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## “To me, it’s just natural to be in the garden”: A multi-site investigation of new community gardener motivation using Self-Determination Theory

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### ABSTRACT

We compare interviews with 30 new community gardeners in Denver, Colorado and Montpellier, France, using Self-determination theory, a general theory of motivation, to determine how new community gardeners may or may not have felt motivated based on psychological needs of autonomy, competence, and relatedness. Relatedness as a motivational feature carried through the interview data at both sites. Participants’ success or failure to relate to other gardeners was a major influence for how autonomous and competent as a community gardener they expressed feeling. As the evidence grows that community gardening is beneficial for health and wellbeing, our findings are critical to understanding how community gardening could serve as a health promotion strategy. With the presence of ongoing, friendly support from others, more individuals may adhere to this socially connective, nature-based practice.

### 1. Introduction<sup>1</sup>

Renowned horticulturalist Gertrude Jekyll once wrote, “The love of gardening is a seed once sown that never dies” (Jekyll, 1910). However, it is evident that gardening skills take time to germinate. It is a challenging and nuanced skillset often cultivated over time. Long-term, active involvement in gardening is difficult to sustain without supportive guidance from others (Beavers et al., 2021; Mangadu et al., 2017). Community gardens (CGs) are shared green spaces where people from more than one household garden communally or side by side (Alaimo et al., 2016). They are increasingly viewed as socially active environments that promote social cohesion and motivate health promoting behaviors (Malberg Dyg et al., 2020). Community gardening (CG) brings members together in the sharing of tasks, seeds, tools, recipes, and produce (Christensen et al., 2019). There is ample research linking gardening, health and social connection for established gardeners (Harris et al., 2014; McVey et al., 2018; Petrovic et al., 2019), however there has been less inquiry into the experience of new gardeners and the

factors that support the adoption and maintenance of community gardening participation over time. This is critical for promoting and extending the reach of gardening as a nature-based health intervention. In this study, we interviewed new community gardeners who participated in two studies (Litt et al., 2018; Tharrey et al., 2019) to uncover keys to community gardening motivation, which is important for understanding the potential reach of community gardening as a nature-based health intervention. We compare interviews with new community gardeners in Denver, Colorado, USA and Montpellier, France, using Self-determination theory (SDT), a general theory of motivation, to better understand adherence to the practice of CG.

In the health domain, according to SDT, the three universal psychological needs of competence, autonomy, and relatedness to others must be satisfied for an individual to be intrinsically motivated to initiate and maintain health conducive behaviors and experience wellbeing (Ng et al., 2012; Ryan and Deci, 2000). Competence is the need to feel capable of achieving desired results, autonomy represents the need to independently initiate one’s own actions, and relatedness is the need

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<sup>1</sup> CG = Community gardening CGs = Community gardens SDT = Self Determination Theory

to feel a sense of belonging and connectedness with others (Deci and Ryan, 1985; Ryan and Deci, 2000). In conceiving SDT, Deci and Ryan (1985) differentiated between the intrinsic and extrinsic motivations regulating one's behavior. They suggest that the key motivation behind behavior change, intrinsic motivation, comes from within an individual, based on the enjoyment one gains from a behavior itself (Ng et al., 2012). Alternatively, an extrinsic motivation reflects the external pressure to act, for example, to avoid disapproval or gain approval. A doctor's warning to quit smoking is an example of an extrinsic regulation that may temporarily motivate compliance, but is less effective at sustaining health behavior change (Cleary et al., 2017; Teixeira et al., 2012). According to SDT, extrinsically motivated goals associated with recognition or approval are viewed as less essential to wellbeing and personal development (Kasser and Ryan, 1996). Intrinsically motivated goals, however, are more closely aligned with fulfilling basic psychological needs (Teixeira et al., 2012). Directly interacting with plants and people while gardening may be intrinsically motivating towards gardening while awakening the senses and building connection to others and place (Hale et al., 2011; Teig et al., 2009). Research has shown that fulfillment and joy are primary motivations for gardening (Sonti and Svendsen, 2018).

