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Employing Position Generators to Assess Social Capital and Health: A Scoping Review of the Literature and Recommendations for Measurement in Future Population-Based Surveillance

Steven Meanley , *University of Pennsylvania School of Nursing*, smeanley@nursing.upenn.edu

Candice Biernesser , *University of Pittsburgh School of Medicine*, lubbertcl@upmc.edu

Teagen O'Malley , *University of Pittsburgh Graduate School of Public Health*, tlo8@pitt.edu

See next page for additional authors

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Abstract

Beneficial social connections are critical to individual-level health because they can be used to avoid or minimize the risks and consequences associated with diseases. How to best measure beneficial social connections to inform social network-level health interventions remains poorly understood. A scoping review of health surveillance studies was conducted to highlight the utility of employing position generators to assess how access to beneficial social connections was associated with population health and disparities. Our review yielded 39 articles conducted across 14 predominantly high-income countries. Most studies (77%) with composite measures for beneficial social connections exhibited health-protective associations. Of the remaining articles, half found that greater diversity within one's network was associated with positive health outcomes. Only eight articles accounted for differences by advantaged statuses, indicating that beneficial connections elicited greater health-protective associations among disadvantaged groups. Employing position generators may inform interventions that seek to reduce health disparities by enhancing social capital in individuals from disadvantaged backgrounds.

Keywords

Authors

Steven Meanley, Candice Biernesser, Teagen O'Malley, Todd Bear, and Jeanette Trauth

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Steven Meanley, University of Pennsylvania School of Nursing
Candice Biernesser, University of Pittsburgh School of Medicine
Teagen O'Malley, University of Pittsburgh Graduate School of Public Health
Todd Bear, University of Pittsburgh Graduate School of Public Health
Jeanette Trauth, University of Pittsburgh Graduate School of Public Health
Corresponding Author: Steven Meanley, smeanley@nursing.upenn.edu

ABSTRACT
Beneficial social connections are critical to individual-level health. These connections increase access to social support/resources that can be used to avoid or minimize the risks and consequences associated with diseases. How to best measure beneficial social connections to inform social network-level health interventions remains poorly understood. A scoping review of empirical health research studies was conducted to highlight the utility of employing position generators to assess how access to beneficial social connections was associated with population health and disparities. Our review yielded 39 articles of studies conducted between 2006-2018 across 14 predominantly high-income countries. Most studies (77%) with composite measures for beneficial social connections exhibited health-protective associations. Of the remaining articles, half found that greater diversity within one's network was associated with positive health outcomes. Only eight articles accounted for differences by advantaged statuses, indicating that beneficial connections elicited greater health-protective associations among disadvantaged groups. Employing position generators may inform interventions that seek to reduce health disparities by enhancing social capital in individuals from disadvantaged backgrounds.

Keywords: Individual social capital, compositional quality, health survey, position generator

INTRODUCTION
Social Capital and Health Disparities

In recent decades, public health researchers have emphasized the importance of social capital in assessing and understanding individual-level health and well-being. Institutions like the World Health Organization and the Centers for Disease Control and Prevention recognize that the social environment in which people live, including the ways people interact with one another, affect population health outcomes (Centers for Disease Control, 2018, Solar and Irwin, 2010). The term social capital has been conceptualized in a variety of ways to describe levels of social cohesion, cooperation, or participation, referring to the resources that individuals have access to through their social networks (Hawe & Shiell, 2000, Hunter, Neiger, & West, 2011; Moore et al., 2014, Veenstra et al., 2005). Colloquially-speaking, this is referred to as the "what you have, based on whom you know" quality of a social network (Luthans et al., 2004). Berkman and colleagues (2000) have developed a conceptual framework that posits that one's social network of relationships is shaped by upstream social-structural factors-- such as racism, sexism, labor market structure, poverty, and public policies. Furthermore, depending on the structure of one's social network (e.g., the number of people in the network and the extent to which they are similar to one another), it can provide opportunities for social support, influence, engagement as well as access to material goods, resources and services that, in turn, can impact health outcomes. The authors point out that whereas a considerable amount of attention has been paid to understanding how social networks may influence health via social support, influence, and engagement, less attention has been paid to examining how one's differential access to resources and material goods such as economic opportunities affect health outcomes.

Individuals with high social capital can leverage their networks to increase their access to flexible resources like economic opportunities (e.g., jobs and internships), housing, health care, human capital, institutional connections, and information or expertise to assist in problem-solving or making important decisions (Berkman et al., 2000; Gage-Bouchard, 2017; Luthans et al., 2004). From a public health perspective, having access to flexible resources like money, knowledge, and beneficial social connections is critical because they can be used to avoid or minimize the risks and consequences associated with diseases (Link and Phelan, 1995). In prior studies, research experts have produced robust findings that suggest increased levels of social capital contribute to better mental and physical health statuses and protect against mortality (Ehsan et al., 2019). However, access to the flexible resources (i.e., social capital) that promote well-being is disproportionately distributed when accounting for intersecting, socially disadvantaged statuses across race, economic status, gender, sexuality, immigration status, and disability status (Carlson & Chamberlain, 2003; Domínguez & Arford, 2010; Garcia & McDowell, 2010; Moore, Stewart, & Teixeira, 2014). Differential access to social resources (e.g., social capital) is a central tenet of the theory of fundamental causes (Phelan et al., 2010). This theory argues that social disadvantage, measured by a lack of resources, undermines the factors that promote good health and protect against mortality, and that social capital may be integral to mitigating against the social determinants that produce health disparities (Hunter, Neiger, & West, 2011). Given marginalizing experiences, individuals from socially disadvantaged backgrounds typically have limited access to flexible resources, thereby providing implications for exacerbating health disparities that burden these communities (Hatzenbuehler, Phelan, & Link, 2013).

Measuring Social Capital in Public Health Surveillance

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Health researchers routinely assess a variety of social capital dimensions in population-health surveys (e.g., Behavioral Risk Factor Surveillance System [BRFSS], the National Health and Nutrition Examination Survey [NHANES] III, the English Longitudinal Study of Ageing [ELSA]; Lee & Kim, 2013; Muennig et al., 2013; O'Doherty et al., 2017; Rodgers et al., 2019). The most common social capital indicators tend to be community trust and social participation. However, the inclusion of social network characteristics, which are critical to informing studies and interventions based on health disparities, has been significantly more limited (Rodgers et al., 2019). Community health experts have scrutinized indicators like social participation when considering interventions on social capital to promote health and well-being (Pearce & Smith, 2003). They suggest that programs must fully consider the social contexts that influence peoples' interactions within their communities and that individuals' participation must not exceed levels when engagement begins to compromise health. Pearce and Smith (2003) note that while strong social networks may facilitate social support, for some, these networks may be coercive or serve as sources of strain. Attending to flexible social resources embedded within a social network may therefore provide a more appropriate measure to integrate into health surveys and inform public health programming (Hunter, Neiger, & West, 2011).

