

Review Article

A Systematic Review of Research on Social Networks of Older Adults

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Received: October 7, 2017; Editorial Decision Date: December 23, 2017

Decision Editor: Patricia C. Heyn, PhD

Abstract

Background and Objectives: There has been a substantial interest in life course/life span changes in older adults' social networks and in the relationship between social networks and health and wellbeing. The study embarked on a systematic review to examine the existing knowledgebase on social network in the field of gerontology. Our focus was on studies in which both ego (respondents) and his or her alters (network members) are queried about their social ties.

Research Design and Methods: We searched for studies published in English before September, 2017, relied on quantitative methods to obtain data from both ego (60 years of age and older) and alters and provided a quantitative account of the social network properties. We searched the following data sets: APA Psycnet, Pubmed, Sociological abstracts, and Ageline. This was followed by a snowball search of relevant articles using Google Scholar. Titles and abstracts were reviewed and selected articles were extracted independently by two reviewers.

Results: A total of 5,519 records were retrieved. Of these, 3,994 records remained after the removal of duplicates. Ten records reporting on five original samples were kept for the systematic review. One study described a social network of community dwelling older adults and the remaining studies described social networks of institutional older adults.

Discussion and Implications: The present study points to a lacuna in current understanding of social networks in the field of gerontology. It provides a useful review and possible tools for the design of future studies to address current shortcomings in the field.

Keywords: Systematic review, Sociocentric, Egocentric, Social network

The term social network conveys the notion that individuals are embedded within a larger context of relational ties (Borgatti, Mehra, Brass, & Labianca, 2009). In the past few decades, there has been a tremendous amount of research on the role of social networks in the life of older adults (Antonucci & Akiyama, 1987; Sohn et al., 2017; Steinbach, 1992). Research has tended to classify older adults' networks based on the type, quality, and/or quantity of the relationships (Litwin, 1995; Meeuwesen, Hortulanus, & Machielse, 2001; Nguyen, 2017; Park et al., 2015). For instance, research conducted in Israel has

found that networks that consisted of diverse and friends-focused ties fared better in terms of health indicators, whereas community-clan networks were associated with less favorable outcomes (Litwin & Shiovitz-Ezra, 2006). Research conducted in other countries largely supported the relationship between network type and health outcomes, even though the proposed typology was somewhat different (Fiori, Antonucci, & Cortina, 2006; Litwin & Shiovitz-Ezra, 2011). For instance, in the U.S.-based sample (Litwin & Shiovitz-Ezra, 2011), the authors identified five types of social networks, whereas in the Israeli sample

(Litwin & Shiovitz-Ezra, 2006), the authors identified six types of networks. Common to both studies was the identification of networks, which were based on friends, family, diverse members, and restricted networks. However, a different U.S.-based sample suggested two restricted networks, rather than one (Fiori, Antonucci, & Cortina, 2006). This line of research has shown that the type of social network one has impacts his or her longevity, mortality, quality of life, and health behaviors. Hence, social networks are thought to play an important role in the life of older adults.

A prominent theory in the field is the convoy model of social relations which suggests that both life course and life span influences impact one's social network (Borgatti et al., 2009). The context and the developmental life stage influence the formation of social relations, which can be characterized across several dimensions, including structure, function, and quality. Social relations are viewed as being multifaceted, constructed of both objective (e.g., number of ties), and subjective (quality of ties) characteristics (Antonucci, Ajrouch, & Birditt, 2014; Antonucci & Akiyama, 1987; Antonucci, Fiori, Birditt, & Jackey, 2010).

This model has attracted attention by researchers who have shown that overall, there is a tendency for older adults' social networks to shrink in old age (Cornwell, Laumann, & Schumm, 2008) and to consist of fewer peripheral network members (English & Carstensen, 2014). The nature of the relationship also changes over time. Research has shown that as older adults' physical ability declines, members in their social network tend to provide them with higher levels of instrumental and personal support (Ducharme, Lévesque, Lachance, Kergoat, & Coulombe, 2011).

