Pakistan Journal of Positive Psychology

Print ISSN : 3078-6428 | Online ISSN : 3078-6436
Pakistan Journal of Positive Psychology

Original Article

A Systematic Review of Social Capital Measures: Applicability and Limitations for Intersex and Transgender Populations

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KEYWORDS:
Social Capital, Measurement, Systematic Review, Intersex, Transgender, Populations

CITE THIS ARTICLE:
Hussain, S., & Habib, S. (2026). A systematic review of social capital measures: applicability and limitations for intersex and transgender populations. Pakistan Journal of Positive Psychology, 3(9), 162-175.

ABSTRACT

This systematic review aimed to identify, synthesize, and critically evaluate existing social capital measurement instruments, with a specific focus on their conceptual foundations, psychometric properties, and applicability to intersex and transgender populations. The review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021). Multiple electronic databases, including PubMed/MEDLINE, Scopus, Web of Science, PsycINFO, and Google Scholar, were searched. Studies were included if they described the development, validation, or application of social capital measures. Data extraction focused on instrument characteristics, theoretical frameworks, dimensional structure, psychometric properties, and population applicability. A narrative synthesis approach was used due to heterogeneity in study designs and measurement approaches. Twenty-one social capital instruments were included. The selected instruments demonstrated substantial heterogeneity in conceptualization, dimensional structure, and theoretical grounding, with most relying on domains such as bonding, bridging, structural, and cognitive social capital frameworks. Internal consistency was generally acceptable to strong (Cronbach's α = .70 to .94). However, evidence for measurement invariance, longitudinal validity, and cross-population comparability was limited. Linking social capital was underrepresented across social capital measures. Furthermore, no instrument was explicitly designed for intersex or transgender populations, and only one partially addressed the relational structures of gay and bisexual men (GBM) through constructed family networks. Existing social capital instruments demonstrate acceptable psychometric properties but remain conceptually fragmented and structurally exclusionary. Future research should prioritize the development of inclusive, intersectional, and theoretically integrated measurement frameworks that better capture diverse social realities.

I. INTRODUCTION

Social capital is a multidimensional construct broadly defined as the resources embedded within social relationships, networks, and institutional ties that individuals can access to achieve health, economic, and social benefits (Bourdieu, 1986; Lin, 2001; Ehsan et al., 2019). Despite its widespread use across disciplines such as public health, sociology, and psychology, there remains no universally agreed definition or measurement framework, largely due to conceptual fragmentation and variation in operationalization across contexts (Villalonga-Olives &

Kawachi, 2015; Mishi et al., 2023). As a result, social capital is often measured inconsistently, with instruments reflecting divergent theoretical traditions, including structural (network-based) and cognitive (trust and reciprocity-based) approaches (Kawachi & Berkman, 2000; Szreter & Woolcock, 2004). Existing measurement frameworks of social capital have been primarily developed and validated in general population samples or within specific demographic groups such as adolescents, students, or community-based adult populations (Carrillo-Álvarez et al., 2019; Ahlborg et al., 2022). Systematic reviews of social capital instruments demonstrate substantial heterogeneity in constructs measured, including bonding, bridging, and linking social capital, as well as variation in psychometric quality and theoretical grounding (Uphoff et al., 2013). However, a consistent limitation across these instruments is the limited involvement of marginalized populations in scale development and validation processes, raising concerns about content validity and contextual relevance across diverse social groups.

This limitation is particularly important in relation to intersex and transgender populations, who experience distinct social structures, identity-related stigma, and network configurations that may not be adequately captured by conventional social capital measures developed for cisnormative or general population samples (Grant et al., 2011; Reisner et al., 2016). Transgender individuals, for example, often navigate fragmented social networks shaped by discrimination, exclusion from family systems, and reliance on chosen families or community-based support structures, which differ substantially from the assumptions embedded in traditional social capital instruments (Bockting et al., 2013). Similarly, intersex individuals may experience unique forms of social isolation and medicalization that further complicate the applicability of standard measures designed without consideration of sex and gender diversity (Jones, 2016). Although emerging research has begun to adapt social capital measures for sexual and gender minority populations, these efforts remain limited and are rarely designed specifically for intersex and transgender communities as distinct analytical groups. For instance, modified network-based social capital instruments have been shown to demonstrate acceptable psychometric properties among gender minority individuals, yet they are typically adaptations of tools originally developed for other populations rather than instruments designed de novo with community-specific conceptual frameworks (Zarwell et al., 2021).