Measuring access to social resources nonetheless poses challenges for researchers conducting population surveillance. Measurement of other individual-level resources such as access to money, knowledge, and power/prestige is routinely assessed by asking questions about income, level of education, and occupation type, respectively. However, assessing an individual's social capital in terms of whom they know (i.e., their occupations and the associated prestige) may be more controversial as researchers may risk projecting their own beliefs regarding what it means for a social connection to be beneficial.

While surveillance efforts have mainly focused on measuring how the health and social benefits of network characteristics like size or density shape individual-level well-being, less attention has been paid to social capital's critical dimensions, specifically, *upper reachability*, *diversity*, and *range* (Lin, 1999a). Upper reachability is the extent to which an individual can access people with power, prestige, financial and material capital, and beneficial connections. Diversity reflects the spectrum or variation in specialized job skills or expertise possessed by individuals in a person's social network. Range refers to the resources accessible across levels of social class. Individuals who have greater access to people with power, prestige, and exposure to people with a diverse range of occupations are considered to have a socioeconomic advantage. This is because increased availability of resources offers opportunities for upward mobilization or advancement in measures of quality of life (e.g., career opportunities or healthcare navigation).

Though there is widespread agreement among public health scientists that increases in social capital indicate a better health status at the individual-level, programmatic efforts to inform the reduction of health inequalities must address aspects of an individual's social capital that can be feasibly modified -- such as upper reachability, network diversity, and range (Trickett et al., 2011). Furthermore, intervention development that aims to leverage social networks' health-promoting qualities demands evidence derived from appropriate measures of social capital. A potential means to simultaneously assess these three dimensions of social capital and objectively identify the beneficial qualities of an individual's network is to measure compositional quality.

Compositional quality refers to the number of people in an individual's social network who possess certain valuable qualities, such as specialized knowledge, financial resources, or who are

influential in their community (Borgatti et al., 1998). This construct builds upon the benefits of having access to a heterogeneous social network, prioritizing the presence of specific characteristics deemed contextually important (Lakon et al., 2008). An account of the compositional quality of an individual's social network may elucidate individuals' social connectedness to others who may assist in navigating complex health problems and systems through positions of power, prestige, expertise, and wealth.

Position Generators as a Social Capital Measurement Tool

Emerging in public health surveillance is the application of *position generators* as a research method to understand individual-level network compositional quality (Lin, 1999b, Singh & Dika 2003). Position generators are practical instruments that emphasize the variation in levels of occupational prestige that exist within a network. Occupational prestige is a measure that captures and ranks the general desirability of an occupation (The John D. and Katherine T. MacArthur Foundation Research Network on SES and Health, n.d.). At the individual level, occupational prestige has been linked to positive health outcomes and mortality (Christ et al., 2012; Fujishiro et al., 2010). This has been attributed to the beneficial social connections with whom people in higher prestige occupations have greater access than those in lower prestige occupations. Increases in occupational prestige commonly reflect high levels of educational training, increases in power, and positive social relations (Christ et al., 2012). From a social-networks standpoint, the diversity, range, and upper reachability of occupations that exist within a person's social network, provide a snapshot of potent resources available.

Utilizing network occupational prestige scores to compute network compositional quality and assess its robust associations with health and well-being remains poorly understood. However, network occupational prestige may have important implications for narrowing health disparities. Health experts argue that the occupations of individuals in one's network, while imperfect, provide valuable insight into potentially available resources (e.g., expertise, financial resources, additional network linkages) that may be leveraged for social support in times of stress or compromised health (Cornwell & Cornwell, 2008; Domínguez & Arford, 2010). Expanding the perceived and existing availability of social resources is critical for facilitating access to stress-mitigating resources from network ties (Gage-Bouchard, 2017).

Position generators are primarily used to determine the number of weak ties an individual has to specific structural positions spanning a low to high range of occupational prestige that are salient in a population-of-interest's society (Lin, 1999b; Maness, 2017). Given the widespread support for the theory of weak ties (Granovetter, 1983), social capital research experts argue that weak ties (i.e., acquaintances) have greater importance to a person's social mobilization compared to strong ties (i.e., close relationships) because weak ties offer novel sources for functional support (Poortinga, 2012). Those who have few weak ties will have a limited breadth of perspective on the potential for social advancement (Granovetter, 1983). The role of weak ties has been found to be an important factor in health information-seeking among underserved communities (Morey, 2007).

The application of position generators requires integrating culturally relevant occupations and associated prestige scores, commonly obtained from formative research of the surveyed target population. As depicted in Figure 1, survey participants are asked to identify whether they know someone who is employed in any of the included positions on a first name basis (Johnson & Griffis, 2014). Subsequently, the values of occupational prestige scores corresponding to participants' responses are frequently used to calculate composite or individual markers of social capital;

specifically, upper reachability, network diversity, and range (Moore et al., 2011, Moore et al., 2014). Occupational prestige scores typically reflect a weighted sum of the average education needed to perform the responsibilities and the average income of the respective position (Verhaeghe & Li, 2015). Interpretations of these scores imply that the higher the highest reach, diversity, and mean (average) occupational prestige scores, the greater is an individual's social capital (Verhaeghe & Li, 2015). These scores then serve as independent variables for assessing individual social capital and health-related outcomes.

Figure 1. Example of position generator

Do you know at least one person on a first name basis who has one of the following jobs?				
Occupation	Yes	No	Associated Prestige Score	Prestige Value
Physician or Medical Specialist	☐	☐	78	High
Elementary School Teacher	☐	☐	57	Moderate
. . . ~10 to 15 occupations . . .	. . .	. . .	. . .	. . .
Construction Worker	☐	☐	28	Low

Research Objectives

We aimed to address the gap in how surveillance methodologists consider beneficial social connections as a practical means to inform social network-related health interventions. In acknowledging network occupational prestige as a reflection of social capital, the primary objective of this manuscript was to review the body of literature and assess the extent to which position generators have been applied to empirical research studies. Aligned with the theory of fundamental causes concerning access to resources and population health inequalities, we also sought to identify whether position generator studies considered analytic techniques to examine health disparities across indicators of socioeconomic status (e.g., gender, race/ethnicity, education level). Assessing these differences may elucidate how social capital differentially affects the risk or development of individuals' health and well-being by those who come from advantaged versus disadvantaged backgrounds.

METHODS

We conducted a scoping review of empirical research studies that have employed position generators in public health research (Grant & Booth, 2009). Scoping reviews are preliminary assessments of topics intended to elucidate the extent to which a topic has been researched, identify gaps in research, and suggest recommendations for future scholarship (Peters et al., 2015). Given position generators' appropriateness and applicability to many disciplines, a scoping review provided us with an avenue to better understand their previous employment in public health surveillance. We searched the titles, abstracts, keywords, and methods sections of peer-reviewed articles ever published and indexed in three databases that include studies in public health: PubMed, Google Scholar, and SCOPUS (Figure 2). We only included articles generated from the

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search terms: (("Position generator") AND health) from 1995 to 2018. Our search was assisted and supported by a public health research librarian at the University of Pittsburgh Graduate School of Public Health to ensure a comprehensive search of the literature. We selected 1995 as a lower-limit cutoff to align with the initial publication of Fundamental Cause Theory, which informed our research (Link & Phelan, 1995).

