RESEARCH ARTICLE

Impact of precarious work on neighborhood health: Concept mapping by a community/academic partnership

Alisa J. Velonis PhD, MPH[1] | Jeni Hebert-Beirne PhD, MPH[1] | Lorraine M. Conroy ScD, CIH[2] | Marcella Hernandez MPH[1] | Dolores Castaneda MPH[1,3] | Linda Forst MD, MPH[2]

[1]Division of Community Health Sciences, School of Public Health, University of Illinois at Chicago, Chicago, Illinois

[2]Division of Environmental and Occupational Health Sciences, School of Public Health, University of Illinois at Chicago, Chicago, Illinois

[3]Community Researcher and Resident, Little Village, Chicago, Illinois

Correspondence
Linda Forst, MD, MPH, School of Public Health, University of Illinois at Chicago, 1603 W, Taylor Street, #1149, Chicago, IL 60612.
Email: lforst@uic.edu

Funding information
National Institute for Occupational Safety and Health, Grant/Award Number: U19-OH011232

Abstract

Objective: As part of community-based participatory research (CBPR) examining precarious employment and community health, academic, and community researchers used concept mapping to explore how residents in two high hardship neighborhoods perceive the impact of work on health.

Methods: Between January and May 2017, 292 individuals who lived or worked in two contiguous Chicago neighborhoods were engaged in brainstorming, sorting, and rating activities. Multidimensional scaling and hierarchical cluster analysis were applied, and findings were interpreted by a community-academic partnership.

Results: Brainstorming resulted in 55 unique ways that work impacts health, each of which was rated on its perceived impact on health and prevalence in the neighborhood. Four major themes emerged: Healthy Aspects of Work, Systemic/Structural Injustices, Lack of Control/Exploitation, and Psychological/Physical Stress, which was a multidimensional, cross-cutting theme.

Conclusion: These findings provide critical insight into community perceptions of the mechanisms by which work influences health, providing a basis for community-driven, sustainable, work-focused interventions that promote community health.

KEYWORDS
community-based participatory research, total worker, work and health

1 | INTRODUCTION

Work is a complex phenomenon that encompasses both job tasks and their attendant hazards, demands, and rewards and employment quality, which refers to contractual agreements around wages and social benefits, scheduling, and the ability for workers to have a voice regarding working conditions.[1] *Work* is shaped by the intersection of macro- and micro-level social, structural, and economic forces, including capitalism, systemic and individual-level racism, sex, immigration policies, educational opportunities, and socioeconomic position.[2-4] Together, these forces create a cyclical structure where those in power create systems that advantage themselves while,

deliberately or unintentionally, disadvantaging others. Lower status occupations provide lower wages, which consequently determines where one is able to live and the educational and job opportunities available. Ultimately, these structures result in occupational segregation, or job ghettos[5] and produce spatial clustering[6] and "pattern[s of] the advantage and disadvantage" on the health of communities.[7] In turn, these patterns influence workers' and families' income, social networks, social status, and power, all of which are fundamental causes of health inequities.[8] Defined here as labor is done in exchange for resources such as money, food, or shelter, work is recognized in various social determinants of health (SDOH) conceptual models,[9-11] yet the mechanisms by which work influences

community health and community health inequities have not been clearly explained.[7]

Precarious employment has increasingly been recognized as detrimental to health and wellbeing.[1] For the purpose of this study, we define *precarious work* as a multi-dimensional construct that encompasses low wage opportunities, employment insecurity, and limited workplace rights.[1] Precariously employed workers labor in some of the most hazardous industries, including the service sector, construction, manufacturing, warehousing, and agriculture.[12] They provide home care, domestic work, "back of the house" restaurant work, day labor construction, materials handling, and machine work. These employment situations are often unstable and unpredictable, precluding regular, full-time employment, and leading workers to take more than one job to support themselves and their families.[13-15] Moreover, irregular work hours, a lack of health insurance benefits, and limited or no paid or unpaid sick leave limit individual and family access to health care. Low wages dictate residence in low-income neighborhoods, frequently accompanied by additional stressors of low-quality housing and schools, limited access to services, increased crime and unhealthy ambient environments. Finally, individuals of lower social position due to systems that discriminate by race/ethnicity, citizen status, gender, and age are disproportionately likely to be precariously employed.[16,17]

While the risks of precarious work are increasingly inventoried,[16,18] and risks associated with work sectors are well-known, the impact that high levels of precarious employment have at a neighborhood level is overlooked in the academic literature. A broader, community-based understanding is critical to creating effective interventions to improve health within communities with high levels of precarious employment; such interventions are most likely to be successful if they incorporate the realities of workers, their families, and their neighbors and are positioned in ways to facilitate action and change. Furthermore, interventions in the community are more likely to reach precariously employed workers than those in their disparate workspaces. As part of a larger community-based participatory research (CBPR) project exploring the relationship between working conditions, individual health, and community health, a team of academic researchers and community residents used concept mapping (CM) to explore residents' perceptions of how work affects health in two low-wage, high hardship communities in Chicago. The focus on precarious work arises out of our prior and ongoing work with this community which determined that much of the employment of neighborhood residents is, indeed, unstable, low paying, and lacking benefits.[19]

2 | METHODS

2.1 | The Greater Lawndale Healthy Work Project

The Greater Lawndale Healthy Work Project (GLHW), is part of the University of Illinois at Chicago School of Public Health Center for Healthy Work (a NIOSH Center of Excellence in Total Worker Health®). The aim of this study is to contextualize health as related to work and determine the pathways and barriers to healthy work in two demographically diverse, contiguous neighborhoods that experience high socioeconomic hardship. Our goal is the establishment of a community-driven culture of occupational health that will move people from unhealthy to healthy work by increasing community capacity. We define healthy work as productive employment with opportunities for growth, a living wage in a 40-hour work-week, benefits, job security, health and safety protections, respectful treatment, and representation and dialogue between workers and their supervisors and employers. Conversely, we define precarious work as work that has some or all of the following conditions: work is irregular or has an unpredictable schedule, work is contingent (ie, where one cannot count on the job continuing), work that does not pay a living wage or provide social benefits (eg, health insurance, paid time off, sick leave), work that involves dangerous working conditions, work that does not allow for representation or a voice in the workplace, and/or work that provides little or no opportunities for advancement.