Given the increasing recognition of social capital as a determinant of health and well-being, particularly in relation to mental health, HIV prevention, and access to care among marginalized groups, it is critical to evaluate whether existing measurement tools are conceptually and methodologically appropriate for intersex and transgender populations (Meyer, 2003; World Health Organization, 2014; Holt-Lunstad, 2018). Without such evaluation, there is a risk of systematic measurement bias, underestimation of social resources, and misrepresentation of social resilience within these populations. Therefore, this systematic review aims to critically examine social capital instruments developed in populations other than intersex and transgender individuals, with a focus on their conceptual applicability, psychometric validity, and contextual limitations when considered for use in these populations. By identifying gaps in measurement frameworks, this review contributes to advancing more inclusive, equitable, and contextually valid approaches to assessing social capital in gender-diverse communities.

II. METHOD

Study Design

This study employed a systematic review design to identify, evaluate, and synthesize existing evidence on social capital instruments and their applicability to intersex and transgender populations. The review followed the PRISMA 2020 statement to ensure transparency, reproducibility, and methodological rigor (Page et al., 2021). Systematic review methodology was selected because it enables the structured comparison of heterogeneous measurement tools and is widely used in social capital research to address conceptual and operational inconsistencies (Villalonga-Olives & Kawachi, 2015; Uphoff et al., 2013).

Search Strategy

A comprehensive literature search was conducted across multiple electronic databases, including PubMed/MEDLINE, Scopus, Web of Science, PsycINFO, and Google Scholar. The search approach integrated both controlled vocabulary and free-text terms associated with social capital and its measurement, including: “social capital,” “social capital measurement,” “social capital scale,” “questionnaire,” “instrument,” “validation,”

"psychometric," and "network measures." Boolean operators (AND/OR) were utilized to refine the search results. This search strategy was guided by previous systematic reviews concerning social capital measurement, which emphasize the diversity of instruments and the lack of standardized tools across different populations (Villalonga-Olives & Kawachi, 2017; Ahlborg et al., 2022). Furthermore, reference lists from the included studies and pertinent reviews were manually examined to find additional qualifying studies.

Eligibility Criteria

Studies were included if they met clearly defined criteria relevant to the objectives of this review. Eligible studies comprised empirical research, methodological papers, or validation studies that focused on the measurement of the social capital construct. In particular, studies were required to describe the development, adaptation, validation, or application of social capital measurement tools using quantitative or mixed-methods approaches. Research conducted in any population group was considered, with the exception of studies exclusively designed for intersex or transgender populations, as the review aimed to identify gaps in applicability to these groups. Additionally, only articles published in peer-reviewed journals and written in English language were included. Studies were excluded based on several criteria to ensure methodological rigor and relevance. Articles that focused solely on theoretical discussions of social capital without incorporating measurable components were not considered. Similarly, studies lacking sufficient methodological detail regarding the instruments used were excluded. Purely qualitative studies that did not employ or develop measurable instrument frameworks were also omitted. Furthermore, editorials, commentaries, and conference abstracts without complete empirical data were excluded from the review. This approach aligns with prior methodological syntheses that emphasize inclusion of validated and operational measurement frameworks for comparative instrument analysis (Uphoff et al., 2013; Villalonga-Olives & Kawachi, 2017).

Study Selection

All retrieved records were imported into a reference management system, and duplicates were removed. Two independent reviewers screened titles and abstracts for relevance. Full-text screening was subsequently conducted against inclusion criteria. Disagreements were resolved through discussion and consensus, ensuring methodological reliability and minimizing selection bias. The screening procedure followed PRISMA recommendations for transparent study selection and reporting (Page et al., 2021).

Data Extraction

A standardized data extraction form was developed and piloted prior to full extraction. Extracted variables included:

- Author(s) and year of publication
- Country and study settings
- Target population
- Type of social capital (bonding, bridging, linking, or composite)
- Instrument name and structure
- Theoretical framework underpinning the measure
- Psychometric properties (validity and reliability)
- Level of measurement (individual, community, or multilevel)
- Evidence of adaptation or cultural modification

Data extraction was guided by established approaches used in previous social capital measurement reviews, which emphasize variability in conceptual and operational definitions across studies (Villalonga-Olives & Kawachi, 2017; Szreter& Woolcock, 2004).

