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Why Be a TreeKeeper? Connecting Involvement to Volunteer Characteristics and Motivations

Jess Vogt

DePaul University, jessica.m.vogt@gmail.com

Annalise Nordgren

DePaul University, annalise.nordgren.2@gmail.com

Camila Cortez

DePaul University, cortezcamila98@gmail.com

Al De Reu

Openlands, aldiablo6@gmail.com

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Why Be a TreeKeeper? Connecting Involvement to Volunteer Characteristics and Motivations

Definitions of involvement in the volunteer literature vary from the simple binary metric (volunteering or not) to frequency (how often) to metrics that use additive or statistical indices to capture concepts like duration, commitment, and satisfaction. In this paper, we examine the connections between several dimensions of volunteer involvement and the characteristics and motivations of volunteers. Who participates in volunteer urban forest stewardship? What motivates individuals to sign-up and then to continue volunteering? Does volunteers' involvement vary with demographic factors or their motivations? We examine these questions using the results of an online survey of TreeKeepers, volunteer participants in an urban forestry training and stewardship program run by the Chicago-based nonprofit Openlands. The typical survey respondent was white, female, over 61 years old, working full time or retired, college-educated, with no kids at home, and grew up in neighborhoods with trees either in the suburbs or a city. Respondents reported a high sense of personal efficacy and volunteered with other groups outside of TreeKeepers, both environmental and non-environmental. Yet involvement in TreeKeepers may mean different things to different volunteers. We defined six dimensions of involvement: self-declared involvement, frequency (# events per year), recency of participation, breadth (# of types of activities), leadership of TreeKeeper events, and specific involvement in activities (planting, pruning, mulching, advocating, etc.). We found the frequency or recency of attendance at TreeKeeper-branded events incompletely captured involvement. Our results can be succinctly summarized as: Sign-up for the trees; continue for the community; intensify involvement because of the program structure. This study furthers the scholarship on urban greening volunteering and provides practical insights for those interested in engaging volunteers in urban forest stewardship.

Keywords

urban forestry volunteering, volunteer process model, volunteer involvement, volunteer motivations, volunteer demographics, volunteering frequency

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INTRODUCTION

Trees along streets in the right-of-way in cities and in urban parks grow on public property. They are a common pool resource, much like other kinds of urban infrastructure such as streets and sidewalks (Steed and Fischer 2008). As a common pool resource, they provide environmental benefits to all in the form of shade, carbon sequestration, temperature moderation, stormwater management, and air quality improvement (Livesley et al. 2016), as well as socio-cultural benefits such as beautification and human health (Nesbitt et al. 2017). It is difficult to exclude anyone in the urban area from receiving these benefits—everyone at some point will interact with or passively benefit from the urban forest (Westphal 2003). Yet street and park trees need to be adequately cared for or they will decline (Vogt et al. 2015). Dead trees provide few benefits (Widney et al. 2016) and instead become hazards.

For members of the public concerned about trees and the benefits they provide, participating in volunteer stewardship of public trees can be a way to contribute to the health and longevity of these trees and thus to the provision of this common pool resource. Urban forestry stewardship can take a number of forms: planting new trees, mulching and watering existing trees, pruning easy-to-reach young and maturing trees, inventorying tree location and species, and even teaching others about trees or advocating for more or better trees and tree care. When volunteers take on these tasks with respect to public trees, their efforts augment those of resource-limited public entities such as streets and sanitation or parks departments that otherwise are responsible for caring for public trees (Hauer et al. 2018). A municipal urban forestry census conducted in the United States in 2014 estimated that volunteers accounted for about 5% of all municipal tree care activities in terms of number of hours (*ibid.*).

But who participates in volunteer urban forest stewardship? What motivates individuals to sign-up and then to continue volunteering? Does volunteers' involvement vary with demographic factors or their motivations? An understanding of volunteers' involvement and motivations could be utilized to improve the volunteer experience and keep people involved more and for longer so that their efforts make real improvements in the urban forest commons. In this paper, we examine the connections between the characteristics of volunteers, motivations for volunteering, and volunteer involvement to further scholarship on urban greening volunteering and providing practical insights for those interested in engaging volunteers in urban forest stewardship.

Research Objective and Questions

This research explores the connections between antecedents (demographics), motivations, and the facets of involvement for volunteers in the Chicago-based urban forest stewardship program TreeKeepers. We consider various dimensions of involvement, including the respondents' answering "yes" that they have remained involved in the stewardship program (what we call "declared involvement"), the overall intensity of their involvement, how often and how recently they've been involved, and the different kinds of activities participated in, event leadership, etc. We also examine the overall intensity of volunteers' involvement—"how much to volunteer" being a factor seldom examined in the volunteering literature (Forbes and Zampelli 2014)—

using ordinary least squares regression to model volunteer intensity of those who declared remaining involved as a function of antecedent factors and motivations.

We examine the following suite of research questions:

- RQ1. Who participates in TreeKeepers?
- RQ2. Why did volunteers initially sign-up, and what motivates continuing involvement?
- RQ3. How are volunteers involved in TreeKeepers? That is, how do they participate: in what kinds of activities, how often, and how recently have individuals participated?
- RQ4. Does involvement vary by antecedent and motivational factors?
 - RQ4a. For those who have declared that they have remained involved, what predicts the intensity of their involvement?

In this paper, we first summarize our literature review on the antecedents and motivations to volunteering and ways of measuring involvement. Then, we detail the methods and results of an online survey of TreeKeepers conducted in November and December 2019. The research presented here contributes to an understanding of the motivations of urban forestry volunteers and how motivations are connected to how much and in what manner volunteers are involved.

LITERATURE REVIEW

Antecedents to Volunteering

In the volunteering literature, the “volunteer process model” (Snyder and Omoto 2008) provides a framework for understanding volunteers and volunteering across the full life cycle and at multiple levels. The framework organizes the relevant factors related to volunteering into antecedents, experiences, and consequences of volunteerism at individual, interpersonal, organizational, and societal levels (Snyder and Omoto 2008; Wilson 2012). *Antecedents* are those things which precede and lead to an individual’s decision to engage in volunteer work. These include demographics, personality, life circumstances, norms/values, and even socio-cultural factors such as level of social capital (*ibid.*; see also Table A1 in Appendix A) Antecedents can impact various individual psychological or behavioral aspects of the volunteering *experience*, such as the satisfaction or stigma associated with the experience, how integrated a volunteer may feel with the organization with which they are volunteering, a volunteer’s level of involvement or commitment to the activity, and the overall quality of the helping relationship (Snyder and Omoto 2008). *Consequences* of volunteering are connected to both antecedents and experiences and include knowledge, attitude, and behavior change, personal health and wellbeing, development of relationships or social networks, and other individual and interpersonal impacts (Snyder and Omoto 2008).

Categories of Motivations for Volunteering

A full picture of why individuals volunteer with a particular cause or organization necessitates a more complete discussion of volunteers’ motivations. Researchers have categorized volunteer motivations several different ways, using both theory and data. In the aforementioned review of volunteering psychology and sociology literature, Snyder and Omoto (2008) categorize motivations into “self-focused” and “other-focused” reasons for volunteering. Self-focused

reasons include career opportunities, gaining knowledge/understanding, and enhancing self-esteem, while other-focused reasons include personal values and community concern (Snyder and Omoto 2008). Interestingly, in a summation of this research, “volunteering for personal reasons, and not just out of relatively ‘selfless’ or ‘altruistic’ desire to serve others, not only is common, but was likely to lead to longer service” (Snyder and Omoto 2008: 16).

Economists studying volunteering have categorized volunteer motivations in terms of different kinds of capital, figuring volunteering is a way of donating one’s labor and time. For example, Forbes and Zampelli (2014) use data from the 2006 social capital community survey in the United States and consider the following categories of motivators in econometric models to predict volunteering or not and volunteering frequency: social capital, religious capital, human capital, attitudes, and economic and demographic characteristics.

In the urban greening volunteering/stewardship literature, methodological approaches to categorizing motivations vary (see Table A2 in Appendix A). Some authors have developed data-driven categories of motivators. Quantitatively, this has been done using factor analysis/principal components analysis of survey items to generate categories of statistically clustered variables (Ryan et al. 2001; Bramston et al. 2011; Asah and Blahna 2012; Wolf et al. 2021). Qualitatively, researchers have coded and themed narrative responses to open-ended survey or interview questions (Moskell et al. 2010; Asah et al. 2014; Johnson et al. 2018; Pike et al. 2020; Foster 2021). Literature reviews or synthesis research have used a similar approach to qualitative research to distill themed categories (Measham and Barnett 2008; Pike et al. 2020; Elton et al. 2023). Whether quantitative or qualitative, many scholars base their categories of motivations on Clary and colleagues “volunteer functions inventory” (VFI) in the 1990s, which distilled 30 survey items into six categories of motivations: protective, values, career, social, understanding, and enhancement (Clary et al. 1998). The VFI has been modified by many authors for particular volunteering contexts (c.f., the meta-analysis by Zhou and Kodama Muscente 2023). Urban greening scholars have used it as a starting point to understand the motivations of urban and conservation stewardship volunteers (Asah et al. 2014; Wolf et al. 2021). However, some authors decline to categorize volunteer motivations at all (e.g., Takase et al. 2019; Ganzevoort and van den Born 2020).

Across the environmental stewardship literature reviewed (see Table A2 in Appendix A), there are some motivational categories represented consistently: values-based motives appear frequently, as do career/learning/skills development-related motivations. Protecting, helping, or benefiting the environment appear in almost all analyses, frequently though not always among the three most dominant themes; same with community-related motivations. There is considerable diversity in which themes are most important, especially with respect to whether community, environmental, or psychological (values, ego) themes are most dominant. Scholarship in urban greening volunteering could clearly benefit from additional empirical research to further clarify volunteer motivations.

Operationalizing “Involvement”

Studies that examine the motivations of volunteers often beg the question, *to what end?* That is, motivations are most useful if understood not just descriptively – i.e., *what* are volunteer

motivations – but also in an explanatory manner – i.e., *how* are motivations connected to antecedents and to *whether* and *how* individuals remain involved as volunteers with a particular organization. These insights could then be utilized to help improve volunteer integration, satisfaction, retention, overall level of involvement, and more. In any case, the “whether and how” of volunteer experience, i.e., “involvement,” must be measured.

