Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
https://foodsystemsjournal.org

Supporting new gardeners: Perspectives of gardeners and garden leaders

Alyssa W. Beavers [a]* and Rebekah Ray [b]
Michigan State University

Kristin M. Lacy [c]
Michigan State University and Wayne State University

Eva Coringrato [d]
University of Colorado Boulder and Wayne State University

Ashby Lavelle Sachs
Michigan State University and University of Colorado Boulder

Za'Nyia Kelly
Michigan State University

Hannah Buchenau
University of Colorado Boulder

Erin K. Decker
Michigan State University and University of Colorado Boulder

Lara Wirtz Fahnestock [i]
Denver Urban Gardens

Pallas A. Quist [j]
University of Colorado Boulder

James R. Hébert [k]
University of South Carolina

Jill S. Litt [l]
University of Colorado Boulder and Barcelona Institute for Global Health

Katherine Alaimo [m]
Michigan State University

Submitted January 17, 2024 / Revised July 10 and August 28, 2024 / Accepted August 30, 2024 / Published online November 1, 2024

Citation: Beavers, A. W., Ray, R., Lacy, K. M., Coringrato, E., Sachs, A. L., Kelly, Z., Buchenau, H., Decker, E. K., Wirtz Fahnestock, L., Quist, P. A., Hébert, J. R., Litt, J. S., & Alaimo, K. (2025). Supporting new gardeners: Perspectives of gardeners and garden leaders. *Journal of Agriculture, Food Systems, and Community Development*, *14*(1), 309–326. https://doi.org/10.5304/jafscd.2024.141.007

Abstract
While gardening has been shown to have wide-ranging benefits, very little research has focused on the experiences of new community gardeners. Our study examined the experiences of new community gardeners, as well as the perspectives of garden leaders, to determine how to best meet new community gardeners' needs. We conducted qualitative interviews with a subset of new community gardeners (N = 34) participating in a randomized controlled trial (RCT) of community gardening, and garden leaders (N = 47). New community gardeners learned to garden through classes, from other gardeners and leaders, from friends and family, and through teaching themselves. Garden leaders provided varied support to new community gardeners, including hands-on assistance and orientations. The events and degree of social interactions with

other gardeners in the gardens also varied, although most gardens had a culture of helping and reciprocity, and gardeners frequently brought family and friends with them to their gardens. Challenges reported by new community gardeners and leaders included lack of gardening knowledge and support; responsibility and time commitment of gardening; poor communication from garden leaders; water, weeds, and pests; plot abandonment; and theft, vandalism, and safety. New community gardeners desired and benefited from social interaction, guidance, and support in their gardens. However, because garden leaders already have substantial garden responsibilities, placing this responsibility solely on garden leaders is frequently not feasible. This study provides insight into new community gardeners' experiences and can be used to inform programs that support gardeners.

[a] * *Corresponding author:* Alyssa W. Beavers, PhD, RD, Graduate Research Assistant, Department of Food Science and Human Nutrition, Michigan State University.
Alyssa Beavers is now Assistant Professor, Department of Nutrition and Food Science, Wayne State University; 410 West Warren Avenue; Detroit, MI 48202 USA; https://orcid.org/0000-0003-1165-0247; beavers.alyssa@wayne.edu

[b] Rebekah Ray, MS, RD, Graduate Student, Department of Food Science and Human Nutrition at Michigan State University.
Rebekah Ray is now a clinical dietitian at Corewell Health.

[c] Kristin M. Lacy, MDP, Research Assistant, Department of Food Science and Human Nutrition, Michigan State University, and Research Technician, Department of Nutrition and Food Science, Wayne State University.
Kristin Lacy is now a consultant in Denver, Colorado.

[d] Eva Coringrato, BA, Research Assistant, Environmental Studies Department, University of Colorado Boulder, and Research Technician, Department of Nutrition and Food Science, Wayne State University.
Eva Coringrato is now a MPhil Student in Population Health Sciences at the University of Cambridge.

[e] Ashby Lavelle Sachs, PhD, Research Assistant, Department of Food Science and Human Nutrition, Michigan State University, and Department of Environmental Studies, University of Colorado Boulder.
Ashby Lavelle Sachs is now a postdoctoral fellow at the Barcelona Institute for Global Health, Barcelona, Spain.

[f] Za'Nyia Kelly, Research Assistant in the Department of Food Science and Human Nutrition at Michigan State University.

[g] Hannah Buchenau, Research Assistant, Department of Environmental Studies, University of Colorado Boulder.
Hannah Buchenau is currently Grants and Data Manager at Denver Urban Gardens.

[h] Erin K. Decker, Research Assistant, Department of Food Science and Human Nutrition, Michigan State University, and Department of Environmental Studies, University of Colorado Boulder.
Erin Decker is currently Program Associate –Horticulture Volunteer and Outreach, Colorado State University Extension.

[i] Lara Wirtz Fahnestock, Director of Garden Operations, Denver Urban Gardens.

[j] Pallas A. Quist, Research Assistant, Department of Environmental Studies, University of Colorado Boulder.

[k] James R. Hébert, MSPH, ScD, Health Sciences Distinguished Professor in the Department of Epidemiology and Biostatistics and Director of the State-Wide Cancer Prevention & Control Program, Arnold School of Public Health, University of South Carolina; jhebert@mailbox.sc.edu

[l] Jill S. Litt, PhD, Professor, Department of Environmental Studies, University of Colorado Boulder; and Senior Researcher, Barcelona Institute for Global Health, Barcelona, Spain; https://orcid.org/0000-0001-8593-5400; Jill.Litt@colorado.edu

[m] Katherine Alaimo, PhD, Associate Professor, Department of Food Science and Human Nutrition, and Director of the Sustainable Agriculture & Food Systems minor/specialization, Michigan State University; https://orcid.org/0000-0001-8566-4962; alaimo@msu.edu

Conflict of Interest Disclosure
The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results. All authors declare no conflicts of interest.

Funding Disclosure
The qualitative component of the Community Activation for Prevention study was funded by Michigan State University Subaward No. 1554944 of the Research Scholars Health Equity Grant from the American Cancer Society (University of Colorado Boulder 130091-RSG-16-169-01-CPPB). Additional support was provided by the University of Colorado Boulder, the USDA National Institute of Food and Agriculture, Michigan AgBioResearch Hatch projects MICL02410 and MICL02711, and the Wayne State University Department of Nutrition and Food Science Faculty Start-up Fund.

Trial Registration
NCT03089177 at ClinicalTrials.gov; https://clinicaltrials.gov/ct2/show/NCT03089177

Keywords
community gardening, garden support, new community gardeners

Introduction

Community gardening is associated with numerous health and psychosocial benefits, including increased fruit and vegetable consumption (Alaimo et al., 2008, 2023; Barnidge et al., 2013; Litt et al., 2011), increased physical activity (Park et al., 2011, 2014), improved mental wellbeing (Hawkins et al., 2011; Soga et al., 2017; van den Berg et al., 2010), and positive social interactions (Teig et al., 2009; Toda & Lowe, 2022). These benefits may arise through the synergistic processes of spending time in an attractive natural setting, nurturing plants, producing fresh food, interacting with others socially, and collective efficacy (Bailey & Kingsley, 2020; Hale et al., 2011; Hawkins et al., 2013; Kingsley & Townsend, 2006; Porter, 2018; Saldivar-Tanaka & Krasny, 2004; Teig et al., 2009; van Holstein, 2017).