Quality Assessment

Methodological quality of included studies was assessed using criteria adapted from psychometric evaluation frameworks, including validity (content, construct, and criterion validity), reliability (internal consistency and test–retest reliability), and measurement transparency. Given the diversity of instruments, a standardized scoring system was not applied; instead, a narrative critical appraisal approach was used, consistent with prior systematic

reviews of social capital measures (Uphoff et al., 2013; Ahlborg et al., 2022). This approach is recommended when synthesizing heterogeneous measurement tools across disciplines.

Data Synthesis

A narrative synthesis approach was used due to the expected heterogeneity in study designs, populations, and measurement instruments. The synthesis focused on:

- Conceptual definitions of social capital used in instruments
- Structural differences across measurement tools
- Validity and reliability evidence
- Applicability gaps for intersex and transgender populations

Thematic grouping was conducted based on established classifications of social capital, including bonding, bridging, and linking dimensions (Kawachi & Berkman, 2000; Szreter & Woolcock, 2004). Special attention was given to identifying structural and conceptual limitations in applying existing tools to gender-diverse populations.

Ethical Considerations

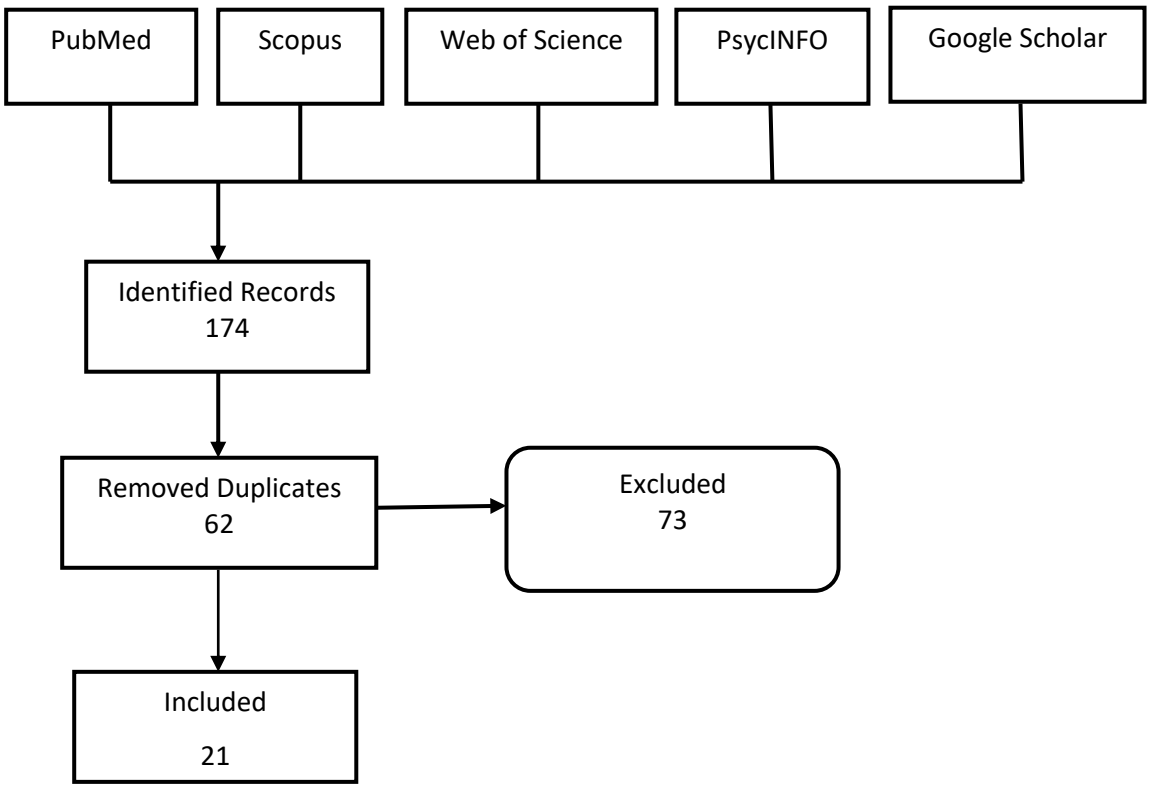
As this study involved analysis of published literature only and didn't directly involve human participants therefore, formal ethical approval was not required. However, other strict ethical principles were applied, particularly in relation to the representation of marginalized populations and the avoidance of epistemic exclusion in measurement frameworks. Moreover, accurate citation of sources, transparent reporting procedures, and objective synthesis of study findings were other ethical considerations of this systematic review.

