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A Participatory, Mixed Methods Approach to Define and Measure Partnership Synergy in Long-standing Equity-focused CBPR Partnerships

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Highlights

- Synergy—accomplishing more together than alone—is central to effective collaborative partnerships.
- Measures of synergy specific to long-standing equity-focused CBPR partnerships are lacking.
- We developed a 7-item measure integrating knowledge from community-academic CBPR and equity experts.
- Evaluating synergy can strengthen CBPR partnership effectiveness to address health inequities.
- Fostering synergy will enhance CBPR partnership success to promote community health and equity.

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Abstract Understanding what contributes to success of community-based participatory research (CBPR) partnerships is essential to ensuring their effectiveness in addressing health disparities and health inequities. Synergy, the concept of accomplishing more together than separately, is central to partnership effectiveness. However, synergy specific to long-standing, equity-focused CBPR partnerships has not been closely examined. To address this, we defined and developed measures of partnership synergy as one dimension of a participatory mixed methods study, Measurement Approaches to Partnership Success (MAPS), to develop a validated instrument to measure success in long-standing

CBPR partnerships. Framed by a conceptual model and scoping literature review, we conducted in-depth interviews with a national panel of academic and community experts in CBPR and equity to develop partnership synergy measures. Items were refined through an iterative process, including a three-stage Delphi process, comparison with existing measures, cognitive interviews, and pilot testing. Seven questionnaire items were developed to measure synergy arising from equitable partnerships bringing together diverse partners across power differences to promote equity. Defining and measuring synergy in the context of long-standing partnership success is central to understanding the role of synergy in collaborative approaches to research and action and can strengthen CBPR partnerships to promote healthy communities and advance health equity.

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Introduction

Community-based participatory research (CBPR) is widely recognized as an effective approach to address complex social and health inequities (Israel, Eng, Schulz, & Parker, 2013; Viswanathan et al., 2004). Drawing upon

empowerment (Zimmerman, Israel, Schulz, & Checkoway, 1992), critical consciousness (Freire, 1973), and feminist theories (Maguire, 2001), and other health and equity frameworks (Bronfenbrenner, 1992; Smith, 1999), CBPR employs a strength-based approach to reciprocally engage communities and academic researchers, optimize individual and community empowerment, and collaborate with communities as mutual partners in research (Israel, Schulz, Parker, & Becker, 1998; Wallerstein & Duran, 2018). CBPR partnerships that examine social determinants of health to reduce health disparities and promote equity have proliferated (Israel, Eng, et al., 2013; Wallerstein & Duran, 2018). Understanding what contributes to the success of CBPR partnerships that have been sustained beyond a specific project or funding period is essential to ensuring the long-term effectiveness of community-based approaches to meaningfully realize social and health equity (Israel, Lantz, et al., 2013; Schulz, Israel, & Lantz, 2003; Ward et al., 2018).

A critical dimension in many CBPR frameworks is the concept of partnership synergy, or synergy that arises from collaboration among members of diverse knowledge, perspectives, cultures, and social positions (Kastelic, Wallerstein, Duran, & Oetzel, 2018; Minkler, 2005). Synergy, the concept that partners accomplish more together than separately, has long been considered an important intermediate outcome of coalitions, consortia, cooperatives, and other collective entities that entail collaboration among participating members (Gray, 1989; Khodyakov et al., 2011; Weiss, Anderson, & Lasker, 2002). A powerful relationship exists between synergy arising from equitable partnerships bringing together diverse perspectives across power differences, and the ability to effectively study and address health and social inequities. Thus, evaluating synergy in equity-focused CBPR partnerships is critical to strengthen partnership success and enhance health equity.

Although numerous definitions, frameworks, and indicators of synergy exist, few of them apply primarily to CBPR partnerships and, to the best of our knowledge, none specifically addresses partnership synergy in long-standing CBPR partnerships—that is, lasting over six years, which is beyond a typical 5-year federal funding cycle. Two central questions are not yet adequately addressed: How is partnership synergy defined by academic and community partners in the context of long-standing, equity-focused CBPR partnerships? Which indicators should be used to assess partnership synergy to understand the success of long-standing partnerships in realizing their goals of achieving equity and eliminating health disparities?

This article describes the development of a definition and measures of partnership synergy in the context of

success in long-standing CBPR partnerships that promote social and health equity. The process is informed by the literature and integrates the perspectives from diverse community and academic experts in long-standing equity-oriented partnerships. It is part of an NIH-funded study, MAPS, conducted by the Detroit Urban Research Center (Detroit URC) to develop and validate an instrument to measure the dimensions of long-standing CBPR partnership success, of which synergy is a key dimension. Consistent with CBPR principles that emphasize co-learning, power sharing, equity, and shared decision making (Israel et al., 1998, 2019), the MAPS study adopts a participatory approach. In this article, we briefly review the existing literature and describe the mixed methods, multi-phase, participatory process that engaged a community-academic expert panel to define and develop measures of partnership synergy. We report our findings and discuss contributions to advancing community-based participatory approaches to promote health equity. Finally, we describe next steps to test and disseminate the new measure for broader use by equity-focused CBPR partnerships.

