ORIGINAL ARTICLE

Resident-reported measurements of neighborhood characteristics: a scoping review

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Abstract

Purpose Because of the growing emphasis on place-based interventions to improve health, we sought to identify commonly measured, resident-reported neighborhood characteristics for use in evaluation studies.

Methods A review was conducted of resident-reported neighborhood indicators in 27 published PubMed articles and eight non-academic gray literature sources. Neighborhood domains and items were evaluated across the literature to identify patterns in resident reporting on neighborhoods.

Results A diverse range of survey items across reviewed literature comprised the following broad domains: physical conditions, social conditions, community resources, social agency, and neighborhood dynamics. Academic and gray literature varied in their assessments' focus and the populations considered, with gray literature exploring a wider array of persons, such as those with disability, and positive aspects of neighborhoods. In general, there was a lack of a cohesive framework for measuring neighborhood well-being and no clear agreement on appropriate language and key definitions. Measures relevant to the elderly were largely absent from the US literature.

Conclusions Most published articles on neighborhood measurement were derived from the criminology and sociology literature on the origins of violence and poverty. Their measures reflected this negative orientation. Gray literature included a broader perspective on neighborhoods and consideration of alternative populations such as the elderly and people with disability. This review's identification of common metrics in neighborhood domains paves the way for building consolidated and standardized neighborhood measurement tools that will also fill current gaps in the literature, such as those concerning elderly residents or those with disabilities.

Keywords Neighborhood conditions · Self-report · Community development · Neighborhood measures

Introduction

The ways in which neighborhood characteristics influence health outcomes, daily functioning, and quality of life have drawn attention from fields of public health research and policy. Neighborhood characteristics have been associated with a wide range of health outcomes, including behavioral health (Hosokawa and Katsura 2020), sleep quality (Johnson et al. 2016; Troxel et al. 2020), preterm births (Giurgescu et al. 2017), obesity (Tamayo et al. 2016; Hoenink et al. 2019), tobacco dependence (Reitzel et al. 2012), and limited life spans (General OotS 2021). Given these associations, it is unsurprising that the US Department of Health and Human Services included "neighborhood and built environment" as one of the five defined domains of social determinants of health ("Social Determinants of Health" n.d.), underscoring the role of neighborhoods in health outcomes.

Tools that capture residential measurements are important for engaging residents and stakeholders while assessing the effectiveness of community development initiatives. The history of community development and renewal in the United States can be traced back to reform movements during the Progressive Era (Hoffman 2012) and continues into today. Initially, such efforts failed to include community input, but

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that has slowly changed. Collaborative partnerships with community groups create multifaceted teams guided by both bottom-up and top-down approaches. These partnerships have taken place in urban, suburban, and rural communities, in the United States and abroad (Savage et al. 2018; Freudenberg and Golub 1987; Liss-Levinson et al. 2020). A review of the strategies utilized by these partnerships yields mixed results in their ability to improve population health outcomes, community behaviors, public policy, or community environments (Roussos and Fawcett 2000). Despite supportive evidence of community change prompted by these partnerships, the degree of change has been called into question due to a lack of clear standards for measuring neighborhood quality of life or change (Roussos and Fawcett 2000).

Efforts have been made to identify and define neighborhood measurements while differentiating temporary from permanent features (Ndjila et al. 2019) to better determine how neighborhoods may affect resident health and the effectiveness of interventions aimed at improving these neighborhoods. Neighborhood measurement methods include in-person evaluation, administrative data (e.g., police records), census data, and review of video recordings (Sampson and Raudenbush 2004). Other examples include the presence of alcohol and tobacco stores, commercial building security, crime data, and neighborhood walk scores (Sampson and Raudenbush 2004; Diez Roux et al. 2017). However, measurements such as resident perceptions of neighborhood characteristics hold predictive power that administrative or built environment measurements cannot capture. For example, perceived neighborhood characteristics have been reported as more accurately predicting physical activity than built environment assessments (Orstad et al. 2017).

As the relationship between neighborhood characteristics and health becomes clearer, it is increasingly important that collaborative partnerships and healthcare organizations are equipped with standardized, comprehensive tools for assessing changes in community development. This is especially true when large investments are made from multiple sectors with expectations for demonstrated improvement.

Resident-reported measures of neighborhood characteristics come from two primary sources. First, academic publications include a variety of surveys employed, especially from criminology and sociology literature. Naturally, these publications include an assessment of numerous characteristics of neighborhoods that are associated with violence and crime. Separate from the published literature are evaluation tools designed for neighborhoods and neighborhood interventions by third party organizations and governmental groups engaged in community development. These latter sources have produced neighborhood measurement tools to assist community development programs and published them in what is called "gray literature" (19-27 Stiefel et al. 2020; "User's Guide for the Fragile Families and Child Wellbeing Study Public Data" 2018, Mulcahy et al. 2020; Mulcahy 2017; "The Healthy Housing Outcomes Survey" 2019; "National Survey of Children's Health Questionnaire" 2020; "CHIS Questionnaires" 2021; "Secondary Student Community Health In-School and Hybrid Only Module" 2020; "2021 State and Local Youth Risk Behavior Survey" 2021). This review aimed to assess the state of both academic and gray literature, while identifying resident-reported measures of neighborhoods currently being utilized and reported in the domestic and international literature to consider domains of coverage, populations included in the assessments, and characterizations of neighborhoods.