We hypothesize that the degree to which participants experience relatedness is a major factor contributing to their feelings of competence and autonomy as community gardeners and their subsequent intrinsic motivation to continue gardening in a community setting. It is understood that CGs can serve as an important means for urban people to connect, because they can amplify social cohesion, support networking, and increase levels of social capital by providing a cohesive environment for gardeners to congregate (Alaimo et al., 2010; Litt et al., 2015; Malberg Dyg et al., 2019). Furthermore, outdoor experiences in general may motivate social involvement and shared learning with others (Izenstark and Ebata, 2017). Connecting with others in nature can reduce barriers between community members, increase feelings of belonging with others, and reduce stress (Leavell et al., 2019). Social interactions in CGs aid in familiarizing neighbors and cultivating a stronger sense of place within communities (Ong et al., 2019). However, little is known about how social connection is formed for those new to CG, or if instead these experiences are more applicable to longstanding CG members. This is one of the first studies to interview exclusively new community gardeners.

In this paper, we interviewed new community gardeners to uncover keys to gardening motivation, which is critical to sustaining behavior change and health promotion goals. We analyzed how new community gardeners formed bonds, navigated relationships, and developed gardening skills. Garden experiences vary within and across garden environments, depending on cultural and social context, geography, and climate (Home and Vieli, 2020). Yet, despite these differences, gardening is a universal endeavor shared worldwide (Soga et al., 2017). In this study, we had an opportunity to explore two garden contexts as part of a joint research partnership in Montpellier and Denver. This study provided the opportunity to co-design an analytic approach, as this investigation was nested within two larger garden studies taking place in both cities (Litt et al., 2018; Tharrey et al., 2019). We used SDT as a guide to assess the degree to which CG participation fulfilled the motivational needs for competence, autonomy, and relatedness in Montpellier and Denver.

## 2. Materials and methods

### 2.1. Data collection

This analysis draws from interviews with 15 new community gardeners in Montpellier conducted in summer 2019, and 15 in Denver conducted in spring 2018 and 2019 (Table 1). We recruited participants for this study after their first year of community garden participation in larger CG health studies taking place in each city. To avoid the

**Table 1**  
Participant demographics.

Characteristic	All (n=30)		Denver (n=15)		Montpellier (n=15)	
	n	%	n	%	n	%
<b>Gender</b>						
Male	8	26.7	4	26.7	4	26.7
Female	22	73.3	11	73.3	11	73.3
Total	30	100.0	15	100.0	15	100
<b>Race/Ethnicity</b>	N/A		n	%	Not Assessed	
White			10	66.7		
Black or African American			1	6.7		
Hispanic or Latino/a			3	20.0		
American Indian or Alaska Native			0	0.0		
Multiple races or Other			1	6.7		
Total			15	100.0		
<b>Age</b>	mean	SE	mean	SE	mean	SE
	44.63	2.47	40.27	3.79	49	2.87

assumptions of cross-cultural equivalence that may be associated with survey findings, we used qualitative methods to uncover dimensions of the CG social experience (Oates et al., 2004; Stevelink and Brakel, 2013). Collecting purposive interview samples in two countries allowed us to assess whether data patterns replicated across cultural and demographic differences between Montpellier and Denver (Perkins et al., 2008). Furthermore, the sample size allowed us to strive for a demographically diverse group of individuals from geographically and socioeconomically varied CGs.

