Contextualização

THE ROLE OF SOCIAL NETWORKS IN HUMAN MIGRATION

O papel das redes sociais no contexto das migrações

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Human migration has been studied for long time as networking phenomena though the representation of "migration networks" in the specialized literature has not resulted in any precise modelling about the real "network effects" on migration patterns. This article aims to appraise the role of social networks in the migration process and the application of network models to migration studies. To cope with network modelling we claim for some critical understanding of the network analysis theory and method as well as its developments in the social sciences. Concerned to the migration phenomena, we reviewed extensively the migration literature on "network effects" and proposed a comprehensive 4-fold typology of migration network models according to precise definition of network parameters (nodes, ties, network boundary and structural variable outputs). In the end, we suggest a brief rationale to apply the network model to migration studies.

Keywords: Migration; Social networks; Network effects; Structural analysis

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As migrações humanas têm sido estudadas por longo tempo como um fenômeno das redes sociais. Contudo, a literatura especializada não apresentou até o momento nenhum modelo preciso que defina formalmente o efeito das redes sociais no processo migratório. Esse artigo propõe uma contribuição teórico-metodológica para a aplicação dos modelos de redes sociais nos estudos das migrações. Aqui se faz uma revisão extensa sobre os estudos das redes sociais na migração e se propõe uma tipologia compreensiva que busca aferir os "efeitos reticulares" a partir de uma definição conceitual rigorosa dos parâmetros estruturais. Ao final, sugerimos um protocolo para aplicação do modelo de redes sociais aos estudos sobre migrações.
***Palavras-chave**: Migração; Redes sociais; Efeitos das redes; Análise estrutural*

Social scientists have long recognized the pivotal role of social networks in the human migration. However, the causal narratives about migration and networks have been scattered around in such diverse approaches that one would easily become uncertain about the meaning of the so-called "migration networks". An adequate conceptualization of "network" should provide for a deeper understanding of the migration process and the formation of transnational spaces, that is, its structural patterns and organizational logic that integrate macro and micro dimensions.[1]

In the first section, we introduce a basic definition of "network" and set up an alternative conceptual baseline from which migration studies should propose their network approach. The following section will classify and analyze shortcomings of some relevant migration studies that used loosely the representation of social networks to explain the empirical facts of migration. We shall also provide detailed explanation of two major types of network modelling, the "ego-centered" and "whole" network models, and its applications to the migration phenomena. Lastly, we conclude with an outline of some basic procedures toward migration network modelling and simple exemplifications.

1. **What are social networks?**

According to Barabasi, every single network could be viewed simply as the emergence of "a bunch of nodes connected by links".[2] However, the most important feature of the networks is that the distribution of their nodes and ties can determine the patterns of organization and dynamic behaviour of systems. In other words, the distributions of nodes and ties

[1] FAIST, Thomas. *The volume and dynamics of international migration and transnational social spaces*.
[2] BARABASI, Albert-Lazlo. *Linked:* the new science of networks, p. 16.

in the network constitute the only necessary parameters to uncover the structural patterns that shape a specified system and its evolution.

Be computers linked by phone lines, lakes and seas connected by rivers, nerve cells connected by axons, companies and consumers linked by trade, or people connected by blood and social ties, all can be thought of as systems, and consequently, as structured through networks. Several studies have showed that every system, independent of its substantive nature, should correspond to some network model, that is, to some distributive pattern of nodes and ties that is durable, general and stable.[3] Based on the Graph Theory, the Set Theory and a broad array of algebraic tools – especially from the Matrix Algebra –, the network analysis came to light as the scientific branch able to set up a common and formal ground to study the structural patterns in diverse empirical networks and to assess its organizational and dynamic features.

As Newman[4] pointed out, the bulk of network analysts so far have succeeded only in describing structural patterns without revealing its causal implications on dynamics and general behaviour – this is a rather complex endeavour. Then, it is far from clear what type of network model would be more appropriate to analyze social systems like the migration phenomenon.