GLHW is an outgrowth of the Little Village Participatory Community Health Assessment, a community-academic partnership created to explore the health needs and assets in the immigrant community of Little Village using iterative research methods. The GLHW's focus on work, mental health, and stress emerged from the larger project's qualitative needs assessment.[20]

As a CBPR team, we are committed to equity in decision making and prioritizing community-identified issues and concerns.[21,22] Every stage of the GLHW project has been jointly undertaken by academic partners and community researchers (CRs), residents and neighborhood leaders who received training in CR methods and are paid members of the research team. We use a mixed-methods community health assessment approach to describe the context of work in the communities. The CM project was one of four distinct data collection activities that are informing the development of a comprehensive, community-driven intervention plan to create a culture of healthy work in the greater community area. The specific aims of the CM activities were to (a) develop a conceptual model that explains how residents of neighborhoods with high levels of precarious employment conceptualize the ways in which the work they engage in influences their health and well-being and (b) inform the domains of a community health survey on work (in conjunction with other qualitative research activities). Ethics approval was received from the University of Illinois at Chicago Institutional Review Board (IRB#2013-0128).

2.2 | The neighborhoods

North Lawndale and Little Village (officially designated South Lawndale by the city of Chicago) make up the Greater Lawndale area. Located southwest of downtown Chicago, these contiguous neighborhoods are two of Chicago's 77 community areas. North Lawndale is a predominantly African American community; Little Village is largely Latino, with nearly 40% of residents born outside of the United States and with limited English.[19] Both communities have

high social and economic hardship and low educational opportunities compared with other neighborhoods.[20] Still, notable differences exist. Little Village has the highest proportion of undocumented residents[21] and the percent of residents who lack a high school diploma and health insurance is over twice that of North Lawndale residents.[20] Yet the overall unemployment rate has historically been higher in North Lawndale[22] with two times the unemployment in Little Village and a large percentage (57%) of adults have been processed by the criminal justice system.[22,23]

2.3 | CM methodology

CM is an iterative, mixed-methods approach that helps to clarify the meaning of terms and ideas and identify key constructs from the perspective of participants.[24,25] CM is well-suited for CBPR, as every participant's voice is given weight. CM has been used to generate and prioritize strategies, conceptualize ideas, explore the relationship between ideas or constructs, and rate and compare these items.[25-27] Comprised of three data collection phases—brainstorming, idea structuring, and participatory interpretation—CM engages participants as co-creators of knowledge, with data moving back and forth between researchers and participants, ending with a final validation exercise conducted with participants.[28]

2.3.1 | Brainstorming

At the outset of the project, the community and academic researchers agreed on the following focal statement for the brainstorming activity: *"When I think of my work situation, or people who live in my community in similar work situations, one way work impacts our health (good or bad) is ___."* After translating the statement into Spanish and testing it with residents, events were held across both communities. Using one-on-one and group techniques, participants were asked to respond to the focal statement with as many answers as they wished, and their answers were recorded by a CR. Demographic characteristics of participants were collected, including the neighborhood of residence, neighborhood of employment, nativity, primary language, education level, work status (eg, employed for wages, self-employed) and gender identity. Brainstorming events were organized by our CR team and included attending community meetings, church-based activities, and other gatherings. CRs also engaged in one-on-one interactions with participants in a variety of settings including laundromats, community centers, and community-based organizations. Participants received a $5 gift certificate as compensation.

Academic and CRs systematically condensed 259 brainstorm responses into a list of 55 unique items. First, all Spanish responses were translated into English and Spanish back-translated accordingly (likewise, all English responses were translated into Spanish). Academic and CRs eliminated responses that were duplicated or not applicable to the focal question, then organized the remaining responses into broad themes. Next, teams of members of the community and academic team were assigned two or more themes

and instructed to consider each response carefully to determine (a) if it was specific and/or complete enough to be useful for the purposes of the project, (eg, were there too many ideas in the response or an incomplete idea), (b) if it was similar to another idea that was being expressed, and (c) if it could be combined with another item so that one concrete idea was expressed. Teams attempted to keep as much of the original language as possible while providing detail or specificity when necessary for interpretation. For example, this item (taken verbatim from a participant during brainstorming), "Lack of sleep. Hands hurting so bad cause carpal tunnel. Traveling to and from work. Standing on concrete 8 hours a day trying to get up early to see kids to school." was separated into two final items: "People work too much and do not get enough sleep," and "Work that is sedentary, repetitive motion or excessive standing." This latter item was combined with other brainstorm responses about travel to work, family commitments and physical pain due to work. Finally, the academic and CR team looked at the consolidated list of responses and compared items across themes to make sure that responses were truly unique, that they addressed the research question, and that they were clear and concrete. Six additional items that did not emerge during brainstorming were added by the research team based on their experience or informed by the literature (a) lack of training on health and safety at work; (b) employers don't value health and safety at work; (c) prior incarceration makes it hard to find and keep work; (d) being an immigrant makes it difficult to find work; (e) not speaking English makes it hard to find and keep work; (f) workers are not empowered or don't feel like they can exercise their rights at work (OSHA, getting paid, workers compensation, health, and safety). The CM process allows all participants (including researchers) to add items to answer the question based on a literature review as well as their knowledge and experience. The goal is to get all possible ideas listed right in the beginning. While it is possible that some of the items were initially conceptualized by university researchers, were they not relevant, they would have been excluded from the final list by the CRs and/or rated very low by the community members during sorting/rating. The consensus was reached on the final list of 55 responses.

2.3.2 | Idea structuring (sorting and rating)

Next, community residents were invited to participate in "open house" style gatherings. First, participants were handed a set of index cards with one statement written on each card and asked to sort the 55 statements into groups or themes "that made sense to them," and then create a label for each pile. Next, they were asked to complete two exercises in which they rated each of the 55 statements using a Likert-like scale between 1 and 6 according to: (a) how prevalent the idea (statement) is in their community (1 = not a lot of people, 6 = a lot of people), and (b) the impact of that idea on health (1 = not much effect on health, 6 = a lot of effect on health). All materials were available in English and Spanish, and CRs were present to assist with literacy issues or other questions. At the conclusion, participants

completed a demographic survey and received a community work resource guide and $25 gift card as compensation.