#### 2.1.1. Montpellier sample

We recruited 15 new community gardeners who were participants of a larger French National Institute for Agricultural Research (INRAE) quasi-experimental study examining the relationship between CG and health. In 2018, INRAE researchers recruited 75 participants without prior experience community gardening, exploring their physical activity levels, food purchasing habits, and social health for a year. Participants received a 15€ voucher at two time points as study incentive (Tharrey et al., 2020). CG members had access to gardening workshops, seeds, and plants as part of their garden membership fees. Some CGs included collectively managed plots with weekly gardening worktimes, and some reflected a typical Denver model of individual plots with occasional workdays. We contacted approximately 25 new community gardeners who had completed the INRAE study and interviewed those willing to meet. We endeavored to access a range of perspectives from the pool of INRAE research participants via diverse gender, social, geographical, and garden involvement characteristics (Table 2). The first author conducted interviews in French. These were professionally transcribed into English via an online service. Semi-structured interviews with 11 women and 4 men ranged from 11 to 50 minutes.

#### 2.1.2. Denver sample

We selected 15 new Denver gardeners' interviews conducted after their first season gardening out of 36 whom the first author and research assistants interviewed in 2018 and 2019. These interviews were conducted as part of a four-year randomized controlled trial (RCT) with new community gardeners funded by the American Cancer Society. The RCT included 291 individuals randomly assigned to garden or a wait-list control (Litt et al., 2018). RCT participants received a CG plot with fees waived and were offered an introductory gardening class, plants, and seeds. We selected interviews based on participant age and gender and from a range of gardens to reflect the demographic profiles of the Montpellier sample (Table 2). The Denver interview guide contained additional questions relevant to the RCT. A \$25 interview incentive was included for completing the interview. The Montpellier ethics review prohibited providing an incentive for the interviews. The University of Colorado, Boulder Institutional Review Board approved this study. Semi-structured interviews with 11 women and 4 men lasted from 34 to

**Table 2**  
Garden identification and participant attributes.

Garden Identification	Gender		Age	Race/Ethnicity	
	M	F		White	Non-white
Denver					
1	0	1	26	1	0
1	0	1	31	0	1
2	0	1	56	0	1
3	0	1	28	1	0
4	0	1	25	1	0
4	0	1	37	1	0
5	1	0	60	0	1
5	1	0	56	1	0
6	0	1	32	1	0
6	0	1	55	1	0
7	1	0	23	1	0
7	0	1	22	0	1
8	0	1	45	0	1
9	0	1	46	1	0
10	1	0	62	1	0
Total	4	11	N/A	10	5
Montpellier	M	F	Age	(Race/Ethnicity Not Assessed)	
1	0	1	63		
1	0	1	39		
2	0	1	65		
3	1	0	36		
4	0	1	42		
4	0	1	63		
4	0	1	48		
4	0	1	50		
5	1	0	34		
5	1	0	38		
6	1	0	41		
7	0	1	61		
7	0	1	60		
8	0	1	41		
9	0	1	54		
Total	4	11	N/A		

94 minutes. All interviews were professionally transcribed and checked for accuracy.

2.2. Coding and analysis

The first and fifth author analyzed transcripts inductively without a predetermined codebook using ATLAS.ti software and Braun and Clarke’s thematic qualitative analytic method (Braun and Clarke, 2006). The fifth author reviewed a dataset subsample, approximately 44% of total transcripts. We coded all data iteratively, organizing codes into code groups and building visual network presentations to decipher links between codes and concepts. We selected key concepts by extracting repetitive topics in the data for closer analysis, sorting codes into larger code groups and visually networking these groups to distill salient themes (Richards, 2015). Code groups were then further reduced to the minimum number of themes that captured results across both sites. Intercoder reliability was supported by weekly meetings to compare code book application to interview transcripts (Barbour, 2001; Krefting, 1991). In addition, we searched the transcripts for negative cases in order to ensure representation of the full range of gardening experiences (Hale et al., 2011).

We then followed a deductive analytic process after this primary inductive analysis. The first and last authors met several times to organize code categories and subcategories under larger SDT concepts including the three basic psychological needs of a competence, autonomy, and relatedness (Ryan and Deci, 2000). This iterative process reduced the number of categories from preliminary inductive coding to broader categories reflecting SDT motivational themes and subthemes (Moran et al., 2014). We then described commonalities and differences between sites regarding new community gardener CG motivation.