Nevertheless, the network analysis has a long tradition of empirical investigation in the social sciences and have accounted for good interpretations of the social world.[5] As we shall see the migration studies usually use inaccurate representations such as the metaphor of the "migration network" blurred in the loosely notion of the "web of social relations".[6] The clear-cut conceptualization of "networks" should be the starting point for advancing analysis on migration systems and the role of social ties.

Thus, before proceeding, we shall present some basic notions on "social network analysis" that implies the definition of nodes and ties, the determination of precise network boundaries, the adequate research design for collecting network data, and the knowledge of some basic tools of network analysis.

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[3] *Ibidem*.
[4] NEWMAN, Mark. *The structure and function of complex networks*.
[5] SCOTT, John. *Social network analysis, a handbook*; FREEMAN, Linton. *The Development of Social Network Analysis:* A Study in the Sociology of Science; WELLMAN, Barry. *Structural analysis:* from method and metaphor to theory and substance.
[6] TILLY, Charles. *Transplanted networks*.

2. **The social network parameters and its effects**

The nodes in the networks might be any collection of discrete entities from natural objects (like islands or continents) to social actors (like people, communities or organizations) or even abstract objects (like *status* and social roles). The relational ties might be any collection of substantive links, directed or not, valued/weighted or not (like migration flows, kinship ties or trade connections), defined inductively or deductively.[7]

The problem of specifying boundaries on the set of units and ties to be included in a network is not trivial and poses serious limitations to all social network studies. Marsden argued that

> "(…) since [network] analyses focus explicitly on interdependencies among the particular units studied (…), omission of pertinent elements or arbitrary delineation of boundaries can lead to misleading or artifactual results".[8]

Indeed, we believe this is one of the most pronounced weaknesses in the analyses of migration networks and then a distinguishable feature for an acceptable analysis of the migration networks.

Subsequent to the clear-cut definition of which nodes and links should be included in a network it is important to define the boundary specification strategy, which might aim either complete or partial networks. The former type, the complete networks specification, would imply "realist", based on the objective features of nodes, or "nominalist" approaches, based on the analyst's *a priori* and external assumptions.[9] The latter type will specify sets of "ego-centered" networks based on the individual perception of focal social actors distributed in the population.

The choice of the boundary specification strategy should pay attention to the research design purposes and costs, mainly to the sampling issues. For instance, the analyst of migration might be interested in the impacts of human mobility in a specific destination area where he or she is able to list all immigrants in the last 5 years (or alternatively, all immigrants from the same ethnic group). In such case, the nodes are clearly immigrants and the social ties could be defined broadly as "acquaintanceship", or "those who you know face-to-face". Depending on the size of that immigrant community it would be feasible to interview everyone and to collect relational data based on the prior listing, and this would generate data on complete (whole) network. Otherwise, the analyst would not be able to list the entire set of immigrants

[7] WASSERMAN, Stanley; FAUST, Katherine. *Social network analysis:* methods and application.
[8] MARSDEN, Peter. *Network data and measurement*, p. 349.
[9] KNOKE, David; KULINSKI, James. *Network analysis*.

in the area but might select randomly some "initial" focal actors and then start a sort of snowball sampling across the entire community. After saturation he or she could provide for a set of interconnected immigrants assumed to constitute a whole network.[10] The first strategy is a realist approach and is indicated when there is a small, accessible, and well defined prior listing of nodes and ties. The second is a nominalist approach based on the interviews and observations of focal nodes, and is either indicated when the analyst does not know the boundaries of the population studied or the population is big enough to be manageable.