III. RESULTS

Study Selection

The systematic search identified 174 records, of which 62 duplicates were removed. A total of 112 titles and abstracts were screened, resulting in the exclusion of 73 records. Subsequently, 39 full-text articles were assessed for eligibility, leading to the inclusion of 21 studies that met the predefined criteria (see Figure 1). The selection process adhered to the PRISMA 2020 framework (Page et al., 2021). The final sample comprised 21 distinct social capital instruments developed, translated, adapted, or psychometrically validated across diverse sociocultural settings. Considerable heterogeneity was observed in conceptual definitions, dimensional structures, and validation procedures, supporting previous findings regarding fragmentation in social capital measurement (Uphoff et al., 2013; Villalonga-Olives & Kawachi, 2017).

Figure I: Search Strategies and Results in Present Study



Characteristics of Included Studies

The included studies represented diverse geographic and sociocultural contexts across North America, Europe, Asia, Australia, Africa, and several low- and middle-income countries (LMICs). Instruments were developed or validated among university students, adolescents, employees, healthcare workers, nurses, pregnant women, and community-based adult populations. Sample sizes ranged from approximately 131 participants to more than 48,000 individuals. Most measures focused on adult and workplace populations, whereas relatively few addressed marginalized or socially vulnerable groups. Across the reviewed literature, 21 social capital instruments were identified (see Table 1), reflecting substantial variability in conceptualization and measurement structure. Instrument length ranged from brief 6-item scales to comprehensive measures containing over 100 items. Most measures used Likert-type response formats and psychometric analyses such as Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), construct validation, reliability analysis, and multilevel modeling (Kouvonen et al., 2006; Berthelsen et al., 2019). Internal consistency estimates were generally acceptable to excellent, with Cronbach's alpha coefficients ranging from .70 to .94 (Nunnally & Bernstein, 1994). Particularly strong reliability was observed in workplace-oriented instruments such as the Bonding Workplace Social Capital Scale (BWSC) and the Workplace Social Capital Scale (WSCS) (Eguchi et al., 2017; Tsounis et al., 2023).

Table I: Summary of the Social Capital Measures

Sr. No.	Measure	Population (Sample Size & Age Range)	Test Characteristics	Analysis Methods	Scale Status	Country	Type of Social Capital	Theoretical Framework
1	Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988)	University students and adults; approximately N = 275–300; ages 18–39 years	12 items; 7-point Likert scale; α = .85–.91	EFA, CFA, reliability analysis	Developed	USA	Bonding	Social Support Theory (Cobb, 1976; House, 1981)
2	Social Capital Assessment Tool (SCAT; Krishna & Shrader, 1999, 2000)	Community households; approximately N = 300–1,000 adults; age 18+	60 items; mixed responses; α = .70–.85	Content validation, EFA, reliability analysis	Developed and adapted	Panama & India	Structural & Cognitive	Social Capital Framework (Putnam, 1993, 2000; Grootaert & van Bastelaer, 2002)
3	Integrated Questionnaire for the Measurement of Social Capital (IQ-MSC; Grootaert et al., 2004)	Adult household respondents; typically N > 1,000; age 18+	95–120 items; categorical/Likert responses	Content validation, field testing, reliability analysis	Developed	Global/World Bank	Structural & Cognitive	Integrated Social Capital Framework (Narayan & Cassidy, 2001; Grootaert et al., 2004)
4	Social Capital at Work (SCW; Kouvonen et al., 2006)	Finnish public-sector employees; N ≈ 48,000; ages 20–65 years	8 items; 5-point Likert scale; α = .88	EFA, CFA, multilevel analysis	Developed	Finland	Bonding, Bridging & Linking	Workplace Social Capital Theory (Kawachi et al., 2008; Oksanen et al., 2011)
5	Arabic Social Capital Scale (ASCS; Looman & Farrag, 2009)	Egyptian parents; N ≈ 150–250; ages 30–45 years	14 items; Likert scale; α = .75	Translation, adaptation, EFA	Translated and adapted	Egypt	Structural & Cognitive	Social Capital Theory (Putnam, 1993, 2000)
6	Personal Social Capital Scale (PSCS; Chen et al., 2009)	Adults; N ≈ 1,200; ages 18–65 years	10 items with 42 subitems; α = .83–.91	EFA, CFA, validity testing	Developed	China	Bonding & Bridging	Social Network Theory (Granovetter, 1973; Wasserman & Faust, 1994)
7	Personal Social Capital Scale-16 (PSCS-16; Wang et al, 2014)	Adults; N ≈ 500–700; age 18+	16 items; 5-point Likert scale; α = .84–.90	CFA, convergent validity	Short-form adaptation	USA/China	Bonding & Bridging	Social Capital Theory (Bourdieu, 1986; Bourdieu & Wacquant, 1992; Putnam, 2000)
8	Social Capital and Cohesion Scale (SCCS; Magson et al., 2014)	Adolescents and young adults; N ≈ 600–800; ages 12–25 years	29 items; 5-point Likert scale; α = .70–.89	EFA, CFA	Developed	Australia	Cognitive	Social Cohesion Theory (Chan et al., 2006; Janmaat, 2011)
9	Organizational Social Capital Scale (OSCS; Fandiño et al., 2015)	Employees; N ≈ 300–500; ages 18–65 years	6 items; α = .84–.89	CFA, reliability analysis	Developed	Spain	Bonding	Social Capital Theory (Bourdieu, 1986; Coleman, 1988; Putnam, 2000)
10	Social Capital Investment Inventory (SCII; Chen et al., 2015)	N = 387 adults; ages 18–60 years	7 items; 5-point Likert scale; α = .81	EFA, CFA	Developed	China	Bonding & Bridging	Investment Theory of Social Capital (Lin, 2001)