In recognition of the importance of older adults' social networks, several large-scale epidemiological studies have collected data on the topic (e.g., the National Social Life Health and Aging Project; NSHAPE <http://www.norc.org/Research/Projects/Pages/national-social-life-health-and-aging-project.aspx>; the Survey of Health, Ageing and Retirement in Europe, SHARE <http://www.share-project.org/>). Although informative, these studies have been conducted from the point of view of the ego, a focal person who provides information about his or her network. There has been very limited research to focus on the entire social network and to incorporate the point of view of various network members related to the ego, also known as alters. This is important because we know that social networks are relational in nature and involve more than a single individual (Seale, 2004). We also know that the individual's perspective on his or her network does not fully correspond with alters' perspectives on the network (Marsden, 2002). Hence, certain properties of the network can only be inferred by interviewing all network members. Moreover, studies that have shown that depression or loneliness are "contagious" within the social network (Cacioppo, Fowler, & Christakis, 2009; Rosenquist, Fowler, & Christakis, 2011) could only be conducted if both ego and alters are

interviewed. Finally, interventions that target the structure of social ties or the contagion of certain behaviors or beliefs also are likely to benefit from data on the entire social network (Valente, 2012).

The present study embarked on a systematic review of the literature to examine the existing knowledgebase on social network in the field of gerontology. We specifically focused only on networks obtained from the point of view of both egos and alters rather than networks that are limited to the ego perspective, given the unique potential for additional information inherent in the former type of networks. In order to facilitate research in the field, we provide detailed information about current methods and findings as well as recommendations for future research.

Methods

Obtaining the Data

We searched the following databases: APA Psynet, Pubmed, Sociological abstracts, and Ageline. The search was conducted in September, 2017.

The following key words were used to guide the search: ("older adult*" OR elder* OR aged OR "nursing home*" OR senior* OR senescent OR "assisted living" OR "long term care" OR "nursing unit" OR "skilled nursing facility*" OR geriatric* OR "residential aged care" OR "adult day care*" OR "continuing care retirement community*" OR "lifelong center*") AND ("social network"). The latter search term was consistent with the term used in a recent review of social network research in a different population (Perkins, Subramanian, & Christakis, 2015). The bibliographies of all relevant review articles were searched. A Google Scholar search using the function "cited by" and "related articles" was used with all articles included in the present review in order to trace additional relevant articles.

Selection of Studies

All titles and available abstracts were reviewed for relevance by two independent researchers (LA, IL). Disagreements were resolved through a consensus. The following *inclusion criteria* were employed: (a) articles published on or before September 11, 2017 (when data search was concluded); (b) written in English; (c) relied on quantitative methods to obtain data from both ego and alters; (d) provided a description of data collection methods; (e) provided numeric information on network properties as a whole or at the ego level, and (f) all egos were 60 years old or over. *Exclusion criteria*: studies in which (a) only two or less alters were queried, as this provides a very limited picture of the whole network; (b) staff or other observers provided network data, rather than self-report of ego and alters; and (c) studies that were not available for a full review, such as conference proceedings. Different studies conducted on the same sample were described in detail but counted only once.

Data Extraction

Data extraction was conducted independently by the two reviewers. Disagreements between reviewers were discussed and a consensus agreement was established. Extraction details are available in [Tables 1 and 2](#).

Results

[Figure 1](#) demonstrates the study flow chart according to PRISMA guidelines ([Moher, Liberati, Tetzlaff, Altman, & PRISMA Group, 2009](#)). The PRISMA diagram maps the flow of information through the various review stages. The diagram outlines the number of articles retrieved, number of articles kept for full review, number of articles excluded,

reasons for exclusion and number of articles kept for analysis. A total of 5,519 records were retrieved into an endnote library from the four data sets searched. Of these, 3,994 records remained after the removal of duplicates and 60 records were maintained for a thorough review because they appeared to be potentially relevant based on their title and abstract. Four additional records were obtained through Google Scholar search of already identified articles. Please see [Figure 1](#) for details concerning study flow and reasons for exclusion.