Background and Literature Review

Synergy is foundational to why we bring together people of distinct backgrounds, expertise, and social positions to solve complex issues of health and social inequities. Lasker, Weiss, and Miller (2001) define synergy as the power to combine the perspectives, resources, and skills of individual and organizational members. Building on Gray and colleagues' work on collaboration (1989), Jones and Barry (2011a) define synergy as the degree to which the partnership combines complementary strengths, perspectives, values, and resources in search for optimal solutions. Both definitions assume that the synergistic achievements of group members extend beyond achievements of individuals on their own. A partnership that has attained an optimal level of synergy is thought to have reached its highest level of collaboration (Lasker et al., 2001; Weiss et al., 2002). Thus, defining and measuring the extent to which a partnership of diverse academic and community members attains synergy is important to understanding the long-term effectiveness of CBPR partnerships in addressing social and health inequities.

The premise of synergy underlies the equity-focused principles of CBPR. These include recognizing community as a unit of identity; building on community strengths and resources; facilitating collaborative and equitable partnership in all phases of research; and promoting co-learning and capacity building among partners. CBPR balances knowledge with action, emphasizing locally relevant public health problems from an ecological perspective.

Findings and knowledge are jointly disseminated to all partners. CBPR entails a long-term process and commitment to sustainability, and addresses race, ethnicity, racism, social class, and cultural humility (Israel et al., 2019). Enhancing synergy in CBPR partnerships may strengthen their effectiveness at achieving equity-oriented processes and outcomes identified by the partnership.

Existing Measures of Partnership Synergy

Because MAPS focuses on established long-term CBPR partnerships, this review did not include existing measures designed to examine early partnership development. Several studies have employed distinct synergy measures to characterize the functional role of synergy in collaborative health partnerships (Jagosh et al., 2012; Jones & Barry, 2011a; Khodyakov et al., 2011; Oetzel, Duran, et al., 2018; Weiss et al., 2002). Four of these measures informed our work. Weiss et al. (2002) developed a scale of partnership synergy in their cross-sectional study examining the relationship between partnership synergy and functioning in health-related partnerships. Study partnerships promoted community-level health and well-being, contained at least ten diverse partners, and had existed for at least 18 months. Building on previous work on collaboration, the investigators conceptualized synergy as a proximal outcome that influenced partnership effectiveness (Lasker et al., 2001). Accordingly, their measure was designed to assess the extent to which “the combined perspectives, knowledge, and skills of the partners strengthen the thinking and actions of the group and the partnership’s relationship to the broader community” (Weiss et al., 2002, p. 687–688). To develop items for their larger *Partnership Self-Assessment Tool Questionnaire* (PSAT; Center for the Advancement of Collaborative Strategies in Health, 2002), the authors combined semi-structured interviews of people in partnerships and a literature review guided by an interdisciplinary panel of partnership experts. The resulting measure contained nine Likert-scale items with evidence of reliability and construct validity.

Khodyakov et al. (2011) modified Weiss and colleagues’ PSAT measure to assess partnership synergy as one component of a cross-sectional study on the impact of community engagement on multi-level outcomes of partnered research projects from two funding cycles of a center funded by the National Institute of Mental Health. The authors conceptualized synergy as a proximal outcome that “refers to how the resources, perspectives, and skills of partners strengthen the work of the group” (Khodyakov et al., 2011). They developed an 11-item scale composed of all nine PSAT items (three modified) and two new items from the research team.

Wallerstein, Oetzel, and colleagues conducted two cross-sectional studies to examine promoters and barriers of community-academic research partnerships and develop measures of effective practices and outcomes, including synergy as a proximal outcome (Kastelic et al., 2018; Oetzel, Duran, et al., 2018; Oetzel, Wallerstein, et al., 2018). Their synergy measure included five items from the Khodyakov et al. (2011) scale—the two new and three PSAT-modified items. The first study tested their partnership synergy measure on 200 federally funded community-engaged research and CBPR partnerships with an equity focus. The measure was retested in the second study on another 179 federally funded partnerships. Their analyses of the five items found good reliability and satisfactory levels of factorial, convergent, and divergent validity (Oetzel, Wallerstein, et al., 2018). Separate analyses were not reported for long-term partnerships (Dickson et al., 2019).