The simplest involvement measure is a binary metric – volunteering or not – but this requires data from both those who volunteer and those who do not volunteer (e.g., Forbes and Zampelli 2014). Among studies that only sample volunteers, many explore motivations descriptively and do not use a metric related to volunteer experience that could be conceived of as volunteer involvement (Moskell et al. 2010; Bramston et al. 2011; Fisher et al. 2015; Pike et al. 2020).

For studies that examine volunteer involvement as an outcome, one simple metric is volunteer *frequency*, that is, the number of volunteering events or hours participated in (e.g., Wilson and Musick 1997; Asah and Blahna 2012; Forbes and Zampelli 2014; Wolf et al. 2021). Frequency may be examined under a different name: Asah and Blahna (2012: 473) operationalize “volunteering intensity” as the “number of occasions they volunteered for conservation purposes in general, and with their favorite stewardship organization, over the 12 months preceding the study.” Frequency has also been operationalized as an ordinal scale where the levels correspond to ranges of participation (Ryan et al. 2001).

Takase, Hadi, and Furuya (2019: 36) use a creative approach to measure frequency as “variation in frequency of participation,” calculated “by deducting the previous frequency from the future frequency that respondents prefer.” Previous frequency referred to the number of days (ranging from 0 to 120) in between volunteering experiences in the past, while future frequency referred to the number of days in between desired volunteering in the future (*ibid.*). These authors then examined if respondents’ intent to increase or decrease their frequency of involvement was connected to their level of agreement with 16 motivations.

Another metric is *duration*, or the number of years a volunteer had served with a particular organization, as in the studies of conservation volunteers by Ryan et al. (2001), and Dávila (2009). Among studies of non-environmental volunteers, Hyde, et al. (2016) utilized a categorical measure of duration by dividing respondents into “novice,” “transition,” or “sustained” volunteers based on the total number of years served as well as the regularity or irregularity of the years of service.

Beyond these simple measures, researchers have used additive methods or statistical techniques such as factor analysis to generate an *index* of one or more aspects of involvement. For instance, Wilson and Musick (1997) created a “volunteer index” as the sum of the types of volunteering in the last 12 months from among 5 types of volunteer organizations by sector listed as options (religious, school/education, political group/labor union, seniors, and other).

Commitment as a dimension of involvement has been examined with index methods in the environmental conservation volunteering research. Ryan, Kaplan, and Grese (2001: 635) used an additive index of “strength of commitment” that combined respondent Likert-scale

ratings of two survey items: “volunteer on a regular basis” and “volunteering is a high priority for me.” Asah and Blahna (2013) used index methods in a multidimensional analysis of *commitment*. These authors defined “commitment to conservation volunteerism” as, “the overall tendency to continue to volunteer under circumstances where they would otherwise be tempted not to do so” (Asah and Blahna 2013: 870). They measured overall commitment as well as “affective commitment” (an index of statements such as “volunteering plays a vital role in my life” and “volunteering says a lot about who I am”) and “normative commitment” (an index of statements related to the moral value of volunteering such as, “volunteering is the morally right thing to do” and “I feel guilty when I pass up a volunteering opportunity”) (Asah and Blahna 2013: 871).

Volunteer *satisfaction* as a means of conceptualizing involvement has also been examined with index methods. Wolf, Brinkley, and Blahna (2021) examine the linkages between motives of ecological restoration volunteers and several measures including volunteer frequency as well as the specific activities volunteers engaged in (what they call “contributions”) and four factors they label the “volunteer satisfactions” (organizational support, participation efficacy, personal efficacy, and social interactions).

Clearly, conceptualization and measurement of involvement vary across the volunteering literatures. In a synthesis article from the field of public affairs, Nesbit, Christensen, and Brudney (2018: 503) provided a framework for the “scope of volunteer involvement” that considers eight dimensions of volunteer involvement, four each as related to organizational choices (decision to use volunteers, magnitude of volunteer use, volunteer contributions, and volunteer status in the organization) or volunteer choices (“volunteer entry into and exit from the organization,” characteristics and diversity, commitment intensity and duration, and work quality). Some of these dimensions translate into involvement metrics mentioned above: the entry and exit dimension includes the decision to volunteer or stop volunteering, while intensity and duration includes the number of hours volunteered and the length of time served by a volunteer.

CONCEPTUAL FRAMEWORK FOR OUR STUDY

To organize theory and research on any complex issue, it can be helpful to have a framework to conceptualize the phenomena of interest, to help identify the sets of variables that might be related, tested, and formulated into theories or models, and provide a common language through which scholarship may proceed (Ostrom 2010; Vogt 2020; Vogt in press). The framework guiding our inquiry in this paper is in Figure 1, a synthesis of select insights from the volunteering literatures described above. The elements of the volunteer process model – antecedents, experiences, and consequences – are shown in grey boxes. Our paper focuses on antecedents, motivations, and the dimensions of involvement (yellow boxes in Figure 1).

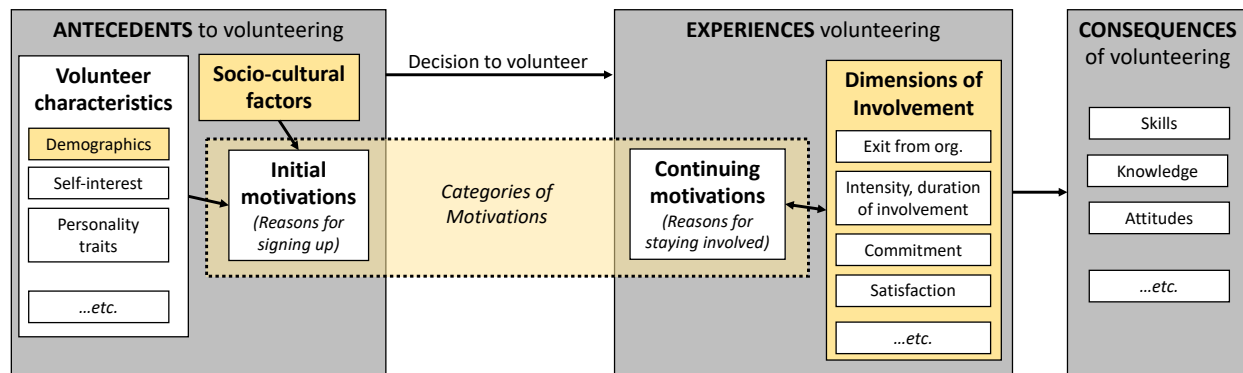


Figure 1. A framework for understanding volunteering, based in part on the volunteer process model (Snyder and Omoto 2008; Wilson 2012) and the Nesbit et al. (2018) “framework for explaining the scope of volunteer involvement.”

STUDY SITE

The Chicago region and the Openlands TreeKeepers Program

The urban forest of the seven-county Chicago region contains more than 168 million total trees, along streets, in parks and preserves, and on private properties, for a total 26% canopy cover (The Morton Arboretum 2020). The City of Chicago contains nearly 4 million trees, approximately 554,807 of which are street trees that provide an estimated \$12 million annually in ecosystem benefits and worth an asset value of nearly \$1 billion (City of Chicago 2023).

Street trees are managed by two departments within the City of Chicago: the Department of Streets and Sanitation Bureau of Forestry manages trees on residential streets, while the Department of Transportation Forestry Division manages trees on the busier arterial streets. The management of street trees to date has been largely reactive, with plantings, removals, and pruning driven by requests from residents (through the City’s 311 system) and alderpersons, as well as high risk trees identified by staff. Although the City switched to an area trimming schedule in 2023 in order to more efficiently manage the street tree resource, overall urban forest management is under resourced, and the City has far more trees than they can effectively care for. Additionally, due to inadequate funding for planting and increased numbers of removals due to an infestation of emerald ash borer, the City has removed far more trees than it has planted in the last decade, resulting in a net loss of as much as 10,000 trees in some years, and a total 59,069 street tree loss between 2012 and 2022. (City of Chicago 2023)

Where there are shortfalls in municipal resources and capacity, the nonprofit sector can sometimes step in. The Chicago-based nonprofit organization Openlands has been stewarding natural resources in Chicago and the surrounding region for over 60 years. In 1991, Openlands – then called “Openlands Project” – launched the TreeKeepers certification course, a volunteer urban forest stewardship training program designed in-part to help improve regional urban forest management and fill the aforementioned gaps in municipal capacity. Westphal (1992) documented the early history of the TreeKeepers program in a master’s thesis on the program’s foundation. From the beginning, municipal forestry staff were involved in the program. Westphal wrote,

Suzanne Malec, Openlands Project's Urban Forestry Manager, saw a need for a trained volunteer force to help focus on tree maintenance and care, as well as tree planting. Late in 1990, she began the process to create a volunteer training program. With input from the Urban Forestry Advisory Council (a committee formed by Openlands Project to discuss and work on regional urban forestry issues) she outlined the topics to be covered and started a network of city officials and private citizens to make the program a reality. This partnership is unique in nonprofit tree planting programs in part because the cooperation was built before the curriculum with solidified, and in part because of the roll the city agencies play in teaching the course and training the TreeKeepers. (Westphal 1992: 14)

Early partners in the program contributing to its design, curriculum, and early management included the City's Bureau of Forestry, the Chicago Parks District, the Morton Arboretum, the Forest Preserves of Cook County, and the U.S. Forest Service.

Today, individuals who voluntarily enroll in TreeKeepers take a month-long series of classes. Participants learn about proper tree planting, pruning, and other kinds of tree care (mulching, watering, inventorying, etc.) as well as how to organize volunteer workdays and advocate for trees and urban forestry in their community. To become a "certified TreeKeeper," individuals must pass both a written test and applied pruning practicum. Once certified, "TreeKeepers can volunteer for and lead tree planting events, participate in or organize their own pruning days, take part in continuing education and advocacy programs, and join or start their own TreeKeeper Chapter to advance community-based forestry goals" (<http://openlands.org/treekeepers>). As of this writing, over 2,400 urban forestry stewards have been trained in the Chicagoland area. Certified TreeKeepers are, aside from municipal staff, the only individuals with official permission to prune trees along City of Chicago streets and in parks. We note that although our study area is officially anywhere in the Chicago region where TreeKeepers volunteer, the majority of TreeKeepers live in the city of Chicago (over two-thirds of those in the database used at the time of this study).