Additionally, benefits of community gardening can extend beyond the boundaries of the garden and impact the neighborhoods in which they are located. Being part of a community garden can impart a sense of belonging and develop a more cohesive feeling of community to residents of a neighborhood (Glover, 2004; Glover et al., 2005; Teig et al., 2009). Relationships that begin in the garden often extend beyond the garden, resulting in the creation of new friendships, social support in times of need, or neighbors looking out for each other (Glover, 2004; Glover et al., 2005; Teig et al., 2009). There is even evidence that community gardens are associated with reduced crime and increased property values (Beam et al., 2021; Voicu & Been, 2008).

Despite the many benefits of community gardening, there are significant hurdles that must be overcome when people begin gardening. Gardening requires developing new knowledge, skills, and habits in order to successfully produce food (Conway, 2016; Diaz et al., 2018; Hale et al., 2011). New community gardeners must learn when to plant and harvest vegetables; how to prepare their soil, plant seeds, and transplant seedlings; and must habituate themselves to visiting the garden regularly to water and weed. Without adequate skills, knowledge, and support, new community gardeners may struggle and ultimately quit gardening (Diaz et al., 2018; Tharrey et al., 2020). When new community gardeners quit gardening, they may not achieve the aforementioned benefits to their own physical, mental, and social health. Additionally, the sustainability of the community garden is put in jeopardy. In a survey of 445 organizations that support community gardens in the U.S. and Canada, respondents reported a loss of 1,615 community gardens over a five-year period (Drake & Lawson, 2015). Getting new gardeners involved and keeping people involved over the long term were the second and third most commonly reported challenges experienced by these organizations, behind the top challenge of obtaining material resources for the gardens (Drake & Lawson, 2015). Thus, it is important to ensure the success of new community gardeners and support their continued participation in gardening. While substantial research has examined gardening's potential to influence health behaviors and physical and mental health, very little research has focused on the experiences of new community gardeners (Sachs et al., 2022). In most studies of gardening, either research participants are primarily experienced gardeners or data regarding how long participants have been gardening are not provided. To expand the uptake of gardening and enhance the sustainability of community gardens, it is imperative to explore new community gardeners' experiences and needs.

In the context of community gardens, governance or leadership also influences gardeners' experiences. There are a wide variety of leadership approaches used in community gardens (Fox-Kämper et al., 2018; Toda & Lowe, 2022), but there is scant research regarding gardeners' perceptions of community garden leadership. However, what little literature exists indicates that leadership is influential in improving or hindering the experience of community gardeners (Aptekar, 2015; Egerer & Fairbairn, 2018; Gilbert et al., 2020; Kingsley & Townsend, 2006). To understand the role that garden leaders can play in influencing the success of new community gardeners, more research is needed; additionally, it is important that this research includes the perspectives of both new

community gardeners and garden leaders.

This study aimed to explore the experiences of new community gardeners, as well as the perspectives of garden leaders, to learn how to best support new community gardeners. This paper describes new community gardeners' perceptions of garden leadership, garden social culture, and management of gardening challenges, as well as insights from garden leaders.

Methods

In this study, we conducted qualitative interviews with a subset of new community gardeners and their garden leaders participating in or supporting the Community Activation for Prevention Study (CAPS). CAPS is a randomized controlled trial investigating the health impacts of community gardening (Litt et al., 2018, 2023) . This study was conducted between 2017 and 2020 in collaboration with Denver Urban Gardens (DUG). DUG is a nonprofit organization that manages community gardens in the metro Denver, Colorado, area, and also offers gardening education, provides subsidized or free seeds and seedlings for low-income gardeners, and recruits and trains garden leaders.

CAPS was designed with three waves of data collection in which each wave consisted of a full gardening season. Interviewees for this current qualitative study were selected from wave one and wave two of the CAPS trial. Participants were eligible for the study if they were 18 years old or older, able to give consent in English or Spanish, willing to be put on a waitlist for a community garden plot, and had not gardened in the past two gardening seasons. Descriptions of recruitment and randomization, intervention, and eligibility for CAPS have been published previously (Litt et al., 2018; Villalobos et al., 2019). Briefly, recruitment for the study was conducted in two phases. First, community gardens and leaders were invited to participate. Gardens were prioritized if they were located in low-income and minority areas as determined by 2010 census data, had a waitlist for garden plots, and had the capacity to reserve two to six plots for study participants. Second, prospective gardeners were recruited to participate in the areas surrounding the garden through 12 methods, including contacting people on the garden waitlists, referrals, displays at health fairs, posting flyers, social media, and canvassing neighborhoods.

The CAPS intervention consisted of material resources and technical support for cultivating a community garden plot, typical of what is provided to new community gardeners through DUG. Both intervention participants and control participants were offered the same intervention package, although the timing was different. Control participants were offered the intervention package after their participation in the RCT had ended. Each participant was provided a garden plot averaging 116 square feet (10.8 square meters) in a community garden. The plot fee was paid by CAPS, and participants were provided free vegetable seeds and transplants. Participants were invited to attend a free beginner gardening class. Depending on the community garden, garden leaders, master gardeners, and/or CAPS staff were available to answer gardening questions and assist participants.

An advisory team of DUG staff members, community garden leaders, past American Community Gardening Association presidents, nutritionists, and academic partners informed the design and implementation of CAPS. Both the present study and the full randomized controlled trial were approved by the University of Colorado Boulder institutional review board. Results presented here answered the research question: What were the experiences of new community gardeners and garden leaders with respect to how new gardeners learned to garden, their perceptions of garden leadership and structure, their social interactions in the garden, and obstacles to their participation?

Interviews with Community Gardeners

After their participation in the RCT was complete, a subsample of CAPS participants was contacted by phone and invited to complete semi-structured qualitative interviews. The participants were selected by purposive sampling to ensure variation in level of gardening engagement, demographics, and assigned community garden. Twenty-nine intervention participants and 26 control participants were contacted to participate in interviews; 25 intervention participants and 24 control participants who gardened in 24 different DUG gardens

agreed to be interviewed, and six declined or did not respond to researchers. Intervention participants were invited to be interviewed one time, after their first season of gardening. Control participants were invited to be interviewed twice: before gardening and after their first season of gardening. The analysis presented here included interviews with 11 control and 23 intervention participants who were all interviewed after their first season of gardening (n = 34); one intervention participant interview was excluded from the analysis because of incomplete data, and 12 control participant interviews were excluded because they were interviewed only before they began gardening, but not after. Participants provided written informed consent prior to the interviews and were provided a US$20 gift card for participation. Interviews were tape-recorded and transcribed, and transcripts were corrected for accuracy. Demographic characteristics were obtained from data captured in CAPS surveys.

The interview guide was reviewed, revised, and approved by the advisory team. To obtain feedback on appropriateness and clarity of question wording, pilot testing of interview questions was conducted with four community gardeners in the Lansing, Michigan, area. Topics of the interview guide analyzed for this study included previous gardening experiences, learning to garden, perceptions of garden leadership, the social culture of the garden, and challenges experienced. The interview guide was split into two parts for the control participants, and they were interviewed about previous gardening experiences during their first interview (conducted prior to gardening) and interviewed about their experiences gardening (the rest of the interview topics) during their second interview (conducted after their first season gardening). Because both the intervention participants and control participants were offered the same gardening package and were interviewed after their first season of gardening (except for the question on previous gardening experiences), gardening and control participants were analyzed together.