Methods

Search strategy and criteria selection

A scoping literature review was conducted on resident self-reported measurements of neighborhoods to identify commonly assessed neighborhood characteristics and the items chosen to represent them in the academic and gray literature, the latter of which is defined as publications outside of traditional academic scholarships, including reports, keynote addresses, briefs, and similar. A PubMed search of the Major MeSH term "Self-Report" AND "neighborhood disorder" yielded 28 results in the academic literature. A second PubMed search was conducted with the Boolean search terms "neighborhood disorder," "neighborhood safety," "neighborhood poverty," "neighborhood cohesion," and "self-report" and yielded 408 results. Filters applied in both searches isolated full-text English language articles published between 2010 and 2021. The results of these two searches underwent a title and abstract screening, in which any paper that indicated having self-reported neighborhood conditions as a variable was included for a full manuscript review. Throughout the screening, reference sections of the articles became a source for finding additional publications to increase the breadth and depth of the findings. Once the review reached a point at which the researchers observed that trends in neighborhood measures were apparent, and questionnaire items ceased to yield new information or additional insights (suggesting that a point of saturation had been reached), the review was concluded. At the conclusion of the screening, 27 published articles were included in the review (Table 1).

An advanced search using Google Scholar was conducted to identify gray literature sources for neighborhood measurements. This search was conducted using the Boolean terms "self-report," "self-assessed," "self-rated," "self-estimated," to search for papers that contained "neighborhood" in relation to health, safety, community, poverty, or disorder. Gray literature meeting inclusion criteria comprised surveys published in English since 2010 and those items evaluating

Table 1 Published articles including resident self-reported surveys

Resource	Country	Study environment	Primary data collection method	Characteristics assessed
Johnson et al. 2016	United States	Urban	Not reported	• Neighborhood social cohesion; violence; problems
Kim et al. 2019	United States	Urban	Self-administered survey	• Neighborhood social cohesion; safety
Pruitt et al. 2012	United States	Mixed	Telephone interviews	• Perceived neighborhood conditions • Perceived Neighborhood Disorder (Social Disorder; Physical Disorder/Decay) • Collective efficacy (Informal Social Control; Social Cohesion and Trust) • Neighborhood Fear • Neighborhood attachment • Weak social ties
Palumbo et al. 2019	United States	Urban	Interview	• Perceived neighborhood environment • Neighborhood safety • Opportunities for physical activity • Poverty • Neighbor disconnectedness • Physical disorder • Social disorder • Engagement with community activities • Social support • Social trust • Social cohesion • Violence
Dawson et al. 2019	United States	Mixed	Computer-assisted self-interviewing (CASI) and computer-assisted personal interviewing (CAPI)	• Perceived neighborhood social cohesion; safety
Hastings and Snowden 2019	United States	Mixed	Face-to-face interview with computer-assisted personal interviewing (CAPI)	• Perceived neighborhood social disorder; amenities
Schulz et al. 2013	United States	Urban	Interview	• Perceived neighborhood environment • Perceived neighborhood social environment; physical environment
Jack and McCormack 2014	Canada	Urban	Telephone interviews	• Neighborhood walkability • Safety from crime • Neighborhood aesthetics • Access to services • Street connectivity • Pedestrian infrastructure • Motor vehicle traffic safety • Physical barriers • Recreation destination mix • Utilitarian destination mix
Matthews et al. 2019	United States	Mixed	Resident survey: self-administered (mail)Study subject face-to-face interviews	• Neighborhood safety • Neighborhood disorder • Neighborhood characteristics • Collective efficacy • Social control • Social cohesion • Neighborhood problems
Troxel et al. 2020	United States	Urban	In-home interviews	• Overall perceived housing conditions • Perceived housing distress; neighborhood safety
Giurgescu et al. 2017	United States	Urban	Self-administered surveys	• Neighborhood conditions • Perceived physical disorder; social disorder; crime in neighborhood

Table 1 (continued)