Early on in the TreeKeepers' program, Westphal (1992; 1993) conducted a survey of the first two classes of TreeKeepers (127 total enrollees) to study the values and motivations of these volunteers. Using pre- and post-class surveys (n = 99, 78% response rate) plus qualitative interviews (n = 9), Westphal studied why volunteers signed up for the program and what they hoped to learn, what they liked and disliked about trees (which the researcher called "values" and "annoyances" about trees), as well as demographic questions (Westphal 1992). Early TreeKeepers top ranked values of trees were that they "bring nature closer," are "pleasing to the eye," "good for the environment," provide shade, and have a spiritual value (Westphal 1993). In an open-ended question, volunteers reported signing up for TreeKeepers for very general reasons, usually because they were interested in trees or the environment (65% of respondents) or, less commonly, wanted to care for a specific place (17% of respondents; Westphal 1992). We used these and other insights from this early research in designing our present study.

METHODS

Survey Design and Administration

To evaluate the involvement and engagement of TreeKeepers, we designed and administered an online questionnaire. The survey was designed to take respondents about 20-30 minutes. The

questionnaire consists of 45 closed- and open- ended questions on volunteer demographics, volunteering experience, their reasons for signing up, motivations for continuing their involvement, the details of if and how they have remained involved in TreeKeepers, as well as barriers to participating, and knowledge, skills, and confidence they may have gained from the program. The core of the survey included questions designed to help us understand volunteer motivations in terms of antecedents, experiences, and consequences (*a la* the volunteer process model). The motivations questions were informed by the volunteer functions inventory (Clary et al. 1998) as adapted to environmental volunteering (Ryan et al. 2001; Asah and Blahna 2012), as well as previous research on the TreeKeepers program (Westphal 1992; Westphal 1993). Appendix B contains a complete copy of the questionnaire as administered.

The questionnaire was distributed via email to individuals who had taken the TreeKeepers course. An email contact list of TreeKeeper graduates was acquired from Openlands and contained 1,170 contacts as of October 2019. The survey was designed and administered via the online survey software Qualtrics (Qualtrics, Provo, UT). Four email invitations were sent on November 5th, November 12th, November 20th, and November 26th, 2019. The survey was closed on December 10th, 2019. Of the 1,170 individuals we emailed, we received a total of 332 usable responses (28% response rate). Of the six respondents who answered the survey twice, the first response was used.

Survey Analysis

Quantitative Analysis

Results were downloaded from Qualtrics and the data was cleaned and analyzed using Microsoft Excel for Mac (version 16.77.1; Microsoft Excel for Mac 2023) and StataSE 18.0 (StataCorp 2023). We use basic descriptive statistics to examine survey data and answer RQ1, RQ2, and RQ3. Statistical analyses used to answer RQ4 included use of chi-square tests to determine significant difference in the distribution of binary response or Likert-scale response questions and with other binary variables. Spearman's rank correlation coefficient (Spearman's rho) was used to determine significant correlations between two ordinal variables or between an ordinal variable and a continuous variable. Analysis of variance (ANOVA) was used to test for significant differences in the mean value of a continuous variable by levels of a categorical or binary variable.

Principal component factor analysis was used to collapse the variability for some parts of the survey data into a smaller number of conceptually logical factors. Three separate principal component factor analyses were used for the suite of sign-up motivations, initial motivations, and dimensions of involvement (in service of answering RQ3 more holistically). The resulting factors are useful for summarizing the data and including motivations in ordinary least squares regression analysis to predict the impact of antecedent (demographic), experiential, and motivational factors on overall involvement intensity (RQ4a). In initial factor analyses, we eliminated survey items that cross-loaded, that is, had loadings >0.32 on 3+ factors with no loading above 0.45 for any factor. Loading coefficients for all variables from each factor analysis were used to predict factor index scores for each of the three sign-up reason factors and six continuing motivation factors and saved for use in the regression. The resulting index scores are

interpreted as above average if positive and below average if negative, with an average of 0 and standard deviation of 1 across all observations used in the factor analysis for that suite of variables.

Qualitative Use of Text Responses

We occasionally use quotations from survey respondents as confirmatory or negative evidence to inform interpretation of quantitative survey results.

Table 1. Demographics of TreeKeepers survey respondents. Sample size differs slightly because some respondents preferred not to answer some questions. Percentages may not add to 100 due to rounding error.

Age	<i>n</i> = 263		Employment status	<i>n</i> = 274	
21-30	17	6%	Full-time student	2	<1%
31-40	33	13%	Retired	87	32%
41-50	37	14%	Unemployed, not seeking	13	5%
51-60	49	19%	Unemployed, laid off (seeking)	6	2%
61-70	88	33%	Working full-time	127	46%
71-80	34	13%	Working part-time	39	14%
81-90	5	2%	Home ownership	<i>n</i> = 274	
Gender	<i>n</i> = 267		Own your own place of residence	202	74%
Female	167	63%	Do not own home	72	26%
Male	97	36%	Kids at Home	<i>n</i> = 274	
Other	3	1%	No	221	81%
Household Income	<i>n</i> = 274		Yes	53	19%
<\$15,000	7	3%	Where They Grew Up^a	<i>n</i> = 274	
\$15-49,999	51	19%	A forest with lots of trees	19	7%
\$50-99,999	56	20%	City apartment building <i>with</i> trees	11	4%
\$100-149,999	45	16%	City apartment building <i>without</i> trees	4	1%
\$150-249,999	34	12%	City neighborhood <i>with</i> trees	82	30%
>\$250,000	15	5%	City neighborhood <i>without</i> trees	9	3%
No answer	66	24%	Neighborhood in the desert	4	1%
Race / Ethnicity	<i>n</i> = 260		Neighborhood in the mountains	4	1%
White/Caucasian	205	79%	Rural agricultural fields	16	6%
Other	23	9%	Street with high-rise buildings, with trees	3	1%
Black/African American	16	6%	Suburban neighborhood <i>with</i> trees	117	43%
Hispanic/Latina/o/x	11	4%	Suburban neighborhood <i>without</i> trees	6	2%
Asian American	3	1%	Level of Education	<i>n</i> = 274	
Native American	2	1%	Post graduate degree	130	47%
			Some graduate training	29	11%
			College graduate	82	30%
			Some college or technical training	27	10%
			High school or GED equivalent	5	2%
			Less than high school	1	<1%

^a See pictures corresponding to descriptions in Q38 in Appendix B: Survey.

RESULTS

RQ1: Antecedents to Volunteering: Who Participates in TreeKeepers?

Survey Respondent Demographics

The typical survey respondent was white (79% of survey respondents), female (63%), 61-70 years old (33%; mean age 56, median age 59, 48% of respondents aged 61+), working full time (46%) or retired (32%), with at least a college degree (88%) and no kids at home (81%; Table 1). Household incomes were nearly evenly spread across income brackets (Table 1), and retirees and non-retirees reported statistically insignificant differences in income (but nearly a quarter of respondents chose not to report income level). Nearly three-quarters of respondents grew up in neighborhoods with trees, either in the suburbs (43%) or a city (30%), but 7% of respondents reported growing up in a neighborhood without trees and 6% grew up in a rural agricultural area.

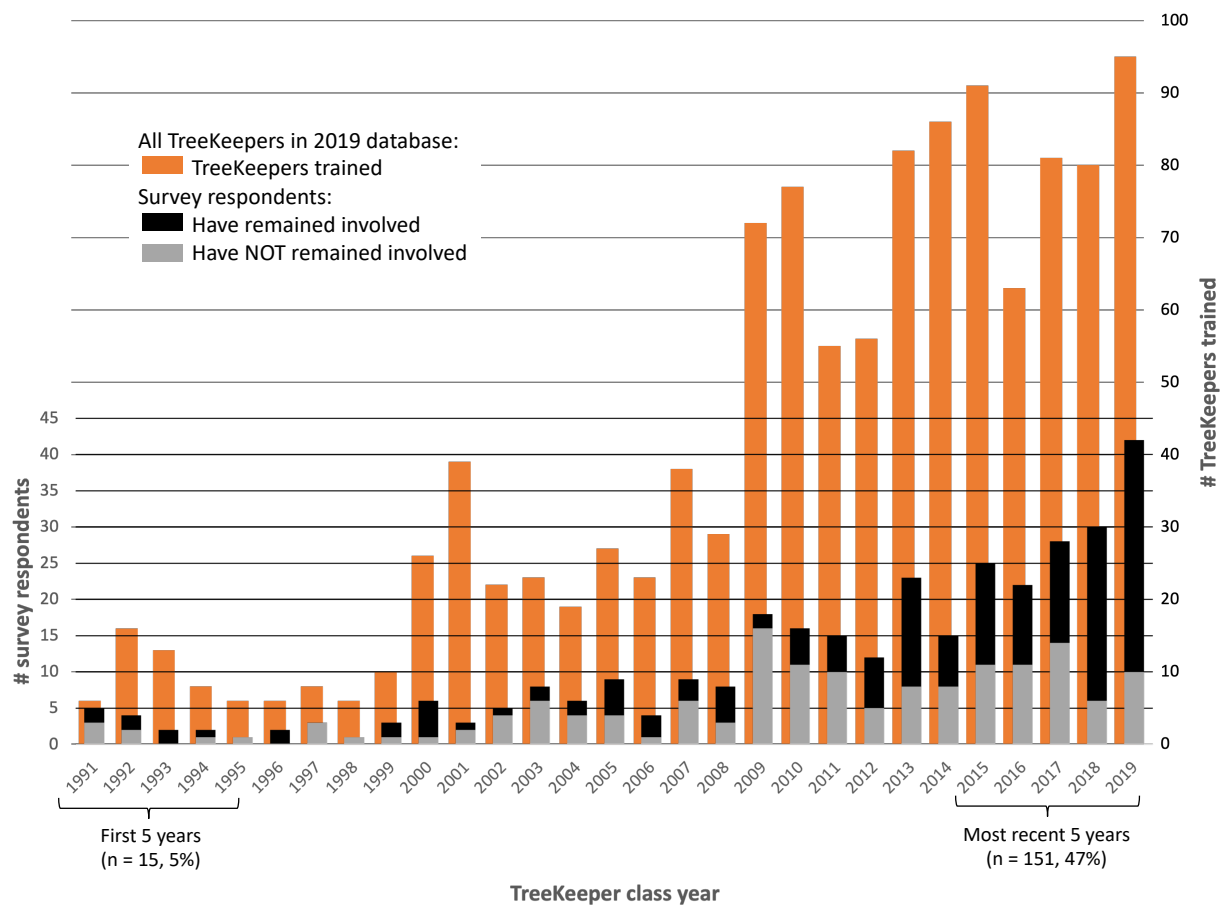


Figure 2. Survey respondents who declared that they have (black bars) or have not (grey bars) remain involved in the TreeKeepers program by class year (n=327) compared to the total number of TreeKeepers trained each year (orange bars) according to the database used at the time of this survey research.