3. Results

Participants in this study described their experiences during their first year of CG. They identified aspects of their experience that made it richer and more appealing, how it shaped their interest in nature and wellness, what made them want to persevere, and how others in the garden influenced their level of participation. In addition, gardeners described obstacles they faced in the social aspect of gardening, and how this affected their intrinsic motivation to engage in community gardening. Specifically, participants’ accounts revealed that support from others in the community garden often mitigated the typical gardening challenges met by new gardeners. We present common themes we discovered at both sites as they relate to SDT, with key differences in the experiences in Montpellier and Denver.

3.1. Competence

Participants in both countries expressed feeling competent in their gardening skills after engaging regularly and habitually with gardening. They felt more capable as their investment in time and attention produced results. Competence frequently resulted from feeling related to others. Although some Denverites with gardening experience from at least 5 years before felt competent, few new community gardeners with limited social support shared pride in their skillset.

Denver gardeners focused more often than Montpellier gardeners on their individual learning process. A Denver gardener described how he learned by gardening regularly, saying “I think just digging in the dirt and watering and just being a part of all the process and seeing it go from seed to fruit, just seeing that progress every day and getting your hands in there.” Routine interaction with his garden literally bore fruit—he felt competent due to the time and attention invested. Another Denver participant described building gardening competence over time:

I think it’s a sense of accomplishment that I didn’t kill it. Especially when you start cutting fruit or veggies, you know you’re doing something right and you’re rewarded. Not only in the sense that you now have something to eat, but just that you were able to contribute or to help nurture that grow.

Another Denver participant described similar positive feelings with gardening achievement, saying, “...having nothing in the garden, planting things and seeing nothing there, and then watching them get taller and happier and grow things. I’m like ‘Oh my gosh, this is like magic.’” When asked how this made her feel, she explained, “Really, I don’t know how to describe it. It’s like ‘I’m growing you.’” Competence developed with gardening practice.

Interviewees often described others who showed them how to succeed. A Montpellier participant described how he was aided by his research and help from others, “Yes, I relied on what I found on the internet, and mostly on my family, which is made up of experienced gardeners.” Gardening was intimidating for some. Information from others helped them progress. A Denver participant shared how social support helped her, saying “Yes, I don’t think I could have done it by myself. Just talking about it got people to help.” She described how another gardener assisted with planting:

I was scared that it was going to die in the dirt, I was going to spend so much time planting it, and then I was going to come next week, it was going to be fried in the sun. That was my biggest fear, it was going to fry like I wasn’t going to give it enough water or something, but they actually grew. I think that was the highlight of my whole season that they grew, they actually grew, and I saw it. I was like, “I did that.” She helped me, and I did that, so that was so helpful.

The instruction helped her to feel competent and begin to see growth. Another Denver participant described how learning from others made

gardening more enjoyable:

I called upon my father who since passed. I called upon him that first year and asked him how he grew some of my favorites. That was fun. All those tips and tricks that come from people who have done it, who have the experience and who are willing to share.

The more pleasurable the social experience was, the more competent and motivated gardeners felt. Much of the encouragement participants received was informal— a garden plot neighbor showed them how to harvest a certain vegetable, or a family member helped them prepare a bed for planting. However, support also came in the form of formalized classes, events, and workshops. These happenings anchored the gardener in the space and provided a sense of belonging. Events were noted more often by Montpellier participants as contributing to their success. A Montpellier woman explained why she gardened:

To practice permaculture, to get to know each other, to spend moments of friendliness, moments in nature, to learn things. There are often very interesting workshops. Whether it is to learn or to educate, to practice, to share this experience of permaculture.

Social and educational garden events provided a platform to share her passion for permaculture, an ecological gardening approach mimicking the patterns and relationships found in nature, (Ferguson and Lovell, 2014) with others. Feeling competent as a gardener was tied to her sense of belonging to something meaningful with others. Montpellier participants mentioned various in-garden educational programs that helped them explore their interests. Similar educational programs were available to Denver gardeners by the RCT and CG nonprofit, although these did not typically take place in CGs, which presented a challenge for some.

