

What is it and how to measure social capital? A systematic review on the use of this concept in network science

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ABSTRACT

This article seeks to understand how social capital has been understood/defined, and measured in the network's community in five journals: Social Networks, Connections, Journal of Social Structures, Network Science, and Applied Network Science. In addition to problematize how this notion has been used from a social network perspective, it shows what the gaps are in the literature and the challenges for the future. A systematic review of 78 articles was carried out following the approach proposed by PRISMA (Page et al., 2021) in the collection, analysis, and reporting of the data; validated using ROBIS tools (Hannes, 2011; Whiting et al, 2016). The results show the type of research conducted in the community using the concept of social capital, providing a broad overview of both, the way in which the concept has been defined, and the gaps in the literature. A preponderance of quantitative research stands out was observed, in addition to the notion/measurement of social capital with Nan Lin's position generator. Finally, topics are identified in which future research could advance using this notion, such as the diversification of samples used, case studies, and data collection and analysis approach.

Key words: *Social capital – Systematic review – Network Science – Methods – Theory.*

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INTRODUCTION

The study of personal networks must be understood beyond the mere enumeration of all the people with whom a node shares direct relationships, and rather comprehended as a network of interconnections and ties between different nodes, who act dependently on each other (Requena Santos, 2012; Wasserman &

Faust, 1994). Along these lines, Mitchell (1969) defines a network as a "specific set of links between a defined set of social actors" (p2). Wasserman and Faust (1994) established that conducting research using networks "is based on the assumption of the importance of the relationships between the interacting units" (p4). Social Network Analysis SNA thus

investigates social relationships and structures using networks and graph theory (Froehlich et al., 2020). Borgatti, Everett, and Johnson (2018) further highlight that part of the power of the network concept is that it provides a mechanism – namely, an indirect connection – through which disparate parts of a system can affect each other. The relational aspect is central to this approach (Bellotti, 2015; Crossley, 2011); therefore, it is one of the predominant aspects of this research.

THEORETICAL FRAMEWORK: SOCIAL CAPITAL

The social capital approach is a useful theoretical framework that provides a way to understand the resources involved in relationships within personal networks (Barret et al., 2014). Among the main authors who have contributed to the conceptual and empirical development of the concept are James Coleman, Robert Putnam and Nan Lin. Both Coleman and Putnam define social capital as resources embedded in the structure of social relationships, which make it possible to achieve certain goals or cover certain needs that would be unattainable in their absence (Coleman, 1988; Putnam, 2000). In other words, social interaction generates interdependence and a bond between subjects, developed over time through trust and norms of reciprocity (Reimer et al., 2008). This facilitates coordination and cooperation for mutual benefit (Putnam, 1995). For his part, Lin describes social capital in terms of network theory, as resources embedded in personal networks that actor's access and use for their actions, that is, they are resources accessible through social connections (Lin, 2001). Likewise, social capital is conceptualized and measured as both individual and collective assets. Based on the above, it can be established that social capital corresponds to valuable resources inherent to social relationships and as a result of them (Lewis et al., 2013). At this point it should be noted that the analysis of social capital - and of personal networks - can be linked to different levels of analysis. However, in this study social capital is conceptualized from an individual (or "micro") approach, understanding it as important resources (of all kinds) that we can identify in personal networks. The micro approach focuses on individuals and is concerned with the benefits accumulated through membership and participation in social groups, through the construction of sociability, in order to create such resources. In contrast, the "macro or ecological" approach tends to be concerned with degrees of social integration at the community level and degrees of civic

participation; that is, it would focus on issues of identity, shared interests and trust within communities, and the resulting degree of community cooperation (Barret et al., 2014).

Derived from the above, it can be pointed out that social capital is that which exists between people with a similar position and values, such as family members, close friends, or neighbors (Lewis et al., 2013). That is, it refers to intimate relationships within a homogeneous group where the needs of the members are known; in these networks there is emotional intensity and provision of reciprocal help, supported by a common history and a strong presence of normative obligations (Barret et al., 2014). But, also, social capital is that which implies a relationship between individuals and groups from different social environments (Lewis et al., 2013). This capital is useful for connecting people with external assets, allowing access to other opportunities and social resources through networks (Barret et al., 2014). This is what other authors have problematized as the notions of "bridging," that is, the possibility of creating bridges with other groups, and "bonding," which would be when people create a stronger or more stable bond as long as there is a deeper connection.