2.4 | Data analysis

While the neighborhoods have distinct sociodemographic characteristics, our community-academic team intentionally analyzed the data at the Greater Lawndale level (combined communities), emphasizing the common structural inequities faced by residents. In the experience of many of our CRs, the unrelenting focus on racial and ethnic distinctions between marginalized groups often leads to tension between communities, as neighborhoods are pitted against each other for resources. Thus, our CBPR team consciously elected not to stratify research questions or results in ways that could serve to divide the two communities.

Data analyses were conducted using Concept Systems Global Max©. First, the sorting data were subjected to multidimensional scaling, generating a plot map that shows the relationship between items, where each statement is represented by a point, and the visual proximity of the points to one another illustrates the frequency with which people sorted them together. (Note: the raw plot map is not shown, however, the distance between the dots can be seen in the Figure 1 Cluster Map). Stress values, which represent the stability of the map configuration, were within the accepted parameters (ideal stress values < 0.36; ours was 0.24).[29] Concept Systems allows researchers to examine specific "bridging" scores, which take on a value between 0 to 1 and represent how often items were sorted with the items in closest proximity; items with values close to 0 are more closely associated with neighboring items, whereas statements with higher bridging scores are likely to have been sorted with items farther across the map.[30]

Next, hierarchical cluster analysis was used with these data to generate a series of "cluster maps." Each separate map showed how the items would group together given a predefined set of clusters. The research team examined the cluster configurations with as many as 15 clusters, reducing the number of clusters with each iteration and considering how the items in the updated cluster configurations related together. Each new configuration was discussed by the academic and CR team together, and consensus determined that an 11-cluster map best represented the data and would be the most helpful for addressing the project's goals. Each cluster was assigned a thematic label, and a brief description of the items in the cluster was developed. Agreement on labels and descriptions was reached by academic and CRs. Finally, just as we calculated the bridging scores for individual items, we examined the bridging scores for the clusters (ie, how likely items in the cluster were to be sorted together), which is an indication of the cohesiveness of the items within the cluster

Next, we used the rating data to understand how community members prioritized the responses. Using the clusters as our unit of analysis, we examined the average rating scores for both prevalence (how prevalent participants believe the statement was within the community) and impact (to what extent did the participant believe this factor influenced health). Using these average scores, we ranked the clusters from most-to-least prevalent and most-to-least impact. Next, we calculated the correlation between prevalence and impact. We then repeated this process with the individual items as our unit of analysis. Finally, we created the visual displays for these analyses:
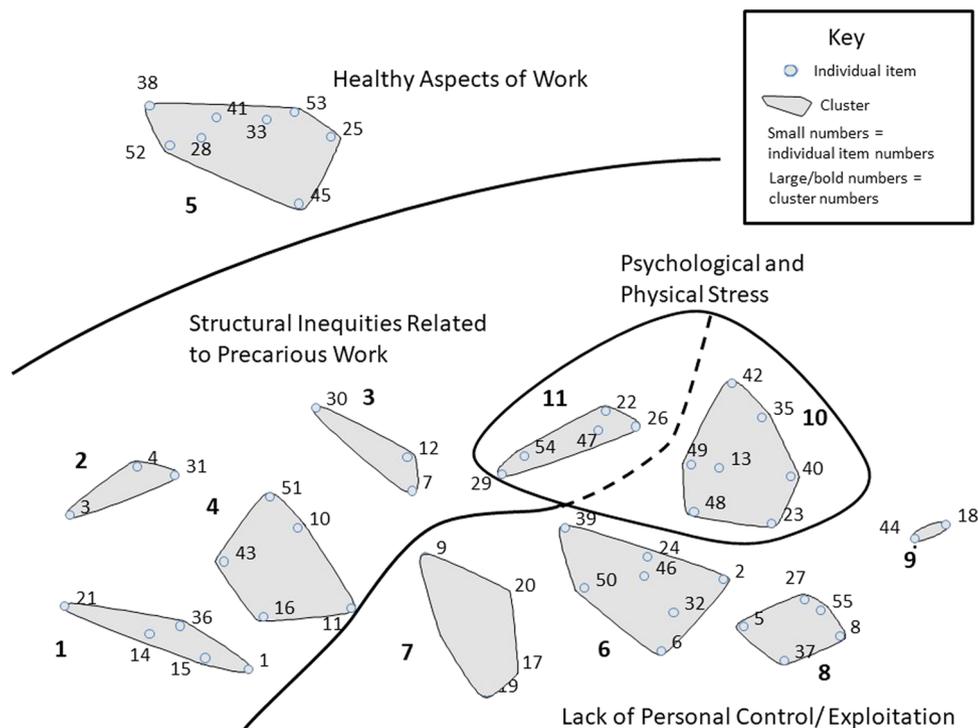

FIGURE 1 Cluster map showing residents' perceptions of the relationship between work and health in the community

Pattern Matches (illustrating comparisons at the cluster level) and Go-Zones (illustrating comparisons between items).

3 | RESULTS

One hundred and fifty-three participants across the two communities assisted with brainstorming activities, and 141 engaged in sorting and rating activities (Table 1). After completing the item reduction exercise, we identified 55 unique brainstorming items that represented the ways in which work impacts the health of residents across both communities. These items were numbered consecutively for the purpose of tracking; there is no significance to the item number. Table 2 provides a complete list of all items ("Item Detail" column).

3.1 | "Sorting" results: the cluster map

As described above, analysis of the sorting data generated an 11-cluster map with four overall themes—*Healthy Aspects of Work*, *Structural Inequities Related to Precarious Work*, *Lack of Personal Control/Exploitation*, and a cross-cutting theme of *Psychological and Physical Stress* (Figure 1). Each numbered dot represents an item, and each cluster of items represents a particular theme (clusters are numbered randomly but the individual cluster labels are shown in Table 2). The clear distance between Cluster 5 (*Healthy Aspects of Work*) and the remaining 10 clusters, which describe negative aspects of work or how to work negatively influences health, suggests that while participants view work as having both positive and negative impacts, these are distinct concepts.

This theme of *Healthy Aspects of Work* reflects the notion that people receive support from those they work with (item 28), that work can benefit mental health by allowing people to achieve their goals (item 45), and the physical health benefits associated with work (items 52 and 53). Several items include qualifiers about the characteristics of work necessary to make it healthy, such as flexible work hours (item 33) or decent wages (item 38). Interestingly, while this cluster is located the farthest from all the other clusters, the individual items have relatively high bridging scores (average value of 0.78, not shown), suggesting that these items are conceptually related to items in different clusters (ie, the crossover between positive and negative impacts of work on health).

