discussing important or private matters and emotional support were classified into five typologies: star, single, multiple subgroups, kite, and pearl collar. The personal networks for the other two types of support were classified into four typologies. The pearl collar network was not found for instrumental and informational support.

The single network was the dominant network for all types of social support. The highest proportion of first-generation and second-generation Indigenous Peoples relied on single networks across the four types of social support. In particular, compared with second-generation Indigenous Peoples, first-generation Indigenous Peoples considerably relied on single networks across the four types of support. Single networks for instrumental and informational support were found for approximately 80% of first-generation Indigenous Peoples.

Except for emotional support, the kite network for the three types of social support ranked second. Second-generation Indigenous Peoples were more likely to rely on kite networks than

were first-generation Indigenous Peoples. The second-highest proportion of the two generations overall, and first-generation Indigenous Peoples specifically, relied on star networks for emotional support and instrumental support, respectively. In both generations of Indigenous Peoples, considerable similarity was found in the network typologies for support in terms of discussing important or private matters and informational support. These two types of social support involve the communication of important information. Except for single networks, second-generation Indigenous Peoples primarily relied on kite networks for support in terms of discussing important or private matters, instrumental support, and informational support.

Table 3

Typology of Personal Networks by Social Support (%)

	Star	Single	Multiple subgroups	Kite	Pearl collar
Discussing important or private matters					
First-generation	11.9	64.4	1.7	15.3	6.8
Second-generation	8.5	55.6	4.3	23.9	7.7
Total	10.5	60.9	2.7	18.7	7.1
Emotional support					
First-generation	11.4	69.9	0.6	10.8	7.4
Second-generation	18.6	50.8	5.9	10.2	14.4
Total	14.3	62.2	2.7	10.5	10.2
Instrumental support					
First-generation	8.4	82.0	2.2	7.3	–

	Star	Single	Multiple subgroups	Kite	Pearl collar
Second-generation	11.9	62.7	4.2	21.2	–
Total	9.8	74.3	3.0	12.8	–
Informational support					
First-generation	6.3	78.7	1.7	13.2	–
Second-generation	17.0	56.3	6.3	20.5	–
Total	10.5	69.9	3.5	16.1	–

Note: "–" means that no pearl collar network was found for instrumental and informational support.

Structural Characteristics of Personal Network Typologies

Table 4 presents a summary of the structural characteristics of personal network typologies by social support. Figure 1 provides a visualization of various typologies. An explanation of various typologies is provided in the following sections.

Star Network

For the four types of social support, the star network was characterized by high centralization (that is, 0.88) and few cliques (that is, 0). Moderate density ranging from 0.53 to 0.58 and low betweenness centrality ranging between 0.39 and 0.68 were found for various typologies. Geodesics distances reflect the shortest path between two actors in a network. The geodesics distances ranged from 2.03 to 2.14. The star network with high centralization indicated that participants had intimate relationships with each support network member, but these support network members did not have close relationships with each other.

Single Network

The highest density scores of 0.95–0.97 were observed for single networks for the four types of social support. Lower average numbers of cliques (M = 0.44–0.54) were found for these networks. Other structural characteristics, such as betweenness centrality and centralization index, were equal to zero. The geodesics distances and diameters were both equal to one. Because of the high density and small diameter of single networks relative to other network typologies, single network types of social support have higher connectivity.

Multiple Subgroups Network

The density of the multiple subgroups network for the four types of social support was approximately 0.6. The network interconnected through several groups exhibited high betweenness centrality (M = 0.89–0.97) but a low centralization index (M = 0.28–0.36). Compared with other typologies, the multiple subgroups network had the highest number of cliques (M = 3.22–3.50). The average geodesics distances and diameters of the networks for the four types of support were 1.38 and 2.08, respectively. Participants were connected to two or three small groups and served as a bridge between them.