Currently, there are still several authors who research capital in different scenarios. Just to mention a few, there is research related to education (Lenkewitz, 2023; Ordaz Teissier et al., 2024), work/occupational spaces (Rey, 2022; Li & Guo, 2022; Bakker et al., 2022; Marsden & Baum, 2024), social classes or socioeconomic inequalities (Carrascosa, 2023; Wang, 2023; Dederichs, 2024), migrations (Casado, 2022; Soares et al., 2023) and sustainable development (Valadez-Solana et al., 2024). The diversification of the use of social capital leads us to question: what is social capital? How has it been measured previously? And how should we measure it? Questions this article focuses on moving forward.

Objectives and hypothesis

This article is part of a broader research project, which its main objective is to study the changes in the personal networks and social capital of women caregivers of an older parent in a dependent situation in Santiago de Chile, and its impact on their subjective well-being, physical and mental health. Within this framework, this article seeks to specifically investigate what has been produced from the network community regarding the concept of social capital. Specifically, the objectives of this particular article are:

1. Identify the notion(s) and theoretical framework(s) of the network community on social capital.
2. Explore how social capital has been measured in the network community.
3. Explore who are and where are the people who study social capital from a network perspective.
4. Evaluate the gaps identified in the literature on social capital, as well as the challenges for the future.

In terms of hypotheses, we have raised two at the beginning of this exploration. First, the literature on social capital will be more focused on studies based on data from the Global North, and in organizational or work spaces. This distinction between the global "south" and "north" has been thematized in the literature in various ways, so in this article we will use the definition proposed by Espinosa-Rada and Ortiz (2022). There, the "Global South" refers to countries that mainly meet two requirements: first, having been colonized at some point in their history; and second, being geographically located in America, Africa or Asia. Thus, those that are called "Global North" are those as opposed to the "Global South", and who, therefore, do not meet both requirements. The underlying hypothesis is that being a researcher in a country in the "south" implies certain structural disadvantages compared to being in the "north".

Second, it is expected to find a discrepancy between research in the way of defining and measuring social capital. In addition to these hypotheses, it is expected to identify content inductively, which will be reported in the results, which will allow progress in research that uses the concept of social capital.

METHODS

This research aimed to review the English-language publications of the community on social capital. To answer these questions, a systematic review was conducted following the approach proposed by PRISMA (Page et al., 2021) in the collection, analysis and reporting of data. PRISMA is a system and guide to report the methodological decisions made for a systematic review to be carried out. This allows for homologation between research of this type, so that its processes and the possibility of comparing results are transparent. It also has recommendations for reporting the use of methods and findings. In this research, its guides were also used to create the annexes, where the "PRISMA checklist" (annex no. 1) and the complete list of articles incorporated in this article (annex no. 2) are presented. In

short, this tool has as its main objective to support the organization of the community around evidence-based research, used in systematic reviews, and to facilitate future comparison between studies. Three journals were selected that publish in English and are recognized by the International Association of Social Network Analysis (INSNA) as belonging to the community on its official webpage. The journals were: *Social Networks, Connections*, and *Journal of Social Structures* (hereinafter "JOSS"). These three are the only ones recognized in this language by this organization as part of the network community. In addition, two more recent journals that are also used by the social network community (mentioned by the same institution, but not included in the official list) and that publish empirical articles in English were incorporated: *Network Science* and *Applied Network Science*. Only journals with publications in English were considered, since English is the common language in science and allows a global perspective. In summary, this study focused on five journals selected because they are referred to by the institution as representatives of the English-speaking network community, beyond their indexation.

Criteria for inclusion and exclusion of publications in the sample

For the selection of the articles incorporated, three inclusion criteria and three exclusion criteria were defined, decided jointly by the research team. Since the intention was to concentrate on those investigations that used social capital as a central concept in their study, the criteria were:

- Inclusion criteria: (1) Be an empirical research article or a "review article". (2) Include the word "social capital" in the abstract, or among the keywords, or in the title. (3) The article must have been published before October 6, 2023, the date of the end of data collection. Thus, incorporating all publications since the beginning of each of the journals. (4) Articles written in English.
- Exclusion criteria: (1) Other types of articles that were not "empirical research" or a "review". (2) Articles that mentioned social capital in a reference or a couple of paragraphs, without it being the central concept in the theoretical framework or in the methodology. (3) Articles that appeared in the search because they incorporate "social" and "capital" as separate words, and not together in the concept "social capital."