In an effort to better understand the aspects of work that participants associate with being detrimental to health, we critically examined the lower section of the cluster map representing negative relationships between work and health. Three overarching themes emerged from the analysis of the remaining clusters: participants identified factors related to larger *structural inequities related to precarious work*, participants identified that the work they do often involves a *lack of personal control or exploitation*, and cutting across these two themes, participants identified the relationship between work and *psychological and physical stress*.

The clusters that comprise the *Structural Inequities* theme loosely reflect the numerous ways in which larger societal level inequities impact precariously employed workers' health through unequal opportunities, an inability to find and keep sufficient work, and living/working in unsafe and fear-inducing environments. The clusters that incorporate this category describe unequal opportunities related to systemic discrimination (eg, being an immigrant or experiencing incarceration) (Cluster 1); child/family insecurity (Cluster 2); work that prevents one from being healthy (Cluster 3); work that is insecure and unsafe (Cluster 4).

Lack of Personal Control & Exploitation generally describes characteristics specific to work environments in which workers perceive having little or no personal agency over the conditions in which they work, including over their own bodies. For example, Cluster 6 encompasses experiences of exploitation and dehumanization (employers reneging on promised time off or withholding pay) and Cluster 7 includes discrimination and harassment while at work, including by police or others. Clusters 8 and 9 address violations of workers' rights and human rights, such as not being provided appropriate safety gear, wage increases, or access to restrooms or water while on the job.

Of the 10 clusters that generally describe ways in which unhealthy or unsafe work and employment conditions negatively impact health, these clusters highlight the perceived relationship between work, stress (as phrased by participants), and health. The concept of stress emerged many times across these clusters—as an exposure, as an outcome, as a cause—demonstrating the salience of stress, broadly conceived, by the participants. The concept of stress was so multifaceted, in fact, that it was identified as a cross-cutting theme, *Psychological and Physical Stress*, to the two central concepts evident in these 10 clusters. Both Clusters 10 and 11 exemplify these relationships, as they describe some of the effects of having a lack of control over one's employment (working too much and not sleeping, not having enough pay to live on) and related to larger structural inequities (stress related to not being able to find and keep work).

3.2 | "Rating" results: perceived prevalence and impact

Data from the rating activities were used to understand participants' perceptions of (a) how common the conditions or factors generated by the brainstorm are in the lives of people in their community (prevalence), and (b) the degree of influence these conditions have on the health of people in their community (impact). After examining the average rating scores for each cluster, we ranked the clusters from lowest to highest (see *Cluster Rank: Prevalence* and *Cluster Rank: Impact* columns on Table 2). The lowest average item rating for either question is 3.6 (of 6), suggesting that participants do not find any of the items to be uncommon or have little impact on health; rather some appear to be more common or important than others.

Using the clusters as our unit of analysis, we compared the average rating scores for impact and prevalence, displayed in Figure 2 as a Pattern Match). *Emotional and physical stress* is ranked as the most prevalent experience for people in their community (average score of 5.01) followed by *unhealthy work and stress relationship* (4.92),

TABLE 1 Selected characteristics of concept mapping participants and the Greater Lawndale community

	Concept mapping participants[a,b]				Greater Lawndale Community[c,d]		
	Brain-storming	Sorting and rating					
	GL	NL	LV	GL	NL	LV	GL
	n = 153	n = 66	n = 75	n = 141			
Sex/gender							
Female	65%	74%	73%	74%	54%	44%	47%
Male	35%	26%	27%	26%	46%	56%	53%
Did not respond (# of participants)	10	4	8	12			
Race/Ethnicity[a]							
Not Hispanic or Latinx: White alone					2.2%	3.4%	3.1%
Hispanic or Latinx					8.2%	84%	59%
Not Hispanic or Latinx: Black or African American alone					88%	12%	37%
Not Hispanic or Latinx: Asian alone					0.23%	0.3%	0.3%
Not Hispanic or Latinx: All other races					1.5%	0.4%	0.7%
Country of Birth							
US Born	51%	98%	23%	58%	97%	61%	73%
Foreign-Born	49%	1.6%	77%	42%	3.3%	39%	27%
Did not respond (# of participants)	1	2	1	3			
Language[e]							
English only, More English than Spanish	56%	98%	23%	58%			
Spanish, More Spanish than English	44%	1.6%	77%	42%			
Spanish, English very well					5%	31%	22%
Spanish, English less than very well					3%	44%	31%
Did not respond (# of participants)	5	5	2	3			
Education							
Less than High School	28%	7.9%	29%	19%	27%	47%	40%
High School Graduate	31%	13%	45%	30%	32%	28%	29%
Some College or Associate Degree	23%	32%	12%	21%	33%	19%	23%
Bachelor's Degree or higher	18%	48%	14%	29%	9%	6%	7%
Did not respond (# of participants)	3	3	2	5			
Employment							
Labor Force Participation Rate	79%	76%	70%	73%	50%	52%	51%
Employed/Population Ratio	74%	74%	55%	64%	39%	47%	44%
Unemployment Rate	6.0%	2.1%	21%	12%	22%	10%	13%
Did not respond (# of participants)	5	4	6	10			
Household Income[a]							
<$25 000					52%	39%	44%
$25 000-$49 999					23%	33%	29%
$50 000-$74 999					20%	21%	20%
$75 000-$99 999					6.5%	5.5%	5.9%
$100 000-$149 999					4.2%	5.8%	5.2%
$150 000 and Over					1.4%	1.2%	1.2%

Note: Gender, Race/Ethnicity and Country of Birth: Total Population. Language and Education: Population 18-year-old and over Employment: Population 16-year-old and over. Household income: total households.

[a]Characteristics of concept mapping participants were measured using a brief socio-demographic questionnaire at the time of the CM activity. The questionnaire did not include questions about race/ethnicity or household income.

[b]GL = Greater Lawndale; NL = North Lawndale; LV = Little Village (also known as South Lawndale).

[c]Characteristics for the Greater Lawndale Community were derived from the American Community Survey (2012-2016).

[d]The universe of analysis for ACS results.