Resource	Country	Study environment	Primary data collection method	Characteristics assessed
Arcaya et al. 2018	United States	Urban	Interviews	• Experiencing discrimination in the neighborhood • Functional social support • Connectedness to the neighborhood • Anticipated residential mobility • Ownership of neighborhood change
Tamayo et al. 2016	United States	Mixed	Not reported	• Perceived neighborhood safety (General neighborhood safety; Awareness of recent specific violent crime occurrences)
Sallis et al. 2010	United States	Urban	Self-administered	• Residential density • Land use mix • Street connectivity • Proximity to neighborhood recreation facilities • Pedestrian infrastructure • Bicycling infrastructure • Aesthetic qualities • Social cues for physical activity • Traffic safety • Crime safety
Secretti et al. 2019	Brasil	Not reported	Not reported	• Social cohesion • Perceived safety
Chola and Alaba 2013	South Africa	Not reported	Self-administered if >15 yrs, mothers completed for children 0–14 yrs	• Social capital • Individual level social capital (Civic participation; Social trust)
Loh et al. 2019	Australia	Urban	Online self-administered survey	• Perceived safety from crime • Perceived traffic-related safety and pollution
Orban et al. 2017	Germany	Urban	Not reported	• Neighborhood satisfaction • Social satisfaction • Perceived safety • Neighborhood social capital
Hosokawa and Katsura 2020	Japan	Urban	Self-administered survey (mail)	• Aesthetic Quality • Walking environment • Availability of healthy foods • Perception of safety • Social cohesion • Violence • Activities with neighbors
Prado et al. 2017	Brasil	Urban	Not reported	• Perceptions of traffic safety; crime-related safety
Parker et al. 2019	Australia	Urban	Online self-administered survey	• Perceived neighborhood pedestrian traffic/safety • Perceived crime safety
Hsueh et al. 2016	Taiwan	Urban	Telephone interviews	• Perceived neighborhood environment • Access to shops and public transport • Presence of sidewalks and bike lanes • Access to recreational facilities • Crime safety at night • Traffic safety • Social environment • Aesthetics • Residential density

Table 1 (continued)

Resource	Country	Study environment	Primary data collection method	Characteristics assessed
Shagdarsuren et al. 2017	Mongolia	Urban	Face-to face interview with structured survey	• Perceptions of neighborhood environment • Physical order • Social support • Safety • Amenities • Social order • Engagement with community activities
Hoenink et al. 2019	Amsterdam	Mixed	Online self-administered survey	• Social network; cohesion; trust • Perceived crime
Cerin et al. 2017	China	Not reported	Self-administered survey	• Child-centered Physical Activity-related neighborhood Informal Social Control • Personal Involvement and general informal supervision • Educating and assisting neighborhood children • Civic engagement for the creation of a better neighborhood environment • Community cohesion • Perceived signs of physical and social disorder; stranger danger; traffic hazards and risk of unintentional injury
Suen et al. 2015a	China	Not reported	Interviews	• Community cohesion • Perceived signs of physical and social disorder; risk of unintentional injury; neighborhood traffic safety and pedestrian infrastructure; stranger danger in the neighborhood • Availability of active-play equipment within or outside the neighborhood • Places for child's physical activity in the neighborhood
Meyer et al. 2014	United States	Mixed	Not reported	• Neighborhood safety fear

resident self-reported measurement of one or more neighborhood characteristics through a primary source. While reviewing gray literature data sets, surveys, and websites, additional resources surfaced that were then evaluated for inclusion. The review of gray literature sources continued until the neighborhood domains assessed and their qualifying items became redundant. At the conclusion of the gray literature review, surveys developed by eight different organizations were included (Table 2).

Data extraction and organization

Information regarding self-reported neighborhood measures in published studies was extracted and compiled to identify trends in measured domains and items (Table 1). These items included the country and setting in which the study took place; method of self-reported data collection; characteristics these measurements assessed; and the validated scales used or modified in the resident survey. Although the majority of surveys were implemented in respondent residential areas, Kim et al. (2019) and Giurgescu et al. (2017) administered surveys at urban hospitals; therefore, gathering information potentially representative of many different neighborhoods simultaneously. These studies were categorized as urban, despite the possibility that a portion of the participants resided in rural and suburban areas.

Self-administered methods of data collection included online or paper surveys completed by respondents. Paper surveys were mailed out or dispersed at local centers. Interviews were conducted in-person, over the phone, or online. During review, if a survey item did not name the domain it was intended to capture, the item was assigned to a descriptive term commonly seen in the literature. After reviewing survey items within each category individually, recategorization and relabeling occurred when necessary to allow for comparison across all collected literature.

Table 2 Gray literature organization self-reported surveys

Year	Resource	Respondent	Examples of Characteristics Assessed
2021	California Health Interview Surveys	For children 0-11 years old, household answers on their behalf. Families with one or more adolescents (12-17 years old), one adolescent randomly selected to complete. Adult	• Civic engagement • Safety • Social cohesion • Encounters with police • Gun ownership and violence • Social support; trust; control • Community involvement; stability
2021	Youth Risk Behavior Surveillance System (YRBSS) 2021 State and Local Youth Risk Behavior Survey for High Schoolers	Middle School and High School Students	• Perceived safety • Violence
2019	Enterprise Community Partners and Success Measures Healthy Housing Outcomes Survey	Community member	• Social support; cohesion • Safety • Amenities
2017 2020	Success Measures Health Outcomes Tool and Creative Community Development Evaluation Tools	Community member/Parent	• Social cohesion; trust • Safety in the community • Housing stability • Use of community services; amenities • Exterior of residence • Community land use • Resident satisfaction • Civic engagement
2020	CalSCHLS Community Health Secondary Student Survey	Student	• Safety • Physical disorder • Social disorder • Crime • Accessibility and perception of amenities • Social support; trust • Civic engagement • Engagement with community activities • Community services
2020	Institute for Healthcare Development's Adult Well-being Assessment	Community member	• Social cohesion; support • Neighborhood satisfaction
2018	Fragile Families and Child Wellbeing Study	MotherFatherChild/Teen	• Conditions of the surrounding block • Neighborhood collective efficacy • Safety • Community services • Social disorder
2020	The Child and Adolescent Health Initiative's National Survey of Children's Health (NSCH) for Children	Parent on behalf of child	• Amenities • Physical order; disorder • Social support • Engagement with community activities • Violence • Safety • Community stability