Figure 2. PRISMA diagram for inclusion criteria of position generator articles
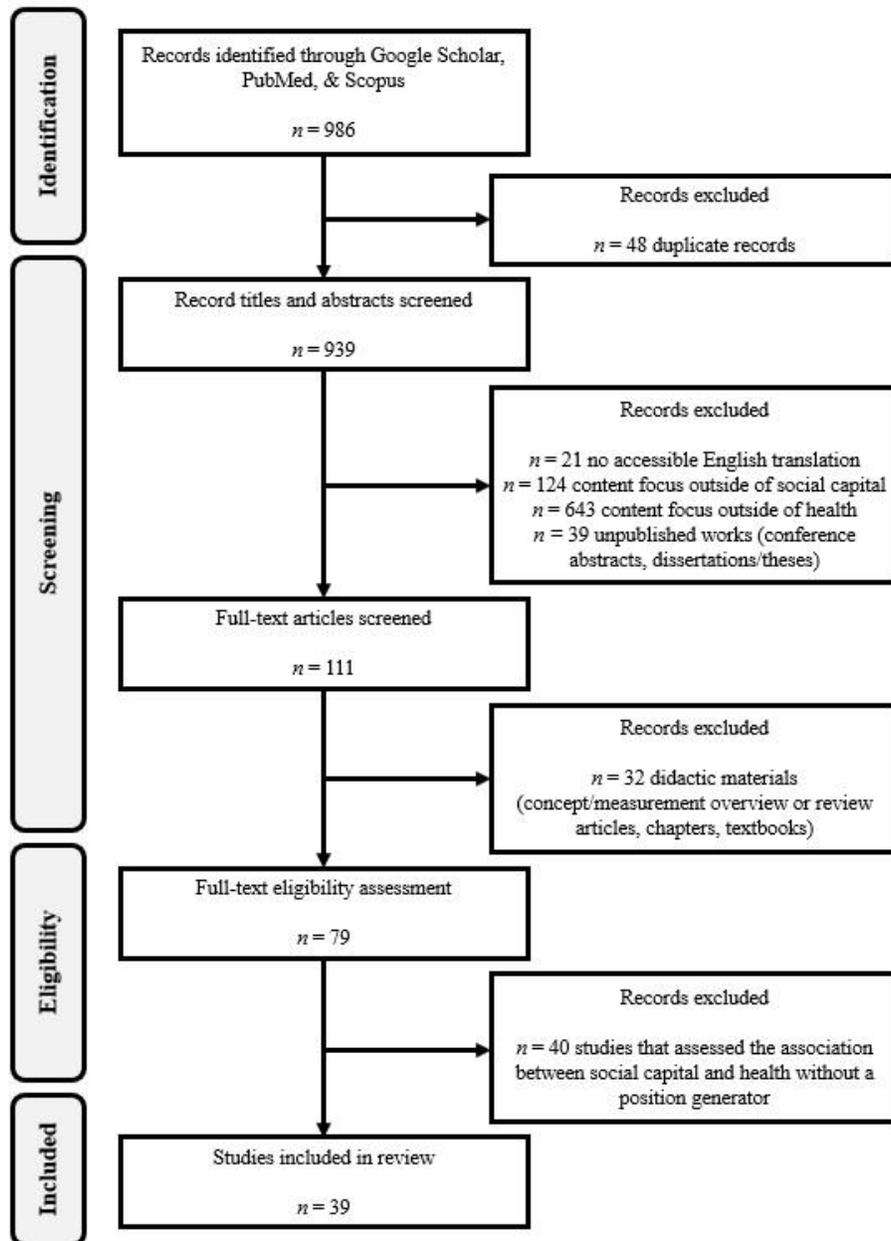
The process for conducting our literature search is outlined in Figure 2. The inclusion criteria were articles published in English in peer-reviewed journals, employed a position generator tool to measure individual social capital, and empirically tested the relationship between social capital and a health outcome. Health outcomes reported in the articles identified by our search included: health behaviors (e.g., physical activity), disease/biological outcomes (e.g., depression), quality of life (e.g., mastery [e.g., control over one's life chances]), self-reported health, and health education (e.g., health literacy). Our initial search yielded 985 abstracts across the three databases. After removing duplicate abstracts ($n = 48$), we excluded articles that had no accessible English translation ($n = 21$), provided no content on social capital ($n = 124$), and were outside a health-related context ($n = 643$). An additional 71 abstracts were excluded because they were either unpublished/non-peer-reviewed (e.g., conference abstracts, theses, and dissertations) or were materials for didactic use (e.g., concept/measurement overview, review articles, chapters, and textbooks). Finally, 40 articles were excluded since they did not apply position generators to measure individual-level social capital. Our search yielded a final sample of 39 eligible articles for full-text review.

Using the identified public health articles, we performed a 'charting of the results' to extract agreed-upon (by research team) study characteristics that would inform the objectives of our review (Peters et al., 2015). For data extraction, we sought to characterize articles based on objective measures, that is, factors that were explicitly described within the body of the text. Specifically, articles were divided among co-authors to identify the country, research design, and sampling strategies for each article included in the review. We used directed content analysis to code the use of position generators. We reported whether articles addressed each dimension of individual social capital (range, diversity, and upper reachability), the spectrum of occupations (access to a diversity of occupations of varying levels of prestige [i.e., compositional quality]) included in the position generator tool, whether included occupations were based on an occupational prestige scale, and whether position generators captured significant relationships to public health outcomes (Hsieh & Shannon, 2005). We reexamined the identified articles to determine if any analyses were conducted that addressed health disparities/inequities. To accomplish this, we identified articles that analyzed the relationships between individual social capital and health outcomes using stratified analyses of advantaged versus disadvantaged groups (e.g., gender, income group, education level) or tested effect modifications of individual social capital by advantaged group status (e.g., individual social capital x education level).

Co-authors served as primary coders for an allotted number of articles (~ 4 each), and the primary and corresponding authors served as secondary coders for all articles. To ensure consistent coding, our quality-check protocol consisted of group meetings to reconcile discrepancies and alternative interpretations of article codes/columns to ensure consistent and reliable reporting.

RESULTS

Our review included 39 studies that were published between 2006 and 2018. See Table 1 for a summary of study characteristics. Fourteen countries were represented across Asia (China, Papua New Guinea, South Korea, and Taiwan), Europe (Belgium, Bulgaria, Greece, Netherlands, Norway, Spain, Sweden, and the United Kingdom), and North America (the United States and Canada). A plurality of studies ($n = 13$, 33.3%) was conducted in Canada, all but one of which were by the same research team.