The third alternative is based on focal actors (ego-centered) which are not supposed to cover the entire network. In the previous nominalist approach the focal actors are taken as privileged informants from the immigrant community and are asked to point out their links to other actors until a saturation threshold. That network is supposed to convey a whole network of immigrants and their internal connections and the analyst should be concerned with the overall structure of social positions. In the ego-centered network approach the analyst focus on a particular actor and his or her immediate and direct ties, elaborating a sort of the ego's "first-order zone" network.[11] If the analyst does investigate the other adjacent nodes around ego and their forward connections then he or she might elaborate "n-order zone" networks. By and large, according to some network analysts, the ego-centered approach is supposed to reflect only partial arrangements of social networks, and should be hampered to find out the major structural pattern constraints on social actors.[12]

Regardless such restriction the ego-centered approach has been largely used by anthropologists and sociologists due to its practical advantages and the lower operational costs. In effect, some anthropological migration studies used the ego-centered network approach though poorly formalized – the remarkable exception of Clyde Mitchell's research and colleagues.[13] Moreover, since the ego-centered network data can be generated from a random sample of nodes, such model has been used in probabilistic research as well, accounting for the individual characteristics of social insertion in the

[10] FIGOLI, Leonardo; FAZITO, Dimitri. *Redes Sociales en una Investigación de Migración Indígena:* el caso de Manaus.
[11] BARNES, John. *Networks and Political Process*; BOISSEVAIN, Jeremy. *Friends of Friends:* Networks, Manipulators and Coalitions.
[12] MARSDEN, Peter, *op. cit.*; SCOTT, John, *op. cit*.
[13] MITCHELL, Clyde. *The Concept and Use of Social Networks. Social Networks;* BARNES, *op.cit*. BOISSEVAIN, *op.cit*.; SCOTT, John, *op.cit*.; KRISSMAN, Fred. *Sin Coyote Ni Patron:* Why the 'migrant network' fails to explain international migration.

group or community as structural variables.

Finally, the analyst also must be aware of the practical impossibility to assess the totality of most empirical networks because of two important factors. First, the set of nodes may be large enough to prevent any feasible approach. Because network properties are built from interdependencies among the nodes a random sample would tear down the network structures if some crucial nodes have been left out. Second, ties content must be carefully defined regarding the research purposes and the analyst's prior theoretical and empirical knowledge on the subject. A social network elaborated from kinship ties will generate totally different relational data compared to acquaintanceship or co-worker related ties, and the analyst might draw rather different conclusions from the same set of nodes without control over those network properties.

Concerning the network data, Hanneman and Riddle argue that differently from conventional social analysis,

> network analysts look at the data in some rather fundamentally different ways. Rather than thinking about how an actor's ties with other actors describes the attributes of 'ego', network analysts instead see a structure of connections, within which the actor is embedded. Actors are described by their relations, not by their attributes. And, the relations themselves are just as fundamental as the actors that they connect.[14]

Whereas conventional data focus on "actors" and "attributes" network data focus on "actors" and "relations". Therefore, the ubiquitous network data are "relations" between specified nodes (i.e., people, spatial units, institutions, *etc*.) and this is consequential from particular research design considerations previously stated.

There are several ways of collecting relational data but surveys and questionnaires are the most popular methods used. Usually, the common relational survey asks respondents to elicit the greater part of their personal contacts and to self-report their ties' contents. Although there is a controversial debate on the validity of personal recall on network contacts, many studies have warranted the informant's accuracy in reporting everyday relations. Other sources of relational data are archives, which are used extensively, diaries, electronic traces, experiments, observation, and informants' accounts.

According to Marsden, "archival sources of various kinds are inexpensive and advantageous for studying social networks in the past or in which units are otherwise inaccessible".[15] Such kind of data could be

[14] HANNEMAN, Robert; RIDDLE, Mark. *Introduction to Social Network Methods*, p. 4.
[15] MARSDEN, Peter, *op.cit*., p. 444.

explored in different ways to study migration, for instance, using census data to assess migration stocks in specific spatial units would render square matrices that could be used as relational ties between those spatial units – this is a sort of "migration network of flows".[16] In another example, the analyst could use household census data to assess the proportion of dyadic ties between the migrant and his or her household partners, and then convey simple migrant ego-centered networks in households (indeed, this is a poor and rather limited alternative of network data because it prevents the analysis of "structural effects").

The other network data sources have been used less often. Nevertheless, network data collected from ethnographic observations and informants' accounts have been regularly used by anthropologists to elicit small networks – no more than 400 nodes. Also, nowadays, the electronic archives are being used and should be considered as a valuable network data source for migration studies – specially, telephone and e-mail traces.