Jones and Barry (2011a, 2011b) developed a partnership synergy measure in a sample of health promotion partnerships in Ireland that existed for at least one year. The authors conceptualized synergy as part of partnership process and product defined as “the degree to which a partnership combines the assets of all the partners in the search for better solutions” (Jones & Barry, 2011b, p. 36). They conducted focus group interviews of health promotion practitioners to develop eight Likert-scale items with evidence of reliability as well as face, content, convergent, discriminant, and concurrent validity.

Summary of Synergy Scales in the Literature

Existing measures of partnership synergy focus on collaborative health partnerships, broadly defined, but the extent to which they are applicable specifically to synergy in long-standing CBPR partnerships is unclear. The partnerships included in previous studies existed for an unspecified or limited time period (i.e., mostly 12–18 months), and emphasized new partnership development rather than success of long-standing partnerships. Further, apart from Oetzel and colleagues, the existing measures did not focus specifically on CBPR approaches that put equity at the center of their processes and outcomes. Thus, such measures may not appropriately assess synergy in long-standing, equity-focused CBPR partnerships.

Methodologically, the measures were developed using multiple methods and data sources, including inductive interviews and deductive literature synthesis. However, scale development may have relied primarily on existing literature. This provides an opportunity to equitably integrate community and academic perspectives in defining and identifying indicators of partnership synergy to enhance long-term success in CBPR approaches to promote equity.

MAPS: A Participatory Approach to Defining and Measuring Partnership Synergy

The overall goal of MAPS is to define and assess the meaning of success in long-standing CBPR partnerships—those in existence for at least six years—which strongly emphasize promoting health equity. MAPS is being carried out by the Detroit URC, established in 1995 to foster CBPR partnerships aimed at understanding and addressing social determinants of health toward eliminating health inequities in Detroit. The Center is guided by a Board composed of members representing eight community-based organizations, two health and human service organizations, and three schools in an academic institution. The Detroit URC and affiliated partnerships have conducted over 30 studies to address critical health equity issues, such as chronic disease and environmental contamination. The Board is actively involved in developing and carrying out MAPS, following CBPR principles and practices (Israel et al., 2020).

Building on the Detroit URC's long-standing CBPR approach to advance health equity, MAPS aims to develop a clear definition of success in long-standing CBPR partnerships, a set of factors that contribute to success, and a practical measurement tool for partnerships to assess and strengthen their efforts to achieve health equity. MAPS builds on and extends a conceptual framework developed over 20 years ago to evaluate CBPR partnerships (Israel, Lantz, et al., 2013; Schulz et al., 2003). The model posits that partnership structure, group dynamics, programs and interventions, and environmental characteristics influence intermediate outcomes of partnership functioning, including synergy and equity generated within the partnership. These intermediate outcomes influence long-term outcomes of effective partnerships, including sustainability and health equity. The framework extends the earlier model to include a new theoretical dimension beyond intermediate and long-term outcomes—CBPR partnership success (Israel et al., 2020). Defining and measuring synergy in the context of long-standing partnership success is central to understanding the role of synergy in collaborative approaches to research and action and strengthening CBPR partnerships to promote equity (See Figure S1).

Methods

National Expert Panel

A national panel of eight community and eight academic experts with extensive experience in CBPR and equity is

central to the MAPS study (see Acknowledgments). The experts were selected by the research team and Detroit URC Board based on their leadership in the field, contributions to the peer-reviewed literature, and diversity along multiple dimensions. Panelists represent all regions of the United States, including urban, rural, and tribal communities, and are of diverse races and ethnicities; three-fourths (12 of 16) are persons of color. Diverse disciplines and community organizations (e.g., social service, health, advocacy) are represented. Panelists have been involved in long-standing CBPR partnerships addressing health equity issues such as environmental justice, racial discrimination, asthma, heart disease, diabetes, and mental health.

For the MAPS study, each expert was asked to draw upon their cumulative knowledge and experience rather than represent a specific partnership. The Expert Panel has been engaged in multiple phases, including serving as key informants, determining validity and clarity of the questionnaire in the Delphi process, and finalizing the questionnaire (Israel et al., 2020).

MAPS Study Design

Guided by the MAPS conceptual framework on CBPR partnership success (Israel et al., 2020), the study uses a sequential exploratory mixed methods design and follows a multi-phase process to develop a measurement tool to assess long-standing CBPR partnership success (see Figure S2). The study protocol was reviewed by the University of Michigan Institutional Review Board (IRB) and determined to be exempt from ongoing review. The process has involved several phases: (a) in-depth, key informant interviews of the Expert Panel; (b) a scoping review of the literature and existing scales; (c) analysis of interview data, informed by the literature, to define long-standing CBPR success, identify key dimensions and indicators, and develop a draft questionnaire; (d) a three-part Delphi process to refine dimensions and indicators of success to establish construct, face, and content validity; (e) cognitive interviews; and (f) pilot testing to enhance face validity and revise the questionnaire. Community and academic experts on long-standing CBPR partnerships (i.e., the Expert Panel, Detroit URC Board, research team members) have participated in every phase of MAPS, with careful attention to integrate all perspectives in developing and revising the questionnaire in an iterative fashion throughout the process (see Israel et al., 2020 for detailed study methods).