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Table 1. Study Characteristics

Characteristics	Total
Countries Represented	14
Level of Catchment Area	
Community/Local	24
National	11
Global	4
Outcomes Assessed*	
Health Behavior	9
Disease Outcome	10
Quality of Life	9
Self-Reported Health	8
Health Education	3
Access to Health Care	1
Number of Social Capital Dimensions Addressed	
0	3
1	9
2	2
3	25
Studies that Addressed Specific Social Capital Dimensions*	
Upper Reachability	27
Diversity	26
Range	27
Other	5
Average Number of Position Generator Occupations	15.7

*Note: Total numbers do not always add up to 39 since studies addressed multiple outcomes and a varying combination of social capital dimensions

       A variety of outcomes were assessed to explore the relationships between individual social capital and health. We found that nine position generator studies (21%) examined the relationship between individual social capital and health behaviors, including physical exercise/activity, diet, smoking behaviors, and cervical cancer screening. Disease/biological outcomes measured in ten studies (26%) included depression, hypertension, waist circumference, and BMI. Nine studies (23%) examined quality of life indicators, including disease self-management, mastery, restless sleep, psychological distress, subjective happiness, leisure activity engagement, and health limitation. Eight studies (21%) examined self-rated health, including outcomes that addressed patient-specific health, general health, and mental health statuses. Lastly, four studies (10%) examined whether individual social capital was associated with health education outcomes, including health literacy, cancer knowledge, and an individual's health information repertoire (ability to access health information from multiple sources).
       In examining how position generators were employed across these studies, we found that most studies ($n = 26$, 67%) addressed the three dimensions of social capital. There was variation

in assessing the three dimensions with upper reachability, network diversity, and range addressed in 27, 25, and 28 articles, respectively.

Regarding the spectrum of occupational domains, studies included an average of 15.7 (range: 3 to 40) occupations. This included several studies using the generator developed by Moore and colleagues, which randomly selected ten occupations from a list of 90 (coded as ten occupations) (Moore et al., 2011). All but three studies used a broad spectrum of occupations (Koetsenruijter et al., 2015; Koetsenruijter et al., 2016; Wasserman et al., 2006). For example, two studies from the same research team were interested in examining individual social capital related to knowing a doctor, nurse, or pharmacist (Koetsenruijter et al., 2015, Koetsenruijter et al., 2016). Studies that utilized a broad spectrum of occupations included positions often described as salient to the target population.

Table 2 presents a summary of the findings from each of the position generator studies in our analysis. Several methodological issues are of note. First, seven studies employed a longitudinal design – the rest were cross-sectional. Second, the nomenclature for individual social capital as measured by position generators varied from study to study. For example, terms like "network social capital," "accessed socioeconomic status," and "individual-level network resources" were employed. Though we broadly used individual social capital to address the independent variable, we report the terminology used by the authors of each article to describe their findings.

Among the 39 articles, 24 (62%) used position generator item responses to calculate individual dimension scores for upper reachability, network diversity, and range. These studies subsequently used dimension scores to develop a composite score for individual-level social capital. The other 14 that used position generators treated social capital dimensions as distinct, independent variables. Seventeen of the articles that used a composite social capital score demonstrated individual-level social capital as a health-promotive factor, three observed health-risk associations, and four exhibited null findings. Of the 15 articles assessing the independent relationships of each dimension to health outcomes, four articles (27%) demonstrated a heath-promotive association for upper reachability, nine (60%) for network diversity, and five (33%) for-range.

Table 2. Use of Position Generator Tool in Public Health Research Studies

Country	Authors	Research Design & Sample Characteristics	Dependent Variable(s)	Social Capital Construct and Dimensions Addressed	Occupational Prestige Scale	Key Findings
Belgium	Verhaeghe et al., 2012	Cross-sectional; multistage cluster sample N = 815 Belgian citizens Age: 18+ Years	Self-rated health	Network social capital Dimensions: Upper reachability, diversity, and range	Broad spectrum of 20 occupations	Volume of social capital from strong ties was associated with better self-rated health; relationship partially mediated by social support (b=0.053, se=.025, p<.05); Having access to intermediate class ties was associated with better self-rated health (b=0.197, se=.065, p<.001)
Belgium	Vyncke et al., 2014	Cross-sectional; purposive neighborhood selection sampling N = 1,025 Ghent residents	Depression and nervousness	Individual social capital (access to social resources) Dimensions: Upper reachability, volume[a]	Broad spectrum of 20 occupations	Men reported access to more social resources and greater number of social ties that might provide social support than women (t=4.50, p≤.001)
Bulgaria, Greece, Netherlands, Norway, Spain, and the United Kingdom	Koetsenruijter et al., 2015	Cross-sectional N = 1,692 adults Age: 18+ Years	Patient-reported health status; Physical exercise, physical activity, and diet/smoking behaviors	Access to healthcare professionals in social network Dimensions: Range	Healthcare-specific (doctor, nurse, pharmacist)*	More health professionals in one's network associated with better mental health in all participants (b=0.67, p <.05) and physical activity in high-income group (OR=1.44, p<.05)
Bulgaria, Greece, Netherlands, Norway, Spain, and the United Kingdom	Koetsenruijter et al., 2016	Cross-sectional N = 1,692 adults Age 18+ Years	Disease self-management: self-monitoring and insight and skill and technique acquisition	Access to healthcare professionals in social network Dimensions: Range	Healthcare-specific (doctor, nurse, pharmacist)*	More health professionals in one's network associated with greater skill and technique acquisition in low education group (b=0.07, p<.05)

Canada	Moore et al., 2009	Cross-sectional, stratified cluster design N = 328 Montreal residents Age: 18-55 Years	Mastery (control over one's life chances)	Individual social capital Dimensions: Upper Reachability, diversity, and range	Broad spectrum of 16 occupations	Greater individual social capital associated with greater mastery (β=.20, se=.07, p<.01)
Canada	Moore et al., 2009	Cross-sectional, stratified cluster design N = 291 Montreal residents Age: 18-55 Years	Waist circumference and BMI	Network social capital Dimensions: Upper reachability, diversity, and range	Broad spectrum of 16 occupations	Greater individual social capital associated with decreased likelihood of high risk waist (OR=0.81, 95% CI: 0.69, 0.96) circumference and lower BMI (OR=0.81, 95% CI: 0.71, 0.92), respectively
Canada	Carpiano & Hystad, 2011	National cross-sectional survey N = 18,052 Canadian citizens Age: 15+ Years	Self-reported general and mental health	Network diversity Dimensions: Diversity	Broad spectrum of 18 occupations	Greater network diversity associated with very good/excellent self-reported general (AOR=1.02, 95% CI: 1.01, 1.03) and mental health (AOR=1.01, 95% CI: 1.00, 1.02), respectively
Canada	Moore et al., 2011	Cross-sectional, 2-stage stratified cluster N = 2,707 Montreal residents Age: 25+ Years	Self-rated health	Outside- and inside-neighborhood network capital Dimensions: Upper Reachability, diversity, and range	Broad spectrum of 10 occupations (randomly selected from list of 90)	Greater outside neighborhood diversity associated with greater likelihood of very good/excellent health (AOR=1.20, 95% CI: 1.01-1.42)
Canada	Legh-Jones & Moore, 2012	Cross-sectional, 2-stage stratified cluster N = 2,672 Montreal residents Age: 25+ Years	Physical inactivity	Network capital Dimensions: Upper reachability, diversity, and range	Broad spectrum of 10 occupations (randomly selected from list of 90)	Greater network diversity associated with decreased likelihood of physical inactivity (AOR=0.87, 95% CI: 0.80, 0.95); partially mediated association between physical activity and social participation
Canada	Bassett & Moore, 2013	Cross-sectional, 2-stage stratified cluster	Depressive symptoms	Neighborhood network capital Dimensions: Upper reachability, diversity, and range	Broad spectrum of 10 occupations (randomly	Inside-neighborhood capital was NOT significantly associated with depressive symptoms (AOR=1.09, 95% CI: 0.97-1.22); however, greater generalized low trust (AOR=1.66, 95% CI: 1.30, 2.12,