[e]Language is characterized in the ACS as "Speak a language other than English" then further characterized by language is spoken and degree of English proficiency. For example, Spanish, English very well means that the respondent speaks Spanish and speaks English very well. The CM socio-demographic questionnaire asked "What language do you usually speak at home?" with response options of Spanish, More Spanish than English, More English than Spanish, Only English.

childcare/family insecurities (4.84), and *static/insufficient growth and resources* (4.83). The least common experiences are *violation of human rights* and *healthy aspects of work* (both 4.03). Looking at participants' perception of how strongly these factors impact health, *unhealthy*

work and stress relationship and *emotional and physical health* are again the top-ranked areas (5.04 and 4.98, respectively), followed by *static/insufficient growth and resources* (4.61) and *violations of human rights* (4.54). *Healthy aspects of work* are ranked last in terms of impacting

health (3.94). Finally, we explored the correlation between pre-valence and impact, finding a moderate correlation ($r = 0.74$) as illustrated by the Pattern Match (Figure 2).

Lastly, we explored individual items by rating (not shown). Similar to the cluster correlation described above, individual items are moderately correlated ($r = 0.8$). As action researchers, we were most interested in the items that fell into the high prevalence and high impact quartile (see Table 2, final column), as these are likely to be areas where successful intervention could have the largest effect. Interestingly, all of the items categorized in the *emotional and physical stress* and *unhealthy work and stress relationships* fall into this high impact/high prevalence quartile, along with other individual items related to feeling exploited or insufficiently compensated (items 12, 2, 24, 46, and 55) and items related to policies that make employment difficult, such as immigration or prior incarceration status (items 14, 36). The safety of neighborhoods (item 51), a lack of personal time (item 30), and concern about children being alone (item 4) are also rated as both common and impactful.

4 | DISCUSSION

This study is one component of a larger CBPR project that seeks to understand how work impacts health in communities with high proportions of residents engaged in precarious employment. For this component, academic and CRs used CM to engage 294 participants from two neighborhoods to address the question of how work affects the health of people in their community. Experiences of exploitation, harassment, and unsafe working conditions are common within these two communities. While other factors identified through brainstorm-ing were considered to have a greater impact on health (based on the results of the rating exercises), none of the items could be considered negligible (the lowest rating score for the "impact" question was a 3.6 out of 5), and this was verified during our member checking exercise.

We note that participants' brainstorming responses closely resemble items found on the *Employment Precariousness Scale*, a validated, theory-driven instrument used to measure precarious employment,[5] suggesting that residents within these two commu-nities commonly experience working conditions that fit the scholarly-informed construct of precariousness. As Figure 1 shows, the distance between the aspects of work that are healthy (or health-producing) in nature and those that are harmful strongly suggests that participants understand these to be very different constructs. Moreover, in these communities where precarious work is common, the healthy aspects of work are viewed as less prevalent compared to those related to stress and insecurities (Figure 2). This makes sense, given the documented association between precarious employment conditions and poor health.[16,31,32]

Four overall themes emerged from the analysis—*Healthy Aspects of Work*, *Structural Inequities Related to Precarious Work*, *Lack of Personal Control/Exploitation*, and *Psychological and Physical Stress*. While there are some similarities between the themes describing *Structural Inequalities* and *Lack of Personal Control*, our academic-CR team (comprised of occupational and community health scholars and individuals with lived experience with precarious employment) identified a meaningful distinction: where *Lack of Personal Control/Exploitation* relates to power and exploitation in the workplace, *Structural Inequities Related to Precarious Work* theme address larger structural injustices and unequal opportunities, family insecurity, insufficient resources and opportunities for growth, fear and instability, and emotional and physical stress. The primary distinction between these two themes is in the first case, the conditions are workplace or employer-specific while the latter relates more to the impact of broader economic, political, and social forces on employ-ment and health. Finally, while the clusters that comprise *Psycholo-gical and Physical Stress* were seen as specifically addressing the relationship between precarious employment and what participants and our academic-CR team consider stress, there was a consensus that stress reaches across all clusters and items.

These findings, which are participant-driven in nature, and validated through community member checking, clearly correspond with previous scholarship, principally using large-scale datasets.[1,29,33] In an overview of research on precarious employment and wellbeing in Europe, Julia et al[1] propose general pathways through which precarious employment impacts wellbeing which are similar to our findings: adverse psychosocial experiences related to employment conditions (uncertainty about future work, discrimination, feeling powerless), material living conditions related to precariousness and exposure to poor working conditions and job content.

Yet our work extends this knowledge by distinguishing and privileging the voices of individuals with lived experience of precarious employment. It is clear that residents of these neighbor-hoods understand the conditions of and benefits from healthy work, such as receiving support from colleagues, personal growth, and taking care of their families. They also clearly recognize that not only are the conditions that lead to healthy or unhealthy work shaped by factors linked to individual workplaces or employer behaviors but are also to larger systemic forms of inequities and discrimination.

As part of a larger CBPR project, we cannot help but consider these findings in conjunction with information that has emerged across the data collection activities (publication forthcoming). When commu-nity members from these neighborhoods speak about how their work impacts their health, they articulate a lack of control, both in how structured their opportunities are and in their lack of agency to take action on the injustices they experience. This is clearly reflected in the larger themes that emerged from the cluster map. Likewise, clear descriptions of the multiple ways in which stress is perceived to operate here suggest the concrete, chronic and cumulative negative impact of work-associated stress on the home, family, and community. These insights are in the process of being integrated into our GLHW Conceptual Model (the focus of a separate manuscript).

4.1 | Strengths, limitations, and challenges

We choose to explore and intervene on work at the community level in two neighborhoods with high social and economic hardship because

TABLE 2 Academic and community researchers' final concept mapping items in associating work and health, by cluster