Key Informant Interviews

Key informant interviews were conducted with 21 CBPR experts (the Expert Panel and five others involved in pilot

testing) to identify relevant dimensions and indicators of synergy in long-standing equity-focused CBPR partnerships. Following the conceptual model and our previous work, a semi-structured interview protocol was developed. Open-ended questions were organized by six study focus areas: outcomes, definitions of partnership success above and beyond outcomes, relationship between costs and benefits, sustainability, synergy, and equity.

Interviews were conducted by members of the core research team, all experienced in qualitative methods and CBPR. All sixteen Expert Panel members were interviewed, either by phone conferencing or in person. Interviews were recorded, documented by verbatim field notes, transcribed, and de-identified. QSR International's NVivo 11 qualitative data analysis software was used to manage data. Interviews ranged in length from 60 to 120 minutes. After obtaining verbal consent, the interviewer read a description of MAPS, the purpose of the in-depth interviews, and a list of the six focus areas, one of which was synergy. The synergy section of the interview included an introduction and two open-ended questions: (a) In thinking about long-standing CBPR partnerships generally, what does the word synergy mean to you? (b) What indicators are critical to determining if synergy has been created or achieved?

Analysis of Key Informant Interview Data

Data were analyzed using a process of in vivo line-by-line restatements and open coding based on a grounded theory approach (Strauss & Corbin, 2015). In vivo codes included participants' terms to preserve their own meanings (Charmaz, 2014). Multiple coders worked to reach consensus on codes for the first eight interviews to develop a codebook. Focused coding and constant comparisons (Charmaz, 2014) were used for subsequent interviews. The in vivo codes were analyzed and categorized into themes within each focus area, resulting in a set of codes, quotes, and themes for partnership synergy. Themes that mapped onto dimensions specified elsewhere in the model (e.g., competence enhancement, reciprocity) were not included in partnership synergy.

Scoping Review of the Literature and Existing Measures

Concurrent with the key informant interviews, a scoping review of the literature was conducted to identify indicators and measures of success in long-standing CBPR partnerships (Brush et al., 2019), and how these indicators influenced broader partnership outcomes. Research team members with extensive familiarity with synergy concepts and measures from multiple disciplines also identified literature and instruments outside of the

scoping review. We compared synergy measures from the four tools described above (PSAT Synergy Scale; Center for the Advancement of Collaborative Strategies in Health, 2002; Khodyakov et al., 2011; Oetzel et al., 2015; and Jones & Barry, 2011b) to understand synergy concepts and measurement from different perspectives and to inform our focus specifically on long-standing CBPR partnerships.

Synthesis of Interview Findings and Literature to Develop the Draft Questionnaire

To synthesize and integrate these findings, synergy-related concepts and indicators from the literature review were systematically examined for alignment with interview codes and themes, and to identify any novel concepts. Using a participatory and iterative process of reviewing and discussing the integrated findings, the research team analyzed these data to formulate a definition of partnership synergy and construct measurement items. To the extent feasible, the items included verbatim quotes. The resulting items formed the partnership synergy item pool for the draft questionnaire for the Delphi process.

Delphi Process

A three-round Delphi process was conducted to develop a pool of items to measure key dimensions of partnership success. Delphi technique employs a structured, successive communication process to collate expert judgments on a complex problem (Helmer-Hirschberg, 1967). In the first two rounds, conducted by email using Qualtrics survey software (Qualtrics, Provo, Utah, 2018), panelists individually and anonymously ranked the importance, appropriateness, and clarity of items on a Likert-type scale and provided written suggestions for revisions. After each round, the research team analyzed the quantitative and qualitative data to assess whether an item should be retained, removed, or modified using these criteria: (a) 75% or more of the panel noted the item as "Very Important" or "Important" (Round 1) or "Yes, Reflective" of partnership synergy (Round 2); (b) panelists' qualitative comments provided a basis for considering changes; (c) modifying or re-wording the item would improve clarity; and (d) item is redundant. Integrating quantitative and qualitative data, the research team revised the items accordingly and circulated the summarized results to panelists for subsequent feedback.

