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Social capital assessments in higher education: a systematic literature review

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Social capital theory is a valuable theoretical framework in the field of higher education—as it has been used to examine differences in important educational outcomes based on students' social network and the resources embedded in that network. Despite multiple well-established methods proposed by seminal researchers, there is limited synthesis of how to assess social capital, perpetuating inconsistent findings and evidence for educational interventions. The aim of the study is to evaluate quantitative social capital assessments, based on survey design and operationalized measures, and recommend methods, operationalized measures and assessment instruments for social capital. Using seven educational databases and *Web of Science*, we reviewed 93 English language, quantitative studies from peer-reviewed journals, published from 1980 to 2022; to be included, studies had to measure the social capital of students entering and currently in undergraduate studies. Results from the 93 articles revealed that generators (18 papers), social network analysis (5 papers), and standard Likert measures (80 papers) were commonly used to assess social capital. Standard Likert measures, while most common, were rarely aligned with social capital theory, reducing the validity of the measures. Results also showed that operationalizations of social capital were heavily rooted in social network theory, where social capital is accessed through social networks (86 papers) and actions from alters (65 papers) in the students' network. However, direct measures of social capital—that is, network characteristics, access to supports, and seminal definitions of trust and community—were less common. This study provides important consensus and recommendations for researchers to select assessment instruments appropriate for their study and rooted in principles of assessment validity. We recommend researchers select survey methods (e.g., social capital generators) and operationalizations (e.g., actions from alters) that are well aligned with social capital theory. Assessment instruments designed using strong theoretical frameworks, such as Lin's network theory of social capital, add to the validity of the researchers' instrument design, use and interpretation of the students' social capital scores.

KEYWORDS

social capital, assessment, systematic review, undergraduate, higher education

1 Introduction

Social capital theory, a framework for understanding the resources embedded in relationships, is a valuable theoretical framework for examining differences in educational outcomes and guiding interventions. Social capital theory has been used to investigate important educational outcomes—across a variety of differing assessment methods—such as undergraduate students' academic satisfaction (Likert scale; [Bye et al., 2020](#)), well-being (Likert scale; [Poots and Cassidy, 2020](#)), persistence (resource generator; [Dika and Martin,](#)

2018), educational attainment (Likert scale; Etcheverry et al., 2001), and access to higher education (social network analysis; Ahn, 2010). With the framework becoming increasingly well-established in education (Engbers et al., 2017), secondary and postsecondary institutions have developed workshops, academic programs, and seminars focused on increasing students' social capital as a means to bolster students' success and persistence (Khosravi et al., 2019; Moschetti and Hudley, 2008; Schwartz et al., 2023). As more institutions develop interventions fostering undergraduate's social capital, it is essential that researchers have assessment instruments that can accurately and concisely assess students' social capital.

Extant social capital studies have utilized a variety of quantitative assessment instruments and measures with little consensus on the ideal definitions, methods, and measures available to measure the complex construct (Engbers et al., 2017; Magson et al., 2014). This lack of measurement standardization could be rooted in the many definitions available to operationalize social capital, the use of *ad hoc* measures not specifically made for measuring social capital or rooted in theory, or a lack of clear definitions that can be easily operationalized for measurement development (Lin, 1999; van der Gaag and Webber, 2008). For example, some studies will define social capital using seminal authors (e.g., Bourdieu, Coleman), yet fail to utilize well-defined theories (or any social capital theories at all) for operationalizing social capital measures or item development (e.g., Bini and Masserini, 2016; Lisnyj et al., 2021). Consequently, these studies then contribute to a base of literature that lacks theoretical alignment and contributes to inconsistent measurement of social capital (Engbers et al., 2017; Gamoran et al., 2021).

Consensus on rigorous, standardized construct definitions and measures is a needed foundation for strong research and effective interventions aimed at supporting students (Magson et al., 2014). Social capital constructs, measures and assessment instruments need consistent usage of a well-defined theory and strong evidence of validity (i.e., constructs well aligned with the theory and the methodology; AERA, APA, and NCME, 2014), reliability (i.e., consistency across multiple applications) and fairness (i.e., items measuring only the construct under investigation without being biased based on background factors). Without well-aligned theoretical framing and assessment validity, educational researchers have been found to publish conflicting findings (Gamoran et al., 2021). On the one hand, studies that utilized assessment instruments without strong alignment with social capital frameworks have found their work to be inconsistent with current studies (e.g., Perna and Titus, 2005; Sandefur et al., 2006)—thus contributing to scholarship that perpetuates confusion around the relationship between social capital and educational outcomes.

On the other hand, studies with assessment instruments with strong evidence of validity and alignment to the theory have started to build a crucial foundation for developing effective interventions. Benchmarking has been useful method for understanding the impact of interventions and performing comparison studies, as demonstrated by the Social Capital Bench Marking Survey, a survey used to benchmark the social capital of various communities across the United States (Easterling, 2011). Within higher education, Starobin et al. (2013), Chen and Starobin (2018, 2019), Johnson et al. (2016), Jorstad et al. (2017), and Kruse et al. (2015) developed and established validity evidence for the STEM Student Success Literacy (SSSL) Survey—a social capital assessment instrument well situated in

Coleman's (1988) definition of social capital and empirical studies on undergraduate students' social capital. For 7 years, Starobin et al. (2013) created a base of empirical social capital research well situated in strong theory and assessment principles. However, few studies utilize instruments with such strong alignment to social capital theory or evidence of validity. For effective educational interventions to be developed, there is a clear need for a foundational base of literature with rigorous assessment instruments rooted in social capital theory.