TreeKeepers from across the program’s lifespan completed our survey; response rates by class year ranged from 8% in 2001 to 83% in 1991, with most years between 15% and 41% response rates. As expected, survey respondents skew towards the more recent TreeKeepers (Figure 2). The median respondent took the class in 2013. Nearly half (45%) completed the course in the 5 years prior to this research (between 2015 and 2019), while just 15 respondents (5%) took the class during the first five years of TreeKeepers’ existence (1991 through 1995). Class year is unknown for 3 survey respondents.

Social Capital: Sense of Personal Efficacy and Volunteering Among TreeKeepers

We asked respondents about their sense of personal efficacy, that is, how much influence they believed they had over each of four domains: local government, national government decisions, the local environment, and global environment. Overall, respondents reported feeling they had much greater influence over their local government and environment compared to national government decisions or the global environment (Figure 3).

We investigated the extent to which respondents to our survey are “joiners” in general – that is, in addition to participating in TreeKeepers, these individuals may also be more involved in other kinds of volunteering: with the TreeKeepers’ parent organization Openlands, with other urban forestry activities in the region, and with other environmental and non-environmental organizations. Respondents were queried about volunteering activities with these kinds of groups within the 2 years prior to taking the survey. We observed that among those who responded to our survey, those who reported volunteering in any capacity are more likely to volunteer in any other capacity. Correlations for all possible pairings of these four variables (volunteering with other Openlands programs, with other urban forestry organizations, with other environmental organizations, or with other non-environmental organizations) were all positive (tetrachoric correlation coefficients ranging from 0.280 to 0.595) and highly significant (see Table C5 in Appendix C).

Forty-three percent of respondents reported also being involved in at least one other Openlands program (Birds in my Neighborhood, Building School Gardens, with the Openlands

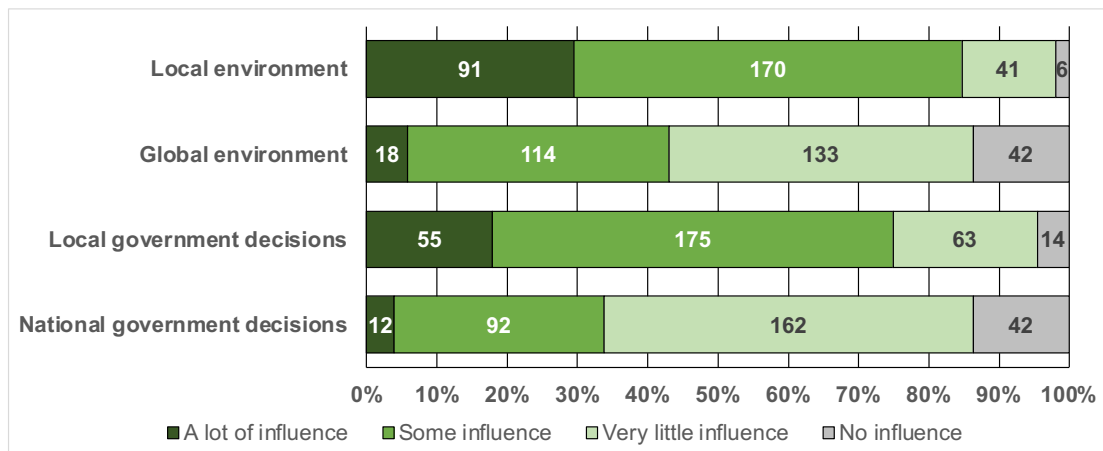


Figure 3. Personal efficacy, or amount of influence respondents believe they have over the following: Local environment (n=308), global environment (n=307), local government decisions (n=307), and national government decisions (n=308).

Lakeshore Preserve, etc.). Forty-five percent of respondents (135 individuals) reported having volunteered with other Chicagoland urban forestry organizations (such as Cook County Forest Preserves, Chicago Parks District, etc.). Sixty-six percent of respondents (220 individuals) reported volunteering with at least one other environmental organization in the Chicagoland area (e.g., the Audubon Society, The Field Museum, Chicago Botanic Garden). The average respondent volunteered with 1 to 2 additional environmental organizations, although 39% volunteered with more than 1 other environmental group, 24% with more than 3 groups, and 7% volunteered with more than 4 groups.

Beyond environmental volunteering, 64% of respondents (211 individuals) reported that they volunteered with some kind of other *non*-environmental organization (e.g., a community services organization like a shelter or soup kitchen, political group, religious organization, and more). Respondents reported volunteering with as many as 7 additional organizations, with survey respondents on average volunteering with a little more than 1 additional non-environmental group, and 16 % of respondents volunteered with 3 or more non-environmental organizations. A majority (51%) reported volunteering both with other environmental and non-environmental groups. A further 9% (30 respondents) were who we consider *very* active volunteers and reported volunteering with 3 or more environmental groups *and* 3 or more non-environmental groups; for 20 of these individuals, this is in addition to declaring continued involvement in the TreeKeepers program. Only 11% (31 individuals) were involved in *no* other volunteering at the time of our survey, and 20 of these individuals had not remained involved in TreeKeepers either. (See the rates of volunteering for different organizations within the urban forestry, environmental, and non-environmental categories of volunteering in detail in Tables C1-C4 in Appendix C).

Table 2. Reasons individuals reported signing up for TreeKeepers. Respondents could check “yes” to as many reasons as were relevant to them. Listed in descending order with the most popular reasons at the top.

Reason	# of respondents	% of respondents
Employer suggested/ required	12	4%
Know more about local gov.	18	5%
Community service opportunity	39	12%
For exercise	43	13%
New/advance career	58	17%
To meet new people	67	20%
Replace recently removed trees	65	20%
As a hobby	73	22%
Address heat, pollution, flooding	80	24%
Seemed interesting	121	36%
Help mitigate climate change	130	39%
To get outside	134	40%
Beautify the neighborhood	134	40%
Enjoy gardening	137	41%
To act locally	141	42%
Increase trees and canopy	178	54%
To have a positive impact on the community	218	66%
Learn about trees	285	86%

RQ2: What Motivates Involvement?

Why Sign Up? Why Continue to Participate?

Of 18 sign-up reasons provided, to learn about trees, to have a positive impact on the community, and to increase trees and tree canopy were selected by more than 50% of respondents (Table 2).

We asked respondents both open- and closed-ended questions about motivations for continuing to participate in TreeKeepers. Themes of open-ended responses included an appreciation for trees and nature, learning about/caring for trees, finding TreeKeeping a personally rewarding experience, and that it has an impact:

“I have come to appreciate how our trees improve the environment... I like the outdoor work and I learn from other participants. I like seeing many parts of the city especially various parks around town. I like sharing what I know about trees with young people and encouraging them to help their community. ...Having beautiful trees...contributes to the wellbeing of people.”

“The physical work and the teamwork feel good. I like that it makes a long-term impact.”

“I love living among beautiful trees and believe the whole community should experience it, and do not believe that local government or private landowners will necessarily be able to make the investment necessary for long-term health of our overall tree habitat.”

“I like helping other people plant them for the first time and see[ing] them get them invested in trees and their well-being. Volunteering with Openlands makes me feel like I am doing something concrete to bring about something positive in the world.”

“I have fallen in love with pruning and spend many days pruning in my park. I notice trees on every walk I take (frequently noting pruning needs).”

Several individuals also noted continuing motivations related to the benefits of trees to the environment, especially for helping mitigate climate change:

“I believe that trees are very crucial in helping to solve a lot of the effects of global warming.”

“Devastation of emerald ash borer. Increasingly hot summers, droughts, cuts in City budget for maintaining Chicago trees.”

“Addressing the climate crisis, advocating for environmental justice, improving public health, changing policies to reflect green jobs, clean energy, and urban green infrastructure.”

“The knowledge that all of us must do our share to preserve the environment and improve our community. The great environmental challenges facing us will not be met if we do not take measures, the sooner the better. I take satisfaction from being able to view the results of my TreeKeepers activities in my community. I enjoy working with people who share my concerns and hopes for the future.”