Once the selection process was completed, a total of 79 articles published since the origin of each of these journals until October 6, 2023 were analyzed (see Table 1). Therefore, it must be considered that each journal has a different creation date: Social Networks in 1978, Connections in 2016 (with annual editions since 2018), JOSS in 2009, Network Science in 2013, and Applied Network Science in 2016. The complete list of articles collected by journal can be found in appendix 2, while the more detailed description of the stages that meant the data collection can be found in the following sub-title.

Table 1

Total number of articles in the systematic review

Journal	No. of articles found	No of articles excluded	No of articles included in the review
Social Networks	83	11	72
Connections	9	8	1
JOSS	1	0	1
Network Science	148	143	5
Applied Network Science	19	19	0
Total	260	180	79

Note: Table prepared by the authors after the review. "JoSS" corresponds to Journal of Social Structure.

Obtaining publications from websites

Below we explain how we carried out the process of obtaining and downloading the articles used in this research. For each journal, we used the system incorporated in their own web pages to review their articles. This meant that the search was not always carried out with the same steps, but with the same inclusion and exclusion criteria previously described. In the case of the journals Social Networks, Network Science and Applied Network Science, the same steps were followed: (1) Search for "social capital" in the advanced search system. (2) Include only "review articles" and "research articles". (3) Make sure that you are only searching in the database of publications from the journal "Social Networks". (4) Add a restriction on the maximum date on which the articles were published. (5) Review the abstract, keywords, and title of the article to corroborate its inclusion or exclusion. To search the journals Connections and JOSS, and

because they did not have an advanced search system, the following steps were followed: (1) Each volume published by the journal was manually reviewed, checking the titles and abstracts of these, to see which ones mentioned "social capital." (2) Filter so that only empirical articles and literature reviews were incorporated. (3) Add the restriction of the maximum date in which the articles were published. (4) Second review of the abstract, keywords and title of the article to confirm its inclusion or exclusion.

Before beginning the analysis of the articles, the team reviewed that the criteria were clear and that the selection of these was also correct; validating their selection. The list of all the articles finally incorporated in the review is found in appendix 2. Following the procedures established by the approach used by PRISMA, as already shown, Table 1 shows the summary of the included and excluded articles.

Data collection and analysis

For the review and analysis of each document, the same questions or categories were completed that corresponded to three macro-categories, enabling subsequent comparison between them. Each of these macro-categories involved different aspects that were identified in the articles and incorporated into a file:

1. Reference information: ID, year of publication, authors, title, journal, volume, number, pages, link, and download date.
2. Meta-analysis: Abstract, keywords, country of journal address, institutional affiliation of authors, gender of authors, country of primary institutional affiliation of authors, funding of article, and acknowledgements.
3. Content of article: Theoretical framework used, main objectives, how the concept of capital is incorporated into research, how social capital is defined, measures used to measure social capital, core concepts (other than social capital), methodologies, methods, data collection, countries from which data came, dates of data used, data analysis, main conclusions, limitations, and future research identified.

Regarding the analysis strategies used to review each of the points raised in the research questions, the following procedure was followed: First, and after having all the information collected for each of the categories mentioned, a complete review was carried out among team members. Second, with the intention of finding patterns, frequencies were obtained. Third, some questions raised at the beginning of the research could not be resolved

with a type of quantitative analysis, so a qualitative inductive approach was used, focused on the search for patterns and aspects that were of interest to respond to the hypotheses of this study. Fourth, and in parallel to the entire process, team meetings were held where these advances were shared, to promote reflection on the results, and the next steps to follow in the analysis. Finally, the joint writing of the results began, in addition to the constant dialogue with the research questions, hypotheses and theoretical frameworks of the study mentioned in this article.