Our study synthesizes the operationalizations and methods available for assessing social capital in higher education. Specifically, our study aims to synthesize the types of quantitative assessment methods educational researchers utilize to measure social capital and we explore the forms of social capital most measured. We investigate the following research questions: (1) *How is social capital operationalized for use in higher education?* and (2) *What types of scaling and survey design techniques are used to assess social capital in higher education?*

2 Literature review

2.1 Seminal authors in social capital literature

Rooted in the work of sociologists such as Bourdieu (1986) and Coleman (1988), social capital can be used to explain differences in outcomes based on access to and use of resources found in one's network or relationships. While these principal theorists generally agree that social capital comprises the resources accessed from relationships, Bourdieu (1986), Lin (1999), Coleman (1988), and Putnam (1993) all had different definitions of social capital that influence the operationalization of social capital and the scaling and survey designs utilized. The interested reader may explore Mikiewicz (2021) and Li (2015) for a complete coverage of the differences between the seminal authors introduced.

2.1.1 Individual-based social capital

Historically, Bourdieu and Lin operationalize social capital as an individual's access to resources within their own personal networks. Bourdieu (1986) posited that social capital is “the aggregate of the actual or potential resources which are linked to possession of a durable network of ... relationships” (p. 21). Thus, access to social capital is dependent on the individual's (i.e., the ego) membership in a social network, that varies in size, heterogeneity, and amount of capital possessed by the individuals in the network (i.e., alters). Similarly, Lin (2001) defined social capital as “resources embedded in one's social networks, resources that can be accessed or mobilized through ties in the networks” (p. 4). Lin (2001) posited three sources of social capital: structural positions, network location, and purpose of action. Structural position and network location refer to network characteristics of the individual and the people in their networks who provide the resources (the alters), whereas purposes of action refers to the intent of the actions, such as providing expressive or instrumental supports (Lin, 2001). Expressive actions provide supports for the individual's mental or physical health while instrumental actions provide tangible supports that help an individual access and achieve a goal (e.g., obtaining a scholarship, getting a new job). Lin (2001) posited that expressive actions come from close ties where “dense

networks benefit the sharing and mobilizing [of] resources,” and instrumental actions are accessed through weak ties, where resources are accessed through multiple connecting or “bridging” relationships (p. 15). Lin and Bourdieu emphasized network characteristics as important factors in one’s accrual of social capital, which can be seen in assessment methods such as Lin’s (2001) position generators and Wasserman and Faust’s (1994) social network analysis.

Another established conceptualization of social capital, based on Bourdieu’s work, is Nahapiet and Ghoshal’s (1998) framework for structural, relational, and cognitive social capital. While the three dimensions can be assessed separately, they are interrelated and commonly measured together for a more comprehensive understanding. Structural social capital refers to the individual’s possession of a social network. Cognitive and relational social capital both refer to shared feelings and values, where cognitive is one’s shared values and attitudes with others and relational is their mutual trust and expectations.

2.1.2 Community-based social capital

While Bourdieu and Lin focused on the individual, Coleman (1988) and Putnam (1993) defined social capital in terms of the collective good, where resources exist in relationships, social organizations, and strong community. Social capital as a collective good supports the individual through “social networks and the norms of reciprocity and trustworthiness that arise from them” rather than the individual’s specific alter-ego network (Putnam, 1993, p. 19). Coleman’s (1988) definition of social capital views the resources in collegiate organizations and programs as a public good available to those involved in the organization. Similarly, Putnam’s (1995) definition focuses on social organizations and the “networks, norms and trust that facilitate action and cooperation for mutual benefit” (p. 65). Putnam defined two key forms of capital: bonding and bridging capital. Bonding social capital is capital accessed through close, in-group ties, whereas bridging capital is accessed through weak, bridging ties (Putnam, 2000).

Based on Putnam’s work, Shiri et al. (2013) developed a framework of social capital as shared social structures, where social capital is measured as “social trust, norms and values, social communication and common objectives, which prepare individuals for collective action” (Gholami et al., 2020, p. 510). The framework operationalizes themes of social trust, social values, and communication with seven factors: social values, social trust, social networks, social cohesion, social participation, social communication, and sharing knowledge.

2.2 Measurement consensus in social capital literature

Little in the way of synthesis on methods and operationalizations is available to those interested in assessing social capital, save for a few reviews and studies by seminal authors. Some reviews have examined the role of social capital in higher education (Dika and Singh, 2002), specifically focused on underrepresented students (Mishra, 2020), or have explored measures more generally (Engbers et al., 2017); however, these reviews offer little synthesis on the types of quantitative methods used in higher education. Lin (1999) posited three methods (social network analysis, name generators and position generators) and a working definition of social capital (embedded resources and

network locations). Work by van der Gaag et al. (2008) and van der Gaag and Snijders (2004) posited three common methods for measuring social capital: name generators, resource generators, and position generators. However, little to no work has confirmed if these methods and operationalizations are well utilized in the literature. This study was born from the lack of available synthesis on methods and measures established from social capital theorists and seeks to provide recommendations for seeking an establish measure.

3 Methods

We utilized a systematic literature review to examine quantitative social capital assessment instruments for students entering higher education and those who are in higher education following guidelines established by Borrego et al. (2014) and Grant and Booth (2009).