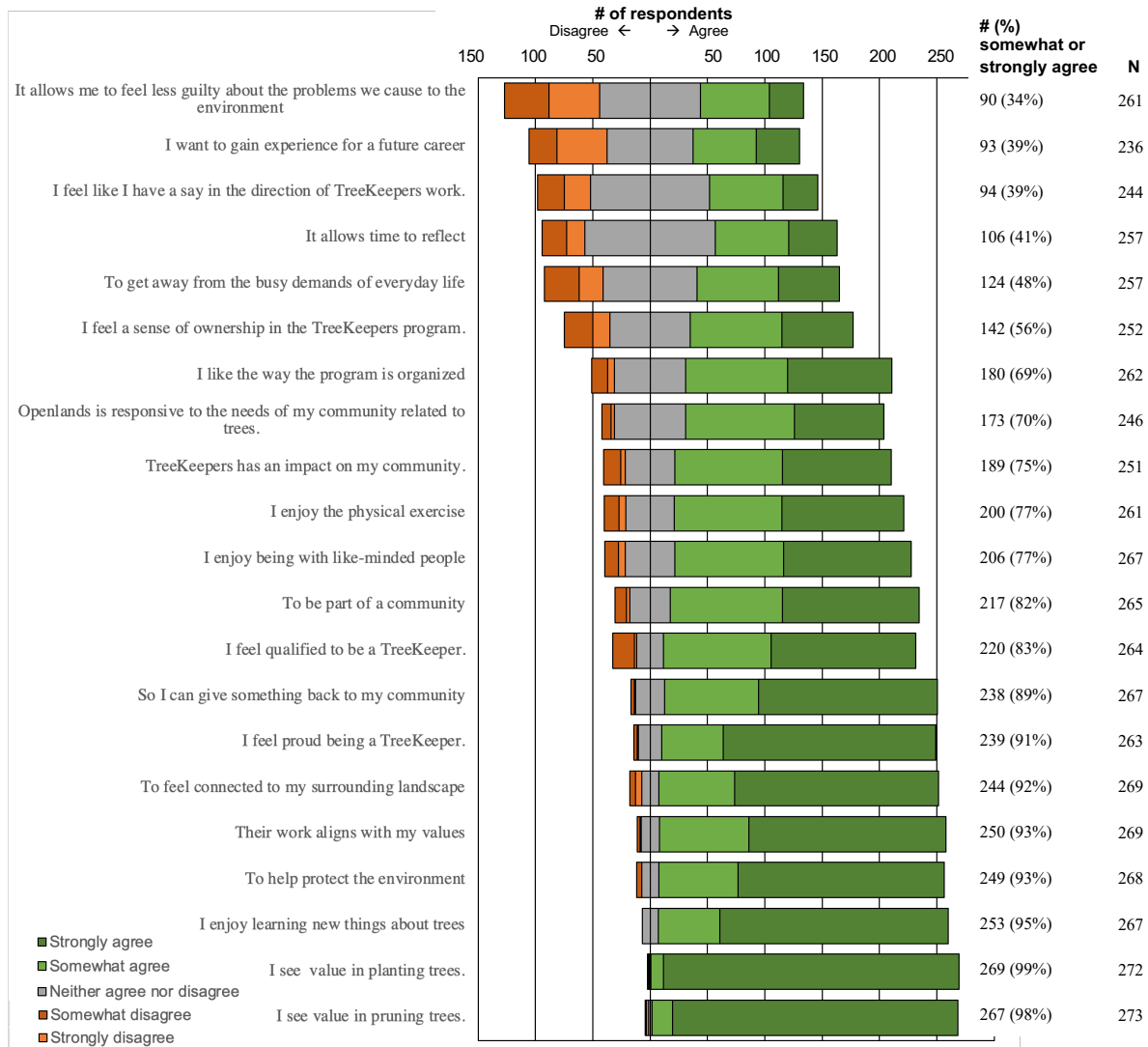


Figure 4. Continuing motivations, agree-disagree. Distribution of responses to motivations for continuing to volunteer with TreeKeepers. Organized in ascending order by percent of respondents who agree with each motivation. N = number of respondents providing an answer for this question.

We see the qualitative motivations written in reflected in respondents’ agreement with the closed-ended continuing motivational items. Valuing pruning, planting, and learning about trees; protecting the environment (although we did not specifically ask about climate change as a continuing motivation); and, feeling connected to the landscape emerged as those items with which over 90% of respondents somewhat or strongly agreed (Figure 4).

Reducing the Complexity of Sign-up Reasons and Continuing Motivations

We used factor analysis to reduce the complexity of motivations to a smaller number of dimensions in order for use in later models that predict involvement intensity. For the set of 18 sign-up reasons (see full list in Table 2), a Bartlett test was highly significant ($\chi^2 = 884.6, p <$

0.001) and the Kaiser-Meyer-Olkin measure was high (KMO=0.757), indicating factor analysis of these items is appropriate. The principal component factor analysis condensed 16 of these statements; in the final factor analysis, we excluded 2 statements related to having a positive impact and meeting new people as these cross-loaded on too many factors in the initial tests. Six factors with Eigenvalues greater than 1.0 accounted for 58% of the total variation in sign-up reasons for our survey sample (n = 332; see Tables D1 and D2 in Appendix D). We described and used the first 3 of these factors with Cronbach alpha (scale reliability/interitem correlation coefficient) of 0.4 or greater, accounting cumulatively for 35% of the variation, in subsequent analyses. The logic of factor analysis producing conceptually related groups of variables breaks down for the last 3 retained factors, two of which have Cronbach alphas of around 0.28 while the last included only a single variable. The three usable factors were Tree Functions, Recreational, and Green Thumb (Table 3).

For the set of 21 continuing motivations (see full list of statements in Figure 4), a Bartlett test was highly significant ($\chi^2 = 1220.2$, $p < 0.001$) and the Kaiser-Meyer-Olkin measure was high (KMO=0.849), again indicating factor analysis is appropriate. The subsequent principal component factor analysis condensed 19 of these statements. In the final factor analysis, we excluded 2 statements regarding protecting the environment and feeling connected to the landscape as these cross-loaded in the initial factor analysis with all motivational statements. Six retained factors with Eigenvalues greater than 1.0 and Cronbach alphas of 0.4 or greater, which together account for 67% of the variability in the continuing motivations data survey sample (n = 175 respondents who answered the motivations questions; see also Tables D3 and D4 in

Table 3. Sign-up reasons factor loadings and factor summary. Factor names in **bold** in column headings.

Sign-up reason	Factor 1	Factor 2	Factor 3
	Tree Functions	Recreational	Green Thumb
Address heat, pollution, flooding	0.779		
Help mitigate climate change	0.768		
Increase trees and canopy	0.684		
Replace recently removed trees	0.421		
To get outside		0.753	
Seemed interesting		0.662	
For exercise		0.662	
As a hobby		0.467	
Enjoy gardening			0.745
Learn about trees			0.624
Beautify the neighborhood			0.569
<i>Cronbach alpha</i>	<i>0.676</i>	<i>0.583</i>	<i>0.436</i>
<i>Factor scores^a</i>			
<i>Min.</i>	<i>-1.78</i>	<i>-1.81</i>	<i>-2.32</i>
<i>Max.</i>	<i>2.30</i>	<i>2.97</i>	<i>2.02</i>
<i>Sign-up index score^b</i>			
<i>Mean</i>	<i>0.341</i>	<i>0.279</i>	<i>0.558</i>
<i>Std. Dev.</i>	<i>0.324</i>	<i>0.290</i>	<i>0.308</i>

^aFactor scores for which minimum and maximum are shown were predicted using the loadings for all motivations. Factor scores are designed to have a mean of ~0.0.

^bAdditive index scores calculated as the sum of sign-up reasons with just the items loading to this factor and dividing by the number of items. For each item, 0 = not selected and 1 = selected, so each scores range ranges from 0 to 1 and can be interpreted as the average proportion of respondents selecting items in that factor; for instance, the first four sign-up reasons related to Tree functions were selected on average by 34.1% of respondents.

Table 4. Continuing motivations factor loadings. Factor names in **bold** in column headings.

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Continuing motivation	TK Program Structure	Community	Competence	Psychological	Value- Based	Career/ Learning
Openlands is responsive	0.765					
Feel ownership in the TreeKeepers	0.732					
TreeKeepers has an impact	0.713					
I have a say in TreeKeepers	0.696					
I like the way it's organized	0.646					
To be part of a community		0.872				
Give something back to community		0.659				
Physical exercise		0.610				
Be with like-minded people		0.601				
Value in pruning trees			0.853			
Proud being a TreeKeeper			0.647			
Qualified to be a TreeKeeper			0.590			
To feel less guilty				0.825		
Allows time to reflect				0.670		
Value in planting trees.					0.875	
TreeKeepers aligns with my values					0.606	
Gain experience for a career						0.796
Get away from busy everyday life						0.542
Enjoy learning new things about trees						0.404
<i>Cronbach alpha</i>	<i>0.839</i>	<i>0.758</i>	<i>0.537</i>	<i>0.547</i>	<i>0.412</i>	<i>0.496</i>
<i>Factor scores^a</i>						
<i>Min.</i>	<i>-3.03</i>	<i>-4.37</i>	<i>-9.67</i>	<i>-2.99</i>	<i>-9.07</i>	<i>-2.69</i>
<i>Max.</i>	<i>2.35</i>	<i>1.77</i>	<i>1.07</i>	<i>2.64</i>	<i>1.28</i>	<i>2.39</i>
<i>Motivation Agreement index scores^b</i>						
<i>Mean</i>	<i>3.82</i>	<i>4.22</i>	<i>4.57</i>	<i>3.18</i>	<i>4.76</i>	<i>3.74</i>
<i>Std. Dev.</i>	<i>0.77</i>	<i>0.67</i>	<i>0.52</i>	<i>0.95</i>	<i>0.41</i>	<i>0.75</i>

^aFactor scores for which minimum and maximum are shown were predicted using the loadings for all motivations.

Factor scores are designed to have a mean of ~0.0.

^bAdditive index generated by summing the level of agreement scores for just the items loading to this factor and dividing by the number of items. Index scores are on a scale of 1=strongly disagree, 5=strongly agree.

Appendix D). These six factors were TreeKeeper Program Structure, Community, Competence, Psychological, Value-Based, and Career/Learning. Table 4 displays factor loadings for the variables loading onto each of the six factors.

RQ3: The Experience of Volunteering: How are People Involved?

Defining “Involvement”

Fifty-three percent (174) of survey respondents reported that “yes,” they are still involved in the TreeKeepers program when asked directly. Of these still involved, most participated in 1-2 (34%) or 3-5 (27%) TreeKeeper events per year. Forty two percent of all survey respondents reported attending a TreeKeeper event within the year prior to our survey, with 60% of respondents having attended an event within the past three years. Of those who declare they’ve remained involved, the vast majority reported attending an event in the last year (Table 5).

Twenty-five respondents (8%) reported not having attended any events since taking the TreeKeepers course (Table 5); most of these people completed their class relatively recently (11 in 2019 and 2 in 2018) and 4 of those from 2019 declared that they had remained involved, indicating an intent to become active in the program.