Details regarding the gray literature survey respondents and questionnaires were extracted and organized for comparison purposes (Table 2). The domain of neighborhood characteristics assessed in each gray literature source was recorded. Nomenclature from the source itself was reported, when possible, to define the measured neighborhood qualities. When necessary, the authors applied appropriate terminology used across the literature to review self-report questionnaire items that did not explicitly identify their measurement.

Categorization methodology and rationale

After extracting all items and questions available in the selected sources, categories of the most common domains measured were developed from terminology available in the literature (Table 3). These domains were further stratified into subcategories. For example, items comprising the domain "physical conditions" were organized and counted as either "physical order" or "physical disorder." If items and survey questions described the same characteristic but under

Table 3 Neighborhood characteristic domains

Domain	Subcategories	Measurements	Examples of measurement
Physical conditions	Physical disorder	18	• Noise • Vandalism • Vacant/abandoned/boarded-up buildings • Abandoned vehicles • Undeveloped land • Broken glass/windows • Trash • Dog refuse • Rats, mice, cockroaches • Air pollution from trucks, factories, or incinerators • Heavy car or truck traffic
	Physical order	11	• Traffic lights; Street lighting • Interesting houses, buildings, things to look at • Sidewalks or walking paths • Well maintained, unobstructed bike paths • Shade • Eco-friendly outdoor features • Air is clean during the summer season • Presence of car parking • Nature is well-preserved
Social conditions Social conditions continued Social conditions continued	Social disorder	12	• No respect for the law • Drug and alcohol use • Trouble between neighbors • Going to church is not important • Presence of homelessness; drunk people; gangs; loitering; prostitution • Likelihood of a father paying child support
	Social order	4	• Attending church on Sunday or religious days of importance to most adults in neighborhood • The people who live in my neighborhood are the best people in the world • Peaceful neighborhood • People follow public rules • Traffic speed is usually slow • Communal land space is relaxing and enjoyable
	Fear	5	• Fear of abduction or attack by strangers around home • Weekly frequency of fearing being robbed, attacked, or physically injured; home would be broken into; to leave the house • People are scared of being robbed, raped, mugged, murdered, or being taken or hurt by a stranger
	Crime	13	• Level of neighborhood crime • Not safe to walk in the neighborhood at night/day • Friends and relatives do not visit because they do not feel safe • There is a high level of crime in neighborhood • Frequency of burglary and theft in neighborhood; fight which a weapon was used; neighborhood gang fights; sexual assault or rape; robbery/ mugging
	Violence	12	• Every few weeks, some kid or adult in my neighborhood gets beat-up or mugged • Neighborhood signs of racism and prejudice at least once a week • No safe places to walk • Child has been a victim of, or witnessed, violence • Frequency of neighborhood fights using a weapon in past 6 months; neighborhood gang fights in past 6 months; sexual assault or rape in the neighborhood the past 6 months; robbery or mugging in past 6 months; violent argument between neighbors; experiencing 7 types of everyday mistreatment

Table 3 (continued)