3.1 Literature search procedures

First, we identified a search string aligned with our research questions that was based on the literature and previous work (Mishra, 2020). We queried nine databases; eight databases (searched through EBSCOhost) were chosen for their education-relevant literature. The ninth database, Web of Science, was selected to provide a broader, more comprehensive search. Per the guidelines established by Grant and Booth (2009), we utilized a similar search string when querying the nine databases with variations of the words “social capital,” “assessment,” and “undergraduates.” The search was restricted to journal articles in English and full-length papers published from 1980 to September 2022. All variations and databases are listed in Table 1.

3.2 Eligibility criteria

From the search strings, we queried 452 full-length, peer-reviewed journal articles from eight databases through EBSCOhost and 210 full-length, peer-reviewed journal articles from Web of Science. Once duplicates were removed (282 articles), we reviewed the remaining articles on how well they met the inclusion and exclusion criteria.

TABLE 1 Results of the number of articles queried from the databases with the specific search string.

Search string	Database	Results
(“social capital” OR “social capital theory”) AND (assessment OR evaluation OR measurement OR survey OR instrument) AND (“undergraduate students” OR “college students” OR “university students” OR undergraduates) NOT (facebook OR “social networking sites”)	ERIC	130
	Education source	89
	APA PsycInfo	90
	Education full text (H. W. Wilson)	81
	Psychology and behavioral sciences collection	24
	Educational administration abstracts	24
	Social sciences full text (H. W. Wilson)	14
	Web of science	210

To be included

- Quantitative assessment instruments discussed are clearly aligned with social capital or constructs that the authors relate to social capital (e.g., social capital measures as social interactions, networking, etc.),
- Participants must be entering undergraduate education (i.e., high school seniors, non-traditional students, etc.) or be current undergraduates,
- Articles were published between 1980 to September 2022.

Articles were excluded if

- Instruments are not aligned with social capital theory,
- Study is not situated in higher education or study uses students in higher education but is not about higher education (i.e., health outcomes or social media use),
- No quantitative measures for social capital (i.e., only qualitative) are included,
- Study did not appear in a peer-reviewed journal, or
- No full-length paper was available, or paper was not accessible in English.

Many valuable higher education social capital assessments are qualitative in nature (Martin et al., 2013; Palmer and Gasman, 2008; Soria and Stebleton, 2013) or focused on K-12 students (Croninger and Lee, 2001; Miller et al., 2024; Willis and Fitzpatrick, 2019). We purposely narrowed our search to undergraduate students, as measures of social capital vary between K-12, undergraduate and graduate students due to their differing social networks and supports needed.

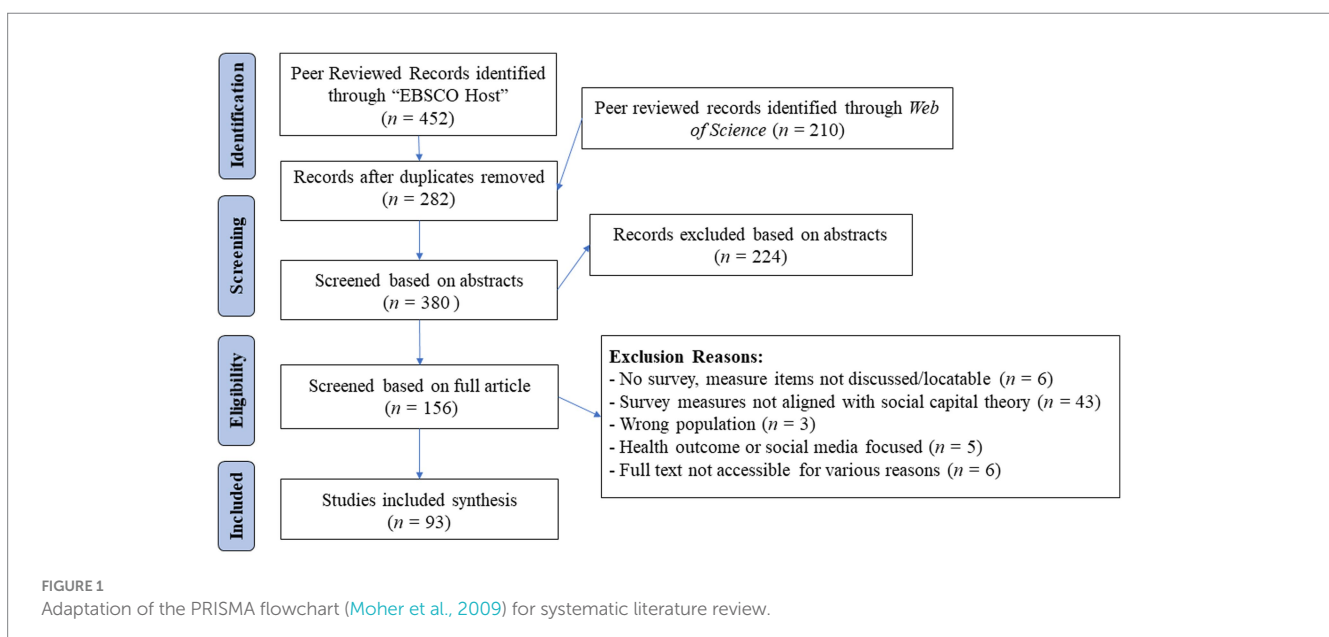
After removing duplicates, we screened 380 titles and abstracts based on the inclusion and exclusion criteria. We excluded 224 articles based on the eligibility criteria and selected 156 papers for full paper review. After applying the exclusion criteria, we reviewed 93 articles. The inclusion process can be seen graphically in Figure 1, a PRISMA

flowchart based on Moher et al.'s (2009) work on reporting items for systematic reviews.