There are a variety of specific activities TreeKeepers reported participating in as part of their involvement with the program. The most common activity was pruning (36% of respondents), followed by planting (31%), mulching (29%), inventory/adopting a park (14%), watering (11%), advocating (10%), and teaching (7%). Forty percent (131 respondents) reported having at some point led or organized a TreeKeeper event (by themselves or with a group). Respondents who declared continued involvement with TreeKeepers are more likely to have reported leading an event than those who had not declared involvement (Table 5; $\chi^2 = 4.807$ $p=0.028$). Planting, pruning, and mulching were the most frequently reported activities for all survey respondents (participated in by 31%, 36%, and 29% of all respondents, respectively), as well as for self-identified active TreeKeepers (participated in by over half of remaining involved respondents; Table C7 in Appendix C).

There are some oddities of survey respondents' reported involvement worth noting: First, 23 respondents declared that they *have* remained involved at the time of survey completion but indicated attending *no* events in an average year. And 14 respondents reported having attended an event in the past year, yet declared that "no," they were not involved in the TreeKeepers program at the time of survey completion. Conversely, there were 9 respondents who reported having attended no event more recently than 6 years ago and yet indicate having remained involved in TreeKeepers (Table 5). Additionally, 43 respondents said they are involved as a TreeKeeper and yet reported participating in no specific activities (Table C7 in Appendix C).

Table 5. Involvement, participation, and leadership by whether or not the survey respondent declared involvement in the TreeKeeper program. Percentages may not add to 100 due to rounding error.

Most recent event attended	# (%) of those <i>not</i> declaring involvement	# (%) of declaring involvement	# (%) of <i>all</i> respondents
Within the last year	14 (9%)	125 (72%)	140 (42%)
Within 1-3 years	35 (22%)	24 (14%)	59 (18%)
Within 4-5 years	14 (9%)	7 (4%)	21 (6%)
More than 6 years ago	47 (30%)	9 (5%)	56 (17%)
Unknown, unsure, or did not report	25 (16%)	5 (3%)	31 (9%)
None since taking TreeKeeper class	21 (13%)	4 (2%)	25 (7%)
Events per year			
0 events	134 (86%)	23 (13%)	157 (47%)
1-2 events	21 (13%)	59 (34%)	80 (24%)
3-5 events	0 (0%)	47 (27%)	49 (15%)
6-10 events	1 (<1%)	23 (13%)	24 (7%)
11-15 events	0 (0%)	8 (5%)	8 (2%)
More than 15	0 (0%)	14 (8%)	14 (4%)
Organized or led event			
No	103 (66%)	95 (55%)	200 (60%)
Yes	52 (34%)	79 (45%)	131 (40%)

Because of this complexity in “involvement,” we define the following separate dimensions of involvement:

1. *Declared involvement*: this is self-defined involvement, or having answered “yes” to the question of whether they remained involved in the TreeKeepers program at the time of survey completion;
2. *Frequency* of involvement: as indicated by the number of events attended per year;
3. *Recency* of involvement: how recently they attended a TreeKeepers event attended;
4. *Breadth* of their involvement: as reflected by the total number of different types of activities they reported participating in;
5. *Leadership*: reporting leading a TreeKeepers event; and,
6. *Specific kinds of involvement*: as reflected by participating in the specific types of TreeKeeper activities (planting, pruning, mulching, watering, inventorying, teaching, and advocating).

We use these dimensions of involvement in answering RQ4 below.

RQ4: Does Involvement Vary by Antecedents and Motivations?

To answer the fourth research question, we consider variables that may be correlated with the separate dimensions of involvement. We examined the extent to which the dimensions of involvement were related to *antecedent factors*, or respondent characteristics that pre-date the time of volunteering, and *experiential factors* related to the nature of respondents’ participation in the TreeKeepers program itself. Antecedent factors include *demographics* (namely, upbringing around trees or the city, and identity as an environmentalist), *connections to community* (as reflected in their sense of personal efficacy and other volunteering efforts), and purported *reasons for signing up* to participate in the program. Experiential factors include the *longevity* of participation, respondents’ reported *continuing motivations* for participating in TreeKeepers, *experiences leading events*, and *barriers to participation*. Throughout the results below, we consider “significant” results to be those with p-values less than or equal to 0.05.

Antecedent Factors Related to Involvement

Involvement and Demographic Characteristics

For respondents’ declared involvement, there were no significant differences by age, gender, race, employment status, household income, homeownership, whether they have kids at home, or in what type of environment they grew up. Those who identified as an environmentalist were more likely to have declared involvement (56% of environmentalists have declared involved compared to just 38% of non-environmentalists: $\chi^2 = 5.28$, $p = 0.021$).

For frequency of participation, older respondents reported lower numbers of events attended per year (Spearman’s rho = -0.1263, $p=0.0407$). There were no significant differences in the frequency of participation in events by race, gender, employment status, household income, whether they have kids at home, what type of environment they grew up in, or whether they identify as an environmentalist. How recently respondents had participated in TreeKeepers activities did not significantly vary by any of the demographic characteristics.

For breadth of participation, those identifying as female are more likely to have reported participating in 1 or 2 types of activities, whereas those identifying as male or other are more likely to report participating in either no activities or 3 types of activities ($\chi^2 = 14.29$, $p = 0.014$). There were no significant differences in breadth of participation by age, employment status, household income, whether they have kids at home, what type of environment they grew up in, or whether they identify as an environmentalist. For leadership, those who reported having led a TreeKeepers event are older (mean age 59 years) compared to respondents who have not led an event (mean age of 54 years; analysis of variance: $F = 5.85$, $p = 0.0163$). No other demographic characteristics are significantly related to event leadership.

We also looked for significant differences in the kinds of events participated in (planting, pruning, etc.) by demographic characteristics. We found that respondents who reported participating in planting are generally younger. Respondents who grew up around trees participated in pruning at higher rates ($\chi^2 = 4.51$, $p = 0.034$), as did those who grew up in the city, while respondents who grew up in a rural environment participated in pruning the least (suburban respondents are in the middle: $\chi^2 = 12.07$, $p = 0.002$). Respondents who grew up in the city were more likely to have reported participating in mulching than those who grew up in rural areas ($\chi^2 = 8.72$, $p = 0.013$). Respondents identifying as female were less likely to report engaging in watering activities compared to those who did not identify as female ($\chi^2 = 6.298$, $p = 0.012$), but they were more likely to have reported participating in inventorying activities ($\chi^2 = 4.17$, $p = 0.041$). There were no significant differences in demographic factors for those respondents who reported having taught TreeKeepers courses or having engaged in advocacy work (i.e., contacted their local representatives about tree issues). No other significant differences were observed for specific activities by other demographic characteristics not mentioned above.

Involvement and Social Capital: Personal Efficacy and Other Volunteering

We tested for whether respondents' level of involvement was connected to their sense of personal efficacy. Respondents who reported higher levels of perceived personal efficacy with respect to *national government decisions* reported being involved more frequently (Spearman's rho = 0.1287, $p = 0.0250$) and to have participated in watering ($\chi^2 = 12.17$, $p = 0.007$). Respondents who reported higher personal efficacy over *local government decisions* were also involved more frequently (Spearman's rho = 0.1216, $p = 0.0332$) and more likely to participate in teaching ($\chi^2 = 8.22$, $p = 0.042$). Respondents who reported higher *local environmental* efficacy were more likely to have declared involvement ($\chi^2 = 8.70$, $p = 0.034$), to participate more frequently (Spearman's rho = 0.2127, $p = 0.002$), more broadly (Spearman's rho = 0.1425, $p = 0.0124$), and more recently (Spearman's rho = 0.1413, $p = 0.0182$). No significant differences in any dimensions of involvement were observed by respondents' level of perceived global environmental efficacy.

With respect to non-TreeKeeper volunteering, respondents who participated in other Openlands programs in addition to TreeKeepers were more involved on every dimension of TreeKeepers program involvement. They are more likely to have declared involvement in TreeKeepers ($\chi^2 = 9.2628$, $p = 0.002$), and participated more frequently ($\chi^2 = 19.94$, $p = 0.001$), more broadly ($\chi^2 = 20.67$, $p = 0.001$), and more recently ($\chi^2 = 12.96$, $p = 0.005$). They were more

likely to report having led an event ($\chi^2 = 9.82$, $p = 0.002$). Additionally, they were more likely to have participated in planting ($\chi^2 = 98.96$, $p = 0.003$), pruning ($\chi^2 = 13.87$, $p < 0.001$), mulching ($\chi^2 = 12.53$, $p < 0.001$), watering ($\chi^2 = 5.55$, $p = 0.018$), teaching ($\chi^2 = 12.72$, $p < 0.001$), inventorying ($\chi^2 = 9.99$, $p = 0.002$), and advocacy ($\chi^2 = 7.56$, $p = 0.006$).

Respondents who volunteered with other urban forestry organizations around the region in addition to TreeKeepers were significantly more likely to report leading a TreeKeepers event ($\chi^2 = 7.91$, $p = 0.005$) and were more likely to report participating in advocacy efforts as a TreeKeeper ($\chi^2 = 4.51$, $p = 0.034$), compared to those who did not volunteer with other urban forestry organizations. No significant differences were observed on any of the other dimensions of involvement. This is interesting and indicate that perhaps the additional urban forestry experience of volunteering elsewhere makes one more interested in leadership or participating in broader efforts to advocate for the urban forest in the Chicagoland area.

Those who volunteered with other environmental organizations around the region were also significantly more likely to report increased activity along almost all dimensions of involvement with the exception of leading a TreeKeepers event compared to those who don't volunteer with environmental organizations. Respondents declared involvement in the TreeKeepers program ($\chi^2 = 10.93$, $p = 0.012$), participated more frequently (Spearman's rho = 0.1579, $P = 0.004$), more broadly (Spearman's rho = 0.2705, $p < 0.0001$), more recently (Spearman's rho = 0.1915, $P = 0.009$), and were more involved with all individual TreeKeepers activities: planting ($\chi^2 = 13.81$, $p = 0.003$), pruning (20.83, $p < 0.001$), mulching ($\chi^2 = 14.16$, $p = 0.003$), watering ($\chi^2 = 16.36$, $p = 0.001$), teaching ($\chi^2 = 12.49$, $p = 0.006$), inventorying ($\chi^2 = 14.5$, $p = 0.002$), and advocacy ($\chi^2 = 16.12$, $p = 0.001$).