The overarching analysis methodologies included grounded theory (i.e., codes and themes were constructed inductively from the data without a pre-existing coding frame) and comparative case study analysis (i.e., each participants' garden experience was analyzed as a discrete unit and compared with the experiences of other participants) (Miles et al., 2014; Yin, 2017). The research team included researchers who were themselves gardeners; grounded theory was used to encourage the researchers to listen carefully to the voices of the participants and develop codes and themes based on the data. During each stage of analysis, the researchers held group meetings to discuss the codes, themes, and findings, and to ensure consistency.

First, transcripts were coded using Atlas.ti software (Version 8). Three researchers coded five interviews independently to generate initial codes and collaboratively reached consensus on code meaning and definitions. Coding was then completed for each interview and checked by an alternative researcher to ensure the finalized codes were applied uniformly, with team discussions to clarify discrepancies.

In the next stage, comparative cases study analysis, themes were created, and PowerPoint displays were completed for each participant by writing summary statements for each theme to enable researchers to understand the connections and disparities between themes and different participants. The PowerPoint displays enabled the researchers to be able to "see" participants' experiences as a whole and draw connections between themes within each participant experience. Summary statements for each theme were added to an Microsoft Excel table, which facilitated the comparison of similar and disparate experiences for each participant. Conclusions were drawn based on systematically comparing PowerPoint displays and summary statements across participants. Descriptions of and theories of connections between themes were extensively discussed by the team and were produced iteratively and by consensus. This article reports on the themes related to supporting new gardeners. Codes groups and themes are displayed in the Appendix.

Interviews with Garden Leaders

Garden leaders in the DUG network are volunteers. Garden leaders attend an introductory training session and are supported in their positions by

DUG staff. For the present study, all garden leaders at participating gardens were invited to participate in an interview, and 47 of 65 garden leaders representing 29 different community gardens were interviewed. Interview guides captured similar themes as the participant interviews. Garden leaders were interviewed either via telephone or in person. Leader interviews were documented by audio-recording plus field notes or note-taking by hand or computer. Recordings were transcribed. Content from each interview was summarized using Microsoft Excel. Using the main themes and key ideas from the interview guide, codes were developed for each topic, and codes and themes were applied to text, counted, and summarized.

Results

Results are described below, including experiences of new community gardeners and garden leaders with respect to (1) learning to garden, (2) garden leadership and structure, (3) social culture of the community garden, and (4) obstacles to participation.

Description of Participants and Community Gardens

The 34 gardeners interviewed were mostly white (79%), non-Hispanic (79%), and female (71%). Ages ranged from 20 to 70 years, with a mean age of 41. Garden leaders interviewed represented 29 of the 37 community gardens participating in the CAPS trial. The number of plots in each garden ranged from seven to 90, and gardens were established between 1976 and 2019.

Learning to Garden

Participants learned to garden in a variety of ways. A class on vegetable gardening basics was offered by DUG as part of the intervention, which 24 participants (70%) reported attending. Over half of these participants mentioned that the class was helpful. For example, one participant described the class as "lovely" and enjoyed getting to sit with others who had a shared interest (P.J).

More than half of participants (n = 20) learned from others both in and outside of the garden. Inside the garden, participants learned by observing others' garden plots and conversations with other gardeners: "People were really super knowledgeable so it was cool to ask people questions and … they'd spew out all these interesting facts." For some participants, garden leaders were an important learning resource, especially if the garden leader(s) were often present at the garden when the participant was. One participant said, "we sometimes look at each other's plots. … it was good to show [the leader] and say, 'What's going on here? Do I need to be worried?'" (P.Z). Some garden leaders described making themselves available to gardeners, especially new community gardeners. One of the most common forms of support garden leaders offered was hands-on troubleshooting in the garden, and some invited master gardeners to garden workdays and/or placed new gardeners next to more experienced gardeners. Participants also learned from friends, family, and neighbors, both outside of the garden and by bringing them to their gardens. Some gardeners also learned from involvement in local gardening organizations.

Notably, almost all participants took initiative to teach themselves to garden. All successfully grew vegetables. Participants sought out gardening information from books, the internet, and trial and error. For over half of participants (n = 21), their biggest teacher was simply learning "by doing" (P.AA) or experimentation. Most of these participants valued trial-and-error in their first season and "seeing what works" (P.BB), although one participant felt this trial and error was "wasted time" (P.N) and would have liked more direct instruction and guidance. About half of participants (n = 16) mentioned building on prior experience or exposure to farming and gardening. Eighteen participants indicated having gardened in the past, and most participants mentioned at least some previous exposure to gardening in their life, primarily through a family or household garden growing up; this experience ranged from tending flowerpots to working at a 10-acre farm.

Garden Leadership and Structure

Each DUG community garden has at least one volunteer (unpaid) garden member who serves as a leader. Garden leader responsibilities include introducing gardeners to the garden, enforcing garden rules and regulations, communicating with garden-

ers, coordinating with DUG, and organizing garden events such as workdays and potlucks. DUG highly encourages—but does not require—garden leaders to attend a training course.

Role of the garden leader

Garden leaders had differing perspectives of how much support they were expected to provide new community gardeners. For example, one garden leader said, "I don't think it's my responsibility to hold their hands. I explain everything to them when they sign on" (GL.L). Others were eager to learn ways to welcome and help new community gardeners, while balancing their other responsibilities. This variation was reflected in participants' perspectives on garden leader support. About half of participants (n = 16) said they received support from their garden leader, and these participants valued having an engaged garden leader who they saw frequently and who served as a source of gardening knowledge. For example, one participant said, "I looked forward to seeing [the garden leader] in the morning. … [Having him there] made my experience, really. He was very willing to help me in every way" (P.L). Another participant said, "The garden leader really stood out to me because she, in my opinion, had the right idea of what I expected with a community garden. … She had a lot of information and she's just really pleasant to be around and work with, and that made it not feel like work when I went to the community garden" (P.E.). Another participant who saw their garden leader often was inspired to become a garden leader in the future (P.AA).

Other participants had much less interaction with their garden leaders. These participants either never met their garden leader, did not know who their garden leader was, or only saw them a few times. For example, one participant described their garden leader as "rather absent," and "gave no particular guidance or direction whatsoever" (P.J). Other participants discussed leadership turnover throughout the season. Participants who lacked engagement with their garden leaders desired more support including seeing their leader in the garden more frequently and receiving hands-on instruction and check-ins. In some cases, participants described their garden leader as "overworked," "in a hurry." or "stressed." This aligned with sentiments from garden leaders who suggested the role was "way too much for one person. … There should be four garden leaders in every garden" (GL.K). In fact, DUG's garden leader training suggests having a garden leadership team of at least three people. While most gardeners reported having a single garden leader, one reported that their garden had quadrant leaders (four leaders in four areas of the community garden). This participant reported that their quadrant leader was at the garden frequently, provided help and shared tips, and organized workshops (P.BB).

Orientation to the community garden

Garden leaders reported holding group orientations in March, April, or May each year, where expectations and guidelines were communicated to gardeners, and felt they worked well. However, many interviewees missed the formal orientation because they were not assigned their garden plots until May. The delay occurred because baseline data collection (informed consent, health surveys, dietary recalls, and accelerometry) needed to occur prior to randomization. Most participants (n = 31) reported either not receiving an orientation or receiving a brief overview at the garden led by either their garden leader or a CAPS staff member. Only three participants reported having a thorough, useful orientation to their garden. Orientation, if received, included signing paperwork, locating garden equipment, and being instructed on how to use the water system. About one-third (n = 11) of participants reported wanting more from the orientation, including more help getting started in their plot, the opportunity to meet other gardeners, and a more thorough explanation of resources available to them.