Kite Network

The kite network exhibited high density and low betweenness centrality (M = 0.51–0.71) and had a low centralization index (M = 0.33–0.50). The average number of cliques ranged from 1.46 to 2. Moreover, the average geodesics distances and diameters of the kite networks for the four types of support were 1.29 and 2.02, respectively. According to the graph, participants served as bridges between one group and one person, indicating close relationships among support network members within a group. Participants were not core members within the networks of intimate relationships. However, other members exhibited close relationships with each other.

Pearl Collar Network

The pearl collar network was found for two types of social support: support in terms of discussing important or private matters and emotional support. Among all typologies, the pearl collar network with intermediate density (M = 0.43–0.58) exhibited relatively high betweenness centrality (M = 0.62–0.78), centralization (M = 0.72–1.54), geodesics distances (M = 1.00–1.60), and diameters (M = 2.03–2.24). Participants served as bridges connecting small groups and isolated individuals in the network.

Table 4

Structural Characteristics of the Five Typologies by Social Support

	Star		Single		Multiple subgroups		Kite		Pearl collar	
	M	SD	M	SD	M	SD	M	SD	M	SD
Discussing important or private matters										
Network density	0.55	0.17	0.95	0.19	0.62	0.08	0.68	0.17	0.43	0.05
Betweenness centrality	0.54	0.36	0	0	0.97	0.30	0.51	0.22	1.54	0.36
Centralization index	0.88	0.29	0	0	0.35	0.22	0.37	0.24	0.78	0.15
Geodesic distance	1.42	0.14	1	0	1.40	0.11	1.28	0.10	1.60	0.12
Diameter	2.10	0.30	1	0	2.13	0.35	2.02	0.13	2.24	0.54
Clique	0	0	0.54	0.50	3.50	0.53	1.47	0.50	1.33	0.58
Emotional support										
Network density	0.55	0.16	0.97	0.16	0.63	0.08	0.71	0.17	0.58	0.14
Betweenness centrality	0.52	0.35	0	0	0.90	0.24	0.65	0.45	0.72	0.40

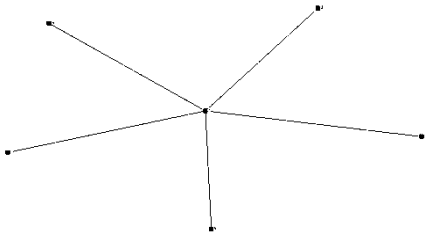
Centralization index	0.85	0.29	0	0	0.36	0.24	0.33	0.31	0.62	0.20
Geodesic distance	1.41	0.12	1	0	1.38	0.08	1.28	0.17	1.38	0.13
Diameter	2.10	0.30	1	0	2.00	0.00	2.03	0.18	2.03	0.18
Clique	0	0	0.48	0.50	3.25	0.46	2	0	1	0
Instrumental support										
Network density	0.53	0.15	0.97	0.14	0.64	0.09	0.70	0.15	–	–
Betweenness centrality	0.68	0.53	0	0	0.89	0.33	0.53	0.34	–	–
Centralization index	0.85	0.26	0	0	0.28	0.18	0.35	0.29	–	–
Geodesic distance	1.44	0.15	1	0	1.37	0.12	1.26	0.13	–	–
Diameter	2.14	0.35	1	0	2.11	0.33	2	0	–	–
Clique	0.17	0.38	0.44	0.50	3.22	0.44	1.68	0.47	–	–
Informational support										
Network density	0.58	0.14	0.97	0.14	0.63	0.09	0.62	0.16	–	–
Betweenness centrality	0.39	0.16	0	0	0.92	0.31	0.71	0.42	–	–
Centralization index	0.88	0.28	0	0	0.31	0.21	0.50	0.26	–	–
Geodesic distance	1.36	0.08	1	0	1.38	0.11	1.35	0.15	–	–
Diameter	2.03	0.18	1	0	2.10	0.32	2.04	0.21	–	–
Clique	0	0	0.45	0.50	3.40	0.52	1.46	0.50	–	–

Note: "–" means that no pearl collar network was found for instrumental and informational support.