		N = 2,624 Montreal residents Age: 25+ Years			selected from list of 90)	p<.001) was associated with more depressive symptoms
Canada	Bassett & Moore, 2014	Cross-sectional, 2-stage stratified cluster N = 2,643 Montreal residents Age: 25+ Years	Restless sleep in previous week	Network capital Dimensions: Upper reachability, diversity, and range	Broad spectrum of 10 occupations (randomly selected from list of 90)	Greater network capital associated with more restless sleep in men only (OR=1.25, 95% CI: 1.04, 1.50, p<.05)
Canada	Moore, Teixeira, & Stewart, 2014	Longitudinal; 2-stage stratified cluster sample N = 2,707 Montreal residents Age: 25+ Years	Smoking relapse	Network social capital Dimensions: Upper reachability, diversity, and range	Broad spectrum of 10 occupations (randomly selected from list of 90)	Greater network social capital associated with decreased likelihood of smoking relapse at follow-up (AOR=0.68, 95% CI: 0.47, 0.96, p<.05)
Canada	Moore, Stewart, & Teixeira, 2014	Cross-sectional, 2-stage stratified cluster sample N = 2,707 Montreal residents Age: 25+ Years	Self-reported health, physical inactivity, hypertension	Network social capital Dimensions: Upper reachability, diversity, and range	Broad spectrum of 10 occupations (randomly selected from list of 90)	Individuals with low social capital reported greater physical inactivity (Absolute concentration index [ACI]=-.03, 95% CI:-.04,-.02), more hypertension (ACI=-.03, 95% CI: -.03,-.02) and lower self-reported health (ACI=-.01, 95% CI: -.02,-.003) than those with higher social capital
Canada	Nagy et al., 2016	Cross-sectional N = 339 children in Montreal, Canada Age: 6-12 Years	Children's Sleep Disturbances	Parental social capital Dimensions: Upper reachability, diversity, and range	Broad spectrum of 10 occupations	Higher parental social capital was associated with fewer sleep disturbances in children (β=-.02, p=.01)
Canada	Child et al., 2017	Longitudinal N = 2,707 Montreal residents Age: 25+ years	Binge Drinking	Network social capital Dimensions: Extensity	Broad spectrum of 10 occupations (randomly selected from list of 90)	Greater network social capital was associated with higher odds of binge drinking (RR=1.08, 95% CI: 1.03-1.12)

Canada	Josey & Moore, 2018	Longitudinal N = 2,707 Montreal residents Age: 25+ years	Physical inactivity	Network social capital Dimensions: Upper reachability, diversity, and range	Broad spectrum of 10 occupations (randomly selected from list of 90)	Network social capital was associated with decreased odds of physical inactivity (AOR=0.86, 95% CI: 0.76, 0.97)
Canada	Wu et al. 2018	Longitudinal N = 2,707 Montreal residents Age: 25+ Years	Obesity	Network social capital Dimensions: Upper reachability, diversity, and range	Broad spectrum of 10 occupations (randomly selected from list of 90)	Network diversity was associated with decreased odds of obesity (AOR=0.83, 95% CI: 0.72, 0.96)
China	Cao et al., 2014	Cross-sectional N = 928 residents of Hangzhou, China Age: 60+ Years	Depression	Social network Dimensions: Upper reachability, diversity, and range	Broad spectrum of 20 occupations	Participants with high network capital reported less depressive symptoms than those with low network capital (β=-.15, p<.05)
China	Zhou et al., 2017	Cross-sectional N = 1,471 Chinese primiparas (30-36 weeks pregnant) at a provincial hospital in Zhejiang, China Age: 18+ years	Antenatal depression	Structural social capital Dimensions: Upper reachability, diversity, and range	Broad spectrum of 20 occupations	Greater structural social capital was associated with decreased odds of antenatal depressive symptoms (AOR=0.67, 95% CI: 0.52, 0.88).
China	Zhou et al., 2018	Longitudinal N = 450 Chinese primiparas (30-36 weeks pregnant) at a provincial hospital in Zhejiang, China Age: 18+ Years	Antenatal depression	Structural social capital Dimensions: Upper reachability, diversity, and range	Broad spectrum of 20 occupations	Structural social capital was associated negatively associated with depressive symptoms at time-point 1 (30-36 weeks; β=-.83, p<.01), but not at time-points 2 (2-3 days post-delivery) and 3 (6-I weeks post-delivery).

China, Taiwan, & United States	Song & Pettis, 2018	Cross-sectional N = 3,390 adults in urban China, N = 3,071 in Taiwan, N = 2,830 in US Age: 21-64 Years	Health limitation	Accessed status Dimensions: Upper reachability, diversity, and range	Broad spectrum of 21 occupations	Accessing higher SES positions was associated with greater health limitation for participants in China (AOR~1.01-1.05) and the US (AOR~1.01-1.03), but not in Taiwan (AOR~0.99-1.01).
China & United States	Song, 2015	Cross-sectional N = 3,000 adults in US, N = 3,500 adults in China Age: 21+ Years	Depressive symptoms	Accessed Socioeconomic Status Dimensions: Upper reachability and range	Broad spectrum of 21 occupations	Accessing high SES positions associated with more depressive symptoms in US (b=0.51, se=0.006, p<.001) and China (b=0.62, se=0.018, p<.001); Accessing low SES negatively associated with depressive symptoms in US only (b=-.057, se=.006, p<.001)
Papua New Guinea	Inoue et al., 2018	Cross-sectional N = 337 febrile children Age: ≤ 15 Years	Utilization of health services	Individual social capital of village health volunteers Dimensions: Diversity	Broad spectrum of 25 occupations	Healthcare utilization was associated with having a village health volunteer who discussed their activities with people outside of their village (PR=1.47, 95% CI: = 1.22, 1.78)
Spain	Pena-López et al. 2016	Cross-sectional N = 3,400 adults in Spain Age: 18+ Years	Subjective Well-Being and Life Satisfaction	Expert mobilization Dimensions: Unclear	Broad spectrum of 14 occupations	Expert mobilization was positively associated with happiness (β=0.25, p<.1) and life satisfaction (β=0.48, p<.1)
South Korea	Han et al., 2011	Cross-sectional N = 811 Seoul residents Age: 20+ years	Self-rated health, subjective life satisfaction and subjective happiness	Network Diversity Dimensions: Diversity	Broad spectrum of 25 occupations	Network diversity was associated with greater self-rated health (AOR=1.05, 95% CI: 1.02, 1.08, p<.01), life satisfaction (AOR=1.08, 95% CI: 1.05, 1.11, p<.001), and happiness (AOR=1.07, 95% CI: 1.04, 1.10, p<.001)
South Korea	Han & Lee, 2012	Cross-sectional N = 4,730 Seoul residents Age: 25+ Years	Self-reported health status	Individual-level network resources; Area-level social capital Dimensions: Upper reachability, diversity, and range	Broad spectrum of 25 occupations	Greater individual network resources associated with greater odds of reporting good/very good health (AOR=1.23, 95% CI: 1.11, 1.37, p<.001)