Overall, 10 records reporting on five original samples were kept for the systematic review. One study addressed community dwelling older adults in Mexico ([Márquez-Serrano, González-Juárez, Castillo-Castillo,](#)

Table 1. Study Characteristics

Author	Country	Setting (community, adult day center, CCRC, etc.)	Scope/definition of the network	Number of participants	Sample characteristics (age/gender)
Abbott et al., 2012	USA	One neighborhood in a residential long term care-assisted living facility	All assisted living residents and staff	25/65 staff agreed to be photographed, 10/15 residents participated	86 y [82–92 y], 5 male, MMSE = 25.8[16–30]
Abbott et al., 2015	USA	An assisted living and dementia care unit in a nursing home	Assisted living residents and staff, dementia care unit	10/15 residents of an assisted living-Same participants as in Abbott et al., (2012) , 10/12 residents of a dementia unit	Assisted living-Same participants as in Abbott et al., (2012) ; Dementia unit- 87 y [82–96 y], 80% female, MMSE = 17.2(14–25)
Abbott & Pachucki, 2017	USA	A dementia special care unit	Dementia special care unit over three consecutive years	10 in wave 1, 10 in wave 2, 17 in wave 3, but only 3 people present across all three waves	90 y, 67–101 y, 80–90% women, dementia, MMSE = 16.9–19.8
Casey et al., 2016	Australia	A nursing home: 3 care units, including a dementia unit	Nursing home residents	36/94-only 29 reported on relationships	63–94 y, 61.1% female, 67% dementia
Hardiman, 2017	USA	A residential facility	All residents (also asked about relationship with staff, nurses, caregivers in residential facility)	24/76 residents; 16/25 staff, nurses and caregivers provided pictures	100% female, 85 y[72–102 y], 16.6% mild dementia, MMSE = 20–24
Márquez-Serrano et al., 2012	Mexico	A neighborhood in Mexico	>60 y neighborhood residents who participated in the educational intervention	10/18	65–85 y, 70% female
Schafer, 2011	USA	A continuing care retirement community	All residents of a continuing care retirement community-independent living only	123/158, 91% participation rate	86 y [74–96 y], 69% female
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Note. MMSE = Mini Mental Status Exam; y = years.

Table 2. Main Findings and Study Design

Author	Study design (cross-sectional/longitudinal, etc.)	Network types measured and analyzed (friendship/familiarity etc.)	Exact questions used to derive the network	Method used to obtain the network (name generator, census report)	Statistical method	Basic network properties reported	Map provided	Main findings
Abbott et al., 2012	Cross-sectional	Social interactions in the past week	The AL residents were asked the same 3 questions about people in their own and other neighborhoods within the same AL facility and about staff who worked at the AL facility: “5 people you spent most time with in the past week, 5 people who provided help to you in the past week, 5 people you provided help to in the past week.” Photos were used only when asked about residents in own community.	Sociocentric with pictures of all AL residents and staff	Descriptive	Degree centrality, in-degree, out-degree	Yes	Descriptive analysis of AL- in-degree, out-degree overall degree centrality ranges between 1 and 23
Abbott et al., 2015	Cross-sectional	Social interactions in the past week/recently	Sociocentric as in Abbott et al.,(2012). In the dementia unit, “recently spent time” with rather than “over the past week” was used for reference	(Egocentric-not relevant for this review) and sociocentric with photos	Descriptive	Sociogram, network size, degree centrality, reciprocity	Yes	Sociocentric vs. egocentric approach nominations. Mean sociocentric network size 7[0–14]. Residents with a higher MMSE score nominated more individuals. Reciprocity in AL 55% [20%–75%]

Table 2. Continued

Author	Study design (cross-sectional/longitudinal, etc.)	Network types measured and analyzed (friendship/familiarity etc.)	Exact questions used to derive the network	Method used to obtain the network (name generator, census report)	Statistical method	Basic network properties reported	Map provided	Main findings
Abbott & Pachucki, 2017	Cross-sectional—three waves of data but only 3 residents went through all waves of data collection	Social interactions recently	Photos were provided. 5 questions asked: who they spent time with, listened to problems, helped with something, who helped them, who listened to them.	Sociocentric with photos	Associations of quality of life and cognition with network characteristics	Personal network size, in-degree, out-degree, betweenness-centrality, closeness-centrality, network density	Yes	Average personal network size 2–4.5. Half the ties were reciprocated and there was a positive association between integration-betweenness centrality and quality of life, but inconsistent associations with cognitive functioning. Friendship ties were more frequent among people of adjacent cognitive status categories
Casey et al., 2016	Cross-sectional	Social support, friendship	Showing photos and asking to identify friends; followed-up by questions about true friend vs. casual friend; (integrated with qualitative and observational data)	Sociocentric with photos	Correlations between ties and assessment scores	Out-degree, in-degree, reciprocity, density, path length	Yes	When all potential relationships were included in the unit, the median size was 0 [0–1]. Low density, low reciprocity (22.2%), high levels of isolation; cognitive impairment was negatively correlated with network size and reciprocity, friendship correlated with reciprocity