11	Bonding Workplace Social Capital Scale (BWSC; Eguchi et al., 2017)	Japanese workers; N ≈ 1,600; ages 20–65 years	6 items; 4-point Likert scale; α = .93	CFA, multilevel analysis	Developed	Japan	Bonding	Workplace Social Capital Theory (Kawachi et al., 2008)
12	Social Capital of Healthcare Organizations (SOCAPO-E; Ansmann et al., 2020)	Healthcare workers; N ≈ 500; ages 20–65 years	6 items; 4-point Likert scale; α = .93	CFA, construct validity	Developed	Germany	Communal/Organizational	Social Capital Theory and Community Concept (Bauman, 2001; Putnam, 2000)
13	Short Adapted Social Capital Assessment Tool (SASCAT; De Silva et al., 2006)	Adults/caregivers; N ≈ 1,000; age 18+	9 items; α = .78–.84	Adaptation, EFA	Adapted/shortens	Peru & Vietnam	Structural & Cognitive	World Bank Social Capital Framework (Grootaert & van Bastelaer, 2002; World Bank, 1998)
14	Global Trust Inventory (GTI; Liu et al., 2018)	N = 11,917 adults; age 18+	21 items; 5-point Likert scale; α = .88	CFA, measurement invariance	Developed	Global	Cognitive	Trust Theory (Fukuyama, 1995)
15	Social Capital Scale for Constructed Families (SCS-CF; Zarwell & Robinson, 2018)	N = 131 GBM adults; age 18+	6 items; 5-point Likert scale; α = .84	EFA, CFA	Developed	USA	Bonding/Cognitive	Social Network Theory (Granovetter, 1973; Wasserman & Faust, 1994)
16	Social Capital Assessment Tool for Maternal Health (LSCAT-MH; Agampodi et al., 2019)	N = 439 pregnant women; ages 18–45 years	24 items; 5-point Likert scale; α = .94	EFA, CFA	Developed	Sri Lanka	Structural & Cognitive	Family and Social Capital Framework (Coleman, 1988; Furstenberg, 2005)
17	Global Scale for Workplace Social Capital (GSWSC; Berthelsen et al., 2019)	N = 1,316 employees; ages 18–65 years	6 items; 5-point Likert scale; α = .89	CFA, multilevel validation	Developed	Denmark	Bonding & Bridging	Workplace Social Capital Theory (Kawachi et al., 2008; Oksanen et al., 2011)
18	Relational Workplace Social Capital Scale for Japanese Nurses (RWSCS-JN; Norikoshi et al., 2020)	N = 309 nurses; ages 22–60 years	15 items; 5-point Likert scale; ω = .79–.90	EFA, CFA	Developed	Japan	Bonding, Bridging & Linking	Relational Social Capital Theory (Nahapiet & Ghoshal, 1998)
19	Club Social Capital Scale (CSCS; Forsell et al., 2020)	N = 1,079 youth/adult club members; ages 12–70 years	20 items; 7-point Likert scale; α = .92	CFA, invariance testing	Developed	Australia	Bonding/Cognitive	Community Capital Framework (Flora & Flora, 2008)
20	Workplace Social Capital Scale (WSCS; Tsounis et al., 2023)	N = 1,109 employees; ages 18–65 years	24 items; 5-point Likert scale; α = .94	EFA, CFA, multilevel CFA	Developed	Greece	Bonding & Bridging	Organizational Social Capital Theory (Kawachi et al., 2008; Nahapiet & Ghoshal, 1998; Putnam, 2000)
21	Workplace Social Capital Scale (WSCS; Khawar et al., 2025)	Pakistani employees; N ≈ 150-308; ages 20–60 years	12 items; Likert scale; α = .85	EFA, CFA, validity analysis	Developed	Pakistan	Bonding & Linking	Workplace Social Capital Theory (Kawachi et al., 2008; Nahapiet & Ghoshal, 1998; Oksanen et al., 2011; Putnam, 2000)