Figure 1

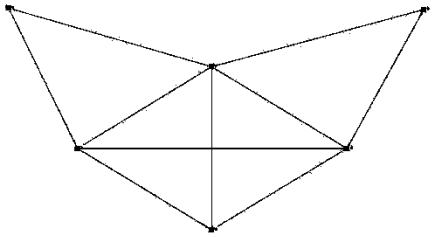
Five Typologies for Personal Networks

Star network

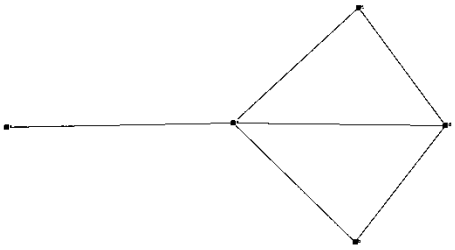


Single network

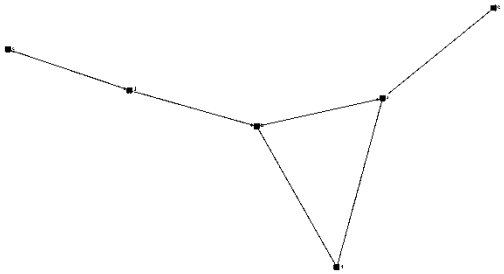
Multiple subgroups network



Kite network



Pearl collar network



Differences in Age by Personal Network Typologies

This study explored the relationships between participants' age and typologies of personal networks (Table 5). The results revealed differences in age between the typologies of personal networks. Overall, for all types of social support, the average age for single networks was the highest (M = 51.68–53.26 years) in first-generation and second-generation Indigenous Peoples.

Furthermore, the average age for multiple subgroups networks for all types of social support was relatively low (*M* = 28.60–53.26 years).

For first-generation Indigenous Peoples, relatively young average age was found for the pearl collar network (*M* = 36.92 years) for support in terms of discussing important or private matters, the kite network (*M* = 44.53 years) for emotional support, the star network (*M* = 37.07 years) for instrumental support, and the multiple subgroups network for informational support (*M* = 28.6 years). Except informational support, age differences were observed between personal network typologies in second-generation Indigenous Peoples. The average age was higher in single networks and lower in multiple subgroups networks.

Table 5

Results of Analysis of Variance for Age by Typologies

	Total			First-generation			Second-generation		
	M	SD	F	M	SD	F	M	SD	F
Discussion on important or private matters									
Star	39.81	18.49	12.019***	45.05	18.67	11.969***	28.80	12.87	2.502*
Single	53.26	19.96		62.32	14.86		37.37	17.78	
Multiple subgroups	30.50	15.69		41.67	22.01		23.80	6.26	
Kite	39.16	19.35		49.59	19.91		29.11	12.41	
Pearl collar	33.38	16.42		36.92	19.20		28.67	11.10	
Emotional support									
Star	40.50	20.58	10.032***	50.70	19.63	4.91**	31.23	17.01	2.337*
Single	52.56	19.90		59.91	17.03		37.48	16.70	

Multiple subgroups	31.00	15.27		64.00	-- [a]		26.29	8.04	
Kite	39.35	18.93		44.53	19.20		31.17	15.96	
Pearl collar	35.27	17.78		46.31	20.11		26.82	9.75	
Instrumental support									
Star	32.31	15.17	15.618***	37.07	15.88	9.412***	27.21	13.05	2.715*
Single	51.68	20.15		59.33	17.36		36.59	16.48	
Multiple subgroups	34.44	19.05		43.50	25.46		27.20	9.60	
Kite	35.45	17.37		47.85	15.86		29.00	14.58	
Informational support									
Star	35.23	17.58	17.084***	44.36	21.98	10.129***	29.95	12.20	1.984
Single	52.26	20.29		60.21	16.47		34.95	16.81	
Multiple subgroups	28.60	15.28		36.00	26.85		25.43	8.40	
Kite	35.59	16.22		42.96	17.99		28.22	10.04	

Note: $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

[a] The standard deviation cannot be calculated because there is only one case.