Table 2. Continued

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Hardiman, 2017	Cross-sectional	Spend time, provide help, receive help	1. Pick up to or point out five people with whom you spent the most time in the past two weeks. 2. Pick up to or point out five people who provided help to you in the past week. 3. Pick up to or point out five people you provided help to in the past week. * Sociocentric questions are to be asked about residents of the NH and with regards to staff, nurses, or caregivers.	A list of names and photos of those who agreed to have their picture taken- both staff, nurses, caregivers and residents	Correlational	Total residents and staff nominated	No	Staff had a higher in-degree centrality. A correlation between number of connections with others, quality of life and MMSE score
Márquez-Serrano et al., 2012	Pre-post: but networks measured only once	Relationship types	Indicate the individuals with whom they have relationships: family, friends, neighbors or work colleagues	Egocentric	Network characteristics in relation to flu infection	Structure, density, degree	Yes	Low density: .0167. Out-degree: 1.57. No knowledge transfer within the network

Table 2. Continued

Author	Study design (cross-sectional/longitudinal, etc.)	Network types measured and analyzed (friendship/familiarity etc.)	Exact questions used to derive the network	Method used to obtain the network (name generator, census report)	Statistical method	Basic network properties reported	Map provided	Main findings
Schafer, 2016	Cross-sectional	Spend time, confidant	Given a map of the floor. Asked if spent time interacting or socializing with the occupant of the apartment: "spend time interacting or socializing with [NAME] in a given week, beyond just passing by or saying hello." If the answer was an affirmative, participants were then asked to approximate how much time they spent socializing "in a typical, or average, week." ≥30 min of interaction was coded as spend time with. List the people they talked to about important matters.	A map of the continuing care retirement community	Regression analysis	in-degree, out-degree, Bonacich centrality	Yes	Time spent (mean 20,09) had more ties than confidant relations (mean 2.24). Less asymmetry in confidant relations (.2) than in time spent (.33). Health as a predictor of Bonacich centrality, in-degree and out-degree. Significant results for some but not all types of ties.

Table 2. Continued

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Schafer, 2013	Cross-sectional	Spend time	Given a map of the floor. Asked if spent time interacting or socializing with the occupant of the apartment: "spend time interacting or socializing with [NAME] in a given week, beyond just passing by or saying hello." If the answer was an affirmative, participants were then asked to approximate how much time they spent socializing "in a typical, or average, week." ≥30 min of interaction was coded as spend time with.	A map of the continuing care retirement community	Regression analysis	Constraint, integration	No	Health predicted structural position. Residents with the best health had positional advantage in the network.
Schafer, 2015	Cross-sectional	Confidant	"From time to time, people will often talk with others about things that are important to them. This could include sharing good news, or bad news, sharing about concerns they might have, or otherwise just talking about things they find very important or significant. Who are the people here at [RC] that you can talk to about things that are important to you?"	A map of the continuing care retirement community	Exponential random graph	Close ties sent and received, density	Yes	An overall density score of .02. Close relations are influenced by physical proximity. Physical proximity intensified health based a-symmetry.

Table 2. Continued

Author	Study design (cross-sectional/longitudinal, etc.)	Network types measured and analyzed (friendship/familiarity etc.)	Exact questions used to derive the network	Method used to obtain the network (name generator, census report)	Statistical method	Basic network properties reported	Map provided	Main findings
(Schafer, 2016)	Cross-sectional	Spend time	Given a map of the floor. Asked if spent time interacting or socializing with the occupant of the apartment: "spend time interacting or socializing with [NAME] in a given week, beyond just passing by or saying hello." If the answer was an affirmative, participants were then asked to approximate how much time they spent socializing "in a typical, or average, week." ≥30 min of interaction was coded as spend time with.	A map of the continuing care retirement community	Exponential random graph	Total ties, density, geodesic distances, reciprocated ties, centrality measures	No	Healthier individuals received more social tie nominations. Only modest support for health-based homophily.