Finally, it is important to mention that in some articles there was no response for all of these categories. In these cases, this gap was reported in the results presented in the following sections, as it could also indicate a lack of information or differences between the objectives of the articles. Most of these cases occurred for the categories that sought more details about the methodologies used, or the limitations section of the study in question.

Validation of the study

In order to validate this systematic review, two tools were used as follows: credibility assessment and bias assessment.

Assessing credibility

First, Hannes' (2011) proposal for reviewing research methods and practices and identifying possible biases was implemented. Based on his approach, it is recommended to explain the steps used by the research team to safeguard four aspects. Below, we establish what the measures were in each of these:

1. **Credibility:** Three measures were taken in this regard. There were team meetings to evaluate the entire process, with more than one person reviewing the data collected. Special attention was paid to excluded articles, with each one being reviewed in depth by at least two people on the team. Finally, in the results, an attempt was made, whenever possible, to maintain textual citations of the articles, in such a way as to avoid possible incorrect over-interpretations.
2. **Transferability:** To ensure this, the database of the analyses carried out in this research is made available as an open access repository on OSF. The project can be found at the following profile: <https://osf.io/k9fgz>.
3. **Trust:** To increase trust in this study, three measures were put into practice. This research has been tested with a peer review, different forms of data collection

were applied, and regular team meetings were held to increase critical reflection. 4. **Confirmability:** During the first team meetings, training was carried out, in addition to sharing previously constructed material with all the instructions to follow for carrying out this review.

Bias assessment (ROBIS)

Second, the ROBIS tool (version 1.2) described by Whiting et al. (2016) was applied, which allows transparency of the entire systematic review process, in order to elucidate possible biases in this study. The three stages of this tool were used, and its results summarize the identified risks (Table 2). From this, we were able to identify that there is a low risk of bias in this research process.

Table 2

Biases identified by applying the ROBIS tool to this research.

Topic	Concerns	Justification for concerns
1. Concerns regarding specification of study eligibility criteria	LOW LEVEL.	NA
2. Concerns regarding methods used to identify and/or select studies	LOW LEVEL. Only one concern to report.	Just one limitation to report: More databases, or even books, could have been incorporated.
3. Concerns about methods used to collect data and appraise studies	LOW LEVEL.	NA
4. Concerns regarding synthesis and findings	LOW LEVEL.	NA

Risks of bias in the review

Describe whether or not the following occurs in this article:	YES/NO
Did the interpretation of the findings address all of the concerns identified in Domains 1 to 4?	YES
Was the relevance of the identified studies to the review's research question adequately considered?	YES
Did the reviewers avoid over-interpreting the results by including other opinions in the process?	YES
Total risk of bias in the review	LOW

Note: Tables prepared by the authors using the proposal by Whiting et al. (2016).

The intention with the application of these two tools to validate the study is to transparently demonstrate the entire review process and the possible biases that this research may have. Thus, it is important to highlight that these aspects must be considered as limitations of the study, and that in one way or another they frame the results presented below.

RESULTS

The results are organized by focusing on the main categories of the articles analyzed. First, a meta-analysis of the authors and institutions from which the articles come is described. Second and third, the most recurrent keywords and theoretical frameworks are presented. Fourth, the notion of social capital used by the researchers is discussed; related to what is in the fifth subsection, which shows the ways in which social capital has been measured. Sixth, the methodologies (data collected and types of analysis) applied in the research are shown. Seventh, the gaps that have been identified in the literature on social capital are pointed out. Finally, a summary is made of what the authors have proposed as necessary future research with respect to social capital.

Meta-analysis of authorships and institutions

There are three variables that we will refer to in this sub-section: the gender of the authors, their country of origin, and the frequency of keywords. Regarding the gender of the 164 authors in total, 59% (97 people) are men and 37% (61 people) are women. Only 4% (6 people) of the authors could not be determined. Regarding the composition of the teams in terms of gender of co-authorships, these are shown in the following Table 3. There we can see that the great majority of the co-authorships were mixed teams (16 articles), or women alone (15 articles), or men alone (15 articles).

On the other hand, in terms of the countries from which the authors come, these can be observed in Table 4. The vast majority of the 164 authors were working, at the time of publication, in universities in the United States (43 people), the Netherlands (37 people), and Germany (11 people).