We analyzed the selected papers by inductively and deductively coding for each research question. First, we deductively coded the methods and scaling designs using codes directly from the methods established by Lin (1999), van der Gaag et al. (2008) and van der Gaag and Snijders (2004)—such as, social network analysis and social capital generators. We found one additional code, dichotomous and Likert scales, which was not directly specified by Lin, van der Gaag or Snijders. Next, we analyzed how each paper operationalized social capital using deductive and inductive coding. Overarching themes, such as “social capital as actions” and “social capital as social networks” were deductively coded using Lin’s network theory of social capital (1999), Shiri et al.’s (2013) social structures, and Putnam’s bonding and bridging networks (1993). For our more detailed codes, we deductively coded measures based on frameworks by seminal authors (e.g., bonding and bridging capital) and emergently coded themes that were not well-situated within pre-existing frameworks (e.g., interactions, peer capital).

3.3 Reliability

We followed recommendations from Borrego et al. (2014) to avoid bias during the selection and analysis phases. As a team, we discussed search terms, methodology, and themes. Two researchers, one doctoral student, and one undergraduate researcher trained in social capital theory and higher education established inter-rater reliability for the initial screening phase and the analysis phase. The two researchers reviewed a random sample (30%) of the articles pulled at the abstract screening phase and a random sample (35%) of the articles selected for analysis. While all studies were screened and analyzed, due to time and financial constraints only 30% of studies went through the inter-rater reliability process, following guidelines for sample size presented by Sim and Wright (2005). Inter-rater reliability was calculated using Cohen’s κ , a



measure used to determine agreement of categorical or ordinal data for two or more raters (Gisev et al., 2013). Based on scale proposed by Landis and Koch (1977), the researchers were in “substantial agreement” during the initial screening stage ($\kappa = 0.69$). Next, Cohen’s κ was calculated for each research question. The inter-rater reliability for both research questions indicated that the two researchers were in substantial agreement ($\kappa_1 = 0.75$, $\kappa_2 = 0.68$).

4 Findings

4.1 Trends in the literature

We found that social capital theory was a widely used framework in studies published in a variety of journals—not all focused on higher education. The journals in this study feature multiple higher education contexts (e.g., *Journal of Postsecondary Education & Disability*, *Community College Journal of Research and Practice*, *Journal of Hispanic Higher Education*, *International Journal of Engineering Education*) and career development (e.g., *Journal of Career Assessment*). Additionally, social capital has been used in numerous other fields tangential to education, such as sports (e.g., *Journal of Sport Behavior*), public health (e.g., *Health Communication*), socio-economics (e.g., *Journal of Socio-Economics*), and more. We share these findings as understanding the context of the assessment is crucial in establishing its validity, reliability and fairness.

4.2 Findings related to RQ1: how is social capital operationalized for use in higher education?

In answering RQ1, social capital was operationalized by measuring social capital as (1) the characteristics of or interactions within the ego’s social network, (2) actions done by alters in the ego’s network (i.e., the resources shared, emotional support provided), (3) the shared values between the ego and their social network or community, and (4) proxy variables that do not directly measure social capital (e.g., number of siblings). See Table 2 and the Supplementary Table 1 for detailed information on the operationalization themes and papers analyzed.

4.2.1 Social capital measured as social networks

The most common operationalization of social capital utilized social network theory as the basis for assessment (74 studies). While all 74 studies assessed the ego’s social network as a measure of social capital, variations in how social networks were operationalized can be seen across the studies. A summary of the results from the review can be found in Table 2.

4.2.1.1 Social networks

In 13 of the 74 studies, social capital was operationalized as the presence of a network. Eleven studies utilized Likert or dichotomous scales to assess whether a student possessed a general or specific type of social network (e.g., presence of a college social network; Ahn and Davis, 2020; Anastasiadis et al., 2018; Edelman et al., 2016; Engberg and Wolniak, 2010; Gholami et al., 2020; Jemari et al., 2017; Kim et al., 2020; Nichols and Islas, 2016; Oja and Clopton, 2017; Tomlinson and

Jackson, 2021; Whitney et al., 2012). Three studies measured the presence of a social network by measuring social capital through various social capital generators (Engberg and Wolniak, 2010; Grace, 2017; Martin, 2013).

Fifteen studies measured specific network characteristics, such as density, network size, and strength of ties. Eight studies measured the ego’s available social capital through network characteristics through a name, resource, and position generator or social network analysis (Ahn, 2010; Daza, 2016; Häuberer and Brändle, 2018; Martin et al., 2014, 2015; Okpych and Gray, 2021; Rodrigues et al., 2019; Skvoretz et al., 2020). Four studies utilized both generators and Likert scales to assess both the characteristics of those who provided supports (name and position generator) and the type of relationship or types of supports being provided (Likert scales; Brouwer et al., 2016; Engberg and Wolniak, 2010; Gowdy and Hogan, 2021; Lee et al., 2018). Three studies relied on Likert or dichotomous scales to assess the ego’s social network—measuring social network characteristics such as “friend network density” (Cheung and Liu, 2017) and maintaining or connection of social network ties (Trieu et al., 2019; Perez-Macias et al., 2019).

Another subset of papers operationalized social capital by assessing the ego’s network ties through bonding and bridging capital. Seven studies assessed both bridging and bonding social capital while 13 studies only assessed bridging social capital (e.g., Ma and Bennett, 2021; Trieu et al., 2019; Yu and Wang, 2019). Eleven of the 13 studies assessed the students’ bridging and bonding capital through Likert scales, often through Williams (2006) Internet Social Capital Scale for bonding and bridging social capital.