Note. AL = assisted livings; betweenness centrality = number of shortest paths from all nodes (alters) that path through the ego; Bonacich centrality = takes into account the number of connections within the ego network; degree centrality = the number of ties one has; density = actual ties/all possible ties; in-degree = number of incoming ties; MMSE = Mini Mental Status Exam; NH = nursing home; out-degree = number of outgoing ties; reciprocity = the likelihood of a tie to be mutually linked; RC = retirement community.

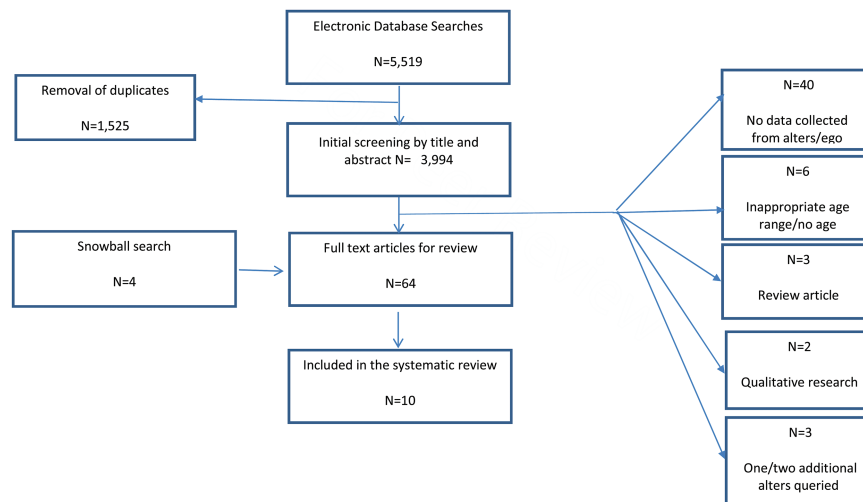


Figure 1. Study flow.

González-González, & Idrovo, 2012). This study used an egocentric method which relied on a name generator to identify the network. The remaining studies addressed older adults in long-term care institutes in the United States and Australia. Three of the studies presented data on social networks among older adults with dementia or mild cognitive impairment (Abbott, Bettger, Hampton, & Kohler, 2012; Abbott, Bettger, Hampton, & Kohler, 2015; Abbott & Pachucki, 2017; Casey, Low, Jeon, & Brodaty, 2016). Under these circumstances, a common approach appeared to be the use of photographs to construct a complete social network. One study employed a pre-post design, but network measures were obtained only once (Márquez-Serrano et al., 2012). Another study had three waves of data collection, but because of the variability in the network over time, the analysis focused on each network separately rather than on changes in network dynamics (Abbott & Pachucki, 2017). All other studies employed a cross-sectional design.

Studies provided descriptive data on the ego network and correlational data to examine the associations of various types of social relations indicators with quality of life, cognitive functioning, and other health measures (Abbott & Pachucki, 2017; Casey et al., 2016; Hardiman, 2017). Two records presented results based on an exponential random graph to examine relationship quality or network position and structure as outcomes (Schafer, 2015, 2016), and two other records used regression analyses to examine health as a predictor of social network properties (Schafer, 2011, 2013). Studies have alluded to a bi-directional relationship between health and well-being and various network properties calculated at the ego level. See Tables 1 and 2 for details.

Discussion

The present study is the first systematic review of whole social networks among older adults. The findings suggest that in contrast to the plethora of research that has examined social networks of older adults from the ego

perspective (Nygqvist, Forsman, Giuntoli, & Cattan, 2013; Smith, Banting, Eime, O'Sullivan, & van Uffelen, 2017), a few studies have examined both ego and alters in the field of gerontology. This finding is disappointing given the growing interest in social networks for the understanding of health and wellbeing in the general population (Lazer et al., 2009).

The findings suggest that the study of whole social networks among older adults is feasible, even in the case of older adults with mild-to-moderate dementia (Abbott et al., 2015; Hardiman, 2017). Moreover, these studies allude to a unique opportunity available to those interested in the study of whole social networks of older adults in institutions. This is because the boundaries of the network are already pre-defined. Hence, this could provide an incentive to conducting a sociocentric study in which all network members are queried.