Table 3

Composition of co-authorships by gender

<i>Co-authorships types</i>	<i>No. of articles</i>	<i>%</i>
One woman	15	19
One man	15	19
Two or three men	14	17.7
Two or three women	5	6.3
One woman and one man	10	12.7
Mixed team	16	20.3
Undetermined	4	5.1
Total	79	100

Note: Table created by the authors.

Table 4

Composition of co-authorships by country

<i>Countries</i>	<i>No. of items in each country</i>	<i>%</i>
USA	43	26.2
Netherlands	37	22.6
Germany	11	6.7
China	7	4.3
UK, Hungary, Switzerland, Spain	6	3.7
Sweden, Poland, Austria	4	2.4
Chile, Singapore, Saudi Arabia, Belgium	3	1.8
France, Taiwan, Hong Kong, Ireland, Canada	2	1.2
Argentina, South Korea, Norway, Italy, Mexico, Israel	1	0.6
Total	79	100

Note: Table created by the authors.

Of all the contributors, only two articles included corresponding authors from countries in the Global South. All other contributions were mostly from countries in North America, Europe and Asia.

Keywords

Table 5 presents the keywords of the most recurrent articles.

Table 5
Frecuencia de palabras claves más recurrentes

Keywrods	Frequency
"social capital"	66
"social networks"	45
"resources"	10
"position generator"	10
"generator"	10
"analysis"	10
"inequality"	7
"personal networks"	6
"network resources"	6

Note: Table created by the authors showing the most frequent keywords (in 6 or more different articles).

Among these, the presence of "position generator", "generator" and "network resources" stands out; these would demonstrate a definition of social capital based on such tools. Meanwhile, "personal networks" and "inequality" also show a slight preponderance among the articles.

Theoretical frameworks

The majority of the articles wrote their theoretical frameworks based on the specific cases they studied. Even so, there are certain approaches that were more commonly identified. Among the most repeated were: the thematization of access (or not) to social capital (14 articles); the study of inequalities through the measurement of social capital (13 articles); the notions of "bonding" and "bridging" (11 articles); an approach to the topic of egonetworks or personal networks (11 articles); search for patterns in the very structure of the network (11 articles); studies of inequalities focused on the socioeconomic level and class of people (10 articles); research in work contexts, focusing on occupations (9 articles); and, finally, studies on stratification and social mobility (7 articles). Not all of them thematized the definition of social capital in the theoretical framework, so in the following subsection we will address how it was defined throughout the sample.

Notion of social capital and its variation over time

For reference, in the articles analysed, social capital was defined in different sections. Of the 79 articles, in 29 this definition was in the theoretical framework and methodological section; in 25 cases in the theoretical framework, methodological section and results; while in 19 documents it was only in the theoretical framework. In only 5 articles the definition was present in the theoretical framework and the results (not in the methodological decisions). Finally, in only one document it was only discussed in the methodological decisions, without reflecting on it in the theory or in the results. This shows how social capital is, above all, used as an argumentative thread, both theoretical and methodological, in the articles.

In appendix No. 3 of this article, a summary table is presented detailing all the definitions used in each of the 79 articles. The greatest preponderance is from the perspective of social capital as individual resources that can be used instrumentally, preferably citing Nan Lin, along with other collaborators of this author. Among the most frequently used references are Lin and Erickson (2008), Lin and Dumin (1986), Lin (1999, 2001), and Lin and Bian (1991). The second most commonly used approach is the resource generator approach, which in all cases is based on the article by Van der Gaag and Snijders (2005).

Regarding the variation of the concept of social capital over time, there is a pattern in which 2010 seems to be a key moment; before this, it was mostly used in one way, and after that, it was predominantly used in another different way. In the articles published before 2010, the research used the vision of social capital more closely linked to the bridging/bonding perspective. In addition, there is a greater presence of studies that focused on the position in the structure of the nodes (measures such as size, density, centralities, among others), with less standardization of the references they used. After 2010, most of the articles cited several of the authors mentioned in their frameworks, and almost exclusively used the position generator.