The third round was conducted over two days in a face-to-face meeting, providing opportunities for deeper discussion, refinement of wording, and to reach consensus on the definition and items. Qualitative comments and

face-to-face discussions were intended to eliminate redundancies and ensure questionnaire items adequately captured each dimension (e.g., partnership synergy) from the perspective of CBPR experts, thus contributing to construct, content, and face validity (Helmer-Hirschberg, 1967).

Cognitive Interviews and Pilot Testing

The resulting item pool was further refined through cognitive interviews conducted with three community and three academic partners from long-standing CBPR partnerships. Findings were applied to improve comprehension and readability of the items, identify potential sources of response error (Willis, 2005), and revise the questionnaire accordingly for pilot testing. The revised questionnaire was then piloted with CBPR experts from the Detroit URC (three community and one academic) and the Expert Panel (one community and two academics). Pilot testing enabled the team to assess survey administration logistics, questionnaire length and flow, and respondent burden (Willis, 2005). The questionnaire and procedures were revised accordingly to enhance face validity of the final questionnaire. Equitable academic and community engagement was integral to all phases of instrument development.

Results

Using this participatory, multi-phase, mixed methods approach, we developed a definition and seven-item measure of partnership synergy in long-standing equity-focused CBPR partnerships. Table 1 summarizes results from each phase that corresponds to the final seven questionnaire items. Next, we report more detailed results at key methodological steps toward the final questionnaire items. Finally, we describe the resulting definition of partnership synergy.

From left to right, Table 1 tracks the development of each item by summarizing results from data collection and analysis at each phase. The first two columns display results from the key informant interviews. Column A lists selected *in vivo* codes, which represent partial or condensed quotes from community and academic experts. Column B presents the corresponding themes/key concepts into which the codes were categorized. Column C lists the results of synthesizing these data with the scoping review and existing measures to construct a set of partnership synergy items for the Delphi process. Column D summarizes the changes made to the draft items (delete, reword, add, or no change) during the next phases of validating and clarifying items:

the three-round Delphi process, cognitive interviews, pilot testing, and reexamining the existing literature. The final seven partnership synergy items included in the larger MAPS questionnaire are shown in the right-hand Column E.

Findings from Key Informant Interviews, Literature, and Synthesis

Results indicated that synergy arising from equitable long-standing partnerships reflected principles of CBPR and equity. From the coded interview data as summarized in Column A, we identified three key concepts that are fundamental to partnership synergy in long-standing, equity-focused CBPR partnerships, as shown in Column B: (a) whole is greater than sum of the parts: better together than alone; (b) leveraging existing resources in building partnership capacity and enhancing each other's work; and (c) combining different perspectives to form new knowledge. These concepts are further explained below with interview excerpts.

Whole is Greater than Sum of the Parts: Better Together than Alone

The concept of diverse partners being able to accomplish more together than partners could separately was widely expressed by both community and academic experts as a defining characteristic of synergy in CBPR. Central to this concept is bringing together different perspectives to create a larger distinct phenomenon that helps the partnership achieve its broader equity goals. A community panelist explains, "We've taken in the beginning our disparate ideas and notions and we've synthesized and created this kind of synergistic relationship that's now a partnership."

This synergy "happens" over time as partners include the perspectives of both community and academic partners when working, writing, presenting, and traveling together. A community member describes, "We believe that they don't speak for me and I don't speak for them - each of us speak for ourselves, but then we speak collectively about the *partnership*." When the synergy created between community and academic partners bridges power differences, the relationships are more equitable and the partnership is strengthened, as expressed by an academic panelist:

You come with a set of skills and an identity, but you don't necessarily force something in a direction that is inappropriate for the other person. You work together to actually mirror each other, and where you get to is better than either would've gotten to alone, if you just stayed in your own self.

Table 1 History of MAPS partnership synergy questionnaire items by methodological phase of development