Conceptual Domains and Measurement Levels

The reviewed instruments conceptualized social capital as a multidimensional construct operating across interpersonal, organizational, and community levels. Cognitive, bonding, and structural domains were most frequently represented, emphasizing trust, reciprocity, social cohesion, civic participation, and network engagement. Bonding and bridging dimensions were commonly assessed within workplace and adult populations, whereas structural and cognitive dimensions were more frequently applied in community-level contexts. Linking social capital was comparatively underrepresented and appeared explicitly in only a limited number of workplace-based instruments. Several measures, including the Personal Social Capital Scale (PSCS) and the Personal Social Capital Scale-16 (PSCS-16), integrated bonding and bridging dimensions to capture close interpersonal ties alongside broader network relationships (Chen et al., 2009; Wang et al., 2014). Community-oriented instruments such as the Social Capital Assessment Tool (SCAT) and the Integrated Questionnaire for the Measurement of Social Capital (IQ-MSC) emphasized participation, collective engagement, and social cohesion (Grootaert et al., 2004; Krishna & Shrader, 1999). Theoretical foundations were primarily informed by Social Capital Theory, Social Network Theory, workplace social capital models, and social cohesion frameworks. Frequently cited theorists included Bourdieu, Coleman, Putnam, and Lin (Bourdieu, 1986; Coleman, 1988; Putnam, 2000; Lin, 2001).

Psychometric Properties

Overall, the reviewed instruments demonstrated generally satisfactory psychometric quality across diverse populations and contexts. Internal consistency was consistently acceptable to excellent, with Cronbach's alpha values ranging from .70 to .94, indicating reliable measurement performance. Workplace and organizational instruments, including the Bonding Workplace Social Capital Scale (BWSC), Social Capital of Healthcare Organizations (SOCAPO-E), and Workplace Social Capital Scale (WSCS), showed particularly strong reliability, while the Multidimensional Scale of Perceived Social Support (MSPSS) also demonstrated consistently high reliability across multiple populations. Construct validity was most commonly supported through exploratory and confirmatory factor analyses, along with convergent and multilevel validation approaches. Instruments such as the Social Capital at Work (SCW), Personal Social Capital Scale (PSCS), and Global Scale for Workplace Social Capital (GSWSC) demonstrated strong evidence of construct validity. However, evidence for criterion validity, predictive validity, test–retest reliability, and longitudinal stability was limited across most studies. In addition, although several instruments underwent cross-cultural adaptation, the rigor and theoretical justification of these processes varied, indicating inconsistency in the depth of validation across contexts.

Applicability and Methodological Limitations of Social Capital Measures

The review identified limitations in the applicability and methodological design of existing social capital measures for intersex and transgender populations. Most instruments relied on conventional family structures, binary gender classifications, and generalized measures of social participation and institutional trust, with limited representation of chosen families, peer-support networks, and experiences of stigma and discrimination. Although the Social Capital Scale for Constructed Families (SCS-CF) incorporated alternative family structures among gay and bisexual men (Zarwell & Robinson, 2018), none of the reviewed instruments explicitly addressed the experiences of intersex and transgender individuals. Additionally, most measures focused on individual or community-level social capital, with limited coverage of interconnected interpersonal, organizational, and institutional dimensions. Intersectional considerations, including the interplay of gender identity with socioeconomic status, ethnicity, sexuality, and disability, were also largely absent from the reviewed measurement frameworks.