Domain	Subcategories	Measurements	Examples of measurement
	Safety	20	• Street lighting • Perceived daytime/nighttime street safety • Police effectiveness in improving safety and reducing crime • Presence of safe outdoor spaces • Safety hazards on property • Most neighborhood adults respect the law • Amount and speed of traffic on nearby streets • Pedestrian crossings and traffic lights. • Exhaust smoke/pollution on the streets • Soil and drinking water is safe • Adults educate children on stranger danger and using facilities correctly to avoid injuries
	Social cohesion	16	• Willingness of neighbors to help each other • Share information about what's happening in the community • Tightly knit neighborhood • People in neighborhood DO NOT share the same cultural, behavioral, ethical, or moral standards • Connected to community • Satisfaction with relations with friends, neighbors, acquaintances • Frequency with which neighbors do things together
	Social trust	13	• Neighbors take care of and protect each other from crime • Frequency of neighbors taking care of each other's property while another is away; asking each other for advice • Most people in my neighborhood can be trusted • Likelihood of neighbor returning a lost wallet containing R200 • Trustworthy people in neighborhood
	Social support	16	• Whether respondent could rely on someone when sick in bed for weeks; needing money during a medical emergency; experiencing relationship troubles; needing to locate housing; needing advice; needing a ride somewhere • Belonging to a group of friends • Presence of adults outside of school who support kids • Frequency of neighbors visiting in each other's homes • If neighbors could support an elderly neighbor if they needed someone to periodically check on him or her; neighbor needed someone to take care of a child in an emergency
	Social disconnectedness	4	• Aggressiveness of neighbors • People in neighborhood DO not get along • Rate level of disconnectedness from people or groups in community • Resident provides a specific group they'd like to be more connected to and to what degree of closeness
	Engagement with community activities	6	• Involvement with sports team; clubs or organizations; organizing activities or lessons, such as music, dance, language, or other arts; community service or volunteer work at school, place of worship, or in the community; community cultural event such as a food festival, dance performance, or music festival; community arts programs; merchant/business district outreach/events; health-related event; actively participate in community or civic organizations; block party; community gardening
Community resources Community resources continued	Amenities	12	• Presence of park or playground area; boys' or girls' club; library; bookmobile; bank/credit union; local health services; free or low-cost recreation facilities; transit stops nearby residence; fresh and low-fat food availability and high quality • Use of public transportation like buses, trolleys, subways, or trains; recreational paths or trails

Table 3 (continued)

Domain	Subcategories	Measurements	Examples of measurement
	Community services	10	• Ability to obtain credit; apply for public benefit; obtain training for employment, growing small business, loan; participate in an artistic and cultural event • Response of fire department; ambulance; trash collection; police • Resident trust and respect of police • Presence of poor people who cannot cover basic needs
Social agency	Social control	5	• Likelihood of adults intervening if kids were skipping school and hanging out on a street corner; kids were spray-painting graffiti on a local building; a child was showing disrespect to an adult; there was a fight in front of your house and someone was being beaten or threatened; budget cuts cause the fire station closest to your home to be closed down by the city • Likelihood that adults would verbally correct a neighborhood child when his/her parent is not around; supervise the neighborhood children at all times; call the police if something looked strange in our neighborhood; change situations and policies that affect the community; identify an issue in the community and figure out how to address it; openly and effectively communicate to address common issues
	Civic engagement	6	• Participation in civic organization; community, resident, or tenant association; advocacy group; elections; representing views on online platforms; changing online profile picture to demonstrate solidarity; neighborhood, government, or public agency meetings; improving local safety measures with local authorities and officials; resident and youth outreach; projects using art or creative strategies to solve community issues
Neighborhood dynamics	Community development	3	• Participation in neighborhood cleanup/beautification; paint/rehab/fix-up of homes; landscape construction; building a playground • Changes in the neighborhood and predictions about how they will improve quality of life: Job creation; development of new transportation options; changes in police practices; public amenities; commercial spaces; new homes, apartments, or condos
	Community stability	7	• Expectation of moving in the next 5 years • Duration of living in the community • Frequency of moving in the past 5 years • Satisfaction with residential area • Likelihood of recommending this residential area to others • In the past three years, how much the community has changed • In the next three years, predictions of how community is likely to change • Bringing visitors to a space to demonstrate how community has changed

a different name, they were organized into the same subcategory and domain pairing. If a literature source provided questions without explicitly stating the aspect of neighborhoods they intended to measure, appropriate descriptive terms seen in other literature were assigned to them in the "characteristics assessed" column.

The several sources that noted what domains were measured, but did not directly provide all survey items, were still added to the "instances" count. Depending on the survey phrasing, the same item could be arguably used to support different neighborhood domains. For example, items concerning violence could be categorized as reflecting violence if asking about its presence as a neighborhood problem (Troxel et al. 2020), safety if asking about its absence

(Palumbo et al. 2019), crime if inquiring after the frequency of criminal occurrences (Tamayo et al. 2016), fear of crime if reporting residential fear of being attacked, raped, or robbed (Giurgescu et al. 2017; Prado et al. 2017; Loh et al. 2019), or more broadly social disorder (Ndjila et al. 2019). Each item was evaluated to determine which aspects were most specifically addressed to ensure proper item placement. For concision, redundant or differently phrased items were grouped together or omitted from tables. For example, "attractive sites" and "interesting things to look at" both can be combined into "interesting and attractive things to look at" to qualify the term "neighborhood aesthetics. Overall, a comparison between academic and gray sources indicated that gray literature includes more survey items for diverse

populations, such as elderly and disabled communities, and more positive attributes of neighborhood conditions.

Results

Following the search and screening process, 28 papers and eight gray literature sources were included in this review. Survey items from 22 published papers and one gray literature source were derived from previously reported or validated scales (Appendix Table 4). Surveys reported in the collected literature could be grouped into one of the following five domains: physical conditions, social conditions, community resources, social agency, and neighborhood dynamics. Domain items suggesting laudatory or positive connotations were placed in a separate subcategory from items capturing a similar neighborhood characteristic with negative connotations.