A. In vivo codes from interviews	B. Themes/key concepts	C. Draft questionnaire items for Delphi process	D. Delphi, pilot, team ^a	E. Final partnership synergy items
Where you get to is better than either would've gotten to alone. Diverse partners together can accomplish more than separately. Collaboration among diverse partners helps partnership accomplish its objectives	(1) Whole is greater than sum of the parts: better together than alone	C-2. Having diverse community and academic partners together accomplishes more than could be accomplished separately.	D1: Deleted D2: Reworded, re-added	1. Working together, the partnership accomplishes more than partners could accomplish separately.
Collaboration among diverse partners helps partnership accomplish its objectives. Shared purpose toward equity	(1) Whole is greater than sum of the parts		D3, Literature ^b : Added	2. By working together, partners develop innovative ways to address issues identified by the partnership.
CBPR combines opposite perspectives, resources, cultures to create a third view. Each partner brings knowledge, which are truths, by bringing together, form 3rd truth. Partners not debating or compromising but forming third new knowledge. Taken disparate ideas in beginning, synthesized, created synergistic relationship that's now a partnership	(3) Combining different perspectives to form new knowledge	C-3. The partnership combines diverse perspectives, ideas, knowledge, and cultures to create a shared view of the partnership's goals and objectives.	D3: Reworded T: Reworded	3. The partnership combines diverse perspectives (for instance, diverse ideas, knowledge, and cultures) to make changes identified by the partnership.
Capacity of both community and academic partners enhanced. Develop capacity to enhance each other's work	(2) Leveraging existing resources in building partnership capacity and enhancing each other's work	C-4. The partnership has changed the way individual partners do or think about their work.	D2: Reworded	4. The partnership influences the way partners think about and do their work.
Taken disparate ideas in beginning, synthesized, created synergistic relationship that's now a partnership. Each partner brings knowledge, which are truths, by bringing together, form 3rd truth	(3) Combining different perspectives to form new knowledge			
Change in perspectives/personal enrichment by being part of partnership (e.g., engaging with partners' ideas, skills, abilities)	(3) Combining different perspectives to form new knowledge	C-5. Partners have experienced a change in perspective by engaging with each other's ideas.	No Change	5. Partners have experienced a change in perspective by engaging with each other's ideas.
Building on partners' capacities we're better together than alone. Sum of parts is greater than each of the parts that contribute to it. Whole greater than sum of parts	(1) Whole is greater than sum of the parts: better together than alone	C-1. The partnership builds on partners' capacities such that "we're better together than alone."	D3: Reworded	6. The partnership integrates partners' capacities such that "we're better together than alone."
Extend/build upon/share partnership's efforts with other related projects/partnerships to create more equitable society. Leverage resources to aid new opportunities for community input, to extend into other projects	(2) Leveraging existing resources in building partnership capacity and enhancing each other's work	C-6. The partnership shares what it has learned and accomplished with other partnerships to help them build and extend their work (e.g., training manuals, questionnaires, procedural guidelines).	D1: Deleted T: Re-added P: Reworded	7. The partnership has relationships with other partnerships which enables them to enhance and extend each other's work.

^aD1 = Delphi Round 1, D2 = Delphi Round 2, D3 = Delphi Round 3, P = Pilot, T = Research Team^bAdapted from PSAT Synergy Scale item: By working together, partners are able to identify new and creative ways to solve problems.

Leveraging Resources in Building Capacity and Enhancing each Other's Work

A second key concept expressed by panelists is that synergy exists when resources are combined and leveraged to enhance capacity of partners and the partnership as a whole. This includes extending the partnership's synergistic efforts into other projects and networks that expand the partnership's work toward equity, as described by two community expert panelists:

It's how you leverage the resources around your [partnership] to aid new opportunities for community input in other issues we hadn't thought about before... Because of that, we leveraged our creative synergy for another project that's doing its own thing now.

So, I've been reading lately about Network Theory, and thinking how this partnership creates power in the community and mobilizes the community. So, in a very real way CBPR is an important piece of that community mobilization and creating a more equitable society, building those networks and hubs.

Combining Different Perspectives to form New Knowledge

The third central concept that emerged from Expert Panel members is also integral to CBPR and equity, as described by an academic panelist when defining synergy as, "CBPR combines opposite perspectives, resources, cultures to create a whole third view." The panelist further described synergy as a "change in perspectives, personal enrichment by being part of partnership...by engaging with partners' ideas, skills, and abilities." This entails recognizing differences as strengths, a principle of CBPR and equity: "You know we're playing to each other's strengths and we're honoring those strengths" (Community Expert Panelist).

I think that's what CBPR does, is you bring in opposites, the professional academic perspective and resources and culture with the community resources and culture perspective, and you create a whole third view.

(Academic Expert Panelist)

We each bring our knowledge, which are truths, but by bringing them together, we form a third truth, and that to me is what synergy is.

(Academic Expert Panelist)

Panel members also described the emergence of this "third truth" when partnerships examined racism and developed deeper understandings of the root causes of

inequities. As an academic panel member described, "We form this partnership knowing that the reality is inequity, and so we form the partnership about 'How can we shift that?'"

Based on the codes and key concepts, the research team constructed a set of seven items that together captured the definition and themes of partnership synergy. Items included verbatim responses as feasible and were sequenced to form a partnership synergy item pool for the Delphi process, as shown in Column C. The items reflected the specific context of partnership synergy within long-standing, equity-focused CBPR partnerships as this academic panelist describes:

[W]ithin a long-term CBPR partnership, there's actually the opportunity to make what each of us does better. Whatever our capacities are, are enhanced because of the other kinds of things, like relationships, the willingness to push back, the ability to help someone understand what you're talking about... It was only because of our long-term relationships that the synergy would manifest in a whole new way that actually got us closer to understanding even how to create a survey.