4.2.1.2 Interactions

A subset of papers focused on alter-ego “interactions” rather than looking at the ego’s network. Thirty-five studies measured “interactions” between the ego and their alters through Likert or dichotomous scales—including interactions with specific alter positions (i.e., parents, faculty, friends; e.g., Wang et al., 2018), frequency of interactions (Daza, 2016; Lingo, 2020), and the quality of each interaction measured as the perceived quality or the quality of the resources provided (e.g., Havelka, 2016; McCallen and Johnson, 2019). Interactions between the ego and alters may be labeled as forms of capital, such as faculty, academic, or college capital (e.g., Chen and Starobin, 2019); peer capital (e.g., Brouwer and Jansen, 2019); and family capital (e.g., Gao and Ng, 2017).

4.2.1.3 Networking

Lastly, four studies operationalized social capital as social networks through the literal act of networking. Four papers measured the ego’s participating in networking behavior or having networking skills (e.g., Tomlinson and Jackson, 2021) as an indicator of an ego’s potential or accessed social capital.

4.2.2 Social capital measured as actions

The next most common operationalization of social capital focuses on the “purposes of actions” (Lin, 2001). Most studies we found did not specifically reference Lin’s purposes of actions (i.e., expressive and instrumental actions); however, we frequently saw measures and items include terms such as “social supports” and “information related capital.” In 29 studies, instrumental supports were commonly measured by asking the respondent if they had someone who could provide them information (i.e., a name generator;

TABLE 2 Summary of results for common operationalizations of social capital.

Measure of social capital	Description	No. of papers
Social capital as social networks		
<i>Social networks</i>	Measures include presence of social network, social network characteristics, the connection to social networks and the maintaining of social networks	27
<i>Social interactions</i>	Measures include the position of the alter, the frequency and quality of the social interaction.	35
<i>Networking</i>	Measures include the ego's networking skills or behaviors.	4
<i>Bridging capital</i>	Measures include access to or how embedded one is in networks outside of one's close network.	13
<i>Bonding capital</i>	Measures include trust and supports from close networks or how embedded one is in their social network.	7
Social capital as actions		
<i>Instrumental actions</i>	Measures include access to resources, services, or information (academic or career related).	28
<i>Expressive actions</i>	Measures include emotional support from peers, faculty, family in network.	10
<i>Structural social capital</i>	Measures include network ties and configurations.	3
<i>Cognitive social capital</i>	Measures include values, goals, and attitudes.	3
<i>Relational/behavioral social capital</i>	Measures include trust and expected norms.	3
Social capital as shared values		
<i>Shared social structures</i>	Measures include social trust, social values, and communication.	6
<i>Trust</i>	Measures include one's trust for alters in their networks.	12
Proxy variables		
<i>"Proxy" social capital variable</i>	"Proxy" measures include friend and family variables.	16
<i>Community participation</i>	A "proxy" measure of social capital that includes participation in political, school, or religious communities.	13

Studies with multiple operationalizations are counted more than once. For full information on papers that utilize each operationalization, see the [Supplementary Table 1](#).

e.g., [Gowdy and Hogan, 2021](#)), someone who provided access to resources (i.e., a resource generator; e.g., [Dika and Martin, 2018](#)), or if they had interactions with alters in specific positions (i.e., peer, faculty, family) that provided college-related information or resources (i.e., Likert scale; e.g., [D'Amico et al., 2019](#)). Eleven studies measured social capital as expressive actions, but their measurement of expressive actions were limited—only a few items related to positive interactions with alters (e.g., [Etcheverry et al., 2001](#)). Expressive actions were more common in papers that were concerned with supporting students' well-being (e.g., [Abbas et al., 2020](#); [Yu et al., 2021](#)).

4.2.3 Social capital measured as shared values

A less common operationalization found was measuring shared values through social participation, communication, values, and trust. We have created the umbrella operationalization of shared values to encompass three separate operationalizations: [Nahapiet and Ghoshal's \(1998\)](#) structural, cognitive, and relational/behavioral social capital, [Shiri et al.'s \(2013\)](#) shared social structures, and social capital as trust. The theme of shared values is commonly in conjunction with additional themes such as social communication, social networks, and social participation.

Four studies utilized [Nahapiet and Ghoshal's \(1998\)](#) framework for structural, cognitive, relational, and behavioral social capital. In total, three studies assessed structural capital (e.g., [Jiang et al., 2021](#)), three studies measured cognitive capital (e.g., [Mato and Tsukasaki, 2019](#);) and three studies assessed relational/behavioral capital (e.g., [Sotaquira et al., 2022](#)).

Six studies operationalized social capital as [Shiri et al.'s \(2013\)](#) shared social structures, measuring a combination of the seven

conceptual framework factors and other additional factors such as cultural values, social integration, social coherence, social confidence, and social cohesiveness (e.g., [Adaryani et al., 2014](#); [Galambahri et al., 2015](#); [Shiri and Naderi, 2015](#)). Most commonly, papers measured four to six factors, the most common factors being social participation ([Adaryani et al., 2014](#); [Galambahri et al., 2015](#); [Gholami et al., 2020](#); [Khosravani, 2016](#)), social values ([Gholami et al., 2020](#); [Khosravani, 2016](#); [Shiri and Naderi, 2015](#)), and social cohesion ([Gholami et al., 2020](#); [Khosravani, 2016](#); [Shiri and Naderi, 2015](#)).