We spoke with new community gardeners who felt unsuccessful at both study sites. Some were unable to commit time to learning. However, some with more flexible schedules felt incompetent in their skillset without necessary instruction. A Montpellier gardener described her poor harvest before connecting it to disappointment in CG leadership:

There is a leader, but this leader has a lot of other things to do and not enough time, I suppose he does everything he can, with the little time has, but it's not enough. We need someone with more time, more energy. I don't know if even the leader does everything he can, gardening is not necessarily his passion...It's not unifying.

Others also described feeling shy and hesitant to ask for help. However, those who could draw on relatedness with others were more likely to share that CG was enjoyable and worthy of their time. To feel competent as a gardener, participants needed to invest time and effort in the practice of gardening. When instruction was readily available via engaged leaders and instructional classes and events, new community gardeners described feelings of relatedness and enjoyment. Often, this satisfaction motivated greater investment in the time needed to improve and feel competent in CG.

### 3.2. Autonomy

The construct of autonomy is closely linked to relatedness in this dataset. New community gardeners at both sites described how the support of other gardeners enabled them to feel autonomous and successful in their gardening practice. One Montpellier gardener described how her group was initially aided by the local gardening association before gaining enough knowledge to move forward independently:

We started with the help of an association in Montpellier whose name I can't remember. They taught us how to prepare the soil, how to plant and especially how to garden without using pesticides, using

biodynamics. Like for example, how to choose which plant to grow with which other plants. We started assisted by an association, and then we continued by ourselves, among neighbors learning from and advising each other.

Here, group support is closely connected to new community gardener capacity to continue independently. A Denver participant shared a similar experience of feeling free and excited to participate due to the support she received:

Just when I did have those connections with— I had the people next to me, [Cassandra], she was just like, "Let's do these barbecues." Just having that youthful energy of like, "Yes, let's do this. Let's start. No one was doing anything last year. Let's get it together." It was just little things like that. People really wanting to participate together. I felt like, "Well, yes."

She described drawing motivation to garden from the enthusiasm of others around her. These relationships encouraged participants intrapersonally.

New community gardeners at both sites also expressed eagerness to participate for the positive sensations CG provided. One Denver gardener shared:

...when I'm working on the garden, I don't feel like I'm exercising. I don't feel like I'm going to the gym. I'm exercising and enjoying it, enjoying the fresh air, enjoying the sunshine, enjoying the socialization. I don't think "I got to go to the gym for two hours." I don't think about that. To me, it's just natural to be in the garden.

She was intrinsically motivated to make this "natural" decision to garden. A Montpellier participant described a similar motivation, "I think it's really almost a moment of meditation, it's all about relaxation; we have only that to do, we're not challenged by anything else." She described feeling empowered to be fully present with the activity at hand.

Gardeners in both settings also expressed feeling more autonomous in their food acquisition because of growing their own food. A French participant shared how the garden afforded her family freedom to eat differently:

In the past, we used to do shopping in [town name] on Sundays, but now that we have a garden, we come to the garden, and we pick our fruits and vegetables. We then we go home, and [Cedric] cooks for the week. We do our shopping differently, and we really eat differently.

The gardener is investing in her local food system. Another Montpellier gardener agreed that the gardening motivated feelings of sovereignty relating to food, saying, "I like the aspect of being able to produce my own food." She continued:

I feel like that is a direct purpose of life. Your purpose in life is to feed yourself, to breathe, to survive. If you want to feed yourself, you must grow. We don't have the option of a hunting and gathering society really, so I like that it does bring a purpose to life. I'm contributing to the ecosystem.

Montpellier participants spoke often about becoming aware the larger food system, and how gardening facilitated their role in it.

In Denver, participants spoke more frequently about how gardening influenced their personal health and wellbeing. One participant took greater ownership in her health with support from her garden:

I feel strong and I'm using the word empowered again because I know where the food came from, I know how to prepare it and I

know that when I eat it, I'm nourishing myself. Nourishing myself across the board mentally with the nutrients, physically again with the nutrients and spiritually. I have the practice of growing and preparing and eating the food.