Results from the Three-round Delphi Process

The Expert Panel examined and discussed the draft questionnaire through a three-round Delphi process. Quantitative ratings, qualitative comments, and face-to-face discussions helped to eliminate redundancies and ensure measurement items captured partnership synergy as an outcome that contributes to long-standing CBPR partnership success. The research team integrated data after each round to revise the items for the next round. Results are summarized in Column D for the Delphi process. Only one item remained unchanged, C-5, "Partners have experienced a change in perspective by engaging with others' ideas."

Item C-6 was initially worded, "The partnership shares what it has learned and accomplished with other partnerships to help them build and extend their work (e.g., shares training manuals, questionnaires, procedural guidelines)." Although this item met the 75% importance threshold, it was deleted in Round 1 based on several comments that it did not represent synergy. In subsequent meetings to revise the questionnaire, the research team looked closely at interview data relevant to this item (Column A), including "extend/build upon/share partnership's efforts with other related projects/partnerships" and "leverage resources to aid new opportunities...to extend into other projects." These

quotes suggest a between-partnership dimension of synergy which to our knowledge has not been conceptualized in the literature. The team thus decided to retain and reword the item. Three other items were reworded to enhance clarity during the Delphi process (see Column D to compare wording before and after revisions).

A new item was added after the Delphi process based on a final comparison with existing instruments. An item in the PSAT (Weiss et al., 2002), “identify new and creative ways to solve problems,” was consistent with key informant data but had not been adequately captured in our items. Drawing upon two themes as shown in Table 1, the new item 2 reads, “By working together, partners develop innovative ways to address issues identified by the partnership.”

Cognitive Interviews and Pilot Testing

During the cognitive interviews and pilot testing, several items were reworded to address understanding and interpretation of the items and enhance overall clarity, as noted in Column D. The overall set of partnership synergy items remained relatively stable.

Definition and Summary

Based on our conceptual model and methodology, partnership synergy in long-standing CBPR partnerships was defined as “Community and academic partners accomplish more together than could be accomplished alone to make changes identified by the partnership.” Expert Panel members considered the joint accomplishment of academic and community members to be intrinsic to the concept of partnership synergy in equity-focused CBPR as distinct from other types of partnerships. As expressed in a quote presented earlier, the creation of the “third view” results from the union between academic and community resources and perspectives in CBPR through power sharing and collaborative processes.

Expert panel members considered change to be an essential element of partnership synergy in CBPR. As a community panel member said during the Delphi meeting, “If this hasn’t changed the way you do research together, then the partnership’s a failure. If it’s not improving health in your community, then there’s no point to the partnership.” While initially the definition of synergy was worded, “. . .to make changes in the community,” during Delphi discussions members emphasized that in CBPR, changes attributed to partnership synergy extend beyond those that occur within the community. As expressed by an academic expert panelist:

One thing to consider is that the current definition indicates that the changes made are in the community. . .one assumes the definition does not include changes made in the academic setting. Long term I think that partnership synergy actually leads to important changes in academic as well as community settings.

As a result, the definition was broadened to “Community and academic partners accomplish more together than could be accomplished alone to make changes identified by the partnership.”

Our definition and measures of partnership synergy were developed concurrently and iteratively to ensure that the measures captured major concepts embedded within the definition. Thus, the final set of seven questionnaire items measure multiple dimensions that together comprise the definition of partnership synergy.

Discussion

We defined and developed a measure of partnership synergy as part of the larger MAPS study to understand success in long-standing, equity-focused CBPR partnerships. Using a participatory, multi-phase, mixed methods approach that engaged a national Expert Panel, we identified a set of seven items to measure partnership synergy as an intermediate outcome that is central to CBPR partnership success. Evaluating synergy in CBPR partnerships can strengthen their success in conducting research that promotes health equity outcomes.

We conceptualized partnership synergy specifically in the context of established CBPR partnerships that study and address social and health inequities. Synergy in such partnerships has been less examined in the literature. Our conceptual model, with its emphasis on synergy as a proximal outcome leading to longer-term outcomes and success in promoting equity, is complementary to the work of others (Kastelic et al., 2018). However, by focusing on partnership synergy within long-standing CBPR partnerships, more specific measures can assist such partnerships in enhancing and sustaining success in attaining health and equity goals.