Role Relationships in Personal Network Typologies

Participants were asked to indicate role relationships providing the four types of social support. Table 6 presents the percentage of participants indicating each role relationship in personal network typologies. Overall, relatives and friends were the most frequently indicated role relationships for all types of social support. Regarding support for discussing important or private matters, a high percentage of first-generation and second-generation Indigenous Peoples indicated that relatives had leading roles in single networks (67.6%, 60.7%) and kite networks (36.8%, 30.4%), respectively. Specifically, children and spouses were the primary supporters of

first-generation Indigenous Peoples, and for second-generation Indigenous Peoples, the primary supporters were parents, spouses, and siblings in single networks. In the pearl collar network, friends were the main sources of support among first-generation (33.3%) and second-generation (32%) Indigenous Peoples. In the star network, the main supporters of first-generation Indigenous Peoples were relatives, especially parents, and friends were the main sources of support among second-generation Indigenous Peoples.

The results for emotional support were slightly different from those for support for discussing important or private matters, especially in kite and pearl collar networks. In the kite network, friends and colleagues provided emotional support for first-generation Indigenous Peoples (35.6% and 31.1%, respectively), and the primary supporters were relatives and friends for second-generation Indigenous Peoples (41.7% and 33.3%, respectively). In the pearl collar network, relatives mainly supported first-generation Indigenous Peoples (37.9%), and friends were the main supporters of second-generation Indigenous Peoples (34.1%).

For both generations of Indigenous Peoples, relatives played important roles in providing instrumental support in all personal network typologies. Compared with other types of social support, instrumental support was mainly provided by relatives in the two generations. For example, in both the first and second generations, >70% and approximately 45% of participants indicated that relatives provided instrumental support in single and star networks, respectively. In single networks, the primary supporters were siblings for first-generation Indigenous Peoples and parents for second-generation Indigenous Peoples. In star networks, parents were critical supporters for both generations of Indigenous Peoples. Overall, the importance of friends as sources of instrumental support declined slightly. Moreover, diverse role relationships were found in the multiple subgroups network.

Most of the results for informational support were similar to those for instrumental support. Relatives continued to provide informational support. Additionally, in most personal network typologies, the supportive roles of colleagues became more critical for second-generation Indigenous Peoples. Specifically, other relatives (excluding immediate family) and spouses also provided essential support in both star and single networks.

Table 6

Percentages for Role Relationships Indicated in Personal Network Typologies

	First-generation				Second-generation			
	Relatives	Friends	Colleagues	Others	Relatives	Friends	Colleagues	Others
Discussion on important or private matters								
Star	34.9	30.2	14.0	20.9	33.3	38.1	23.8	4.8
Single	67.6	20.4	7.7	4.2	60.7	19.0	6.0	14.3
Multiple subgroups	28.6	28.6	28.6	14.3	33.3	41.7	16.7	8.3
Kite	36.8	26.3	29.8	7.0	30.4	30.4	24.6	14.5
Pearl collar	27.8	33.3	25.0	13.9	28.0	32.0	20.0	20.0
Emotional support								
Star	35.0	27.5	15.0	22.5	27.3	40.9	18.2	13.6
Single	64.9	23.0	7.4	4.7	51.3	25.0	11.3	12.5
Multiple subgroups	50.0	50.0	0.0	0.0	40.0	46.7	13.3	0.0
Kite	24.4	35.6	31.1	8.9	41.7	33.3	12.5	12.5
Pearl collar	37.9	31.0	20.7	10.3	25.0	34.1	25.0	15.9