A lack of orientation left participants without key information about the garden, knowing what DUG and the garden leadership expected of gardeners, or knowing who to approach with questions. One participant described receiving "very little guidance … about how things work, where resources are, or how to get started gardening" (P.A). Another participant did not know how to operate the watering system in her garden, which prevented her from watering her plants at the

beginning of the season. Regarding expectations of gardeners, a few participants reported receiving abrasive or combative emails about responsibilities to weed communal areas, but they were never told that this was an expectation. One of these participants reported feeling attacked and not wanting to be involved in the garden after receiving that email (P.B). In contrast, one participant received a "very thorough" orientation with their garden leader with printed rules and a demonstration on how to deal with weeds, and thus, she "felt prepared to get started gardening after the orientation" (P.L).

Participants recommended providing a clearer explanation of the governance and structure of the garden, as well as the expectations and responsibilities of gardeners, which could be outlined at garden orientation meetings as well as on the plot application. Participants also wanted additional information about events, gardeners' responsibilities for tending communal areas, and resources available to the gardener (such as hoses, sheds, rakes, seeds, and seedlings). Participants thought that frustrations early on could have been alleviated by communicating the amount of help a garden leader could realistically provide—understanding they were unpaid volunteers and were not always available. Such information could encourage new community gardeners to turn to other people with questions.

Communication

Perceptions of communication in the gardens varied widely. Most garden leaders reported communicating via email newsletters, text messages, and phone calls; other methods included physical message boards at the garden, social media, event calendars, and in-person communication. Twenty-six of the leaders said they believed communication in the garden was "adequate." Garden leaders attempted to communicate with all gardeners but experienced challenges connecting with everyone, and most leaders acknowledged that communication could improve. For example, one leader said, "We can always use better communication and more communication. But with a garden this size and with a diverse population agewise, there doesn't seem to be one method that fits everyone" (GL.M).

Participants echoed that communicative garden leaders often sent out emails with newsletters or Facebook group messages where they announced upcoming gatherings, planned communal workdays, information about water issues or shared produce available, and sometimes offered gardening tips. Participants of the more organized or more established gardens had whiteboards that included announcements such as expected inclement weather (e.g., hail), notification of upcoming communal workdays or social events, and tips on gardening. For other participants, it was unclear what the main form of communication was supposed to be, or there was no communication. Participants who reported having absent or unengaged garden leaders often reported poor communication. A very few participants reported abrasive communication, including emails reprimanding people for excessive weeds, the appearance of their garden plot, or violating rules.

Events in the community gardens

DUG community gardens often have group events, such as workdays, potlucks, gardening lessons, and other social events. About one-third of participants reported at least one event in their community garden, the most common being communal workdays, which included weeding, harvesting, and caring for communal areas. Few participants reported other types of garden events, but some of the more established gardens had festivals, workshops, potlucks, or weekly happy hours. Participants who attended events enjoyed them, especially relishing the opportunity to meet and socialize with other gardeners. For example, one participant attended a few workdays and said, "It was good to meet other gardeners, because typically I wouldn't see anybody when I was there. It was interesting to see what people were growing and who was doing what" (P.C).

About one-third of participants said they did not participate in any events associated with the community garden. Some gardeners reported that events were not offered, or they could not attend due to scheduling conflicts. Others chose not to go for various reasons, for example because they were uncomfortable not knowing other gardeners. One gardener said others encouraged her not to go to

communal workdays because it was "a waste of time" (P.D) and another participant stopped going to events because they were not well attended (P.E).

Garden leaders reported trying to organize events but encountered challenges finding times that worked for most gardeners, communicating the events to gardeners in time, and balancing multiple responsibilities with organizing social events. One garden leader acknowledged the desire for more events, saying there was disappointment among participants at the end of the season around low participation in garden events and activities (GL.A).

Social Culture of the Community Garden

Participants' perceptions of the culture of their community garden were mixed with regards to socializing in the garden, diversity of cultures in the garden and intergenerational interactions, the promotion of learning with other gardeners in the garden, and acts of helping others and reciprocity.

Social interactions in the garden

The extent of interactions with other gardeners varied widely among participants, ranging from seeing other gardeners every time they went to the garden, to seeing other gardeners only a few times during the entire season. Those who had frequent interactions with other gardeners enjoyed and benefited from those interactions. For example, one participant said, "I just thought I'd go to my garden, tend my plot, and go. … I didn't really think that there would be the other aspect of it, of making friends and really having a community within the neighborhood" (P.T). The more structured communal events—happy hours, workdays, meetups—were special features for some participants, and they benefited greatly from having community garden experiences with others.

For some, the gardens provided an opportunity to interact with people from other cultures, which several participants enjoyed:

> It [the garden] had probably four or five different nationalities as far as folks that gardened there. … While they didn't speak my language and I didn't speak theirs, we could communicate through smiles and hugs and handing over vegetables and things like that, which was lovely. I absolutely adored that piece of it. (P.J)

One participant said her cultural identity was respected at the garden, and everyone "welcomed ideas from where you were from, or seeds from your country" (P.H). Others enjoyed learning about gardening techniques from gardeners from other countries. Some participants also enjoyed intergenerational interactions, including seeing kids around the garden and interacting with people older and younger than themselves. For example, one participant said, "For me, just being around young kids like that, and then it's a teaching opportunity, because they may think it's boring until they get engaged" (P.K). Gardening also provided an opportunity for participants to socialize with their friends and families, which more than half of the participants reported appreciating.

Fifteen participants reported minimal interactions with other gardeners in the garden. Some reported that their visits to the garden simply did not coincide with other gardeners' visits or that interactions with other gardeners, although friendly, tended to be limited to brief exchanges. Several participants explained that the other gardeners were "there to do their own thing," and did not try to interact. Some participants expected more community engagement in the garden and found the lack of social interaction disappointing. As one participant said, "It was lonely. … I could be there longer if there was somebody there" (P.G). A few other participants reported that there was social interaction among other gardeners, but that they felt left out of the main group. For example, one participant described themselves as a "black sheep" because many other gardeners worked together at the school at the garden site. Another participant said, "it was almost cliquey" and she felt like an "outsider" (P.A).

Helping others and reciprocity

Even though there was not extensive interaction among gardeners in many gardens, most participants reported a culture of helping others or reciprocity, especially with watering. One participant said, "We just learn to take care of each other. I

would come in sometimes and look around, I've noticed my garden was watered. Yes, or I would do it for others … or I would see weeds along their pathway, I would pull them up. We learned to do little things for each other" (P.I). Another gardener reported that once when there was an unplanned water shutoff at the garden, one of the gardeners who lived near the garden allowed other gardeners to fill up buckets of water at her house. Another participant said, "I felt like [helping others] is part of working as a community. It's helping each other out, especially people who are less able-bodied" (P.E).

Several participants gave other examples of reciprocity: helping each other with gardening tasks, sharing resources such as seeds and food, and sharing knowledge. Gardeners also sometimes solved problems together. For example, one participant described how other gardeners created a text chain and made plans to help each other feel safe after there was a safety issue in the garden: "We were always looking out for each other, … making sure no one was there alone" (P.H). Furthermore, many participants described working together to tend communal areas of the garden, often informally (not associated with a planned event).

Obstacles to Participation

Participants and leaders described varied challenges to gardening and how they worked to overcome them.