Finally, respondents who reported volunteering with non-environmental organizations were more likely to participate in mulching ($\chi^2 = 9.44$, $p = 0.024$) and advocacy ($\chi^2 = 10.34$, $p = 0.016$) compared to those respondents who did not report non-environmental volunteering. However, the amount of outside non-environmental volunteering had no relationship with any of the other dimensions of involvement.

Involvement and Reasons for Signing Up

Table 6 shows the significant differences in the distribution of responses for each pairing of an involvement dimension with a particular sign-up reason. The coefficients in this table can be interpreted as, for instance, those individuals who signed up to learn about trees reported being more broadly involved (having participated in more kinds of TreeKeeper activities), and individuals who indicated that they signed up in order to have a positive impact on the community were more likely to have declared involvement. Across all the sign-up motives we see that only two were significantly and positively related to four of the dimensions of involvement. Those who indicated having signed up to help mitigate climate change or its symptoms (heat, flooding, and pollution) were more likely to have declared remaining involved in the TreeKeepers program and participated more frequently, more recently, and more broadly than those who did not have climate-related motivations (Table 6). Two other sign-up motives were positively and significantly associated with three of the involvement dimensions: wanting to get outside or to advance their career or start a new career. No specific sign-up motive is

associated with a respondent being less involved overall in the TreeKeeper program, although respondents who signed up to learn about trees were less likely to report teaching and respondents who signed up because they like to garden are less likely to report participating in planting.

Experiential Factors Related to Involvement

Involvement and Longevity of TreeKeeper Program Participation

As expected, those who had been a TreeKeeper for less time (i.e., become a TreeKeeper more recently) were more likely to have declared to still be involved (ANOVA: $F = 9.90$, $p = 0.0018$; see also Figure 2 above) but were less likely to report having led an event (ANOVA: $F = 14.47$, $p = 0.0002$). Recently graduated TreeKeepers unsurprisingly reported participating in an event more recently (Spearman's $\rho = -0.5172$, $p < 0.001$), participating more frequently (Spearman's $\rho = -0.3922$, $p < 0.001$), and more broadly (Spearman's $\rho = -0.2714$, $p < 0.001$). Those who have been a TreeKeeper for less time were more likely to report participating in planting (ANOVA: $F = 24.30$, $p < 0.0001$), pruning (ANOVA: $F = 10.67$, $p = 0.0012$), and mulching activities (ANOVA: $F = 13.89$, $p = 0.0002$). There were no significant differences in levels of participation in watering, teaching, inventorying, or advocacy by TreeKeeper class year.

Involvement and Continuing Motivations

Continuing motivations should in theory be related to the dimensions of involvement. Table 7 shows the results of chi-square tests (for the binary involvement dimensions: declared involved and event leadership, plus the 7 specific activities) and Spearman's ρ (for the ordinal involvement dimensions: frequency, recency, and breadth) for the differences in the distribution of responses for each pairing of an involvement dimension with a particular continuing motivation. The signs in Table 7 can be interpreted as, for instance, the more recently an individual reported being involved, the more strongly they are to "agree" with the motivation, "To gain experience for a future career." Of the 14 motivations about which there is less than 90% agreement among survey respondents (Figure 4), we found that 10 of these were positively and significantly related to at least 4 of the 5 core dimensions of involvement (declared involved, plus frequency, recency, and breadth of involvement). Notably, 6 of these motivations were related to the structure or identity of the TreeKeepers program itself: having a say in the direction of TreeKeepers work, feeling a sense of ownership in the program, liking the way the program is organized, feeling that Openlands is responsive to their community's needs, feeling that TreeKeepers has an impact, and feeling that they themselves are qualified to be a TreeKeeper. Four other motivations (enjoying the physical exercise, being with like-minded people, feeling a part of community, and giving back to community) were also significantly and positively connected to at least 4 of the 5 main dimensions of involvement. The motivation with which the fewest percent of respondents agreed ("It allows me to feel less guilty...") was not significantly connected to any of the dimensions of involvement.

Table 6. Sign-up reasons by involvement dimensions. Significance (p-values) for chi-square tests of the relationship between reasons for signing up for TreeKeepers (see full statements in Table 2), listed in categories (*in italics*) resulting from the factor analysis described below, and the five main dimensions of involvement (**bolded** column headings) and the specific kinds of TreeKeeper activities. All relationships are positive and significant relationship unless otherwise noted by (-). Only p-values <0.05 are shown for easier reading; blank cells indicate a non-significant relationship between the sign-up reason and involvement dimension.

(a)

Reason for signing up	Declared involved	Frequency	Recency	Breadth	Event leading	Plant	Prune	Mulch	Water	Teach	Inventory	Advocate
<i>Tree Functions^a</i>												
Heat, poll., flood	0.002	0.001	0.012	0.005		<0.001	0.001	0.001				
Climate change	<0.001	<0.001	<0.001	0.002		<0.001	0.007	<0.001			0.036	
Increase canopy				0.035	0.025							
Replace trees	0.021	0.021			0.040	<0.001		0.015	0.002			
<i>Recreational^a</i>												
To get outside	0.026	<0.001	0.011			0.004	0.036	<0.001				
Seemed interesting												
For exercise												
As a hobby						0.020						
<i>Green Thumb^a</i>												
Enjoy gardening						0.032 (-)						
Learn about trees				0.028						0.020 (-)		
Beautify neighb.									0.049			
<i>Additional reasons^b</i>												
Community service												
To act locally						0.035	0.050					
Know about gov.		0.002	0.030				0.046				0.049	
New/advance career		0.011	0.012	0.002		0.001	0.001	0.025				
Employer suggested												
Positive impact	0.019											
To meet new people		0.019										

^a Categories of motivations emerged from a principal component factor analysis described in the “Reducing the complexity” section of the text.

^b *Additional motivations* are those that either loaded onto factors that were not conceptually useful or were excluded from the factor analysis because they cross-loaded onto many factors.

Table 7. Significance (p-values) of relationship between continuing motivations by involvement dimensions and specific activities. Motivations for continuing involvement (see full statements in Figure 4), and the five main dimensions of involvement, plus specific TreeKeepers activities. All relationships are positive and significant unless otherwise noted by (+/-) indicating a mixed relationship where individuals who participate in a particular kind of activity both more strongly disagree and more strongly agree with that motivation. Only p-values <0.05 are shown for easier reading; blank cells indicate a non-significant relationship between the motivation and involvement dimension.

Continuing motivation	Declared involved ^b	Frequency ^c	Recency ^c	Breadth ^c	Event leading ^b	Plant ^b	Prune ^b	Mulch ^b	Water ^b	Teach ^b	Inventory ^b	Advocate ^b
<i>TK Program Structure^a</i>												
OL is responsive	0.012	<0.001	<0.001	<0.001		0.003	0.022	0.025			0.045	
Ownership in TK	<0.001	<0.001	<0.001	<0.001	0.014	<0.001	<0.001	<0.001	0.020		<0.001	
TK has impact	0.001	<0.001	<0.001	<0.001		0.011	0.010	0.009			0.044	
Say in TK	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001			0.004	
Like organization	<0.001	<0.001	<0.001	<0.001		<0.001		0.001				
<i>Community^a</i>												
Part of a community	0.003	0.003	0.019	<0.001		0.001	0.016	0.019	0.047			
Give back to comm.	0.002	0.002	0.001	0.002		0.003		0.021				
Like-minded people	0.002	0.036	0.002	<0.001		0.039		0.006				
Physical exercise	0.001	<0.001	0.004	0.004		0.030		0.034			0.014	
<i>Competence^a</i>												
Value in pruning	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d
Proud being TK	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d
Feel qualified	<0.001	<0.001	<0.001	<0.001	0.009	<0.001	0.001	0.001		0.022	0.017	
<i>Psychological^a</i>												
To feel less guilty												
Time to reflect	0.009	0.020			0.002							
<i>Values-Based^a</i>												
Value in planting	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d
Aligns with values	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d
<i>Career/Learning^a</i>												
Career experience		0.013	0.004			0.038	0.006 (+/-)	0.041				
Get away	0.023				0.028							
Enjoy learning about trees	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d
<i>Additional motivations^e</i>												
Protect environment	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d
Connected to land.	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d

^a Categories of motivations emerged from a principal component factor analysis described in the “Reducing the complexity” section of the text.

^b Chi-square tests were used to assess potential significant differences in the distributions of these binary (0/1) dimensions of involvement/specific activities and the 5-response choice Likert scale continuing motivation items.

^c Spearman’s rho coefficients were used to calculate the significance of a relationship between the ordinal dimensions of involvement (the frequency, recency, and breadth where higher levels indicate more frequent, more recent, and greater breadth of involvement, respectively) and the 5-response choice Likert scale continuing motivation.

^d We did not test significance for the relationships between these motivations and the dimensions of involvement because it’s not particularly helpful to understand any differences when over 90% of respondents “Agreed” or “Strongly Agreed” with these statements.

^e Additional motivations are those excluded from the factor analysis because they cross-loaded onto many factors.

Predicting Involvement Intensity Using a Multivariate Regression Model

Because the dimensions of involvement examined above in research question 3 are related to one another, we combined 4 of the dimensions (declared involved, frequency, recency, and breadth) into a single *involvement intensity* index via principal component factor analysis in order to holistically examine the complex of involvement dimensions as a single dependent variable. A Bartlett test of sphericity was highly significant ($\chi^2 = 489.0$, $p < 0.001$) and the Kaiser-Meyer-Olkin measure was high (KMO=0.800), indicating that the correlation between these variables was high and factor analysis was appropriate. A single factor was retained (Eigenvalue = 2.72) accounting for 68% of the variation in the survey sample ($n = 300$ respondents who answered all involvement-related survey questions). Cronbach alpha for the suite of variables used to develop the index was 0.775. This factor analysis yields a range of *involvement intensity* index scores ranging from -1.34 (least involved) to +2.26 (most involved), with average involvement corresponding to an index score of 0, below average involvement indicated by negative scores, and above average involvement indicated by positive scores. (Full factor analysis results for involvement intensity are reported in Table D5 and Figure D1 in Appendix D.)