Instrumental support								
Star	41.9	29.0	9.7	19.4	44.8	27.6	13.8	13.8
Single	75.5	17.8	4.3	2.5	71.6	10.2	6.8	11.4
Multiple subgroups	33.3	22.2	33.3	11.1	35.7	35.7	21.4	7.1
Kite	44.0	24.0	20.0	12.0	37.5	30.4	21.4	10.7
Informational support								
Star	45.0	25.0	5.0	25.0	39.4	39.4	15.2	6.1
Single	65.6	21.3	9.4	3.8	57.9	17.1	13.2	11.8
Multiple subgroups	12.5	37.5	25.0	25.0	41.2	41.2	11.8	5.9
Kite	36.0	32.0	18.0	14.0	31.0	29.3	22.4	17.2

Discussion

This study revealed the typologies of personal networks for four types of social support for urban Indigenous Peoples on the basis of structural characteristics. The study also examined the differences in individual networks between first-generation and second-generation Indigenous Peoples. The findings revealed the diversity of intimate networks, which are in line with those of (Bidart et al., 2018). The major findings of this study are as follows. First, intimate networks for urban Indigenous Peoples were characterized by small size, and single networks for the four types of social support were found in the two generations. Mostly, the single network included two members. One of them was the participant. The other member was the only person who provided social support and maintained close relationships with the participant. Additionally, in both the first and second generations, urban Indigenous Peoples with a single network tended to be older than those with the other network typologies.

This study found a link between age and network size. As mentioned earlier in the text, across the four types of social support, the networks were of smaller size in first-generation Indigenous Peoples than in second-generation Indigenous Peoples. Another study suggested that the network size may decrease with age (Harling et al., 2018; Smith et al., 2015). However, a decrease in the network size does not necessarily negatively affect an individual's outcomes. Research has indicated that older people with a smaller network size may experience more positive emotions than their younger counterparts (English & Carstensen, 2014). A decreased network size does not lead to social isolation (Smith et al., 2015). According to socioemotional selectivity theory, emotional goals are prioritized in later life because people perceive limited time in the future. With age, people reduce social contact with others and increase emotional interactions with core network members (Carstensen, 1992). A cross-ethnic study found that older people focus on emotional goals and interactions with inner networks (for example, family members) and that their peripheral connections decline (Fung et al., 2001).

Second, this study revealed that relatives served as essential sources of social support within all personal network types for both generations of Indigenous Peoples. The findings confirm those of other studies (Chua et al., 2014; Plickert et al., 2007) that have indicated the importance of kinship in personal networks. Kinship networks are characterized by a densely knit network (Bastani, 2007). Plickert et al. (2007) revealed the reciprocity between family members, particularly parents and their adult children, in support networks. Although friends and colleagues played supportive roles and provided intimate relationships in the current study, relatives were the most significant source of intimate connections and provided strong connections.

Strong connections reflect the homophily of a social network. According to McPherson (2001), homophily is a sociological construct that describes the idea that "birds of a feather flock together" and that "contact between similar people occurs at a higher rate than among dissimilar people" (p. 2). People tend to interact and form groups with those who share similar sociodemographic characteristics, attitudes, and behaviors. Therefore, relatives from the same ethnic group facilitate similarity in the networks of urban Indigenous Peoples. Similarly, empirical evidence for the ethnic self-identification of migrants in Spain indicated that personal networks, which consisted of a high proportion of family members and individuals from the country of origin, were dense and homogeneous. Dense personal networks were related to ethnic identification (Lubbers et al., 2007).

People have multiple connections within their networks and thus do not rely on a single network member for social support (Plickert et al., 2007). In the present study, the diversity of role relationships was found for the networks for certain social support types in both generations of Indigenous Peoples. Multiple role relationships were found for support in terms of discussing important or private matters and emotional support. For first-generation Indigenous Peoples, relatives and colleagues provided support in terms of discussing important or private matters within the kite network, and friends and colleagues were the main providers of emotional support within the kite network. By contrast, low diversity was observed for supportive role relationships for instrumental support.