Responsibility of garden and time commitment

The time and/or level of commitment required to garden were commonly cited as challenges for both participants and garden leaders. For some it was hard to fit in visits to the garden on top of their other responsibilities. One participant, who had many responsibilities outside of the garden, enjoyed and benefited from gardening but still eventually stopped gardening due to the stress of the time commitment: "When I started … realizing that it was just more than I could deal with, it dwindled little by little until I wasn't going any longer. … When I stopped going it was a tremendous relief as far as time, that sort of thing. It took a lot of pressure off" (P.J).

Garden leaders made similar observations about the responsibility of gardening for new community gardeners, particularly early in the gardening season. One leader observed that people often start out feeling really enthusiastic, but then sometimes lose momentum over the season. Another leader echoed this saying some "realiz[e] how much work it is and or hav[e] other life events interfere. … They're not able to tend to it" (GL.D). Garden leaders and participants also mentioned that summer vacations make gardening responsibilities challenging.

The commitment was especially challenging if the garden was over a mile from the participant's home, or there were other barriers to getting to the garden such as lack of transportation or needing to cross busy or dangerous intersections on foot. This led to participants feeling guilty for not tending the garden enough. Some participants mentioned it would be easier to garden at home. One participant stated, "it wasn't in my back yard where I could just wake up and do it. … It was close [but] … sometimes, I would even drive and just make it as quick as possible and not really spend time there" (P.D). Most participants who experienced challenges with the distance of the garden from their home said that if they continued gardening, they may garden at home.

Lack of gardening knowledge and support

Many participants (n = 17) cited a lack of gardening knowledge, such as how to get started, what and when to plant, and when to harvest, as a major challenge. Some noted that they were too intimidated to ask questions or were unsure who to ask. As described above, some learned from others in or outside the garden, but others did not feel supported. One such participant reported feeling "thrown in the fire" with learning how to garden, and left the community garden halfway through the season and continued gardening at home. A few others also reported quitting gardening or, more commonly, leaving the community garden to garden at home due to a lack of feeling supported. Garden leaders also noted the challenge of onboarding gardeners, particularly if they were new to gardening and needed a lot of support; sometimes this contributed to turnover rates of 50% in some gardens each year (GL.N).

To help new community gardeners learn, some garden leaders recommended having accessible resources such as handouts or videos. Garden leaders also suggested having more people involved in garden leadership to help address the needs of new community gardeners. Gardeners had similar recommendations: many participants recommended providing hands-on support and gardening information to new community gardeners, which was very helpful for those who received it. Hands-on help in the garden was especially desired early in the season when plots often had a lot of weeds, because preparing the soil and planting was intimidating and physically challenging.

Most participants overcame the challenge of lack of gardening knowledge through taking initiative to learn on their own, typically through trial and error in the garden or seeking out resources on the internet or asking questions of friends and family members. Many of these participants expressed a sense of pride for teaching themselves how to garden. For example, one participant described how gardening was difficult in the beginning because she had no gardening experience, but she overcame this by learning from other gardeners and just "doing it" (P.16). Another participant said she overcame her intimidation around gardening by just doing it, saying, "[I wanted to] prove, like, everybody can grow something" (P.P). Another participant said the learning through trial and error "gave me confidence" (P.E).

Environmental challenges: Weeds, water, and pests

Several participants talked about environmental challenges to gardening, particularly the short gardening season and dry climate in Denver. Other weather challenges were also reported. For example, there were late frosts in June that killed recently planted seedlings, and early frosts in September that killed harvests. Several participants noted challenges with water access in the garden. For example, one participant described losing access to water for his plot when a hydrant needed repair, and the lack of water damaged several of his plants. When confronted with water access issues, gardeners reported working together to provide access to water in the garden or else bringing their own water to the garden. One participant said that due to hydrant repair in their garden, gardeners strung hoses together from a neighboring house to water their plots in the early part of the season. Some participants reported delays in the water being turned on in the garden, often resulting in lost plants, forcing gardeners to replant.

Challenges such as pests and plant diseases were also common. Several participants developed or adopted means of pest management including making organic, homemade herbicides; sprinkling spices on plants to deter squirrels; and planting flowers around other crops to deter insects. Weeds were another problem, particularly at the beginning of the season, as some plots were entirely covered with weeds when participants arrived. This led to a feeling of being overwhelmed for many participants. As one participant said, "the plot was just filled with weeds. I mean, just filled. … [When] I saw those weeds, I about died" (P.L); a garden leader ultimately helped this participant remove weeds. Another participant almost did not finish the season because she did not think she could manage the weeds on her own (P.O).

Abandoned plots

Numerous participants discussed abandoned or idle plots at their community garden. Abandoned plots caused other associated challenges like social conflict about appearance, low morale, and disagreement about how to repurpose the extra space. Sometimes low participation caused more work for others: "With ten plots but only four gardeners, it was a lot of work for just us four to maintain the whole garden" (P.V).

Garden leaders discussed idle plots in their interviews as well: 23 said garden abandonment is a problem in their community garden. Leaders cited the most common reasons they were given by the participants included personal matters (moving, illness) and being overwhelmed or too busy for the garden. One leader mentioned that some participants have gotten frustrated with produce being stolen from the garden (see more below), which led them to abandon the garden (GL.F). Several leaders mentioned that gardeners, especially new community gardeners, were surprised by the amount of work getting started early in the season and gave up because they could not keep up: "I had people

after May say 'gosh, no, I'm sorry I won't be able to work on it, more than I expected'" (GL.D).

Theft, vandalism, and safety

Some gardeners reported vandalism (including trampled vegetables, smashed pumpkins or broken stalks of corn) or theft. One participant said that by the end of the season, much of his produce was stolen or destroyed by others. Some participants also had physical safety concerns when they were at the garden alone, in the garden at night, or were approached by individuals who made them uncomfortable. Some participants worked together to address safety concerns by supporting each other and putting resources into the safety of the garden. One participant organized their community garden to "have a better presence of people throughout the day to deter theft" (P.I). Another participant discussed talking with the garden leader about getting a fence and/or cameras set up at the garden.

Garden leaders also addressed safety. Thirty reported that their gardens were safe. These gardens tended to have fences or locks and were often located next to schools. Even those that did mention safety concerns often said there was a sense of comradery among participants in the garden, and they would usually address it together by asking the police to patrol the area at night, putting up fences or signs that ask folks not to steal the produce, or buying additional resources for the garden to increase safety.

Fourteen garden leaders cited concerns for physical safety. Some leaders noted that broken or cracked sidewalks leading to the garden create risks for older gardeners to fall and difficulty for those in wheelchairs. Some leaders reported vandalism, theft of produce from the garden, or break-ins of garden sheds; several of these garden leaders installed cameras at the garden to help deter vandalism. Several leaders advised gardeners to only garden when it was light outside.

Twenty-two garden leaders discussed community concerns outside their control that affected participants' ability to feel safe and welcome in the garden related to violent or discriminative behavior in the surrounding community. One garden leader noted a nearby drive-by shooting, a person overdosing on opioids in the garden, gang violence, and finding bullet casings inside the garden (GL.H). A few garden leaders said gardeners had been harassed by passersby, including one man who repeatedly harassed a female gardener and another passerby shouting racial insults at a gardener.

Discussion

This study examined the experiences of new community gardeners with respect to how they learned to garden, perceptions of garden leadership, the social culture of the community garden, and challenges experienced, while also including the perceptions of garden leaders. To our knowledge, this is one of the first studies to focus on the experiences of new community gardeners. Understanding new community gardeners' and their garden leaders' perspectives is crucial if the benefits of community gardening are to be extended to more people. Helpful recommendations were offered by gardeners and garden leaders to address the needs of new community gardeners and address the challenges they experience, providing important information for community garden organizers. An overview of the major findings and recommendations for community garden organizers is in Table 1.