Of the 29 instances of physical condition measures, 18 measured aspects of physical disorder, while 11 measured aspects of physical order. Social conditions were evaluated by the number of studies asking questions regarding safety (20), social cohesion (16), social support (16), social trust (13), crime (13), violence (12), social disorder (12), engagement with community activities (6), fear (5), social disconnectedness (4), and social order (4). There were 21 instances of community resources measurements that were observed and broken down further into subcategories of amenities (12) and community services (10) available in the neighborhood. Social agency was measured most often at an organizational level as civic engagement (6) or more interpersonally as social control (5). Neighborhood dynamics were assessed by measures of community stability (7) and community development (3). Examples of items used to qualify subcategories are listed in Table 3 to demonstrate the range observed in the literature.

Differences between literature published in the United States and internationally were evident in both the populations of focus and the framing of neighborhood characteristics. Additionally, gray literature sources and academic literature differed in terms of target populations and content of survey tools. These differences suggest implications for practice and require further consideration to improve the measurement of neighborhoods.

Discussion

This study examined articles and gray literature that used resident-reported measures to understand neighborhood characteristics. Although international self-reports' survey items distinguished them from domestic ones, these differences may be explained by demographic, economic, and cultural differences. To date, this appears to be the first review of resident-reported neighborhood measures inclusive of surveys from the gray literature.

Characteristics of neighborhood self-report toolkits in international literature

Academic studies conducted outside of the United States were closer to gray literature publications in two ways. First, they often included more information on diverse age groups, such as the elderly. Second, they often assessed neighborhood characteristics with a more positive connotation. Investigating the neighborhood friendliness suitability for the elderly sets international publications apart from American articles. Two international studies conducted in low- and middle-income countries measured neighborhood friendliness toward elderly and disabled communities (Shagdarsuren et al. 2017) or focused on adults over the age of 65 (Hsueh et al. 2016). Of all the US sources, Success Measures, a source from the gray literature, was the only one to measure neighborhood characteristics specifically for the elderly (Mulcahy et al. 2020; Mulcahy 2017). Older adults may be the most affected by disparate neighborhood characteristics as their mobility declines and dependence on their social network increases. Negative neighborhood characteristics have been associated with hastened cognitive decline and functional limitations ("Today's Research on Aging" 2017).

Survey items that were most often characterized in negative terms in the US literature were often presented positively in the international literature. For example, Hosokawa and Katsura (2020) developed Likert scale survey items regarding physical conditions and safety to reflect positive aspects of the neighborhood. This is in contrast to many US studies that orient questions to be about the presence of disorder or crime. Shagdarsuren et al. presented positive statements of physical order and safety featuring both manmade and environmental characteristics, including the quality and cleanliness of the soil, air, river water, drinking water, and nature (Shagdarsuren et al. 2017).

Characteristics of neighborhood self-report toolkits in gray and academic literature

Patterns in survey content, format, and target population became apparent when analyzing survey items reported in gray and peer-reviewed literature. The peer-reviewed literature placed a greater emphasis on certain measurements, most notably physical disorder (14/18), physical order (9/11), social disorder (10/12), fear of crime (4/4), crime (11/13), and violence (8/12). Meanwhile, gray literature placed a greater emphasis on civic engagement (4/6) and community stability (5/7). While the majority of published surveys contained categorical scales, some gray literature

included free response portions to better solicit resident perspectives. Additionally, gray literature sources were more child- and family-oriented in their target audience and survey content. Some surveys captured child neighborhood perceptions with direct survey administration ("CHIS Questionnaires" 2021; "Secondary Student Community Health In-School" 2020; "2021 State and Local Youth Risk Behavior Survey" 2021)), while others targeted parents to respond on behalf of their child ("National Survey of Children's Health Questionnaire" 2020; "CHIS Questionnaires" 2021).

Gray literature measured similar neighborhood domains to those in the academic literature, contributing to a greater number of overall items measured. Although only two gray literature sources contributed to the six instances of measurement of neighborhood engagement with community activities, they accounted for 13 of the 18 measurement items (Mulcahy et al. 2020;"National Survey of Children's Health Questionnaire" 2020). Four of the six sources measuring civic engagement were from gray literature (Stiefel et al. 2019; Mulcahy et al. 2020; Mulcahy 2017; "CHIS Questionnaires" 2021; "Secondary Student Community Health In-School" 2020). Notably, only one gray literature collection (Mulcahy et al. 2020; Mulcahy 2017) inquired about disability accessibility features and another about eco-friendly outdoor features (Mulcahy et al. 2020).