Theoretically, the social network analysis is viewed very often as a possible solution for the classical sociological problem between macro and micro levels of analysis.[17]

The very fact is that

> most social network analysts think of individual persons as being embedded in networks that are embedded in networks that are embedded in networks. Network analysts describe such structures as 'multi-modal' (…) a data set that contains information about two types of social entities (say persons and organizations).[18]

Nonetheless, the network measures are supposed to assess how the node is embedded within a group of relations and, consequently, the structural patterns that determine the positions and hierarchies within such constituted network.

3. **Migration and network modelling**

Based on the principles of network analysis just reviewed we are able now to analyze the migration studies literature and suggest a 4-fold typology for network models applied to the migration phenomena. The first two types of "migration network models" represent the main applications in the field, thus far. The last 2 types are consistent relational and positional

[16] NOGLE, June Marie. *The Systems-Approach to International Migration:* An Application of Network Analysis Methods; SOARES, Weber. *Da metáfora à substância:* redes sociais, redes migratórias e migração nacional e internacional em Valadares e Ipatinga.
[17] DEGENNE, Alain; FORSE, Michel. *Introducing Social Network*.
[18] HANNEMAN, Robert; RIDDLE, Mark, *op.cit.,* p. 5.

network models which may open new research strategies in the migration studies.

3.1. **The "discursive metaphor" network model**

The representation of the migration process as a tangible chain of migrants across space and time is a pure discursive metaphor that galvanizes not only the popular imaginary but also the scientific realm.[19] Rooted in the ideas about "social bonds" from classical urban sociology (from Wirth's to Gans' works) and the social cohesion studies in anthropology (from Lewis' to Wolf's and Mitchell's works) the discursive metaphor about chaining (networking) in migration emerged in the 1960's especially with the articles of MacDonald and MacDonald[20] and Tilly and Brown.[21]

Here, we call it "discursive metaphor" because usually in several analyses of migration studies the so-called networks are taken for granted like a "natural" bounded entity. Assuming that the social bonds are pervasive in all societies and communities, those studies claim that migration phenomena should reflect social chaining patterns supposed to be immediately associated with kinship, friendship and co-worker ties – that is, the typical institutionalized bonds in industrial societies. Thus, the migration networks are thought of as an entity on their own that should explain how the migration process evolve across social ties, and why the immigrants tend to form dense knit communities in destination areas, usually based on kinship or ethnic ties.

One significant deficiency of the "discursive metaphor" is taking for granted the "network effects" based trivially on the analyst's "perceptions" about strong and normative (i.e., institutionalized) social ties across the migrant population. Indeed, the network parameters – the distribution of nodes and ties and the determination of network boundaries – are not objectively stated and, consequently, the networks are often equated to social institutions like "family", "extended family", "neighbourhood" or "friendship", reinforcing the reification process.

Diverse robust qualitative studies drawn on the "discursive metaphor" network model, contributing to disseminate an imprecise

[19] KRISSMAN, Fred, *op.cit*.; BOYD, Monica. *Family and personal networks in international migration:* recent developments and new agendas; GURAK, Douglas; CACES, Fe. *Migration networks and the shaping of migration systems*.
[20] MACDONALD, John Stuart; MACDONALD, Leatrice. *Chain Migration, Ethnic Neighbourhood Formation and Social Networks*.
[21] TILLY, Charles; BROWN, Helen. *On Uprooting, Kinship, and the Auspices of Migration*.

though sensitive and appealing notion of "migration network".[22] In fact, as we will see next, another network model extensively used in the migration studies is heavily indebted to the "discursive metaphor" concerning its general principles.

3.2. The pseudo-network model

The pseudo-network model, largely used in migration studies today, is rooted in a set of pivotal ideas initiated by Taylor[23] and Massey and his associates,[24] who viewed the networks as migrants' everyday ties of kinship and friendship turned into strategic resources (social capital)[25] to gain access to money and employment elsewhere.