The study findings highlight the significance of star and kite networks in the provision of social support. Both networks ranked second across the typologies of personal networks. Both generations of urban Indigenous Peoples relied on the kite network for support in terms of discussing important or private matters and informational support, and second-generation urban

Indigenous Peoples relied on these networks for instrumental support. First-generation urban Indigenous Peoples relied on star networks for emotional and instrumental support. In addition to kinship, friends and colleagues were crucial sources of social support in star and kite networks. Friendship networks typically consist of both close connections and peripheral relationships. Intimate friendships can partially satisfy traditional family functions, serving as a substitute for kinship (Bellotti, 2008).

Implications for Indigenous Development

This study contributes to extending the application of social network theory within the field of ethnic studies. Social networks offer a meso-level framework for exploring the relationships between network structures and social support in an Indigenous cultural context. The study revealed a diversity of network and social support types among Indigenous Peoples living in urban areas. Therefore, Indigenous social policies should account for Indigenous social connections and relational structures from a culturally sensitive perspective. Kinship networks in urban areas exhibit Indigenous self-determination; individuals share resources through informal support systems that reduce reliance on colonial welfare structures. These kinship-centered networks, characterized by close ties, indicate that shared values and trust persist in urban settings, contributing to cultural revitalization. Ultimately, these mutual-aid networks highlight the resilience of Indigenous communities and serve as a decolonial strategy to support Indigenous individuals in surviving and thriving in urban settings.

In traditional network analysis, single networks are often characterized by a provision of social support that primarily depends on a single person. Urban Indigenous individuals with single networks may have a weak support system, which could lead to social isolation. However, the deficit-based interpretation fails to accurately reflect social relationships within Indigenous

contexts. In Indigenous communities, a kinship anchor plays a critical role in establishing a strong and cohesive network. The dominant social network framework cannot capture Indigenous relational networks. Social workers who are knowledgeable about the structural typologies of support networks within a culturally specific context can more effectively identify the support networks of urban Indigenous Peoples.

Social workers can help strengthen the connections among urban Indigenous individuals with a limited yet concentrated social network by leveraging existing kinship ties. For those with star and kite networks, social workers can provide mutual support across different networks to help reduce the risk. Community organizations—including community development associations, community care centers, churches, and Indigenous organizations—play essential roles in strengthening the structural links of personal networks among urban Indigenous Peoples. Future interventions and social services should be led by Indigenous communities and based on culturally responsive practices.

Limitations and Future Research

Several limitations of this study must be acknowledged. First, the proportion of neighbors was extremely low (<2%) in intimate networks for all types of social support. Whether neighbors are family members and relatives who live nearby is not clear. Thus, the significance of neighbors in intimate networks may be underestimated. Additionally, this study used a fixed-choice format that limited the selection to only five individuals for each type of support. This approach may not fully reflect the complexity of Indigenous kinship relationships. Future research should explore more suitable and culturally appropriate network measures. Furthermore, this study did not investigate the geographical distance between network members. Therefore, the associations between geographical distance, social support, and intimate relationships are

unclear. Future studies should focus on the geographical distance between network members for analyzing the geographical distribution of network members and the effect of geographical proximity on the formation of intimate relationships and the provision of support. Finally, this study mainly examined the typologies of personal networks for social support. Further studies should explore how network typologies and structural characteristics affect an individual's physical, mental, and social outcomes.

Conclusion

This study explored the typologies of personal networks across four types of social support and compared network typologies between first-generation and second-generation urban Indigenous Peoples. Analysis of support network typologies revealed differences in, and patterns of, support networks based on structural characteristics. Visualizations of networks were used to portray the relational networks and structural locations between network members. In conclusion, this study enhances our understanding of intimate networks and social support among urban Indigenous Peoples. Furthermore, the research has practical implications for social workers developing intervention strategies. To ensure accessibility and knowledge sharing, the results will be disseminated in formats specifically tailored to Indigenous organizations.

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