Cluster name	Cluster rank: prevalence (av. score (scale) 1-5)	Cluster rank: impact (av. score (scale) 1-5)	Cluster map content area	Item #	Item detail	Item ranked high impact & high prevalence
Cluster 1: Structural injustices/ unequal opportunities	5 (4.72)	7 (4.41)	Structural inequities	1.	Being an immigrant makes it difficult to find work.	
				14.	Not having papers makes it hard to find and keep work.	x
				15.	Not speaking English makes it hard to find and keep work.	
				21.	Work opportunities are limited because of a lack of education.	
				36.	Prior incarceration makes it hard to find and keep work.	x
Cluster 2: Childcare/family insecurities	3 (4.84)	6 (4.45)	Structural inequities	3.	Difficulty with childcare makes it harder for people to get and keep jobs.	
				4.	During work hours, children are home alone making parents worried.	x
				31.	Working interferes with people's family commitments (such as taking kids to school/activities) or time with family.	
Cluster 3: Static/insufficient growth and resources	4 (4.83)	3 (4.61)	Structural inequities	7.	People do work that is boring and not mentally stimulating.	
				12.	Low pay prevents people from buying healthy food for themselves/their family.	
				30.	Working interferes with personal time (such as exercise, going to the doctor, social time, vacations).	x
Cluster 4: Fear and instability	7 (4.37)	3 (4.61)	Structural inequities	10.	It is unsafe for workers traveling to and from work.	
				11.	Lack of training on health and safety at work	
				16.	People are afraid of not being able to work because of the social, political climate.	
				43.	Work is seasonal or unreliable.	
				51.	People work in unsafe neighborhoods which causes fear and stress.	x
Cluster 5: Healthy aspects of work	10 (4.03)	11 (3.94)	Healthy aspects of work	25.	Work provides a space to get away from other life stressors and increase people's happiness.	
				28.	People get support from other people they work with.	
				33.	People with flexible work hours are less stressed.	
				38.	Those who earn decent pay have access to better living conditions, food, and other opportunities.	
				41.	Work environment and coworker interaction provides people with a space to learn and challenge themselves and to grow in many ways.	
				45.	Work positively affects people's mental health because it supports reaching personal goals, self-worth and pride.	
				52.	People who safely walk to work experience health benefits.	
				53.	Working keeps people in physical shape.	
Cluster 6: Cycle of power and exploitation	6 (4.46)	5 (4.48)	Lack of control	2.	Being underpaid decreases work morale.	x
				6.	Employers exploit workers by withholding pay.	x
				24.		

(Continues)

TABLE 2 (Continued)

Cluster name	Cluster rank: prevalence (av. score (scale) 1-5)	Cluster rank: impact (av. score (scale) 1-5)	Cluster map content area	Item #	Item detail	Item ranked high impact & high prevalence
				32.	People don't have access to health insurance through their employer.	
				39.	Worker are not allowed to take vacation days even if they were promised them.	
				46.	People do not have control over their work schedule. People feel dehumanized when they are harassed, abused or exploited at work.	x
				50.	Workers are not empowered or don't feel like they can exercise their rights at work (OSHA, getting paid, workers compensation, health, and safety).	
Cluster 7: Uncontrollable, unwarranted harassment	8 (4.23)	10 (4.12)	Lack of control	9.	It is expensive to get to work when one is paid hourly.	
				17.	People are discriminated at work.	
				19.	Those who work outdoors, such as street vendors, are harassed by police.	
				20.	People cannot control the conditions in which they work.	
				34.	Workers fear being assaulted, robbed, harassed or killed while working.	
Cluster 8: Employer violation & neglect of worker rights	9 (4.17)	7 (4.41)	Lack of control	5.	Employers don't value health and safety at work.	
				8.	Being hired to do work and then not getting paid for it.	
				27.	Employers punish workers who miss work by not paying them or not giving them additional work.	
				37.	People are not provided with sufficient protective gear at work.	
				55.	People who work the same job for years with no pay increase.	x
Cluster 9: Violations of human rights	11 (4.03)	4 (4.54)	Lack of control	18.	People are exposed to hazards and hazardous conditions (breathing chemicals or dust, exposed to weather, working at heights, exposed to noise etc.) at work.	
				44.	People don't have access to or time to use bathrooms or drink water or other fluids while on the job.	
Cluster 10: Unhealthy work & stress relationship	2 (4.92)	1 (5.04)	Psyc. & physical safety	13.	Low wage work for long hours causes physical and mental stress.	x
				23.	The amount that people earn from their work is not enough to pay their bills and/or maintain a healthy lifestyle.	x
				35.	People work too much and do not [get] enough sleep.	x
				40.	While at work people suffer physical pain but have to ignore it and their feelings to get job done.	x
				42.	Work affects eating habits (eating because of stress, not being able to eat healthy because of time and money, needing to eat fast food).	x
				48.	People work too many hours and still cannot afford what they need (such as food, medication, housing).	x
				49.	Workers are burnt out, stressed, or mentally overwhelmed.	x

(Continues)

TABLE 2 (Continued)

Cluster name	Cluster rank: prevalence (av. score (scale) 1-5)	Cluster rank: impact (av. score (scale) 1-5)	Cluster map content area	Item #	Item detail	Item ranked high impact & high prevalence
Cluster 11: Emotional and physical stress	1 (5.01)	2 (4.98)	Psyc. & physical safety	22.	People do physically strenuous work.	x
				26.	People experience stress when they can't find or keep work.	x
				29.	People have to work too many hours to survive.	x
				47.	Work that is sedentary, repetitive motion or excessive standing.	x
				54.	People have trouble finding work, causing anxiety or depression.	x

opportunities for employment and fair work conditions are not distributed equally across the place. In fact, neighborhoods with insufficient educational and community resource infrastructure are unlikely to have strong pathways to decent work and are likely to have a high proportion of residents who, due to limited opportunity, are working in precarious situations. In highly segregated urban areas, focusing on building community capacity to support healthy work is one important way to address work as a structural determinant of health.

A major strength of this project is that it is part of a larger CBPR program. CM is well-suited for CBPR work, as the perspectives of the participants are kept front and center, with an ongoing exchange between researchers and participants. Working in partnership with CRs added an extra layer of accountability and grounding as we wrestled with the English and Spanish wording for our focal question, recruitment strategies, and analysis. Finally, CM allowed us to incorporate the voices and perspectives of larger numbers of people across both communities, which traditional qualitative methods do not always allow.

Many of our limitations and challenges are common to CBPR and CM. While our CRs recommended key locations for data collection to include a range of workers in both communities, we relied on a convenience sample, resulting in markedly higher levels of education among North Lawndale sorting and rating participants compared with the community as a whole. Despite the participation of CRs across all aspects of project planning and implementation, we were challenged to craft a focal question, a final list of items, and rating scales that were clear, concise, and had shared meaning in two languages. We also struggled with how to address unemployment and work that falls outside of legal classifications (eg, cash economy or bartering), and while we settled on a definition of employment that generally describes the exchange of labor for money, we knew that this did not fully capture the experiences of many residents in either community. While it may be obvious, we should note that our CM activities, as well as our findings, are specific to these neighborhoods. Replication in different communities is important for validation and generalizability, and to truly hone our understanding of the relationship between work and health, similar investigations need to be initiated in different communities. However, true CBPR work requires that the CM activities (eg, the focal question, the processes used for brainstorming, sorting, and rating) be tailored to individual communities to be useful for action-taking in those communities, which can make a comparison of findings challenging. Finally, the commitment to avoid replicating research approaches that stereotype and pit the communities against each other but instead examine common themes across the neighborhood may have resulted in losing some specificity of issues unique to each. Examination of the communities as a whole was important for the development of our conceptual model, however, we will examine differences to inform specific neighborhood-level intervention strategies.