Table II: Applicability Gaps in Social Capital Measures for Gender-Diverse Populations

Measurement Feature	Current Status	Limitation for Trans/Intersex Populations
Family-based bonding measures	Widely used	Assumes heteronormative kinship structures
Gender variables	Binary classification	Excludes non-binary, transgender, and intersex identities
Trust and institutional engagement	Standardized	Ignores discrimination and stigma contexts
Network measures	Generalized	Does not capture chosen or constructed families
Cultural adaptation	Moderate	Lacks gender-diversity sensitivity
Intersectionality	Rarely included	Overlooks compounded marginalization

These findings suggest that although existing social capital instruments demonstrate acceptable to strong psychometric properties and conceptual breadth in general populations, their applicability to intersex and transgender populations remains limited. This limitation reflects the insufficient representation of gender-diverse experiences, conventional family structures, binary gender classifications, and intersectional influences within existing measurement frameworks. Collectively, the findings highlight the need for more inclusive, context-sensitive, and theoretically grounded approaches to social capital measurement that adequately capture the social relationships and structural experiences of intersex and transgender populations.

IV.DISCUSSION

The present systematic review synthesizes a diverse and methodologically heterogeneous body of literature on social capital measurement instruments identified through a PRISMA 2020-guided search strategy across multiple databases (Page et al., 2021). By focusing specifically on the applicability of these instruments to intersex and transgender populations, this review extends previous methodological syntheses of social capital measures (Ahlborg et al., 2022; Villalonga-Olives & Kawachi, 2015) and addresses a critical gap in equity-oriented measurement research. The findings highlight three overarching concerns: persistent conceptual and methodological fragmentation in social capital measurement, uneven psychometric and theoretical rigor across instruments, and the systematic exclusion of gender-diverse populations from instrument development and validation. The findings confirm that social capital remains a highly heterogeneous construct. The instruments identified through systematic screening varied considerably in their conceptualization of bonding, bridging, linking, structural, and cognitive dimensions, despite the widespread use of established theoretical frameworks (Kawachi & Berkman, 2000; Szreter & Woolcock, 2004). This heterogeneity reflects broader methodological challenges identified in previous systematic reviews, which indicate that social capital measures are frequently developed for context-specific applications rather than derived from unified theoretical models (Uphoff et al., 2013; Villalonga-Olives & Kawachi, 2015). The present review further demonstrates that this fragmentation persists across geographical regions, populations, and study designs, even when standardized psychometric approaches, such as Likert-type response formats and Cronbach's alpha coefficients, are employed. Consequently, differences in conceptual definitions, dimensional structures, and operationalization may limit direct comparisons across studies and complicate the interpretation of findings across social and cultural contexts.

The quality appraisal, based on psychometric criteria encompassing validity, reliability, and measurement transparency, indicated that most instruments demonstrated acceptable levels of internal consistency. This finding is consistent with the systematic data extraction, which identified reliability coefficients as among the most consistently reported psychometric properties across the reviewed studies. However, evidence concerning criterion validity, measurement invariance, and longitudinal stability remained limited for most instruments. These findings align with methodological critiques emphasizing that internal consistency alone is insufficient to establish the overall quality of measures assessing complex psychosocial constructs such as social capital (Ahlborg et al., 2022). Furthermore, the narrative synthesis indicated variation in psychometric rigor across instrument types, with workplace- and trust-based measures demonstrating comparatively stronger validation profiles than broader community-level instruments. These differences suggest that the availability of reliability estimates should not be interpreted as evidence of comprehensive psychometric adequacy. Instead, instrument selection should consider the theoretical coherence of the construct, the range of validity evidence, the appropriateness of the measurement structure, and the suitability of the instrument for the intended population and context. A particularly important finding concerns the limited representation of intersex and transgender populations in the development and validation of existing social capital instruments. Although the reviewed studies included diverse populations, none of the identified instruments had been explicitly developed for intersex or transgender groups. Only one measure partially accounted for LGBTQ+ relational structures through the recognition of non-biological family configurations (Zarwell & Robinson, 2018). This gap reflects a broader limitation in social capital measurement, in which eligibility criteria, sampling strategies, and instrument design may rely on conventional kinship structures and cisnormative assumptions. The reviewed instruments predominantly emphasized traditional family relationships, generalized trust, and broad social network structures, potentially overlooking chosen

families, identity-based exclusion, and stigma-related disruptions in social relationships. Such omissions may restrict the content validity and contextual relevance of these instruments when applied to gender-diverse populations. Although these limitations do not, by themselves, establish measurement non-invariance, they raise important questions about whether existing measures adequately represent the social relationships and institutional experiences of intersex and transgender individuals. Accordingly, instruments developed and validated in conventional populations should not be assumed to demonstrate equivalent validity in gender-diverse groups without appropriate empirical assessment.