Another interesting point regarding its variation over time has to do with the references that were cited. In general, the articles in which the theoretical framework and the notion of social capital were in line with a single author; In most cases, the predominant author was Lin and his approach to social capital. But we also identified that, over time, an increasing variety of definitions were cited, which may also be due to a specialization and diversification of this

notion. This brought with it the fact that in some articles Coleman, Putnam and Lin were cited to refer to the same aspect of what social capital is, but without mentioning the differences in their approach (as has been done at the beginning of this article).

Measuring social capital

In the case of 11 articles, it is not clearly specified how social capital was measured. Even so, in the other 68 articles there were certain trends that are presented in Table 6. There, it can be observed that the great majority used the position generator as their main tool (25 documents). In fact, it is also interesting that the use of this tool was always in the publications from 2011 onwards. Before that date, there was a greater diversity of tools, with a high presence of the measurement of people's attributes (such as socioeconomic level, class, or educational level), questions that sought to investigate the dynamics of "bridging" or "bonding", and questions about the resources available in the particular context (almost always being work).

Table 6

Formas de medición del capital social (CS)

CS Measurement Tools	Frequency
Position generator	25
Attributes of the person (e.g. socioeconomic level or education)	15
Open questions about resources specific to the context	12
Bridging or Bonding	9
Scores associated with the occupation (ISEI, SOC, or others)	7
Resource generator	5
Others	4

Note: Table created by the authors showing the most common tools and forms of measurement, which was not clear to identify in 11 articles.

When measuring social capital, at least one third of the cases asked directly about the workplace, occupations or professional advice. In other cases, emotional and instrumental support networks were measured, in addition to friendship or acquaintance networks.

Data collected

In total, of the 79 articles analysed, 90% (71) used a quantitative perspective, 8% (6) mixed

methods, 1% (1) qualitative, and 1% (1) theoretical.

Regarding the data collected in the articles, there are certain aspects worth highlighting. The authors largely (31 articles) used data between the years 2011 and 2020, and there were no studies using more recent data (although there were data prior to 2011). In addition, the vast majority also used a cross-sectional approach to the data, with only 28 articles using longitudinal data or data collected at more than one point in time. Finally, the data used by these 79 articles are predominantly from countries in the Global North, in the United States, the Netherlands, and Germany; which also tells us where the empirical findings are being concentrated, which are shown in the following sub-section. The details of this can be seen in Table No. 7. Among these articles, only in 7 cases are data from more than one country reported, allowing international comparisons.

Table 7

Countries from which the data collected by the 79 articles are from.

Countries	Frequency
United States	22
Netherlands	13
Germany	10
China	7
Italy, France, Sweden, Spain, United Kingdom	3
Switzerland, Canada, Belgium	2
Argentina, Norway, Romania, Croatia, Chile, Hungary, Uganda, Singapore, Saudi Arabia, Poland, Israel, Ecuador, Mexico	1

Note: Table created by the authors, where in 9 articles it was not possible to identify the source of the data.

As for the methodological techniques of analysis, there was a great variety, but given the predominance of the quantitative approach in the articles, the use of modelling techniques (especially regressions) and descriptive exploration (clusters, network measurements, correlations, among others) was more common. Those investigations that involved a qualitative aspect were usually related to ego network analysis or personal networks.

Limitations

Of the total of 79 articles in the sample, 21 did not identify any limitations at the end of their research. Of the remaining 58 articles, the

limitations noted can be summarized in six groups (Table 8).

Table 8

Most recurrent limitations reported

<i>Limitations</i>	<i>Frequency</i>
Problems with data collection or access	42
Lack of relationship between theory and methods	22
Network size	17
Associated with the case study or the particular context	17
Problems with methods	14
Lack of theoretical development	2
No reported limitations	21

Note: Table created by the authors. The frequency is the number of documents out of the total that identify such a limitation.

First, the vast majority (42 papers) reported a problem with data collection, as they used secondary data or did not have the possibility to include complementary variables that, as they say, would have been useful for the specificity of their case studies. They also report that using used data, often secondary, left important questions unincluded (or to which they did not have access). Second, there are 22 papers that mentioned the lack of a link between what the theory says about social capital and the measurement of this concept. In third and fourth place, with 17 articles, the authors identified problems with the size of the network (not having a sufficient size to be representative data, nor allowing comparison with other groups/cities/countries), and particular complexities associated with the case study or context (for example, difficulties due to COVID). Fifth, 14 papers reported problems or biases associated with the methodological techniques they used. Finally, only 2 articles mentioned the lack of theoretical development in the social capital literature.