South Korea	Han & Lee, 2013	Cross-sectional N = 4,730 Seoul residents Age: 25+ Years	Subjective happiness (well-being)	Individual-level network resources; Area-level social capital Dimensions: Upper reachability, diversity, and range	Broad spectrum of 25 occupations	Greater individual and area-level resources associated with greater happiness (β=.093, p<.05)
South Korea	Han et al., 2013	Cross-sectional N = 4,734 Seoul residents Age: 25+ Years	Mental health	Individual-level network resources Dimensions: Upper reachability, diversity, and range	Broad spectrum of 25 occupations	Network resources were NOT associated with mental health; however, greater individual-level trust (b=.035, se=.009, p<.001) was associated with better mental health
South Korea	Lee et al., 2018	Longitudinal N = 582 adults in South Korea Age: 40+ Years	Stomach cancer knowledge	Social capital Dimensions: Upper reachability	Broad spectrum of 22 occupations	The association between personal cancer history and media use for stomach cancer information was significant among participants with high social capital (β=.127, p<.01), but not low social capital (β=.006, p>.05)
Sweden	Miething, Rostila, & Rydgren, 2017	Longitudinal N=3,078 Swedish citizens with parents born in Sweden, Iran, or the former Yugoslavia Age: 19 and 23 years	Depressive symptoms	Occupational social capital Dimensions: Extensity[a]	Broad spectrum of 40 occupations	Extensity of manual contacts was associated with less depressive symptoms among men (β=-.017, p<.05); Higher accessible prestige scores were associated with less depressive symptoms among men (β=-.023, p<.01).
Taiwan	Song & Lin, 2009	Cross-sectional N = 2,081 Taiwanese citizens Age: 20+ Years	Depression and self-reported health	Social capital Dimensions: Upper reachability, extensity[a], and range	Broad spectrum of 15 occupations	Greater social capital was associated with less depression and (b=-.086, se=-.078, p<.001) better self-reported health (b=.032, se=.048, p<.05)
Taiwan	Yang et al., 2013	Cross-sectional N = 1,098 Taiwanese citizens Age: 15+ Years	Health Literacy	Social capital Dimensions: Upper reachability, extensity[a], and range	Broad spectrum of 15 occupations	Greater social capital associated with higher health literacy (t=10.255, p<.001)

Taiwan	Wu et al., 2018	Cross-sectional N = 2,598	Depressive symptoms	Network social capital Dimensions: Upper reachability, diversity, and range	Broad spectrum of 15 occupations	There was NO association between network social capital and depressive symptoms.
United Kingdom	Verhaeghe & Tampubolon, 2012	Multiple wave cross-sectional N = 23,327 England residents Age: 16+ Years	Self-rated health	Social network resources Dimensions: Upper reachability, diversity, and range	Broad spectrum of 11 occupations	Having salariat class people in individual's network associated with better self-rated health (AOR=1.11, 95% CI: 1.07, 1.14, p<.001)
United States	Wasserman et al., 2006	Cross-sectional N = 223 Latina immigrants Age: 15-44 Years	Prior year cervical cancer screening	Access to community bridge persons (promotoras) in social network Dimensions: Range	Bridge persons: promotora, bilingual with > HS education, Spanish-speaking non-Latino, supporting organization	Access to promotoras associated with greater likelihood of obtaining cervical cancer screening (b=1.34, se=.33, p<.01)
United States	Song, 2011	Cross-sectional N = 2,857 US citizens Age: 21-64 Years	Psychological distress	Network Resources Dimensions: None	Broad spectrum of 22 occupations	Greater social capital associated with less psychological distress (b=-.014, se=.003, p<.001); relationship mediated by perceived social status
United States	Chen et al., 2014	Cross-sectional N = 1,701 Austin, TX residents Age: 18+ Years	Health information repertoire (accessing health information from multiple sources)	Social capital Dimensions: None	Broad spectrum of 16 occupations	Greater social capital associated with larger health information repertoire (IRR=1.034, se=.008, p<.001)
United States	Child et al., 2017	Cross-sectional N = 430 Greenville, SC residents Age: 18+ Years	Meeting physical activity guidelines (≥ 150 minutes of moderate/vigoro	Network extensity Dimensions: Upper reachability, diversity, and range	Broad spectrum of 12 occupations	Network extensity was associated with greater odds of meeting physical activity guidelines (AOR=1.11, 95% CI: 1.03, 1.20)

			us physical activity)			
United States	Maness, 2017	Cross-sectional N = 2,512 Non-institutionalized adults in the United States Age: 18+ Years	Leisure activity engagement	Loose social network (i.e., their weak ties) Dimensions: Upper reachability, diversity	Broad spectrum of 12 occupations	Diversity was positively associated with variety (Estimate [Est.]=1.95, p≤.01) and frequency (Est.=0.45, p<.01) of leisure activities. Upper reachability was positively associated with variety (Estimate [Est.]=2.52, p≤.01) and frequency (Est.=0.49, p<.01) of leisure activities.

Note: [a] Two studies assessed non-traditional dimensions of social capital (e.g., extensity, volume), both resemble characteristics related to range.

As Table 3 indicates, we observed that eight of the 39 (21%) articles addressed health disparities/inequities based on socioeconomic indicators in their analysis of the relationships between individual social capital and health outcomes. Of these eight, three (38%) addressed differences by gender, one (13%) by income level, four (50%) by educational attainment. Generally speaking, these studies demonstrated that individual social capital had a greater protective factor for disadvantaged groups (e.g., low income and low education) compared to advantaged groups even while controlling for other common SES factors like race and employment status.