The review also identified a persistent underrepresentation of linking social capital, despite its theoretical importance in understanding relationships between individuals or communities and institutions possessing authority, resources, and decision-making power (Kawachi & Berkman, 2000; Szreter & Woolcock, 2004). This omission is particularly consequential for intersex and transgender populations, whose access to healthcare, education, employment, legal recognition, and social protection may depend on their relationships with institutional actors. Measures that primarily assess interpersonal ties or connections within and between communities may therefore provide an incomplete account of the resources available to these populations. The limited incorporation of intersectional perspectives further compounds this problem. The reviewed instruments did not systematically integrate intersectional identity variables or explicitly examine how gender identity may interact with other dimensions of social position to shape social capital formation. Consequently, the combined effects of gender diversity, socioeconomic disadvantage, geographical context, and institutional exclusion may remain insufficiently represented in existing measurement frameworks. An intersectional approach could help clarify how social capital is distributed, accessed, and constrained across different social positions and institutional settings.

Taken together, the findings indicate that the limitations of existing social capital instruments extend beyond inconsistencies in psychometric reporting to encompass fundamental questions of conceptual coverage, contextual relevance, and population inclusivity. Although established measures provide useful foundations for examining social relationships and access to resources, their applicability to intersex and transgender populations requires careful evaluation rather than assumption. Future instrument development and validation efforts should therefore prioritize theoretically grounded operationalization, comprehensive psychometric assessment, and meaningful engagement with gender-diverse communities. Particular attention should be given to chosen-family relationships, community solidarity, bridging connections, institutional access, and the effects of stigma and discrimination on social networks. Establishing the content validity, structural validity, reliability, and measurement invariance of instruments in intersex and transgender populations would strengthen the evidence base for assessing social capital in these contexts. Such efforts would also support more culturally responsive and equitable measurement practices, enabling researchers to examine social capital in ways that more accurately reflect the relational experiences and institutional realities of marginalized populations.

Implications of the Study

This systematic review highlights several important implications for theory, methodology, practice, and equity in social capital research. Theoretically, the findings reveal persistent fragmentation in how bonding, bridging, and linking social capital domains are conceptualized and operationalized, indicating the need for stronger alignment between theoretical frameworks and measurement practices, particularly regarding underdeveloped linking dimensions that capture institutional power relations. Methodologically, reliance on internal consistency as the dominant psychometric indicator, alongside limited evidence of measurement invariance and longitudinal validity, underscores the need for more advanced validation approaches and multilevel measurement designs. Practically, the absence of instruments explicitly developed for intersex and transgender populations limits the applicability of current tools in inclusive public health and social policy contexts, potentially reinforcing the invisibility of gender-diverse groups in empirical research. From an equity perspective, the findings expose structural and epistemic biases embedded in existing instruments, which often reflect cisnormative and heteronormative assumptions and fail to capture chosen families and intersectional identities. Collectively, these gaps highlight the need for future research to develop theoretically integrated, psychometrically robust, and intersectionally inclusive social capital measures that better reflect diverse lived realities.

Limitations and Suggestions

This review is subject to some limitations, including potential language and publication bias due to the inclusion of only English-language, peer-reviewed studies, as well as substantial heterogeneity in study designs, populations, and measurement frameworks, which necessitated a narrative rather than quantitative synthesis. Additionally, reliance on published psychometric evidence may have excluded underreported or unpublished instruments, particularly those relevant to marginalized groups, and the limited availability of tools specifically addressing intersex and transgender populations constrained comparative analysis. Future research should focus on developing and validating more inclusive social capital measures grounded in intersectional frameworks, applying advanced psychometric methods such as measurement invariance testing, and adopting longitudinal designs to assess stability and predictive validity. Expanding multilingual and cross-cultural research efforts will also be critical to reducing bias and enhancing the inclusivity, robustness, and theoretical coherence of social capital measurement.

V. CONCLUSION

This systematic review provides a comprehensive evaluation of social capital measures with a specific focus on their applicability to intersex and transgender populations. The findings demonstrate that although existing social capital measures exhibit acceptable psychometric properties and broad conceptual diversity, they remain methodologically fragmented and structurally exclusionary. The absence of validated tools for intersex and transgender populations represents a significant gap in the existing literature, limiting the equity and applicability of social capital research. Addressing these limitations requires integrative theoretical frameworks, rigorous psychometric expansion, and explicit inclusion of gender-diverse perspectives in future measurement development.

Disclosure Statement

No potential conflict of interest was reported by the authors.

Funding

The author received no funding from any organizations.

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