Terminological variability in residential self-reports

Although both academic and gray literature include similar aspects of resident reports on neighborhoods, there is little consistency in the language used to describe these aspects across the literature. Even when there is agreement in the terminology for the domain and subcategory being measured, the illustrating items vary greatly. In cases where the items substantively agree, varying specificity or cultural differences led to a breadth of survey items. For example, although some studies listed "trash" to support physical disorder (Hosokawa and Katsura 2020; Johnson et al. 2016; Troxel et al. 2020; Palumbo et al. 2019), others listed "litter," (Johnson et al. 2016; ;"National Survey of Children's Health Questionnaire" 2020; Matthews et al. 2019) "garbage," ("User's Guide for the Fragile Families and Child Wellbeing" 2018) "rubbish" (Matthews et al. 2019) or specific forms of trash such as "broken bottles" in addition to "trash" or in place of it.

Our results are similar to those previously reported by Ndjila et al. who found linguistic variability and diversity in the peer-reviewed literature's survey items supporting synonyms of physical and social conditions (Ndjila et al. 2019). Not only are many synonyms used, but the same items are interpreted as evidence for different neighborhood characteristics. While Palumbo et al. (2019) categorized "using/selling drugs" and "drug dealers have the most money" as physical disorder, other studies cited the use and selling of drugs as an example of social disorder (Giurgescu et al. 2017; Pruitt et al. 2012; Hastings and Snowden 2019) or more generally as a neighborhood problem. ("Secondary Student Community Health In-School and Hybrid Only Module" 2020). It is of course unsurprising that a qualitative domain such as neighborhood perceptions, which has arisen organically over time, would lack conceptual clarity. Bringing clarity to the terms of this reporting is an important task ahead.

Limitations

This review has several limitations. As discussed previously, the dissimilarity of items and language in literature created difficulty in evaluating and organizing characteristics and items (Table 3). Nonetheless, though this is a limitation, it might also be considered a finding given this study's parameters and aims. Although a consistent strategy was applied in sorting items, it relied heavily on interpretation. Many measures used Likert scales, which may lead to an underestimation of attention paid to positive or negative aspects of neighborhoods. International studies translated either questionnaires or study findings, which may imprecisely convey the characteristics that the researchers in those settings attempted to measure.

Conclusions & recommendations

Items in resident self-report surveys were organized into the following domains: physical conditions, social conditions, community resources, social agency, and neighborhood dynamics. Within these domains, there is great variability in terminology and items used to evaluate neighborhoods. This review highlights the need for future research to develop a systematic approach for characterizing and categorizing resident neighborhood perceptions. Few studies define geographical boundaries or inquired as to how long respondents had resided in their neighborhoods, limiting the strength and reliability of gathered information to inform community development practices.

There remains a need to generate items that intentionally include currently overlooked and vulnerable residents in communities, such as older adults and those with disabilities. In addition, clear definitions, standardized scales, and the consolidation of items representing the domains presented in this review would lead to better appraisal of community development efforts, more generalizable results, and easier comparisons of related work.

Appendix

Table 4 Reported validated scales used or modified

Resource	Validated scales reported as used or modified
Johnson et al. 2016	None reported
Kim et al. 2019	*Social Cohesion and Trust Scale* *Neighborhood Environment for Children Rating Scales*
Pruitt et al. 2012	Ross-Mirowsky Neighborhood Disorder Scale *Multidimensional Measure of Neighboring* (4/14 items)
Palumbo et al. 2019	18 item scale used for individual perceptions of the environment reported in Crum RM, Lillie-Blanton M, Anthony JC. Neighborhood enviroment and opportunity to use cocaine and other drugs in late childhood and early adolescence. Drug Alcohol Depend. 1996;43:155–61. [PubMed: 9023071]
Dawson et al. 2019	Perceived neighborhood social cohesion items reportedly reliable (Donnelly 2015)
Hastings and Snowden 2019	None reported
Schulz et al. 2013	Perceived neighborhood social environment scale reported by Sampson et al. 1997; Schulz et al. 2008 Perceived neighborhood physical environment previously reported by Israel et al. 2006; Schulz et al. 2008
Jack and McCormack 2014	Abbreviated Neighborhood Walkability Scale (NEWS-A)
Matthews et al. 2019	Collective efficacy via Sampson's scale subdivided into social control and cohesion Other characteristics not reported
Troxel et al. 2020	Perceived housing conditions and housing distress items taken Moving to Opportunity study (Katz LF, Kling JR, Liebman JB. Moving to opportunity in Boston: early results of a randomized mobility experiment. Q J Econ. 2001;116(2):607–54.) Perceived neighborhood safety scale draws from items reported in Sampson RJ, Raudenbush SW, Earls F. Neighborhoods and violent crime: a multilevel study of
Giurgescu et al. 2017	*Neighborhood Social Environment Scale (added an item) (*Israel et al. 2006) *Neighborhood Physical Environment Scale (Israel et al. 2006; Schulz et al. 2013)* *Perceived Neighborhood Scale (4 items)* Martinez et al. 2002 *Neighborhood Problems Scale (2 items)* Elder et al. 1995
Arcaya et al. 2018	*Williams Everyday Discrimination scale (7/9 types of mistreatment)* Social support: five-item scale, developed by Abramson et al. (2008) and drawing on Litwak's task specific model of social support (Litwak et al. 1989; Messeri et al. 1993) Even their single-item collectedness was used in previous research Witherspoon et al. 2009
Tamayo et al. 2016	Measurements previously reported as validated 20. Mujahid MS, Diez Roux AV, Morenoff JD, et al. Assessing the measurement properties of neighborhood scales: from psychometrics to ecometrics. Am J Epidemiol. 2007;165(8):858–67. 21. Echeverria SE, Diez-Roux AV, Link BG. Reliability of self-reported neighborhood characteristics. J Urban Health. 2004;81(4):682–701.
Sallis et al. 2010	The Physical Activity Neighborhood Environment Scale supported for the listed terms by comparison with NEWS-A
Secretti et al. 2019	*Previously validated in English language then translated to Portugese* seen in Sampson RJ, Raudembush SW, Earls F. Neigh- borhoods and violent crime: a multilevel study of collective efficacy. Science 1997; 277: 918-24. 38. Mujahid MS, Diez-Roux AV, Morenoff JD, Raghunathan T. Assessing the measurement properties of neighborhood scales: from psy- chometrics to eco-metrics. Am J Epidemiol 2007; 165:858-67.
Chola and Alaba 2013	None reported
Loh et al. 2019	*Neighborhood Environment Walkability Scale-Youth (NEWS-Y)*
Orban et al. 2017	None reported