Table 3. Position Generator Studies Addressing Socioeconomic Disparities in the Relationship between Social Capital and Health

Country	Authors	Socioeconomic Indicator	Description of Findings
Belgium	Vyncke et al., 2014	Gender	Psychological distress higher in women than men; Men have greater social capital (social support, social influence, and social capital volume) than women; No significant interaction of gender and social capital on psychological distress
Bulgaria, Greece, Netherlands, Norway, Spain, and the United Kingdom	Koetsenruijter et al., 2015	Income	Having a health professional in wider network was associated with better MHQoL in the low income group (β=0.76), but not in the high income group; Having a health professional in wider network was associated with higher odds of physical activity in high income group (OR=1.44), but not in low income group
Bulgaria, Greece, Netherlands, Norway, Spain, and the United Kingdom	Koetsenruijter et al., 2016	Education	Having a health professional in wider network was associated with greater self-management capabilities (technique acquisition) in the low education group (β=0.07), but not in the high education group
Canada	Moore et al., 2009	Education	Social capital was negatively associated with mastery in the less than high school education group (β=-0.46, se=0.08, p<.001); Non-significant association among high school or

			equivalent and the more than high school education groups
Canada	Bassett & Moore, 2014	Gender	Less than excellent network social capital was associated with a higher odds of restless sleep in men (*AOR*=1.25, *95% CI:* 1.04, 1.50), but not in women; Neighborhood-level disadvantage was associated with higher odds of restless sleep in women (*AOR*=1.189, *95% CI:* 1.01, 1.38), but not in men
Canada	Moore, Stewart, & Teixeira	Education	Compared to those with less than a high school education, individuals with a college degree or higher explained 51.2%, 30.8%, and 15.9% of social capital-related inequalities in hypertension, low self-rated health, and physical inactivity, respectively.
Sweden	Miething et al., 2017	Gender	Extensity of manual class contacts (β=-0.017, *se*=0.007, $p \le 0.05$) and higher accessible prestige scores (β=-0.023, *se*=0.007, $p \le 0.01$) were associated with lower depressive symptoms in men, but not in women
Taiwan	Song & Lin, 2009	Education	The protective effect of social capital on depression is weaker for those with more education and stronger for those with less education (β=0.017, *se*=0.057, $p \le 0.05$)

DISCUSSION

Position generators offer insights into the types of resources individuals have access to by virtue of the types of occupations of people in their social network. For example, the breadth of weak ties that exist within an individual's network is linked to potentially accessible social resources (Granovetter, 1983). Beneficial social connections are a crucial component of social advantage similar in importance to an individual's level of income and educational attainment (Phelan et al., 2010). Position generators are a practical tool to objectively assess the quality of networks, specifically compositional quality, based on occupational prestige as a proxy for access to flexible resources (e.g., money, knowledge, power, prestige, and additional beneficial connections) embedded within a network that have been shown to affect individual-level health

outcomes. Unlike other similar available instruments like the resource generator (Van Der Gaag & Snijders, 2005), the position generator does not assume the types of social resources an individual needs in any given circumstance. For example, depending on specific contexts, the resources that an individual may need may vary from financial support, informational support/expertise, linkages to other supportive ties, or a combination thereof. The application of occupational prestige in describing social capital dimensions quantifies the potential resources an individual has from being part of diverse networks.

Scope of Position Generator Implementation in Population-Based Studies

Our literature review identified 39 peer-reviewed articles that assessed individual social capital using position generators to test their associations with public health outcomes. Most of the identified articles included cross-sectional assessments in upper-middle-income to high-income countries (The World Bank, 2017). Position generator studies have been successfully implemented to assess the associations that social capital has across health behaviors, disease outcomes, quality of life, self-reported health, and health education.

The employment of position generators to assess individual social capital was not uniform across studies. Twenty-six studies (67%) addressed all three social capital dimensions, while others addressed only one or two. Diversity was the least assessed dimension (n = 26, 67%), yet among studies conducting dimension-specific analyses, it demonstrated the most common health-promotive association compared to upper reachability and range. Because greater diversity implies potential increased access to information (including ideas and ways of behaving), goods, and services, we argue that the ability to capture this dimension should receive at least equal priority in assessing health as range and upper reachability (Albrecht & Goldsmith, 2003).

Though most studies included a broad spectrum of occupations to assess occupational prestige, three studies included occupations based on a priori hypotheses (e.g., health care professionals, bridge persons). That is, having access to specific key individuals offered more advantages to one's health than having access to people from a broad spectrum of occupations (Koetsenruijter et al., 2015, Koetsenruijter et al., 2016, Wasserman et al., 2006). Of those that used a broad spectrum, between 10 and 40 regionally-relevant occupations were included. Though intuitively accessing specific individuals may afford more benefits than others, the temptation to focus solely on the most influential members of one's network limits our capacity to understand the complex relationship individuals have with others in their networks. Vulnerable and marginalized populations, in particular, need a variety of resources in order to acquire health advantages. Therefore, the use of position generators that assess a broad spectrum of occupations will likely provide greater insight into how people actually use social capital to improve their health.

Utilization of Position Generators to Inform Health Statuses

Among all included articles, a large majority exhibited a statistically significant, protective relationship of individual social capital, either measured as a composite of its dimensions or by individual dimensions, on the health outcome of interest. Creating a composite measure for social capital was the most common analytic technique for assessing social capital's association with health outcomes. Using composite scores, researchers highlighted robust health-promotive associations between social capital and self-rated health (Han & Lee, 2012; Moore, Stewart, & Teixeira, 2014; Song & Lin, 2009; Verhaeghe et al., 2012), physical activity (Child et al., 2017; Josey & Moore, 2018; Moore, Stewart, & Teixeira, 2014), indicators of mental health (Cao et al.,

2014, Han & Lee, 2018; Song, 2011; Song & Lin, 2009; Zhou et al., 2017; Zhou et al., 2018), and health information access (Chen et al., 2014; Lee et al., 2018), respectively. Alternatively, some studies highlighted the unique contributions of each dimension to specific outcomes of interest. For example, numerous studies exhibited unique associations that upper reachability (Verhaeghe et al., 2012; Verhaeghe & Tampubolon, 2012), diversity (Carpiano & Hystad, 2011; Han et al., 2011; Moore et al., 2011), and range (Koesenruijter et al., 2015) have with self-rated health. The inconsistent application for calculating the scores for social capital dimensions poses challenges to making inferences about the robustness of each on specific health outcomes. However, data derived from analyzing all three dimensions may better inform prioritized areas for intervention development and implementation.

Informed by the theory of fundamental causes, we also sought to identify whether position generators have been informative in understanding health inequalities in empirical research studies, specifically, capturing the relationship of individual social capital on health outcomes among historically less advantaged populations. Among the 39 articles, only eight conducted a health disparities-informed analysis of individual social capital on health stratified by an indicator of socioeconomic well-being (e.g., low income versus high income) or tested an effect modification of a socioeconomic indicator (e.g., level of educational attainment) (Bassett & Moore, 2014, Carpiano & Hystad, 2011, Koetsenruijter et al., 2015, Koetsenruijter et al., 2016, Miething et al., 2017, Moore et al., 2009, Song & Lin, 2009, Vyncke et al., 2014). Overall, the results from these eight studies largely indicated that individual-level social capital had a protective/promotive association with health outcomes among those who belong to less advantaged groups. For example, in a multinational study with diabetes patients, having a health professional in one's wider network was associated with better mental health quality of life in the low-income group (Koetsenruijter et al., 2015). However, this association was not significant among those in the high-income group. This supports the added-value hypothesis, which posits that beneficial social connections may be particularly helpful for disadvantaged groups compared to groups who already have high access to social resources (Vitaliano et al., 2001).