Lastly, twelve studies measured trust as an indicator of social capital. These studies generally paired measuring trust with bridging capital, social interactions, and exchange of information (instrumental actions; e.g., [Perez-Macias et al., 2019](#); [Sotaquira et al., 2022](#)). Trust, while not explicitly an expressive action, was measured similarly. For example, [Brouwer and Jansen \(2019\)](#) operationalized trust as "the extent to which members of the learning community could rely on one another for support" (p. 225).

4.2.4 Social capital measured through proxy

The last operationalization found was the use of proxy variables as indicators of social capital. Utilizing proxy variables such as family engagement and involvement in organizations is rooted in early social capital work, with [Coleman \(1994\)](#) assessing social capital through involvement in religion. [Sandefur et al. \(2006\)](#) noted that the use of proxy variables can be valuable for assessing social capital as ego-alter interactions are hard to assess; however, some variables can be misleading, such as the number of siblings in a family, since the true social capital can only be measured by direct measures related to the relationship. The 29 studies utilizing proxy variables were categorized into three types of

variables: friend background, family background, and community participation. Friend background variables generally measured the number of friends attending college (Kim et al., 2020; Nichols and Islas, 2016; Settle, 2011). Family variables often focused on family background and values; for example, items often measured socioeconomic status, parents' background (i.e., education level), family structure (e.g., number of siblings), parental support, and expectations around education (e.g., Johnson et al., 2016; Wagner, 2015). Community variables included participation in specific communities such as political (e.g., participation in the communist party in China), school-based (e.g., participation in after-school sports) and religious (e.g., attending church; Lisnyj et al., 2021; Park, 2012).

4.3 Findings from RQ2: what types of scaling and survey design techniques are used to assess social capital in higher education?

In RQ2, we found 6 types of scaling and survey designs: social capital generators, social network analysis and Likert and dichotomous scales. Social capital generators (e.g., name, resource and position generators) and social network analysis are strong, direct measures of social capital, whereas Likert and dichotomous scales were found to be less aligned with social capital theory. See Table 3 and the Supplementary Table 2 for detailed information on the scaling and survey designs and papers analyzed.

4.3.1 Generators

Name generators, position generators, and resource generators all appeared in the literature by seminal authors and our study articles (see Table 3). Name generators prompt the participant to list a certain number of alters that have contributed to the participant's social capital in a specific way (McCallister and Fischer, 1978; Wellman, 1979). From the listed alters, network characteristics are collected, such as the "position" of the alter (i.e., employment position), type of relationship, length of relationship, quantity of communication, and other aspects of the relationship. Since name generators prompt students to list the names of alters that they can think of in a survey setting, name generators tend to focus on measuring close, bonding relationships (McCallister and Fischer, 1978). In this literature review, name generator prompts often encouraged students to think of those with whom they had discussed school and personal topics. On average, the name generators prompted students to think of five to 10 alters. Data collected from name generators acted as a method to

collect network characteristics that were later examined using social network framework and social network analysis methods (e.g., Ahn, 2010; Okpych and Gray, 2021; Rodrigues et al., 2019).

Position generators ask respondents to think of alters with specific social positions that provide access to resources (Lin, 2001). Although they are less common than name generators, Lin (2001) posited that the value of focusing on an alter's structural position lies in the capital that position conveys. In the four position generators found in this review, the prompts focused on collecting the position of the person who provided educational guidance, such as being influential college-related decisions (Engberg and Wolniak, 2010; Liu, 2020; Skvoretz et al., 2020) or supporting them in academic endeavors (Martin, 2013). The specified alter positions prompted in the instruments fall into two categories: type of job (teacher, counselor) or name of relationship to the ego (parent, friend, relative, or peer).

Resource generators ask respondents to think of (an unspecified) alter who supports them and to record, through dichotomous or Likert scale, if they have someone who provides the listed resource (van der Gaag and Snijders, 2005). Within this study, all papers utilizing a resource generator utilized the original or an adapted form of van der Gaag and Snijders' Resource Generator, entitled *Survey on the Social Networks of the Dutch*. This resource generator measures social capital broadly, querying about available forms of social capital in the respondent's personal, financial, and work lives. In this study, three studies utilized all or parts of the *Survey on the Social Networks of the Dutch* (Brändle, 2017; Grace, 2017; Häuberer and Brändle, 2018). Three studies adapted the survey to better suit an educational context by measuring the specific instrumental and expressive educational resources available to students (Dika and Martin, 2018; Martin et al., 2014, 2015). Additionally, these studies addressed multiple methods of accruing capital by using a combined name and resource generator (Dika and Martin, 2018; Martin et al., 2014, 2015).

4.3.2 Social network analysis

Social network analysis is a method for collecting and assessing social capital from a network perspective (Lin, 1999; Wasserman and Faust, 1994). Generally, social network analysis examines the social capital available in networks through metrics such as network size; connections or betweenness for alters; heterogeneity, density, distance, tie strength, and other measures of alter network location. The type of social network measures depends on if the network is "open" or "closed," where closed networks are closely knit networks where alters may know each

TABLE 3 Summary of the assessment types found in the literature.

Assessment type	Description and use	No. of papers
Name generators	Collects names of alters and characterization of relationships.	8
Position generators	Similar to name generators, but positions are listed instead of names.	4
Resource generators	Records if any person provided a specific resource.	4
Combined generators	Collects names of alters who provide specific resources and collects additional resources provided.	2
Social network analysis	Characterizes relationships between alters and ego through specific network characteristics.	5
Survey (Likert or dichotomous)	Includes scales developed for measuring social capital or aligned pre-existing survey data with social capital theory.	80

Studies with multiple operationalizations are counted more than once. For full information on papers that utilize each assessment type, see the Supplementary Table 2.