The community garden inspired some Denver gardeners to move towards a healthier lifestyle. A man working through mental health challenges shared, "Even for my depression, I cut my medicine in half and I'm feeling the same, it's not affecting me, it's good." He continued,

...I feel more energized. It's something that you look forward to throughout the day like, "Oh, I want to go see my garden. I want to go. I don't know, it's emotional, excitement, and that helps when you have depression."

The garden gave him a sense of purpose. These examples underscore how supportive conditions in Denver CGs helped newcomers feel confident both in lifestyle decisions and their choice to garden.

We interviewed several participants at both sites with fewer positive stories to share. Some faltered without sufficient support. For example, one new Montpellier gardener struggled to learn:

I had to make mistakes...it's a garden where there aren't many people, so it's hard to get advice, it's hard to look at on the internet. That's not what I expect from a garden, that's the discussion, that's what I want to get tips, because there are people who have been doing this for a longer time. It didn't work for me.

Many found learning to garden challenging. It took time. Unable to attend an introductory class sponsored by the community garden organization, one Denver gardener described gardening as "frustrating." Her initial interest waned as she toiled independently. However, when others were available for guidance, it took less individualized effort for new community gardeners to learn. While interacting with and learning from others, relatedness added to participants' overall feelings of autonomy, energizing them through inevitable difficulties.

### 3.3. Relatedness

In both samples, relatedness in the garden proved to be critical to new gardeners' motivation to continue participation in a community garden. Participants described the pleasures of getting to know others as they assimilated into the CG setting. They bonded with more experienced gardeners while deepening their skills, navigating garden duties, and sharing photographs, meals, and produce. In both cities, many of those who were less well-integrated struggled to find motivation for CG. Some quit, and some began gardening at home.

Gardeners described sharing quotidian experiences with garden contacts. According to one Denver participant, "Yes, my friend and neighbor, at least once a week, she would walk down with me. We made a little routine of it of doing a walk down to the garden." Mutual interest motivated them to garden together each week. She continued:

I think what was so awesome is just the help that showed up to get me through that learning curve, and just how willing everyone was to give their experience or point me in the right direction. That felt really cool, just that community element of people wanting to come together and create this really cool garden together. That was probably a big takeaway, just the way the community did show up.

This emphasis on others getting her "through that learning curve" was prominent in the Denver interview material. Consistent, positive social interactions were often pivotal in supporting new community gardeners. A Denver participant explained how she "...went through a lot of disappointment." She continued, "...but I learned from it. Now, I'm just like, 'Yes. I know, I don't want to do that anymore. I'm going to

do this right.' I need help so that I can actually go through it." She required support to feel successful.

When participants exchanged consistently with other gardeners, they spoke with excitement about the larger experience. A Denverite shared, "...I got to share all of my vegetables and stuff like that with other people and people really like that, so that made me happy." She experienced a beneficial sense of reciprocity with others.

Montpellier participants expressed less concern and frustration related to learning to garden, and more concern towards the collective atmosphere in their gardens. Often, the more social Montpellier gardens also included a greater number of shared, collective plots gardened by multiple members, rather than separately tended plots. Weekly group gardening times observed in some Montpellier CGs aided new community gardeners. These informal meetups seemed ideally suited to busy members who could rely on an hour or two a week where they could garden side by side with others to strengthen their skills with others. A Montpellier participant explained how connections formed in the garden setting:

At the garden, even if we don't know each other, we will eventually have to talk to each other, look at each other, look at what the other one is doing or to ask him or her for advice and so conversation comes easily. I was under the impression that those who came to the garden came for that too. To talk, to get to know other people, whereas, in cafés or public places, that's not necessarily the case as people are a little more in their social bubbles.