4.2 | Context and further work

The CM findings were one of four methodologies used in our participatory community health assessment on work in Greater
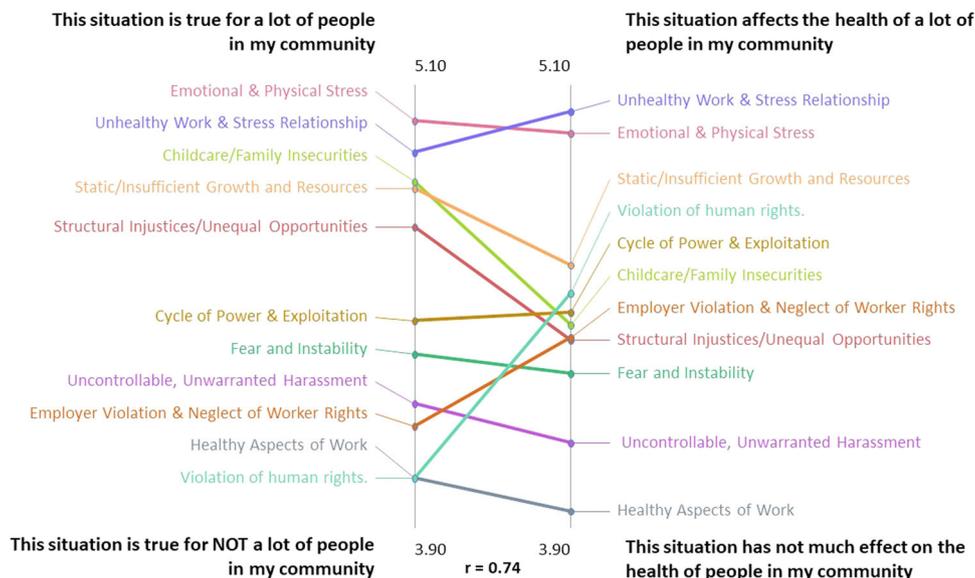
FIGURE 2 Pattern match illustrating the correlation between prevalence and impact by cluster/theme [Color figure can be viewed at wileyonlinelibrary.com]

Lawndale. The CM findings were useful for two purposes (a) to build the GLWH Conceptual Model that will guide the testing of interventions moving forward and (b) to inform instrument development. The CM findings were triangulated with findings from 20 interviews with key stakeholders and 12 focus groups with 77 residents to inform the domains of the GLHW Community Health Survey (*n* = 500). Findings from all four methods were rolled forward into a collaborative intervention mapping study[34] using the Theory of Change[35] to identify potential solutions to the problems described in this paper and to plan an evidence-based, community-informed roadmap for action. The multi-level interventions aligned with the community-owned roadmap are expected to influence change across the ecological level to foster a culture of occupational health at the community level. The next steps include completing an "action mapping" exercise during which our CBPR team will strategize and then implement actions to improve healthy work opportunities at the community level.

4.3 | Public health implications

Embedding CM into our CBPR project allowed for the identification of community themes around work, with stress emerging as a salient, multidimensional, cross-cutting subtheme. There is increased attention to the structural drivers of social processes that impact health. Work plays an important role in these processes, serving as a central theme in the World Health Organization's Framework for the SDOH.[36] Given the embeddedness of work in social processes that produce health, CM is a useful strategy to discern work-related community priorities that may be important mechanisms to promote health equity in communities with a high prevalence of precariously-employed residents.[37] The normalization of exploitive work in high hardship neighborhoods perpetuates a cycle of inequality such that workers will endure injustices to make a living. The Universal Declaration of Human

Rights Article 25(1) states that "everyone has the right to a standard of living adequate for the health and well-being of himself and his family, including food, clothing housing, and medical care and necessary social services, and the right to security in the event of unemployment, sickness, or disability."[38] We call on occupational safety and health specialists to develop a research agenda aimed at uncovering health impacts of work at the community-level and guiding community-based intervention strategies to promote the health and well-being of low income and precarious workers. In addition to incorporating "work" more carefully into structural inequity models, Public Health must join with communities to make fair social policies that protect workers from exploitation and assure their human rights.

CONFLICTS OF INTEREST

The authors declare that there are no conflict of interest.

DISCLOSURE BY AJIM EDITOR OF RECORD

Paul Landsbergis declares that he has no conflict of interest in the review and publication decision regarding this article.

AUTHOR CONTRIBUTIONS

Velonis, Hebert-Beirne, Forst conceived the project. They planned the project along with Lorraine Conroy. Marcella Hernandez and Dolores Casteneda collaborated with the four faculty investigators on the execution of the project. All authors contributed to the analysis and the writing of the manuscript. All authors approved the final version. We agree to be accountable for all aspects of the work, ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

ETHICS APPROVAL AND INFORMED CONSENT

This protocol was approved by the Institutional Review Board of the University of Illinois at Chicago. IRB#2013-0128 (Full Review). There was verbal informed consent and presentation of a consent form to participants.