TABLE 4 Summary of common scales used to assess social capital.

Scale (No. of papers)	Citation	Description	Sample Item
National survey of student engagement (4)	Kuh (2001)	Instrument used to measure student engagement in educational practices.	Indicate the quality of your interactions with the following people at your institution (Choice of Faculty)
National educational longitudinal study/Education longitudinal study (2)	Ingels et al. (1998, 2004)	Longitudinal surveys with middle and high school students focusing on school, work, home experiences, educational resources, the role of parents/peers, neighborhood traits, educational and occupational aspirations.	Where have you gone for information about the entrance requirements of various colleges? (List of institutional alters)
Informal and formal social interaction scales (2)	Meeuwisse et al. (2010)	Instrument consisting of multiple scales on informal and formal interactions between students-teachers and students-peers.	Fellow students invite me to work together on school tasks?
Survey on the social networks of the Dutch* (4)	van der Gaag and Snijders (2005)	Resource generator that measured 33 social resources that would be useful to the general population.	Do you know anyone who... has higher vocational education?
STEM student success literacy survey (5)	Starobin et al. (2013); Myers et al. (2012)	Online instrument that measures community college students' self-efficacy, social capital, and transfer knowledge.	Discussed career plans and ambitions with a faculty member?
Internet social capital scale (7)	Williams (2006)	Two scales used to assess bonding and bridging capital in the Internet age.	The people I interact with online/offline would be good job references for me.
Multidimensional scale of perceived social support (2)	Zimet et al. (1988)	Instrument measures self-reported social supports from family, friends & significant other.	I get the emotional help and support I need from my family.
Social capital assessment tool (2)	Krishna and Shrader (1999)	Quantitative portion of the instrument assess structural and cognitive social capital	Students/faculty at this university are always interested only in their own welfare here

*More commonly referred to as van der Gaag and Snijders' (2005) resource generator. For full information on papers that utilize each assessment instrument and/or scale, see the Supplementary Table 3.

other (Granovetter, 1973). For example, closed networks, such as mentoring networks or programs found in this review, allow for assessment of the network between alters as there is a finite number of alters (Ahn, 2010; Okpych and Gray, 2021). Papers in this review collected data for open networks using name generators, where not all of the alters listed were located in the same network, and the measures captured the relationship between the alter and the ego (e.g., Martin, 2013; Rodrigues et al., 2019). The most common measures found in this review assessed students' quality of ties by examining the closeness, strength, or frequency of contact between the ego and their alter.

4.3.3 Surveys

Surveys, both Likert and dichotomous scales, were the most common method of assessing students' social capital. Three common types of survey were identified in this review: (1) survey items created for the specific study, (2) survey items from previously validated instruments, and (3) survey items that were proxy variables from large-scale studies. Multiple studies utilized instruments that were used frequently, indicating some standardization of measuring specific methods or constructs, such as van der Gaag and Snijders' (2005) resource generator and Williams's (2006) Internet Social Capital Scale. Of the 80 studies that utilized surveys in this literature review, 16 surveys utilized proxy variables. We define proxy variables as the use of pre-existing surveys or data sets that were originally collected to measure constructs other than social capital (e.g., university satisfaction) and have been reinterpreted to measure social capital. These studies generally used large datasets from national longitudinal

studies such as the National Educational Longitudinal Survey, the National Longitudinal Survey of Freshman, and National Survey of Student Engagement (Beattie and Thiele, 2016; Dika, 2012; Sandefur et al., 2006; Wagner, 2015). Instruments utilized in more than one study in this literature review are summarized in Table 4 and Supplementary Table 3.

5 Discussion

We sought to establish common methods and operationalizations that can be used to assess social capital in higher education to start a conversation of consensus around assessing social capital. Our research aligns with seminal researchers' limited synthesis of assessment methods and operationalizations; specifically, we found that the methods shared by Lin (1999; e.g., name generator, position generator, and social network analysis) and van der Gaag and Webber (2008; e.g., social capital generators and social network analysis) were represented in our literature review. The operationalizations that Lin (1999) posited, assessing social capital as network locations (e.g., strength of tie) and embedded resources (e.g., network resources), also appeared in our review. Network characteristics, such as frequency and strength of tie, were among frequent operationalizations we found. Multiple instruments measure the range of embedded resources provided such as access to financial, family, and academic capital. While these reviews still reflect instruments used in social capital research, they are limited in their accuracy and prevalence.

5.1 Operationalizations of social capital (RQ1)

Common operationalizations found in the literature generally provided surface level information about the alters in a students' network rather than assessing students embedded social capital. Seventy-four of the 93 studies we reviewed utilized social networks and interactions, but these common operationalizations are limited. For example, operationalizations such as “the presence of a social network” or the “interactions between alter and ego” are not well aligned with theory, as they do not capture the access or mobilization of resources for expressive or instrumental gain. Similarly, some studies measured interactions with specific types of alters or measure the quality through perceived understanding or frequency, which provides limited information about actual capital embedded in those relationships.