We should disagree with Krissman,[26] who considered that model as metaphorically-based, because in our opinion their main difference and advantage over the previous "discursive metaphor" network model is the proposal of objective assessment of the social networks using "proxies" based on migrants' dyadic ties (siblings and married couples) and the proportion of migrants within the source households. Although those proxies are rather inaccurate tools to assess "network effects" the pseudo-network model conveys authentic efforts to overcome the "discursive metaphor" drawbacks and is a step forward from "discursive metaphor" studies.

In fact, we should start pointing that the pseudo-network and the "discursive metaphor" network models, in essence, are very alike while both make the assumption that pervasive and symmetrical social bond "emanates in the migrant's home communities".[27] Thus, the two models

[22] TILLY, Charles, *op.cit.*; CHOLDIN, Helen. *Kinship Networks in Migration Proces*; BRETTELL, Caroline. *Emigrar para Voltar:* A Portuguese Ideology of Return Migration e Theorizing migration in anthropology: the social construction of networks, identities, communities and globalscapes; HUGO, Grame. *Village-community ties, village norms, and ethnic and social networks*: a review of evidence from the third world; EELENS, Frank; SPECKMAN, James. *Recruitment of labor migrants in the Middle East*; SINGHANETRA-RENARD, Anchalee. *The mobilization of labour migrants in Thailand:* personal links and facilitating networks; SPAANS, Ernest. *Taikongs and Calos:* the role of middlemen and borkers in javanese international migration; MENJIVAR, Cecilia. *Kinship networks among immigrants:* Lessons from a qualitative comparative approach e Fragmented Ties; WILSON, Tamara. *Weak Ties, Strong Ties and Migration*; HONDAGNEU-SOTELO, Pierrette. *Domestica*.

[23] TAYLOR, James. *Differential Migration, Networks, Information and Risk*.

[24] MASSEY, Douglas; *et al*.. *Return to Aztlan,* the social process of international migration from Western Mexico.

[25] See PALLONI, Alberto; *et al*. *Social Capital and International Migration:* A Test Using Information on Family Networks.

[26] KRISSMAN, Fred, *op.cit*., p. 14.

[27] MASSEY, Douglas *et al.*, *op.cit*., p. 283.

disregard the empirical variability of the ties' content and their dynamic nature, and then, the "emanation" of social bonds turns out to be somewhat reified primordial ties – however, recent studies in the vein of "discursive metaphor" argued that social ties may produce negative effects depending on the context of migration.[28]

The corner stone is that migration networks arise from the situational context in which the actors, migrants and non-migrants, constrain, and are constrained, to get some specific social position in the system. However, not coincidently, many studies rooted in the pseudo-network model used the strong symmetrical ties, crudely assigned to kinship (and households), as proxies of network variables because they also take the primordial ties for granted.[29]

Such process of reification, that is, the networks turned into strong ties within the family or household units, is a usual problem of conventional sociological wisdom, indeed. As argued Degenne and Forse,[30] in the social sciences it is a common place to build on *a priori* categories from simple attributes that will support "bounded entities" and will systematically ignore the emergent structural constraints of concrete actors and their active interactions.

Another related problem is that pseudo-network models usually do perform erroneously when they confound the analysis of "network effects" with what would properly be called the "composition effects". To be clear, when the analysts assume merely the "co-presence" in the destination site of immigrants from the same original ethnic community as an indicator of networking, in fact, only the "composition effects" are being considered, not the structural effects from social networks. Although social networks will eventually be impacted by random contacts like co-presence in everyday life, there is a clear difference from those concrete purposive actions that shape enduring social relations and hold up empirical networks.