Guidance and Support for New Community Gardeners

We found that guidance and support with learning gardening knowledge and skills, and sometimes also hands-on help gardening, are important to new community gardeners. Most gardeners reported seeking information out by themselves, and garden leaders and new community gardeners alike recommended providing new community gardeners with resource lists such as websites at the beginning of the season. Hands-on help was especially important at the beginning of the season due to the amount of work to get the garden started. The importance of guidance and support was evident from the appreciation of the knowledge and support that some participants received from their garden leader or other gardeners. As found in other studies, many participants benefitted from knowledge and skill sharing that occurred within the garden (Hale et al., 2011; Kingsley & Townsend, 2006; Milligan et al., 2004; Teig et al., 2009; Wakefield et al., 2007).

The importance of support was also evident from other participants who wished they had more support and/or brought supportive family and friends to the garden. While many of these participants desired more support from their garden leaders, garden leaders have many other responsibilities managing the garden. DUG recommends an engaged team of at least three leaders per garden but also acknowledged that it can be difficult to find multiple leaders for each garden (L. Fahnestock, personal communication, 2021). Other studies have also reported difficulty in recruiting and/or retaining garden leadership (Aptekar, 2015; Diaz et al., 2018; Toda & Lowe, 2022). To avoid overburdening leaders, other experienced gardeners within the garden could be encouraged to help the new community gardeners. Additionally, formal mentorship programs using volunteers from programs such as Master Gardeners or graduates of DUG's Master Community Gardening Program could pair experienced mentors with new gardeners to offer education and hands-on help to new community gardeners. Other gardening intervention studies have utilized Master Gardeners to provide one-on-one mentorship to participants (Bail et al., 2022; Blair et al., 2021).

Challenges Experienced by Gardeners

Aside from lack of gardening knowledge and skills, the level of responsibility and commitment of gardening was one of the most common challenges experienced. Gardening inherently requires consistent time and effort, and additional time may be required to travel to a community garden. Both

Table 1. Major Findings and Recommendations for Community Garden Organizers

Topic	Summary of Major Findings	Key Recommendations*
How did new community gardeners learn how to garden?	• Beginner gardener class, other gardeners, friends and/or family, self-teaching (e.g. internet, books), and prior experience or exposure.	• Provide gardeners with resource lists that can provide answers to most common questions and challenges. • Communicate clearly about the expectations and responsibilities of both gardeners and garden leaders and how to use garden resources (e.g., water system). • When possible, have a garden leadership team instead of a single garden leader. • Encourage informal mentorship or offer a formal mentorship program for new community gardeners (authors' recommendations).
What were new community gardeners' and garden leaders' perceptions of garden leadership and structure?	• About half of new community gardeners had an engaged leader who provided support; many who did not receive support from their leader desired this. • Some garden leaders felt that teaching new community gardeners to garden was not their responsibility, especially given their many other garden management responsibilities. • The new community gardeners who did not receive an orientation were often left unaware of expectations, responsibilities, and understanding of garden resources.	
What were new community gardeners' perceptions of garden social culture?	• Extent of interaction with others in garden ranged from minimal to always seeing other gardeners. • However, a culture of reciprocity and helping others was present in many gardens.	
What did new community gardeners and garden leaders perceive to be obstacles to participation?	• Lack of gardening knowledge, lack of support, and environmental challenges (e.g., weeds, water, pests) reported by new community gardeners. • Responsibility and time commitment of gardening; abandoned plots; and theft, vandalism, and/or safety concerns reported by both new community gardeners and garden leaders.	

* Recommendations are from new community gardeners and/or garden leaders, unless otherwise specified.

time and distance are challenges to community gardening found in other studies (Hale et al., 2011; Kingsley & Townsend, 2006). Education on time-saving strategies, such as mulching to reduce weeds and water use, may reduce this challenge.

Regarding garden governance and structure, gardeners recommended clear communication about their responsibilities, what to expect from a garden leader, what resources were available, and how to use resources (such as the water system and shed). Unfortunately, few interviewees attended a group garden orientation, likely due to the study timeline assigning participants to their gardens after orientations typically occurred. Garden orientations are the ideal time to share this information, but undoubtedly not all garden members will be able to attend a group garden orientation, and so additional ways of sharing this information should also be used.

Perceptions of Social Culture

Participants' experiences related to the social culture of their gardens differed considerably. Extensive research has demonstrated that community gardens are places where gardeners meet new people, build friendships that often extend outside of the garden, and confer a sense of belonging (Bailey & Kingsley, 2020; Hale et al., 2011; Kingsley & Townsend, 2006; Saldivar-Tanaka & Krasny, 2004; Teig et al., 2009). Some participants in this study enjoyed and valued interacting with other gardeners during their routine visits to the garden or during more formal events. Even in gardens where gardeners did not interact extensively, there was a culture of helping others or reciprocity such as with watering and weeding, which has been found in other studies (Bailey & Kingsley, 2020; Hale et al., 2011; Toda & Lowe, 2022). Some participants enjoyed intercultural interactions with gardeners from other countries, which is consistent with other studies finding that community gardens bring diverse groups of people together, including different socioeconomic statuses, nationalities, and races (Kettle, 2014; Kingsley & Townsend, 2006; Ober Allen et al., 2008).

However, other participants in this study saw other gardeners infrequently. This was disappointing for participants who were motivated, in part, to join the garden by the potential to meet new people. Additionally, these participants were not able to benefit from other gardeners' knowledge and skills. There are several factors that may have contributed to the relatively low level of social interaction among gardeners found in our study compared to other published research. Most studies on social interaction and community gardening do not indicate how long participants have belonged to the community garden. It may take participants several years in a community garden to forge social ties. Additionally, study participants were placed only at community gardens that were able to reserve at least two plots for study participants. This may have precluded more established gardens from participating in this study; more established gardens may have stronger social interaction and foster a deeper sense of community.

Strengths and Limitations

Very few studies have examined the experiences of new community gardeners or included the perspectives of garden leaders. By incorporating both new community gardeners and garden leaders' perspectives on how to best support new community gardeners, our study provides valuable information for community garden organizers. Further, it is noteworthy that this study took place in real-world conditions. Rather than creating community gardens for participants to join for research purposes, we placed participants in existing community gardens; participants' experiences were likely very similar to non-research participants' experiences. However, several aspects of this study may limit the transferability of findings to broader new gardener experiences. The majority of participants were non-Hispanic white and female. Thus, while this is similar to the demographics of the host city, the experiences of interviewees in this study may not be representative of other demographic groups.

We interviewed both intervention and control participants after their first season of gardening, but the intervention participants participated in their community garden while they were enrolled in an RCT, and the control group participated in their community garden after their enrollment in the RCT had ended. Approximately the same percentage of qualitative participants (5 out of 23 interven-

tion participants [22%] and two out of 11 control participants [18%] received CAPS staff support for gardening during their first gardening season; however, because control participants received attention from study staff (i.e., participation in RCT data collection) before gardening, while the intervention participants received attention from study staff during the gardening season, their experiences may have been different. Our analysis did not account for these differences and thus is a limitation of the study. Moreover, since participants were part of a larger RCT of community gardening, the results may not be representative of gardeners who do not participate in an RCT. Additionally, due to the study timeline, most participants were assigned to their gardens after group garden orientations. Missing an orientation, which may also occur when gardeners sign up to gardens after orientations have occurred, can make it more difficult to get to know their garden leader and meet other gardeners, potentially limiting subsequent garden social interactions in the garden.