The MAPS partnership synergy definition centers the idea of partners accomplishing more together than could be accomplished alone and adds a key dimension of community and academic partners working toward changes identified and agreed upon by the partnership. This reflects CBPR principles of action toward equity goals which distinguish it from similar definitions in community engagement and collaboration literature (Jones & Barry, 2011a; Minkler, 2005; Weiss et al., 2002). All MAPS

measures reflect at least one principle of equity-oriented CBPR (Israel et al., 2019). Partnerships leverage their resources to build partnership capacity, enhance each partner's work, and combine diverse perspectives to form distinct new knowledge. One item, "The partnership has relationships with other partnerships which enables them to enhance and extend each other's work," contributes to the field by examining synergy across partnerships. This reflects CBPR's long-term commitment to achieving broader social and health equity. When partnerships effectively bridge differences in power and perspectives, the resulting partnership synergy strengthens their collaborative success toward health equity.

MAPS was conducted by a long-standing, diverse CBPR partnership that brings decades of experiential and scholarly expertise that includes partnering among each other. Academic and community CBPR experts were equitably engaged at all stages of definition and instrument development. Recognizing that there is no one "right" way to carry out CBPR, we assembled a team that represents different CBPR contexts that focused on equity outcomes. Thus, the resulting partnership synergy definition and measures were derived from the knowledge, experiences, and perspectives of community and academic experts from multiple settings and backgrounds, and all within long-standing, equity-oriented CBPR partnerships. Thus, our results may be more reflective of the diverse views of partnership members than if we had relied primarily on published literature and existing synergy scales.

Our methodological approach contributed to the strength of our measures. Indicators of synergy were derived from verbatim codes and themes to ensure that items conveyed panelists' intended meaning, stayed close to our definition, and indicated rather than predicted partnership synergy. A rigorous mixed methods approach was employed throughout, with substantial feedback and discussion to analyze and integrate findings. Multiple phases provided opportunities to iteratively and collaboratively examine, interpret, and apply findings to revise the measures. The inductive-oriented item development balanced participants' expertise and the literature. We designed MAPS to ensure that the results were informed but not constrained by the existing literature and measures. The final synergy scale will assist CBPR partnerships to evaluate synergy to strengthen their success to understand and promote health equity.

Limitations

A limitation of this study is that we examined synergy as a distinct construct within the broader conceptual model of CBPR, although the constructs are interrelated and not mutually exclusive. We also looked at equity separately,

which is integral throughout the model. At times it was challenging for both the Expert Panel and the research team to distinguish between predictors, indicators, and outcomes of partnership synergy. The purpose of this phase of MAPS was to develop a strong definition and measures of partnership synergy. However, we will not know how valid this measure is until it is empirically tested in the next phase. Similarly, this study did not examine the role of synergy in enhancing CBPR success. That will also be empirically tested in the next phase, which was under way at the time of writing.

Next Steps and Implications for Understanding and Measuring Synergy

The next steps in the overall MAPS study are to validate the questionnaire by testing its psychometric properties in a purposive sample of U.S.-based CBPR partnerships that are long-standing (at least six years), follow CBPR principles including a long-term commitment to equity, and conduct evaluation and dissemination activities. The questionnaire will be administered to all core members of each partnership. We will analyze those data to assess the relationship between key variables in the conceptual model (Israel et al., 2020). The results will enable us to further revise and finalize the questionnaire and model, with involvement of community and academic members of the Expert Panel and the Detroit URC Board. Advancing the field of partnership development, the validated questionnaire will allow us to examine the relationship of partnership synergy to other dimensions of partnerships, and to better understand how synergy contributes to longer-term success of CBPR partnerships to promote health equity.

To ensure that the validated questionnaire is readily accessible and usable, the MAPS project will develop a mechanism for partnerships to score, feed back, interpret, and apply findings to improve their partnership. Finally, we will disseminate the validated questionnaire and practical feedback tool to CBPR partnerships nationwide, providing a means for both new and long-standing partnerships to evaluate and enhance their efforts toward partnership success and equity. The resulting partnership synergy scale will provide a reliable and valid measure for CBPR partnerships to evaluate the extent to which they are achieving synergy, and to identify aspects of their partnership that they may want to improve to enhance their long-term success.

Conclusion

CBPR is an effective strategy to address health disparities and reduce health inequities, and partnership synergy is a

central component of effective equity-focused partnerships. Synergy arising from bringing together diverse perspectives across power differences is particularly powerful for addressing health inequities. Thus, evaluating synergy in equity-focused CBPR partnerships is critical to strengthen their ability to achieve equity-oriented goals. Defining and measuring partnership synergy will contribute to the field more broadly and to individual partnerships by identifying and assessing key dimensions that contribute to long-term outcomes and ultimately partnership success. Evaluating partnership synergy can strengthen the success of CBPR and other collaborative partnerships to promote healthy communities and health equity.

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Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article.