Instead, more direct measures operationalized social capital as resources available through ones' social network—as seen in studies that measure network characteristics and/or resources accessed through network interactions (e.g., Brouwer et al., 2016; Gowdy and Hogan, 2021; Perez-Macias et al., 2019). Network characteristics, such as density, heterophily and quality of ties, and embedded resources, were less common, but strong in the sense that they are developed from Lin's (2001) operationalization of social capital as network locations and Bourdieu (1986) as network density and heterophily. When selecting or developing measures of social capital, researchers should intentionally select direct indicators of social capital (e.g., networks, actions, shared values) rather than relying on weak measures, such as proxy indicators.

5.2 Social capital scaling and survey design techniques (RQ2)

We found that Likert and dichotomous survey designs ($n = 80$) were used significantly more than social capital generators and social network analysis, despite lacking alignment with theory or endorsement by seminal authors, such as Lin (1999) and van der Gaag and Webber (2008). Many of the studies present developed their own items without consulting the literature for existing instruments or establishing validity evidence. Consequently, assessment instruments and their items were poorly aligned with social capital theory—a sentiment shared by Engbers et al. (2017) who posits there has been “a tremendous loss in theoretical purity from Bourdieu's time” (p. 550). A preferable strategy used by some of the studies ($n = 25$) was to use pre-established instruments (see instruments in Table 4). Selecting direct, pre-established measures will ensure the traits being measured are aligned with social capital theory, establish additional validity evidence for the assessment, and contribute to the ongoing conversation of assessing social capital in higher education (Engbers et al., 2017). While Likert and dichotomous surveys are easier to distribute and analyze than social capital generators and network analysis, social capital generators and social network analysis directly measure either social network characteristics or the resources embedded in them. We found social capital generators to be some of the strongest methods to measure social capital, as they directly measure a student's access to resources and are developed from social capital theory (Lin, 2001). We recommend these methods, rather than creating new Likert scales; direct measures provide theoretical alignment and increase evidence of construct validity.

5.3 Trends in social capital research

While many studies contribute unique instruments, definitions, and operationalizations, little to no conversation is happening around already established methods that are based on the theory. We expected there to be cross-citations within the specific methods (e.g., name generator, social network analysis), but found no papers that cited other social capital study's methodology. Rather, authors cite seminal authors in the field of social capital as evidence for the aptness of their methodology and papers of similar domains or contexts. For example, Batistic and Tymon (2017), a study on networking behavior and employability, is cited by four other studies in this literature review, all focused on networking, employability, and entrepreneurship (Caballero et al., 2020; Gholami et al., 2020; Ma and Bennett, 2021; Perez-Macias et al., 2019). Cross-pollination of assessment methods is essential to building a strong body of available assessments and establishing benchmarks for students' levels of social capital. When assessing social capital in higher education, we should utilize established methods and instruments from current works and consider our role in providing strong validity evidence and guides for our instrument use.

International studies bring unique perspectives to social capital research with the addition of new operationalizations and frameworks. In the 24 international studies we analyzed, we found that cultural contexts (e.g., local religion, politics, and societal norms) played an important role in the definition and operationalization of social capital. For example, in Liu (2020), the author posits that guanxi networks, a specific type of social network that emphasizes trust and moral obligation to support, is fundamental to understanding social capital in Chinese culture. We encourage researchers to consider the role of contextual factors (e.g., societal norms, culture, politics, etc.) in their assessments. By being sensitive to these contexts, we can establish additional validity evidence for our assessments by accurately measuring students' cultural perceptions of their own social capital. Future work could perform meta-analysis of social capital assessment instrument results and assessment validity to strengthen the base of literature available for designing educational policies and interventions.

6 Conclusion and recommendations for future directions

Current higher education literature lacks consensus on how to define, operationalize, and measure social capital which creates challenges for the researchers selecting an appropriate method or operationalization when designing a study. In order for future assessments developed to positively contribute to higher education's understanding of students' social capital, there is a need for instruments with strong validity evidence and alignment to social capital frameworks. Our review identified several prominent trends in higher education literature: (1) social capital is frequently operationalized as social network characteristics, social interactions between ego-alter, and instrumental actions (2) Likert and dichotomous scales were the most used method, but often used proxy measures of social capital; (2) methods specifically developed for understanding social capital (e.g., name, resource, and position generators and social network analysis) appeared but were less common.

To develop a better understanding of how to support undergraduates' social capital, researchers should come to a consensus on what aspects of social capital are valuable to measure and what methods most directly assess social capital. In doing so, the literature would provide more evidence to inform practitioners in higher education. To assist in consensus forming, we propose the following based on our findings:

- Operationalizations and methods should be guided by a strong theoretical framework (Engbers et al., 2017), such as Lin's (2001) network theory of social capital;
- Operationalizations should measure direct indicators of social capital (e.g., actions from alters, interactions with alters, shared values with communities or alters) rather than proxy indicators (e.g., family size, participation in school sports);
- Survey measures should utilize a social capital generator (e.g., name, resource, or position generator) to directly assess the perceived support provided by alters in the network;
- Validation studies should be conducted before reporting the results;
- Established instruments, with evidence of validity, may be preferred for those not interested in developing new instruments.

Higher education researchers should consider these recommendations when considering how to best support undergraduate student success. We hope this review starts a consensus-based conversation on how best to assess social capital.

Data availability statement

The original contributions presented in the study are included in the article/[Supplementary material](#), further inquiries can be directed to the corresponding author.

Author contributions

AG: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing – original draft. JM: Conceptualization, Funding acquisition, Methodology, Project administration, Supervision, Validation, Writing – review & editing. KD: Conceptualization, Funding acquisition, Methodology, Project

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/feduc.2024.1498422/full#supplementary-material>

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