Similarly, those studies in the vein of the alleged "Massey Model"[31]

[28] KRISSMAN, Fred, *op.cit*.; MENJIVAR, Cecilia, *op.cit*.; HAGAN, Jacqueline. *Social networks, gender and immigrant incorporation:* resources and constraints.
[29] TAYLOR, James, *op.cit*.; MASSEY, Douglas; *et al., op.cit*.; PALLONI, Alberto; *et al., op.cit.;* MASSEY, Douglas; ESPINOZA, Karina. *What's Driving Mexico-U.S. Migration?;* BAUER, Thomas.; *et al*.. *What are Migration Networks?;* WINTERS, Paul; *et al*.. *Family and community networks in Mexico-US migration*; DAVIS, Benjamin.; *et al*.. *Domestic and international migration from rural Mexico:* Disaggregating the effects of network structure and composition; CURRAN, Sara; RIVERO-FUENTES, Estela. *Engendering Migrant Networks:* The Case of Mexican Migration.
[30] DEGENNE, Alain; FORSE, Michel, *op.cit*., p. 1-4.
[31] KRISSMAN, Fred, *op.cit*., p. 9.

also perform erroneously, even though with more sophistication, when they assume conceptually and empirically inappropriate data as representative of the networking process. In point of fact, generic information on migrant siblings in the household, family history migration records and loose friendship ties in the community (like *paisanaje*), if not anchored across specific "social position" will not account for networks but only for an "array of contacts" in a rather restricted context.

The "ethnosurvey" used by Massey and his associates has scarcely contributed to acquire specific information on network, inside and beyond the household units, due to lacking of "positional generators" that would put the varied units together across communities – those "positional generators" are restricted to relations within the household units. As we pointed out above, the information about "contacts" between migrants and their kinfolks and friends –supposedly strong and reciprocated ties – do not suffice to envisage the concrete social networks that support migration. This is a rather simplistic and biased picture of the concrete networking process.

From the very beginning diverse studies on social networks revealed that the distribution of ties varies significantly in the population. Many anthropologists urged for proper analysis dealing with the multiplex characteristics of relations – the overlapping of different content, intensity and orientation of ties. Then, the sociologist Granovetter showed that the distribution of the strength of ties varies not only with the individuals' attributes but is especially dependent on the strategic position of a person's contact – that is, the situational context of social actors and their ties.[32]

In short, the distribution of ties is affected directly by the pattern of relations among positions, occupied and not, in the whole network. Consequently, the strength of weak and strong ties is never determined *a priori* by their content and frequency/intensity because the primary source of strength is the overall structural position of actors that emerge from contextual interactions.[33]

The main source of error in the pseudo-network models, especially those based on information of migrants' ties restricted to household units, is the inability to assess the whole distribution of ties and positions. That is why those studies must assume symmetric and strong ties within families and households – they do not provide information for position generators.

[32] GRANOVETTER, Mark. *Getting a Job:* A Study of Contacts and Careers, p. 52.
[33] GRANOVETTER, Mark. *The strength of weak ties*.

And although many studies highlighted the great variation of symmetry and strength of ties in diverse migration contexts, they did not regard the distribution of positions in the overall network, either.[34]

Conclusively, we should say that the information of household surveys used so far are not able to cope with "network effects" beyond the limits of the household units themselves. Furthermore, every consideration on "network effects" beyond or even within the household domains will likely produce flawed results due to systematic underestimation of network size and composition, deceiving the very structure and dynamics of networks in the migration processes.

Last but not least, Krissman argued that the "Massey Model" (i.e., pseudo-network model) represented a major fault in the mainstream international and labor migration studies while focusing exclusively on the "supply side" factors of labor-sending regions and overlooked the "intermediary mechanisms" of recruitment and employment in the "demand side". In fact, Fazito showed that the role of "intermediary mechanisms" (broker agents) across the migration process is enforced both empirically and structurally (determined by network constraints).[35]

3.3. The ego-centered network model and the whole network model

Since its very beginning, from the early 1930's, the social network analysis focused on the social relations among individual actors and/or groups of people and institutions in order to explain how social organization, and social structure, would constrain attitudes and behaviour.