Table 4 (continued)

Resource	Validated scales reported as used or modified
Hosokawa and Katsura 2020	The Neighborhood Scale 29. Mujahid, M.S.; Diez Roux, A.V.; Moreno, J.D.; Raghunathan, T. Assessing the measurement properties of neighborhood scales: From psychometrics to ecometrics. Am. J. Epidemiol. 2007, 165, 858–867. [CrossRef] [PubMed]
Prado et al. 2017	Neighborhood Environment Walkability Scale for Youth (NEWS-Y)
Parker et al. 2019	*Neighborhood environment walkability scale for youth (NEWS-Y)* Rosenberg D, Ding D, Sallis JF, Kerr J, Norman GJ, Durant N, Harris SK, Saelens BE. Neighborhood environment walkability scale for youth (NEWS-Y): reliability and relationship with physical activity. Prev Med. 2009;49(2–3):213–8.
Hsueh et al. 2016	*International Physical Activity Questionnaire-Environmental Module (IPAQ-E)*
Shagdarsuren et al. 2017	*Questions based off* Takano T, Nakamura K. Participatory research to enhance vision sharing for healthy town initiatives in Japan. Health Promot Int. 2004;19(3):299–307. doi: 10.1093/heapro/dah301. Araya R, Dunstan F, Plale R, Thomas H, Palmer S, Lewis G. Perceptions of social capital and the built environment and mental health. Soc Sci Med. 2006;62(12):3072–83. doi:10.1016/j.socscimed.2005.11.037.
Hoenink et al. 2019	Social capital (network and cohesion) 13-item 5-point Likert scale questionnaire on social capital and cohesion based on: Mackenbach JD, Lakerveld J, van Lenthe FJ, Kawachi I, McKee M, Rutter H, et al. Neighbourhood social capital: measurement issues and associations with health outcomes. Obes Rev. 2016 Jan;17 Suppl 1:96–107.
Cerin et al. 2017	PA-related neighbourhood informal social control scale for parents of pre-schoolers (PANISC-PP) reported in Suen et al. (2014) Perceived Neighborhood Scale Validated Chinese version of Martinez 2002 scale (Suen…2015b) *Chinese validated version of a 4-item, 4 pt Likert scale stranger danger scale used in the Neighborhood Impact on Kids Study* Suen et al., 2015b's scales also used for all other traits
Suen et al. 2015b	*Perceived Neighborhood Scale* (Martinez 2000) *Disorder Scale developed by Coulton* (Coulton et al. 1996) *Grow et al. 2008 study items* *Neighborhood Impact on Kids Survey* (Rosenberg et al. 2009) Joe et al. 2008). *Modified items from Joe et al. 2008*
Meyer et al. 2014	None reported
California Health Interview Surveys	None reported
Youth Risk Behavior Surveillance System (YRBSS) 2021 State and Local Youth Risk Behavior Survey for High Schoolers	None reported
Enterprise Community Partners and Success Measures Healthy Housing Outcomes Survey	None reported
Success Measures Health Outcomes Tool and Creative Community Development Evaluation Tools	None reported
CalSCHLS Community Health Secondary Student Survey	None reported
Institute for Healthcare Development's Adult Well-being Assessment	None reported
Fragile Families and Child Wellbeing Study	*Home Observation for Measurement of the Environment Scale* *Informal Social Control Scale* *Social Cohesion and Trust Scale Neighborhood Environment for Children Rating Scales*
The Child and Adolescent Health Initiative's National Survey of Children's Health (NSCH) for Children	None reported

Declarations

Ethics approval Not applicable

Consent to participate Not applicable

Consent for publication Not applicable

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