Future research

Unlike the limitations, the vast majority of the articles contained reflections on what should be studied in future research. Beyond the aspects identified in the particular case study, and with the aim of staying within the limits of this research, below we present (in order from most to least recurring) a summary of the five most mentioned points:

First, the need that had the greatest emphasis is having to diversify the population, spaces, city, countries, or groups that are being studied (Coleman et al., 2022; Pang, 2022; Li and Guo,

2022; Alecu, 2021; Kuo and Fu, 2021; De Vaan and Wang, 2020; Cepić and Tonković, 2020; Contreras et al., 2019; Growiec et al., 2018; Solano and Rooks, 2018; Norbutas and Gladstone, 2018; Van Tubergen et al., 2016; Hostra, Corten and Buskens, 2015; Ellwardt, Steglich and Wittek, 2012; Son and Lin, 2012; Hipp, 2010; Röper, Völker and Flap, 2009; Boxman, De Graaf, and Flap, 1991; Kennedy, Bradbury and Karmey, 2023; Vacca, 2020; Hepworth et al., 2019); thus incorporating the option of evaluating different combinations, achieving more comparisons (Vantaggiato and Lubell, 2023).

Secondly, the need for research comparing different sociodemographic categories of the populations analysed was highlighted, with gender being the most frequently mentioned (Goodson-Miller, 2022; Van Tubergen et al., 2016; Son and Lin, 2012; McDonald, 2011; Hipp, 2010; Burt, 1997; Kennedy, Bradbury and Karmey, 2023; Bakker, 2020). Other studies highlighted not only gender alone, but also its interrelation with race (Son and Lin, 2012, McDonald, 2011). Socioeconomic status was also highlighted as an element that continues to require attention in future research (Contreras et al., 2019, Van Tubergen et al., 2016, Pena-López and Sánchez-Santos, 2017; Hipp, 2010).

Third, future research should consider longitudinal data collection or analysis, as this could reveal the causes, acquisition, and effects of social capital (Dederich, 2024; Pang, 2022; Bakker, Hendriks, and Korzilius, 2022; Alecu, 2021; Stockmann, Hartman, and Luo, 2020; Contreras et al., 2019; Sommer and Gamper, 2018; O'Connor and Gladstone, 2018; Bähr and Abraham, 2016; Chen and Völker, 2016; Brooks et al., 2014; Song and Chang, 2012; Song, 2012; Flap and Völker, 2001; Hepworth et al., 2019).

Fourth, methodological concerns emerged regarding the measurement of social capital, and how it should be treated in the future. The need to use a variety of methods was mentioned, allowing the same phenomenon to be investigated from different points of view, and therefore to compare results (Godart and Mears, 2024; Seminario, 2022; Lórinca et al., 2019; Growiec et al., 2018; Van Tubergen et al., 2016; Hostra, Corten, and Buskens, 2015; Verhaeghe, Van der Bracht and Van de Putte, 2015; Ellwardt, Steglich and Wittek, 2012; Röper, Völker and Flap, 2009). In the future, it would be possible to develop instruments to measure not only causal effects but also the influences of social capital (Bähr and Abraham, 2016; Godechot, 2016; Chen and Völker, 2016; Lopaciuk-Goncaryk, 2016; Lu, Danching and Lai, 2013; Son and Lin, 2012;

Molina et al., 2020). In addition, it was sometimes mentioned that there is a lack of representative data at regional or national level (Sapin, Widmerc and Iglesias, 2016; Hostra, Corten and Buskens, 2015; Song, 2012; Bakker, 2020; Völker, 2020; Molina et al., 2020). Along the same methodological lines, it is proposed to investigate further the dynamics of capital (Li and Guo, 2022; Growiec et al., 2018; Sommer and Gamper, 2018; Shah, Levin and Cross, 2018; Schnettler, 2009), in different dimensions (Völker, 2020), and how it interrelates with social inequality (Li and Guo, 2022; Carrascosa, 2023). It would also be useful to think of other, more creative ways of collecting data on social capital (O'Connor, 2013; Song and Chang, 2012; Van Der Gaag and Snijders, 2005). Only two articles mentioned the need for an understanding of social capital from a qualitative perspective (Bakker, Hendriks, and Korzilius, 2022; Hernandez, Pullen and Brauer, 2019).