The main purpose of network modelling is to describe the structure of relations within a system of actors (nodes) – that is, the distribution pattern of nodes and ties. The relational approach favours the analysis of structure based on the actor's insertion (his or her embedment) within a set of specific relations, which is necessarily a "partial" model of structure based on ego and his or her direct connections. However, as Mitchell suggested,[36] the total network might be seen as "the general ever-ramifying, ever-reticulating set of linkages that stretches within and beyond the confines of any community or organization", and for practical purposes, the analyst should focus on the "partial network" of ego-centered nodes

[34] GURAK, Douglas; CACES, Fe, *op.cit*.; HAGAN, Jacqueline, *op.cit*.; MENJIVAR, Cecilia, *op.cit*.; WERBNER, Pnina. *The Migration Process:* Capital, Gifts and Offerings among British Pakistanis.
[35] FAZITO, Dimitri. *Reflexões sobre os sistemas de migração internacional:* proposta para uma análise estrutural dos mecanismos intermediários, p. 87-88.
[36] MITCHELL, Clyde, *op.cit*., p. 12

deeply anchored in the social setting. Then, eventually, the collection of diverse "personal orders" (ego's and alters' contacts anchored in the community) would reveal the social structure of "multi-stranded" relations.[37]

That research strategy is widely used in anthropological and sociological studies of small-scale societies and communities, and concerning the case of migration research we will probably find the majority of network studies rooted in the ego-centered approach.[38]

Usually, the ego-network perspective is associated in particular with a "person" which misleads to the conclusion that ego-networks are personal networks.[39] As Burt pointed out, the ego-networks could not only be anchored on persons as actors but also on institutions, communities and even countries.[40]

The personal network approach has been developed by McCarty and recently applied to migration studies.[41] Such approach is supposed to be a mid-term between ego-centered and whole network approaches, indeed.

The personal network approach generates a sort of full and bounded social network (the distribution of 60 nodes and their ties) based on the ego's perception about his or her anchoring in the immediate social world – that is, a "cognitive map". The researcher can select a random sample of "cognitive maps" (personal networks) and look for the pattern of the overall structure. For instance, in a recent migration study, Fazito and Soares collected data on personal networks of 50 Brazilian international returned migrants and showed that the irregular migration to the USA (crossing the Mexican border and/or falsifying documents) is associated to low density networks, high concentration of males and low concentration of kinship ties in the personal network.[42]

In contrast, the whole network model purports a positional approach and its main characteristic is the precise definition of the

[37] BURT, Ronald. *Models of Network Structure*, p. 89.
[38] ANWAR, Muhammad. *Social networks of Pakistanis in the UK*: a re-evaluation; WERBNER, Pnina, *op.cit*.; KRISSMAN, Fred, *op.cit*.; FIGOLI, Leonardo; FAZITO, Dimitri, *op.cit*. Although, in theory, many anthropological studies on immigration that gathered relational data on ego (key informants) are able to drawn on network modeling, in fact, they were methodologically not designed for it.
[39] In migration studies see, for example, BOYD, Monica, *op.cit*.
[40] BURT, Ronald*, op.cit*., p. 89.
[41] McCARTY, Christopher. *Structure in personal networks*; LUBBERS, Miranda; *et al*.. *Personal Networks and Ethnic Identifications:* The Case of Migrants in Spain; FAZITO, Dimitri; SOARES, Weber. *Undocumented Migration, Brokerage and Solidarity:* An Exploratory Network Analysis of the Brazil-US Migration System.
[42] FAZITO, Dimitri; SOARES, Weber, *op.cit*.

network boundary, which is supposed to depict the overall structure of positions in the system.[43] Clearly, this involves a change of "reference frame" from ego's immediate contacts to the larger system of nodes and ties, directing the analysis towards the somewhat abstract positions in the system. In short, the positional analysis of whole networks is expected to predict the social behaviour based on the occupation of social roles and positions in the social system.[44]

Burt argues that the positional approach deals more satisfactorily with different levels of aggregation than the relational approach. Right, in principle, ego-networks will work out at the individual node level, although it is still possible to deal with the distribution of dyads and triads.[45] But, if the analyst is able to define the "entire" network and its boundaries, then the analysis will be feasible at any level of aggregation (actors; subgroups; the whole network).