Relating with others was a welcome surprise to some in Denver. A Denverite described how he "...didn't expect everybody to be friendly, I didn't expect – none of that came to mind, socialization." He elaborated:

The socialization was great for me because every time I would go there, no matter what time. Morning, night, midday, weekends, during the week, meet different people, all working on the garden. Everybody was different. I mean I remember going there one morning and there was two women there, they were watering, and they both were having a conversation. Then I got there, and they were having a conversation with me.

He interacted while performing routine gardening tasks. Through gardening, he bonded with people he may not otherwise have encountered. Affirming support from others increased his investment.

However, when new community gardeners lacked guidance from others, the outlook was less optimistic. A Denver gardener explained:

I mean, I feel like the people who are doing that are generally friendly people. I think just the interactions that I had were just pretty minimal. As I said, as an introvert and a shy person, I'm usually not the first person to initiate a conversation.

This participant did not feel unwelcome. Yet, she felt challenged in moving beyond simple exchanges. She clarified, "I think being more involved with people would have made me more motivated." The lack of weekly meeting times or events was regularly cited by discouraged gardeners as an obstacle to social integration. Another Denver gardener explained, "I can show up every day at the same time, but if no one else is there, then I can't build on the community part. I'm just doing my own things, which I could be doing at home." In the absence of forming relationships with other gardeners, for some, gardening began to feel like a burden.

However, participants in both sites shared various theories about why their gardens lacked social atmosphere. A new mother in Denver shared, "It's not like they were mean to me, it's just that I didn't find much interaction...Everybody is busy, so it's okay." A Montpellier participant seemed reluctant to return to her garden, finding it unpleasant. She shared stories of children throwing basketballs into the

garden and loud music playing constantly. She declined the formal interview, not wanting to share a negative experience. New community gardeners in both cities met a variety of experiences in their gardens, ranging from pleasure and connection to disappointment and boredom. Gardeners' personal approaches to relating with others and how socially active each garden was influenced the outcome of their first year. Social connections—from friendships to passing acquaintances—were regularly noted as encouraging.

#### 4. Discussion

In this study, we conducted a qualitative analysis of the new community gardener experience in Montpellier and Denver focusing on new gardener social integration and the impact on motivations to garden after their first year of gardening. Findings revealed that many aspects of the new gardener social experience are found across contexts; gardeners in both countries expressed similar concerns about challenges in connecting with others and finding the motivation for CG and the confidence and independence to persevere. Participants in both cities developed competence as gardeners and autonomy through a regular practice reinforced by contact with fellow gardeners and garden leaders. Both samples included examples of gardeners sharing food and each other's company. However, Montpellier gardeners referenced slowing down and seeking pleasure to convey their motivations for gardening. Denver gardeners more often emphasized the aspiration to meet new contacts, skill building, and garden production when describing why they gardened. The sample size and variety of experiences shared made generalizing across contexts challenging. However, as observed with collectively managed garden plots in Montpellier, gardeners in settings with active regular workdays and in-garden educational events learned more readily and shared increased inclination to continue. CG events in several Montpellier gardens were advertised via chalkboards in the garden and through word of mouth. These events helped with informal social integration. When guided by other gardeners, participants at both sites described expansive feelings of connectedness with others while learning new skills in a supportive outdoor environment.

Using SDT as a scaffold, we analyzed how new community gardeners may or may not have felt motivated. As the evidence grows that CG is beneficial for health and wellbeing (Litt et al., 2015; Wood et al., 2016), our findings are critical to understanding how CG could serve as a health promotion strategy. The psychological needs for competence in gardening, autonomy, and relatedness with other gardeners were descriptive features of intrinsic motivation for CG. Yet, our analysis highlights the prominence of relatedness needs. Relatedness as a motivational feature carried through the interview data at both sites. Participants' success or failure to relate to other gardeners was a major influence for how autonomous and competent as a community gardener they expressed feeling. This reinforces findings in Perth, Australia by Quested et al. (2018) that relatedness featured as a prominent community gardener psychological need.