Limitations of the Scoping Review

Though our review of position generators in public health research has yielded substantial insight into its employment and utility in understanding the role of social capital indicators and health disparities and outcomes, our review was not without its limitations. As part of our scoping review, our team employed two search terms, which were searched in tandem. We used the term "health" to develop a broad search; however, we may have missed articles had we included alternatives such as "well-being" or "quality of life." Furthermore, the number of health studies employing position generators may be underestimated due to our study inclusion criteria (Pickering & Byrne, 2014; Ehsan et al., 2019). Our review included manuscripts that were published in English only. Many scoping reviews include grey literature as part of the inclusion criteria for data extraction (Peters et al., 2015). Our review limited inclusion criteria to peer-reviewed literature, thereby potentially underestimating the extent to which position generators have been employed in the contexts of public health research. There is a wide breadth by which social capital has been measured in public health studies beyond indicators computed via position generators; therefore, reviewing only peer-reviewed literature permitted our team to focus on studies deemed to employ methods of high rigor and quality by third parties. Like other literature reviews, our scoping review was susceptible to publication bias. Researchers whose studies

produced null or inconclusive findings may not have pursued publication opportunities, thereby potentiating an underestimate of the scope of use in health surveillance efforts. Though some studies included in our review provided some null findings, these studies explored additional indicators of social capital, providing insight into how network compositional quality characteristics operated when accounting for these factors. Lastly, many of the articles included in our search were derived from the same parent population-based study; therefore, sample-related characteristics may have contributed to producing consistent associations between social capital indicators and health outcomes. We opted to treat these articles distinctly given variances in how social capital was calculated and because there was a spectrum of health topics of interest. Despite these limitations, our study team's literature review process adhered highly to the recommendations for extracting and charting results in a scoping review (Peters et al., 2015).

Implications for Population-Based Surveillance

Despite our review's limitations, our findings support the need to consider alternative and comprehensive means to measure individual-level social capital informed by network compositional quality. That is, beneficial social connections beyond factors like network size or density should be included in population health surveys. Position generators are instruments that have been utilized and shown to be effective in global efforts to conduct national health surveillance (Koetsenruijter et al., 2015, Koetsenruijter et al., 2016, Lee et al., 2019, Pena-López et al., 2017, Miething et al., 2017, Moore et al., 2009, Song, 2011, Song & Lin, 2009, Verhaeghe et al., 2012a, Verhaeghe et al., 2012b, Wu et al., 2018, Yang et al., 2013). Capitalizing on the strengths and limitations of prior work, we recommend that future population-based surveillance employ position generators that assess all three dimensions of individual social capital on health outcomes of interest and include a broad spectrum of occupations. Public health surveillance experts should also continue routine measurement of social disadvantage/socioeconomic indicators to better identify local or regional health disparities and inform tailored health promotion interventions seeking to build and diversify social networks.

Furthermore, prior position generator studies in public health contexts have primarily been conducted in high and upper-middle-income countries. How individual social capital shapes health and how position generators may inform this relationship in lower-income countries warrants further scrutiny. Additionally, position generators may help assess how individual social capital shapes health and well-being at critical periods across the life course, such as early adulthood and older age, which are developmental periods characterized by increased social dependence. Given that most of our identified studies were cross-sectional in design, the addition of position generators to national surveillance surveys may permit longitudinal or trend assessments of these relationships, further underscoring the role of beneficial social connections as a social advantage that buffers against the impact of stress on poor health and mortality.

Lastly, socioeconomic indicators like individual income and education levels are routinely assessed in national health surveillance surveys given their straightforward method of measurement. While the measurement of individuals' beneficial social connections requires measuring qualitative (e.g., beneficial aspect) and quantitative (e.g., accessible number of persons) characteristics, unlike income and education, assessing individual-level social capital offers an enhanced understanding of population health disparities (Borgatti et al., 1998). We believe that the inclusion of position generator questions will improve the quality of U.S. population health surveys by advancing our understanding of population health disparities and offering opportunities to

inform network-level interventions. It is common in population-based studies to collect measures that assist in identifying individuals from socially disadvantaged backgrounds (e.g., minority or disadvantaged statuses across race/ethnicity, gender identity, sexual orientation, social class, disability, and geographic location). Therefore, health researchers should elucidate how these social determinants produce disparities across a variety of health indicators and commit to assessing the extent to which social capital indicators (e.g., diversity, range, and upper reachability) attenuate these associations.

Implications for Public Health Practice

To enhance people's social circumstances and related health outcomes, the fundamental cause theory suggests that health promotion efforts focus on increasing flexible resources. Individuals' social networks are flexible resources that afford health advantages. By enhancing networks to raise individuals' awareness of available, flexible resources may facilitate and accelerate behavior change, specifically leveraging network connections and novel interactions for social support in times of stress (Villalonga-Olives, Wind, & Kawachi, 2018). Utilizing position generator instruments may be integral to developing or strengthening network-focused interventions that target health. Position generators may help identify communities in need of prioritized efforts, elucidating neighborhoods where there is limited access to flexible resources as indicated by network range, diversity, and upper reachability. Implementing programs that build up these factors may buffer against the negative health impact imposed by fundamental causes like socioeconomic stress and, in turn, assist in narrowing health disparities.

Though there are limited interventions that seek to intervene on social capital from a network resources approach (Villalonga-Olives, Wind, & Kawachi, 2018), a specific intervention that has drawn praise and may be integral to enhancing network compositional quality is Circles® USA (Circles® USA Building Community to End Poverty, 2019). Circles® USA is a program that utilizes community capacity building to achieve local, significant reductions in poverty. Through the program, individuals seeking to escape poverty (circle leaders) enter into an intentional relationship with a group of volunteers (allies) who have skills and experiences that they share with the circle leader, such as managing credit card debt or negotiating a lease (i.e., collectively strategizing ways to minimize barriers out of poverty). The program typically enrolls individuals who earn less than 150% of the Federal Poverty Level and willingly commit to building linkages (i.e., weak ties) with allies via Circles meetings. Circles® USA has exhibited substantial improvements on indicators of socioeconomic status, including income, employment status, educational attainment, housing, and access to transportation. Circle leaders' income increased an average of 30% after participating for six months and 43% after being in the program for one year. Leaders also expanded their support networks after 18 months in the program. Given the robust associations between low socioeconomic status, health, and mortality, the successful adaptation and implementation of programs like Circles® USA may significantly assist with mitigating against the production of economic-related health disparities.

CONCLUSION

Having beneficial social connections remains a critical facet of the theory of fundamental causes; specifically, having beneficial social connections affords individuals advantages that promote health and well-being, prevent disease and mortality, and minimize socially-produced health disparities. Identifying appropriate and feasible measures that capture beneficial social

connections remains an ongoing challenge for public health experts. Our study aimed to provide insight and recommendations for using position generator tools among public health experts as the field continues to grapple with ways to incorporate network-focused indicators of social capital into population health surveys and health interventions. We contribute to the field of public health research and practice by providing greater insight into position generators' scope of prior use in population-based studies to measure individuals' weak network ties and compositional quality. Our review highlighted the magnitude and robustness of position generator-computed social capital dimensions, notably network diversity, range, and upper reachability. Lastly, we underscored how position generators could be utilized in health surveys to inform social capital's capacity to attenuate health disparities imposed by social disadvantage.

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