Studies conducted in the United States and Australia relied exclusively on this property to examine an entire unit or institute in order to produce whole social network data (Abbott et al., 2015; Casey et al., 2016; Hardiman, 2017; Schafer, 2011). In contrast, a study conducted in Mexico (Márquez-Serrano et al., 2012) relied on the close-knit nature of community dwellers who participated in an educational intervention to develop a model which capitalized on overlap in ego networks (Márquez-Serrano et al., 2012). A community-dwelling living arrangement, which allows for the use of ego networks to construct full social networks due to overlap in ego networks, is less common in urban places, which characterize the global North.

A potentially interesting and useful tool for collecting whole network data can be the use of snowball sampling several degrees away from a focal person (Antonucci & Israel, 1986; Bear, 1990). Such an approach can potentially help researchers to understand the social network not only from the perspective of the older adult, but also from the perspective of his or her alters even in settings, where boundaries are not predefined and there is

no expectation for a natural overlap of ego networks. Although our review identified several studies that relied on such a method, these studies were limited to one or two additional alters or examined a focal person who did not meet our age criteria (Carpentier & Ducharme, 2007; Koehly, Ashida, Schafer, & Ludden, 2015). Despite the complexity of this type of design, it is particularly valuable for use in populations that do not have a-priori set boundaries, such as urban, community dwelling older adults.

Based on the studies reviewed, one can infer that the concept of friendship can be used to describe older adults' networks (Abbott et al., 2012; Casey et al., 2016). In general, networks in institutions are characterized by low density (number of actual ties divided by the number of all possible ties) and reciprocity (e.g., if ego knows alter, alter also knows ego) and high levels of isolation (no incoming/outgoing ties) (Casey et al., 2016; Schafer, 2011). This appears to be the case also in the community (Márquez-Serrano et al., 2012). Although some of the studies found a correlation between health, quality of life, cognitive functioning, and network characteristics (Hardiman, 2017; Schafer, 2013, 2015), the relationship appears to be bidirectional and given the cross-sectional design of the studies, it is impossible to determine its exact direction. Unfortunately, the small and varied nature of the studies reviewed does not allow determining the size or direction of these potential effects.

Implications

To sum, despite a plethora of research on social networks in older adults, there is only a handful of studies on whole social networks in this population. Hence, many studies disregard the fact that social interactions are bidirectional, with all stakeholders contributing to the shared meaning of the encounter (Seale, 2004). Moreover, the limited research comparing ego networks to sociocentric networks has shown that the two are not always comparable and that valuable information can be obtained by querying both ego and alters, rather than relying only on the ego (Chung, Hossain, & Davis, 2005).

Examining the structure and the function of the entire network is important for several reasons. First, this can provide additional insights and enrich existing theories in the field of aging which have been exclusively based on the ego-perspective. Second, such an approach can provide information about the network as a whole, which is not limited to the ego perspective. Third, there is a growing interest in social networks as an intervention tool (Valente, 2012). These interventions address the structure of the network. For instance, by identifying those individuals who are more prone to isolation, one can initiate interventions for re-integration into the network. Alternatively, interventions can instigate a change in the network through contagion. For instance, interventions that promote the adaptation

of specific health behaviors within the network (Valente & Davis, 1999).

The present study points to a lacuna in current understanding of social networks in the field of gerontology. It also provides useful tools for the design of future studies to address current shortcomings in the field. However, as is always the case with systematic reviews, there is a chance that our search had failed to include papers that should have been included. Also, given the very small number of articles and their heterogeneity, we cannot make concrete predictions about the nature of older adults' full social networks nor about their correlates. Finally, our inclusion/exclusion criteria might have resulted in the exclusion of important studies in the field. For instance, we excluded qualitative studies because of our interest in numeric network properties (e.g., density, degree centrality) and in self-report of social ties. It is important to note, though, that this is in line with the methodology of systematic reviews, which requires strict and coherent inclusion/exclusion criteria, as long as they follow a clear rationale.

Funding

The study was funded by the Israel Science Foundation 537/16.

Conflict of Interest

None reported.

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