Conclusions

This study examined the experiences of community gardeners and garden leaders participating in an RCT of community gardening and health. It offers important insights into the experiences of new community gardeners, a topic that has been only minimally addressed in the research literature. These findings demonstrate the types of guidance and support needed by new community gardeners, as well as specific suggestions for providing needed support. They can be used to inform the operation of community gardening programs or gardening interventions that are focused on new community gardeners. Future research with new community gardeners who are not part of a randomized controlled trial study are needed to elucidate whether the experiences presented in this study are typical of new community gardeners more generally.

Acknowledgments

The authors warmly thank the participants whose commitment and dedication made this trial possible, the garden leaders who supported and believed in this study, and our partner, Denver Urban Gardens. We are grateful for the contributions of the study investigators, study personnel, students, and advisory committee.

References

Alaimo, K., Beavers, A. W., Coringrato, E., Lacy, K., Ma, W., Hurley, T. G., & Hébert, J. R. (2023). Community gardening increases vegetable intake and seasonal eating from baseline to harvest: Results from a mixed methods randomized controlled trial. *Current Developments in Nutrition*, *7*(5), Article 100077. https://doi.org/10.1016/j.cdnut.2023.100077

Alaimo, K., Packnett, E., Miles, R. A., & Kruger, D. J. (2008). Fruit and vegetable intake among urban community gardeners. *Journal of Nutrition Education and Behavior*, *40*(2), 94–101. https://doi.org/10.1016/j.jneb.2006.12.003

Aptekar, S. (2015). Visions of public space: Reproducing and resisting social hierarchies in a community garden. *Sociological Forum*, *30*(1), 209–227. https://doi.org/10.1111/socf.12152

Bail, J. R., Blair, C. K., Smith, K. P., Oster, R. A., Kaur, H., Locher, J. L., Frugé, A. D., Rocque, G., Pisu, M., Cohen, H. J., & Demark-Wahnefried, W. (2022). Harvest for Health, a randomized controlled trial testing a home-based, vegetable gardening intervention among older cancer survivors across Alabama: An analysis of accrual and modifications made in intervention delivery and assessment during COVID-19. *Journal of the Academy of Nutrition and Dietetics*, *122*(9), 1629–1643. https://doi.org/10.1016/j.jand.2022.05.005

Bailey, A., & Kingsley, J. (2020). Connections in the garden: Opportunities for wellbeing. *Local Environment*, *25*(11–12), 907–920. https://doi.org/10.1080/13549839.2020.1845637

Barnidge, E. K., Hipp, P. R., Estlund, A., Duggan, K., Barnhart, K. J., & Brownson, R. C. (2013). Association between community garden participation and fruit and vegetable consumption in rural Missouri. *International Journal of Behavioral Nutrition and Physical Activity*, *10*, Article 128. https://doi.org/10.1186/1479-5868-10-128

Beam, D. R., Szabo, A., Olson, J., Hoffman, L., & Beyer, K. M. M. (2021). Vacant lot to community garden conversion and crime in Milwaukee: A difference-in-differences analysis. *Injury Prevention*, *27*, 403–408. https://doi.org/10.1136/injuryprev-2020-043767

Blair, C. K., Adsul, P., Guest, D. D., Sussman, A. L., Cook, L. S., Harding, E. M., Rodman, J., Duff, D., Burgess, E., Quezada, K., Brown-Glaberman, U., King, T. V., Baca, E., Dayao, Z., Pankratz, V. S., Davis, S., & Demark-Wahnefried, W. (2021). Southwest Harvest for Health: An adapted mentored vegetable gardening intervention for cancer survivors. *Nutrients*, *13*(7), Article 2319. https://doi.org/10.3390/nu13072319

Conway, T. M. (2016). Home-based edible gardening: Urban residents' motivations and barriers. *Cities and the Environment*, *9*(1), Article 3. https://digitalcommons.lmu.edu/cate/vol9/iss1/3/

Diaz, J. M., Webb, S. T., Warner, L. A., & Monaghan, P. (2018). Barriers to community garden success: Demonstrating framework for expert consensus to inform policy and practice. *Urban Forestry & Urban Greening*, *31*, 197–203. https://doi.org/10.1016/j.ufug.2018.02.014

Drake, L., & Lawson, L. J. (2015). Results of a US and Canada community garden survey: Shared challenges in garden management amid diverse geographical and organizational contexts. *Agriculture and Human Values*, *32*, 241–254. https://doi.org/10.1007/s10460-014-9558-7

Egerer, M., & Fairbairn, M. (2018). Gated gardens: Effects of urbanization on community formation and commons management in community gardens. *Geoforum*, *96*, 61–69. https://doi.org/10.1016/j.geoforum.2018.07.014

Fox-Kämper, R., Wesener, A., Münderlein, D., Sondermann, M., McWilliam, W., & Kirk, N. (2018). Urban community gardens: An evaluation of governance approaches and related enablers and barriers at different development stages. *Landscape and Urban Planning*, *170*, 59–68. https://doi.org/10.1016/j.landurbplan.2017.06.023

Gilbert, J., Chauvenet, C., Sheppard, B., & De Marco, M. (2020). "Don't just come for yourself": Understanding leadership approaches and volunteer engagement in community gardens. *Journal of Agriculture, Food Systems, and Community Development*, *9*(4), 259–273. https://doi.org/10.5304/jafscd.2020.094.019

Glover, T. D. (2004). Social capital in the lived experiences of community gardeners. *Leisure Sciences*, *26*(2), 143–162. https://doi.org/10.1080/01490400490432064

Glover, T. D., Parry, D. C., & Shinew, K. J. (2005). Building relationships, accessing resources: Mobilizing social capital in community garden contexts. *Journal of Leisure Research*, *37*(4), 450–474. https://doi.org/10.1080/00222216.2005.11950062

Hale, J., Knapp, C., Bardwell, L., Buchenau, M., Marshall, J., Sancar, F., & Litt, J. S. (2011). Connecting food environments and health through the relational nature of aesthetics: Gaining insight through the community gardening experience. *Social Science & Medicine*, *72*(11), 1853–1863. https://doi.org/10.1016/j.socscimed.2011.03.044

Hawkins, J. L., Mercer, J., Thirlaway, K. J., & Clayton, D. A. (2013). "Doing" gardening and "being" at the allotment site: Exploring the benefits of allotment gardening for stress reduction and healthy aging. *Ecopsychology*, *5*(2), 110–125. https://doi.org/10.1089/eco.2012.0084

Hawkins, J. L., Thirlaway, K. J., Backx, K., & Clayton, D. A. (2011). Allotment gardening and other leisure activities for stress reduction and healthy aging. *HortTechnology*, *21*(5), 577–585. https://doi.org/10.21273/HORTTECH.21.5.577

Kettle, P. (2014). Motivations for investing in allotment gardening in Dublin: A sociological analysis. *Irish Journal of Sociology*, *22*(2), 30–63. https://doi.org/10.7227/IJS.22.2.3

Kingsley, J. Y., & Townsend, M. (2006). 'Dig in' to social capital: Community gardens as mechanisms for growing urban social connectedness. *Urban Policy and Research*, *24*(4), 525–537. https://doi.org/10.1080/08111140601035200