Finally, some articles highlighted that not only the positive consequences (which is what is usually observed) but also the negative consequences of social capital could be investigated (Shin, 2022; Hernandez, Pullen and Brauer, 2019, Bähr and Abraham, 2016, Moerbeek and Need, 2003). In addition, in some cases it was mentioned that there is a lack of focus on understanding the return and reciprocity of the ties associated with social capital (Pena-López and Sánchez-Santos, 2017; Ellwardt, Steglich and Wittek, 2012; Boxman, Bradbury and Karmey, 2023).

DISCUSSION

Answers to the study questions and hypotheses

In conclusion, by reviewing the predominance of the different subsections, we can answer the questions posed at the beginning of this article. In general, we can conclude that in this analyzed community there is: a greater number of quantitative studies, most of which use the name generator as their only tool, there are problems associated with data collection, there is a lack of research with a greater connection between theory and methodology, there is a lack of data that is more current and from other countries, and there is a lack of greater consideration of the diversity identified in the data and analysis. These aspects tell us about several aspects in which we have to improve as a community and point out in future studies on social capital. This confluence would also allow us the possibility of comparing cases, and, therefore, the option of

finding patterns not only at the country level, but also at the regional and global level.

As for the hypotheses, we can review each of their fulfillments or refutations. Following the results, we can say that the first one is confirmed: it was found that most of the studies are based on countries in the Global North, in addition to focusing mainly on studying social capital linked to organizational or work spaces. As for the second hypothesis, there was a discrepancy between the ways of measuring and defining social capital in the articles. Sometimes, this discrepancy was visible through the lack of differentiation of theoretically different frameworks; or in that the measurement used did not necessarily contain a reflection on justification and relationship with what was theoretically proposed. Thus, it mostly happened that one type of resource generator was used, and the concept was defined using several opposing authors, but cited together as if they had the same approach. In addition to these two hypotheses, different results were raised collected in an inductive way that allowed having a more complete panorama of what has been used in the delimited community.

Contributions of this study

One of the most important objectives when starting this systematic review was to gather information on how social capital is defined in network analysis, and also how it has been measured in five key journals in the analyzed community: *Social Networks*, *Connections*, *Journal of Social Structures (JoSS)*, *Network Science*, and *Applied Network Science*. In this regard, our results have made it possible to see that there is a majority tendency to measure social capital through the position generator, and focusing on work or professional-related contexts. Here it is interesting to ask: Which tool makes more sense to be used according to the research question? Resource or position generator, or personal attributes? Are there other forms of expression of social capital? Can social capital be analyzed in other contexts or social circles? What happens in the case of care work, informal or non-institutionalized? The main contribution of the study lies precisely in these reflections. Not only to identify the "state of the art" of the notion of social capital in a specific community; but rather, in doing so, to give rise to a critical discussion regarding how this concept has been used, and how we can continue to use it to make sense of the reality that surrounds us. In the particular case of female caregivers, who are the participants in the broader research in which this article is framed, it is interesting to consider whether this concept makes sense, or whether it would be necessary to rethink its measurement and

definition. Emphasizing that methodologies in social sciences make sense as long as they are adapted to the reality in question; and not vice versa.

Limitations and future research

The main limitation of this research, as in other reviews, is the exclusion of literature that could have been included. In this sense, a review of the main journals was carried out, but books and book chapters could be incorporated. Access to these made it difficult to incorporate them, but this is mentioned because for future research it would be necessary to compare with other publishing communities, outside of this one in particular. In addition to this, a second limitation of this study is that we focused on English-speaking studies, while in the future the search and selection of articles could be extended to other languages. In fact, this would be important to consider when incorporating literature on the Global South, and not just the North. The research team has agreed to do an investigation of the literature in Spanish as part of the next steps to follow. Finally, it is hoped that the gaps identified in the results presented in this article will be useful for future research, so that the community can advance in knowledge about the behavior of social capital.

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