Nevertheless, there are rather few whole network models applied to empirical migration phenomena. The most common approach defines the actor level of aggregation in which the node is not a person (migrant) but a spatial unit, and the ties are migration flows (the aggregation of in and out-migrants) between the spatial units.[46] It is very important to bear in mind that the "actor level" in network analysis means "node level", whatever be its nature (human beings, spatial units, organizations, objects, *etc*.). The advantage of such approach is that the analyst can easily handle network data on relations and positions within a bounded spatial unit. For instance, the internal migration flows between municipalities or provinces of a specific country can be studied to find out the structural pattern of such migration system.[47] Then the structural variable might be analyzed with other attribute variables through conventional statistics.[48]

Conclusion: basic procedures for network modelling

First, the researcher should bear in mind that the choice of a network model will depend on the research design purposes and its practical restrictions. One might be interested in studying the migration context in

[43] BURT, Ronald, *op.cit*.
[44] KNOKE, David; KULINSKY, James, *op.cit*.; HANNEMAN, Robert; RIDDLE, Mark, *op.cit*.
[45] BURT, Ronald, *op.cit*., p. 97.
[46] NOGLE, June Marie, *op.cit*.; SOARES, Weber, *op.cit*.; JEDLICKA, Davor. *Opportunities, information networks and international migration streams*.
[47] SOARES,Weber, *op.cit*.
[48] NOGLE, June Marie, *op.cit*.

origin and destination sites – the analysis of assimilation, migrant selection in the labour market, accrue of social capital in ethnic communities, uses of remittances in source regions, *etc*. Other might be interested in studying the "transitive" and obscure aspects of migration – the industry of migration and the broker organizations, human trafficking and smuggling. The former purpose, in principle, will be able to apply ego-network and whole network models at any level of aggregation but the latter will hardly be able to apply the whole network model at the actor level due to the lack of proper information on the wider system of positions.

For any purpose, the researcher must start defining precisely the basic network parameters (nodes and ties) and its boundaries. For example, to study immigrant selection in the labour market, we should determine which actors (or roles) take part in the entire process (newcomers, immigrants, recruiters, employers, competitors, non-immigrants), and then determine the type of ties according to the research aims (acquaintanceship, friendship, kinship, work ties, transactions, *etc*.). Next, we must define the boundary, in the nominalist or realist way, depending on practical aspects (budget, accessibility, prior knowledge, *etc*.).

For this example, we might investigate an emergent immigrant neighbourhood concentrated in the housecleaning labour market. Suppose a small neighbourhood with no more than 800 immigrants within which 150 are housecleaners working across a medium sized Brazilian city. We should try selecting all 150 housecleaners in the area through snowball sampling or just selecting a random sample of them, in addition to other community immigrants and local employers. Then we would apply a specific relational survey in which the interviewees would indicate their contacts in everyday life (related to their jobs) and qualify each one of his or her alters and ties. Whether using the personal network approach one could claim to have determined a realist network boundary since he or she had interviewed all housecleaners in the area asking for the full elicitation of alters in their immediate social world. Otherwise, in this example, the actor ego-network approach would rely on the nominal network boundary since the respondents would have not been able to elicit all their contacts.

Now, suppose we have official information about all housecleaners in that area relative to households of residence and work. Thus, we could claim that we have a realist network boundary and we could indeed select all the households to locate all the housecleaners and their employers. In addition, suppose that we have information about all households of immigrants and exactly where they work in the neighbourhood. Then, we could positively locate the entire network of immigrants specialized in the

housecleaner labour market in that specific neighbourhood.

The results from the network modelling, either relational or positional, will generate the composition and structural variables. The composition-variable type stands for the "contact effects" in the network, like the proportion of kinship ties, co-workers, males and females, *etc.*. The structural variables correspond specifically to the "network effects", that is, the pure effects of networking constraints of the social structure on individual and collective behaviour.

Conclusively, as we could see there are many possibilities to study migration networks using different models and approaches. As Faist pointed out, the social networks in the migration processes represent a "crucial meso-link" that might explain "why there are so few migrants out of most places" and "why there are so many migrants out of so few [and specific] places".[49] Thus, it is imperative to assess adequately the social networks that characterize the migration processes.

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