ORCID

Alisa J. Velonis http://orcid.org/0000-0002-9787-979X
Jeni Hebert-Beirne http://orcid.org/0000-0002-9473-0017
Lorraine M. Conroy http://orcid.org/0000-0003-0116-4077
Linda Forst http://orcid.org/0000-0003-4966-1929

REFERENCES

1. Julià M, Vanroelen C, Bosmans K, Van Aerden K, Benach J. Precarious employment and quality of employment in relation to health and well-being in Europe. *Int J Health Serv.* 2017;47(3):389-409.
2. Gee GC, Ford CL. Structural racism and health inequities: old issues, new directions. *Du Bois Rev.* 2011;8(1):115-132.
3. Pager D, Shepherd H. The sociology of discrimination: racial discrimination in employment, housing, credit, and consumer markets. *Annu Rev Sociol.* 2008;34:181-209.
4. Gkiouleka A, Huijts T, Beckfield J, Bambra C. Understanding the micro and macro politics of health: inequalities, intersectionality & institutions—a research agenda. *Social Sci Med.* 2018;200:92-98.
5. Murray LR. Sick and tired of being sick and tired: scientific evidence, methods, and research implications for racial and ethnic disparities in occupational health. *Am J Public Health.* 2003;93(2):221-226.
6. Forst L, Friedman L, Chin B, Madigan D. Spatial clustering of occupational injuries in communities. *Am J Public Health.* 2015;105(S3):S526-S533.
7. Ahonen EQ, Fujishiro K, Cunningham T, Flynn M. Work as an inclusive part of population health inequities research and prevention. *Am J Public Health.* 2018;108(3):306-311.
8. Phelan JC, Link BG, Tehranifar P. Social conditions as fundamental causes of health inequalities: theory, evidence, and policy implications. *J Health Soc Behav.* 2010;51:S28-S40.
9. Muntaner C, Solar O, Vanroelen C, et al. Unemployment, informal work, precarious employment, child labor, slavery, and health inequalities: pathways and mechanisms. *Int J Health Serv.* 2010;40(2):281-295.
10. Office of Disease Prevention and Health Promotion Healthy people 2020 [Internet]. Washington, DC: U.S. Department of Health and Human Services; 2019.
11. Baron SL, Beard S, Davis LK, et al. Promoting integrated approaches to reducing health inequities among low-income workers: applying a social ecological framework. *Am J Ind Med.* 2014;57(5):539-556.
12. Bureau of Labor Statistics. Contingent and alternative employment arrangements summary; 2018.
13. Alterman T, Luckhaupt SE, Dahlhamer JM, Ward BW, Calvert GM. Job insecurity, work-family imbalance, and hostile work environment: prevalence data from the 2010 national health interview survey. *Am J Ind Med.* 2013;56(6):660-669.
14. Quinlan M, Mayhew C, Bohle P. The global expansion of precarious employment, work disorganization, and consequences for occupational health: a review of recent research. *Int J Health Serv.* 2001;31(2):335-414.
15. Underhill E, Quinlan M. How precarious employment affects health and safety at work: the case of temporary agency workers. *Relat Ind.* 2011;66(3):397-421.
16. Vives A, Vanroelen C, Amable M, et al. Employment precariousness in Spain: prevalence, social distribution, and population-attributable risk percent of poor mental health. *Int J Health Serv.* 2011;41(4):625-646.
17. Bureau of labor. Statistics, injuries, illnesses, and fatalities; 2016.
18. Koranyi I, Jonsson J, Rönnblad T, Stockfelt L, Bodin T. Precarious employment and occupational accidents and injuries—a systematic review. *Scand J Work Environ Health.* 2018;44(4):341-350.
19. Hebert-Beirne J, Hernandez SG, Felner J, et al. Using community-driven, participatory qualitative inquiry to discern Nuanced community health needs and assets of Chicago's La Villita, a Mexican immigrant neighborhood. *J Community Health.* 2018; 43(4):775-786.
20. Hebert-Beirne J, Felner JK, Castañeda Y, Cohen S. Enhancing themes and strengths assessment: leveraging academic-led qualitative inquiry in community health assessment to uncover roots of community health inequities. *J Public Health Manag Pract.* 2017;23(4):370-379.
21. Cacari-Stone L, Wallerstein N, Garcia AP, Minkler M. The promise of community-based participatory research for health equity: a conceptual model for bridging evidence with policy. *Am J Public Health.* 2014;104(9):1615-1623.
22. Israel BA, Schulz AJ, Parker EA, Becker AB. Review of community-based research: assessing partnership approaches to improve public health. *Annu Rev Public Health.* 1998;19(1):173-202.
23. US Census Bureau. 2012-2016 American community survey 5-year estimates; 2018.
24. Cohen S, Prachand N, Bocskay K, Sayer J, Schuh T. Healthy Chicago 2.0 community health equity assessment: informing efforts to achieve health equity. *Chicago Health Atlas.* 2018:5-9.
25. Tsao F. Illinois' undocumented immigrant population: A summary of recent research by Rob Paral and Associates. Illinois Coalition for immigrant and refugee rights. Chicago; 2014.
26. Chicago Metropolitan Agency for Planning. http://www.cmap.illinois.gov/documents/10180/126764/North+Lawndale.pdf); 2017.
27. McKean L. Drugs, crime, and consequences. *Center Impact Res.* 2002:5-23.
28. Maddox R, O'Campo P, Grove J, et al. Identifying how to engage men in domestic violence research: a concept mapping study. *J Fam Violence.* 2018:1-13.

29. Trochim WM. An introduction to concept mapping for planning and evaluation. *Eval Program Plann*. 1989;12(1):1-16.

30. O'Campo P, Minh A, Omand M, Symile J, Cyria A. Conceptualizing acts and behaviours that comprise intimate partner violence: a concept map. *Health Expect*. 2014;18:1968-1981.

31. Eddy P, Wertheim EH, Kingsley M, Wright BJ. Associations between the effort-reward imbalance model of workplace stress and indices of cardiovascular health: a systematic review and meta-analysis. *Neurosci Biobehav Rev*. 2017;83:252-266.

32. Van Aerden K, Puig-Barrachina V, Bosmans K, Vanroelen C. How does employment quality relate to health and job satisfaction in Europe? A typological approach. *Social Sci Med*. 2016;158:132-140.

33. Kane M, Trochim WM. *Concept Mapping for Planning and Evaluation*. Thousand Oaks, CA: Sage; 2007.

34. Eldredge LKB, Markham CM, Ruiter RA, Fernández ME, Kok G, Parcel GS. *Planning Health Promotion Programs: An Intervention Mapping Approach*. Hoboken, NJ: John Wiley & Sons; 2016.

35. Annie E. Theory of change: a practical tool for action, results and learning. *Casey Foundation*. 2004:10-11.

36. Solar O, Irwin A. A conceptual framework for action on the social determinants of health. Social Determinants of Health Discussion Paper 2 (Policy and Practice). Geneva; World Health Organization; 2010.

37. Velonis A, Forst L. Outreach to low-wage and precarious workers:concept mapping for public health practitioners. *J Occup Environ Med*. 2018;60(11):e610-e617.

38. United Nations. Universal Declaration of Human Rights;1948.