Litt, J. S., Alaimo, K., Buchenau, M., Villalobos, A., Glueck, D. H., Crume, T., Fahnestock, L., Hamman, R. F., Hebert, J. R., Hurley, T. G., Leiferman, J., & Li, K. (2018). Rationale and design for the Community Activation for Prevention study (CAPs): A randomized controlled trial of community gardening. *Contemporary Clinical Trials*, *68*, 72–78. https://doi.org/10.1016/j.cct.2018.03.005

Litt, J. S., Alaimo, K., Harrall, K. K., Hamman, R. F., Hébert, J. R., Hurley, T. G., Leiferman, J. A., Li, K., Villalobos, A., Coringrato, E., Courtney, J. B., Payton, M., & Glueck, D. H. (2023). Effects of a community gardening intervention on diet, physical activity, and anthropometry outcomes in the USA (CAPS): An observer-blind, randomised controlled trial. *The Lancet Planetary Health*, *7*(1), e23–e32. https://doi.org/10.1016/S2542-5196(22)00303-5

Litt, J. S., Soobader, M.-J., Turbin, M. S., Hale, J. W., Buchenau, M., & Marshall, J. A. (2011). The influence of social involvement, neighborhood aesthetics, and community garden participation on fruit and vegetable consumption. *American Journal of Public Health*, *101*(8), 1466–1473. https://doi.org/10.2105/ajph.2010.300111

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). SAGE.

Milligan, C., Gatrell, A., & Bingley, A. (2004). 'Cultivating health': Therapeutic landscapes and older people in northern England. *Social Science & Medicine*, *58*(9), 1781–1793. https://doi.org/10.1016/S0277-9536(03)00397-6

Ober Allen, J., Alaimo, K., Elam, D., & Perry, E. (2008). Growing vegetables and values: benefits of neighborhood-based community gardens for youth development and nutrition. *Journal of Hunger & Environmental Nutrition*, *3*(4), 418–439. https://doi.org/10.1080/19320240802529169

Park, S.-A., Lee, A-Y., Lee, K.-S., & Son, K.-C. (2014). Gardening tasks performed by adults are moderate- to high-intensity physical activities. *HortTechnology*, *24*(1), 58–63. https://doi.org/10.21273/HORTTECH.24.1.58

Park, S.-A., Lee, K.-S., & Son, K.-C. (2011). Determining exercise intensities of gardening tasks as a physical activity using metabolic equivalents in older adults. *HortScience*, *46*(12), 1706–1710. https://doi.org/10.21273/HORTSCI.46.12.1706

Porter, C. (2018). What gardens grow: Outcomes from home and community gardens supported by community-based food justice organizations. *Journal of Agriculture, Food Systems, and Community Development*, *8*(Suppl. 1), 187–205. https://doi.org/10.5304/jafscd.2018.08A.002

Sachs, A., Tharrey, M., Darmon, N., Alaimo, K., Boshara, A., Beavers, A., & Litt, J. (2022). "To me, it's just natural to be in the garden": A multi-site investigation of new community gardener motivation using Self-Determination Theory. *Wellbeing, Space and Society*, *3*, Article 100088. https://doi.org/10.1016/j.wss.2022.100088

Saldivar-Tanaka, L., & Krasny, M. E. (2004). Culturing community development, neighborhood open space, and civic agriculture: The case of Latino community gardens in New York City. *Agriculture and Human Values*, *21*, 399–412. https://doi.org/10.1023/B:AHUM.0000047207.57128.a5

Soga, M., Cox, D. T., Yamaura, Y., Gaston, K. J., Kurisu, K., & Hanaki, K. (2017). Health benefits of urban allotment gardening: Improved physical and psychological well-being and social integration. *International Journal of Environmental Research and Public Health*, *14*(1), Article 71. https://doi.org/10.3390/ijerph14010071

Teig, E., Amulya, J., Bardwell, L., Buchenau, M., Marshall, J. A., & Litt, J. S. (2009). Collective efficacy in Denver, Colorado: Strengthening neighborhoods and health through community gardens. *Health & Place*, *15*(4), 1115–1122. http://doi.org/10.1016/j.healthplace.2009.06.003

Tharrey, M., Sachs, A., Perignon, M., Simon, C., Mejean, C., Litt, J., & Darmon, N. (2020). Improving lifestyles sustainability through community gardening: Results and lessons learnt from the JArDinS quasi-experimental study. *BMC Public Health*, *20*, Article 1798. https://doi.org/10.1186/s12889-020-09836-6

Toda, E., & Lowe, E. (2022). Gardens in a postsuburban region: Community garden governance and ethos in Orange County. *Journal of Agriculture, Food Systems, and Community Development*, *11*(2), 161–178. https://doi.org/10.5304/jafscd.2022.112.010

van den Berg, A. E., van Winsum-Westra, M., de Vries, S., & van Dillen, S. M. E. (2010). Allotment gardening and health: A comparative survey among allotment gardeners and their neighbors without an allotment. *Environmental Health*, *9*, Article 74. https://doi.org/10.1186/1476-069x-9-74

van Holstein, E. (2017). Relating to nature, food and community in community gardens. *Local Environment*, *22*(10), 1159–1173. https://doi.org/10.1080/13549839.2017.1328673

Villalobos, A., Alaimo, K., Erickson, C., Harrall, K. K., Glueck, D. H., Buchenau, H., Buchenau, M., Coringrato, E., Decker, E., Fahnestock, L., Hamman, R. F., Hebert, J. R., Hurley, T. G., Leiferman, J. A., Li, K., Quist, P., & Litt, J. S. (2019). CAPS on the move: Crafting an approach to recruitment for a randomized controlled trial of community gardening. *Contemporary Clinical Trials Communications*, *16*, Article 100482. https://doi.org/10.1016/j.conctc.2019.100482

Voicu, I., & Been, V. (2008). The effect of community gardens on neighboring property values. *Real Estate Economics*, *36*(2), 241–283. https://doi.org/10.1111/j.1540-6229.2008.00213.x

Wakefield, S., Yeudall, F., Taron, C., Reynolds, J., & Skinner, A. (2007). Growing urban health: Community gardening in South-East Toronto. *Health Promotion International*, *22*(2), 92–101. https://doi.org/10.1093/heapro/dam001

Yin, R. K. (2017). *Case study research and applications: Design and methods* (6th ed.). SAGE.

Appendix

Table A1. Participant Categories, Themes, and Code Groups

Participant category	Theme	Definition	Code Groups
New Community Gardeners			
	Community garden environment	Describe garden and plot	DESC.GARDEN
	Engagement	Activities in garden	TYP.VISIT
	Learning to garden	How the participant learned to garden	PREV.GARDEN.EXP LEARN.HOW
	Leadership, governance, events, orientation, communication	Leadership styles, interactions with leader, governance of the garden, and garden events	LEADER EVENTS SOC.INTERACTIONS
	Social culture of garden	General culture of garden, social interactions in the garden, intergenerational and intercultural experiences, social support from garden leaders, other gardeners, culture of garden, and friends and family conflict	CULTURE SOC.INTERACTIONS HELP.IN.GARDEN HELP.OTHERS VALUE OF GARDEN SOC.CONFLICT
	Challenges	Challenges and whether and how they were overcome	CHALLENGE
Garden Leaders			
	Recruitment, orientation, assistance, events, and retention	Resources and assistance provided to new community gardeners	BEGINNER.GARDENERS
	Challenges	Challenges and whether and how they were overcome	GARDEN.BARRIERS
	Communication	Methods and means of communicating with gardeners	COMMUNICATION