Several less-satisfied participants in both countries described accounts of a well-established group failing to welcome participants, and disappointing or tense social interactions, as Tharrey and coauthors detailed with the Montpellier sample (Tharrey et al., 2020). The necessity to navigate social norms and shared space reflects prior research in CGs (Teig et al., 2009). Our study findings highlight the importance of social connection for those new to gardening in a community setting.

This study contributes to our understanding of new community gardener needs by describing intrinsic motivations to CG that can be leveraged to support new gardeners. This research supports the understanding that CGs have the potential to build social connection by underscoring how connection was fostered in Denver and Montpellier CGs. The feelings of pride and acceptance described by our participants supports prior research that residents living in greener areas may know more neighbors, be more socially active, and find neighbors to be more helpful than residents living in an area without nature (de Vries et al.,

2013; Holtan et al., 2015; Kuo et al., 1998). Furthermore, many experiences found in this sample reflect evidence that CG can improve mental health and wellbeing (Wood et al., 2016) and sense of belonging (Ong et al., 2019).

The analysis is consistent with prior research about how social involvement is an important ingredient in explaining the connection between CG and improved wellbeing. There is a growing understanding that the enhanced social ties and collective efficacy and the knowledge sharing occurring during CG may reduce stress and anxiety, and improve mood, self-esteem, and satisfaction (Gregis et al., 2021; Litt et al., 2015; Teig et al., 2009). These findings support evidence that community gardeners find empowerment through the cultivation of relatedness with others (Christensen et al., 2019; Firth et al., 2011). We elicited specific motivational components relevant to informing the promotion of gardening as a socially connecting practice. The emphasis on the psychological need for relatedness in the sample indicates that social drivers serve as incentives to begin CG, as well as to endure through challenges. These findings build upon research in Detroit showing that volunteering with garden-related events was significantly associated with sustained garden membership, possibly due to the informal knowledge sharing and bonds developed whilst volunteering (Beavers et al., 2021). We suggest that relatedness should be viewed as an important objective to be cultivated alongside the other core needs in SDT (competence and autonomy) when planning nature-based health interventions. Our results that new community gardeners benefit from social support in varying contexts will help CG organizations design the most appropriate gardener support strategies.

##### 4.1. Limitations

In this analysis, we present general experiences shared by new urban community gardeners. Further study of the interaction between race, ethnicity, socioeconomic status, age, gender and sexuality and exposure to gardening environments is warranted to deepen our understanding about how socio-ecological interventions can improve quality of life among diverse populations. It would also be valuable to formally examine social gardening experiences in gardens with varying structural organizations, such as comparing the experience in more collective garden settings where members tend plots together, versus more individualized settings where each gardener is responsible for their own garden bed. In addition, future research is needed to better understand how new community gardeners may be more successful; for example, with the aid of a designated mentor (not necessarily garden leaders, referenced in this study as often busy with other tasks) to help build skills and meet other gardeners. Having someone to contact for help with basic gardening issues and CG integration could be a solution to the lack of relatedness shared by some in this study.

#### 5. Conclusion

This study interviewed new community gardeners in Denver, Colorado, USA and Montpellier, France to determine the basis of CG motivation based on SDT concepts of autonomy, competence, and relatedness. Relatedness with other gardeners was important for continued intrinsic motivation to community garden. Gardens with a collective spirit and regular in-garden events helped alleviate new community gardener anxieties and facilitated the learning process. Although welcoming CGs were described in both cities, several in Montpellier with more collective versus individual plots exhibited more social activity. In general, structured support helped new gardeners feel motivated to overcome learning challenges. These findings can inform CG organizations in their design of appropriate gardener support strategies that support new gardeners. This, in turn, is meaningful, as being active in one's community improves social relationships and contributes to mental wellbeing and lower levels of depression (Kitchen et al., 2012). With the presence of ongoing, friendly support from others, more

individuals may adhere to this socially connective, nature-based practice.

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## Declarations of Competing Interest

None.

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