The distribution of all respondents' involvement intensity scores is (expectedly) highly non-normally distributed (skewness = 0.202, kurtosis = 1.81; skewness-kurtosis joint test of non-normality $\chi^2 = 111.47$, $p < 0.001$). Because of this, we explore the connection between reported motivations for participation and the overall intensity of individuals' involvement in TreeKeepers using a regression model with *only those survey respondents who declared remaining involved*. The distribution of involvement intensity index scores is normally distributed for those who declared involvement (skewness = -0.101, kurtosis = 2.67; skewness-kurtosis joint test of non-normality $\chi^2 = 1.02$, $p = 0.6007$). We used the `regress` command in Stata, which utilizes the ordinary least squares method of multivariate regression, with robust standard errors, to see how involvement intensity (dependent variable) is predicted by the reasons individuals signed up for TreeKeepers and the factors that motivated them to continue volunteering with the program, how long an individual has been a TreeKeeper, TreeKeepers' event leadership, and the number of barriers experienced, while controlling for the suite of demographic characteristics, identification as an environmentalist, sense of personal efficacy, and volunteering commitments outside of TreeKeepers.

Table 8 displays the results of the best regression model—a full model with all variables included, which had the lowest AIC of several nested model permutations (see Appendix E for detailed regression results including model selection procedures and descriptive statistics for the 82 observations and 29 variables included in the final model). In this model, we find that, holding all else constant, those who signed-up for recreational reasons and those who were strongly motivated by the program's structure and a feeling of competence to continue volunteering were involved with a greater intensity, while those who were motivated for psychological (reflection, guilt) and value-based reasons were less intensely involved. We also found that, holding all else constant, the longer an individual had been a TreeKeeper the less intensely they were involved in the program, but that those who had led events were involved with greater intensity. Homeowners were, holding all else constant, more intensely involved relative to non-homeowners. And unsurprisingly, the more additional non-environmental volunteering an individual reported engaging in, the less intensely they were involved in the

Table 8. Full regression model to predict involvement intensity index score, for individuals declaring to have remained involved in TreeKeepers. Stars indicate significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Variable	Coef.	Robust Std. Err.	t- value	p- value	[90% Conf. Interval]	Signif.
Initial motivations						
<i>Sign-up factor: Tree Functions</i>	0.006	0.069	0.08	0.937	-0.110 0.121	
<i>Sign-up factor: Recreational</i>	0.154	0.075	2.05	0.045	0.028 0.280	**
<i>Sign-up factor: Green Thumb</i>	-0.047	0.077	-0.61	0.547	-0.175 0.082	
Continuing motivations						
<i>Motivation factor: TK Program Structure</i>	0.173	0.083	2.08	0.043	0.034 0.313	**
<i>Motivation factor: Community</i>	0.075	0.066	1.15	0.256	-0.035 0.185	
<i>Motivation factor: Competence</i>	0.199	0.095	2.09	0.041	0.040 0.358	**
<i>Motivation factor: Psychological</i>	-0.230	0.061	-3.75	<0.001	-0.333 -0.127	***
<i>Motivation factor: Value-Based</i>	-0.164	0.064	-2.56	0.013	-0.271 -0.056	**
<i>Motivation factor: Career/Learning</i>	-0.032	0.062	-0.52	0.604	-0.136 0.071	
Experiential factors						
<i>How long a TreeKeeper (# years)</i>	-0.043	0.014	-3.08	0.003	-0.067 -0.020	***
<i>Event leadership (0,1)</i>	0.280	0.150	1.87	0.067	0.029 0.532	*
<i># of barriers reported</i>	-0.052	0.078	-0.67	0.507	-0.183 0.079	
Demographics						
<i>Age (# years old)</i>	0.005	0.007	0.74	0.463	-.006 0.016	
<i>Female (0,1)</i>	0.064	0.139	0.46	0.650	-0.170 0.297	
<i>White (0,1)</i>	-0.206	0.199	-1.03	0.306	-0.539 0.127	
<i>Education (6 ordered categories)</i>	-0.030	0.055	-0.54	0.590	-0.121 0.062	
<i>Household income (6 ordered categories)</i>	0.024	0.047	0.51	0.615	-0.055 0.103	
<i>Working (0,1)</i>	0.023	0.214	0.11	0.916	-0.335 0.380	
<i>Homeowner (0,1)</i>	0.291	0.161	1.80	0.077	0.021 0.561	*
<i># kids under 18 in household</i>	0.104	0.087	1.20	0.235	-0.041 0.250	
Socio-cultural factors						
<i>Grew up around trees (0,1)</i>	-0.194	0.208	-0.93	0.355	-0.543 0.155	
<i>Grew up in city (0,1, rel. to rural env.)</i>	0.094	0.224	0.42	0.677	-0.282 0.469	
<i>Grew up in suburb (0,1, rel. to rural env.)</i>	0.020	0.182	0.11	0.914	-0.286 0.325	
<i>Identifying as an environmentalist (0,1)</i>	0.248	0.173	1.43	0.158	-0.042 0.537	
<i>Sense of personal efficacy (add. index, range 4-16)</i>	0.017	0.028	0.60	0.549	-0.030 0.063	
<i>Involved in other Openlands programs (0,1)</i>	0.122	0.159	0.77	0.446	-0.144 0.388	
<i>Other urban forestry volunteering (0,1)</i>	0.055	0.166	0.33	0.741	-0.222 0.332	
<i>Total # env. orgs. involved with</i>	0.003	0.050	0.07	0.948	-0.080 0.087	
<i>Total # non-env. orgs. involved with</i>	-0.120	0.060	-2.01	0.049	-0.220 -0.020	**
Constant	0.150	0.486	0.31	0.759	-0.664 0.963	
Mean dependent var.	0.770					
Std. dev. dependent var.	0.625					
N	82					
F	4.8					
Model significance (Prob > F)	<0.0001					
R ²	0.63					
Adjusted R ²	0.42					
AIC	133.68					
BIC	205.88					

Table 9. Standardized regression coefficients for significant variables from full regression depicted in Table 8, in descending order from the strongest magnitude effect on involvement intensity, based on the absolute value of the standardized coefficient.

Variable	Standardized regression coefficient
<i>How long a TreeKeeper (# years)</i>	-0.424
<i>Motivation: Psychological</i>	-0.363
<i>Total # non-env. orgs. involved with</i>	-0.293
<i>Sign-up: Recreation</i>	0.236
<i>Motivation: TK Program Structure</i>	0.230
<i>Event leadership (0,1)</i>	0.220
<i>Home owner (0,1)</i>	0.218
<i>Motivation: Values-Based</i>	-0.206
<i>Motivation: Competence</i>	0.180

TreeKeepers program. Of all the significant variables, the length of time an individual had been a TreeKeeper had the largest relative magnitude effect, followed by the psychological motivational factor, and then non-environmental volunteering (Table 9). Table 10 presents a qualitative summary of all our results.

DISCUSSION

Measuring Involvement: To Volunteer or Not to Volunteer—Is That the Only Question?

Why should we care about how we define “involvement” in urban forestry volunteer research? And, for long-term volunteering programs such as TreeKeepers in particular, why go any deeper than a binary metric of still involved or not still involved, or a simple measure like involvement frequency?

For the simplest metrics of involvement – frequency – we observed results consistent with the literature: Over one-third of those who remained involved participated in 1-2 events per year, with another quarter participating in 3-5 events per year (Table 5), which matched rates of volunteering observed in the aforementioned social capital community survey where plurality of individuals who volunteered at all volunteered between 1 and 5 times annually (Forbes and Zampelli 2014). An early study on conservation volunteering by Ryan et al. (2001) reported a 3 times per year average volunteering frequency, but 20% of that surveys’ respondents volunteered once per month.

However, “involvement” may mean different things to different volunteers, and frequency alone may incompletely capture what involvement means. For some respondents of our survey, involvement in the TreeKeepers program may mean something other than recently or frequently attending TreeKeeper events and activities. These respondents might find other ways to engage in tree care and advocacy even while they do not attend any TreeKeeper-branded/organized events or are no longer able to attend events as regularly as they perhaps once did. Since closed-ended survey questions did not fully capture the nature of participation for all

Table 10. Summary of antecedent, experiential, and motivational factors connected to the 5 separate dimensions of involvement, as well as the Involvement intensity index. (+) indicates a positive relationship, (-) a negative relationship, and (~) a mixed relationship (for categorical variables; see Results section text).

Involvement Dimension	Motivations for...				
	Antecedents	Experiential elements	...signing up for program	...continuing with program	
For all survey respondents	(1) Declared involvement	Identifying as an environmentalist (+) Personal efficacy sense: Local environment (+) Participating in other Openlands programs (+) Volunteering with other environmental organizations (+)	Length of time a TreeKeeper (-)	Address heat, pollution, flooding (+) Help mitigate climate change (+) Replace recently removed trees (+) To get outside (+) To have a positive impact on the community (+)	Openlands is responsive (+) Ownership in TK program (+) TreeKeepers has an impact (+) Say in TK (+) Like organization of TK program (+) To be part of a community (+) Give back to community (+) Like-minded people (+) Physical exercise (+) I feel qualified to be a TreeKeeper (+) Time to reflect (+) Get away from busy demands (+)
	(2) Frequency of involvement	Age (-) Personal efficacy sense: National government (+) Personal efficacy sense: Local government (+) Personal efficacy: Local environment (+) Participating in other Openlands programs (+) Volunteering with other environmental organizations (+)	Length of time a TreeKeeper (-)	Address heat, pollution, flooding (+) Help mitigate climate change (+) Replace recently removed trees (+) To get outside (+) Know more about local gov. (+) New/advance career (+) To meet new people (+)	Openlands is responsive (+) Ownership in TK program (+) TreeKeepers has an impact (+) Say in TK (+) Like organization of TK program (+) To be part of a community (+) Give back to community (+) Like-minded people (+) Physical exercise (+) I feel qualified to be a TreeKeeper (+) Time to reflect (+) Experience for a career (+)
	(3) Recency of involvement	Personal efficacy: Local environment (+) Participating in other Openlands programs (+) Volunteering with other environmental organizations (+)	Length of time a TreeKeeper (-)	Address heat, pollution, flooding (+) Help mitigate climate change (+) To get outside (+) Know more about local gov. (+) New/advance career (+)	Openlands is responsive (+) Ownership in TK program (+) TreeKeepers has an impact (+) Say in TK (+) Like organization of TK program (+) To be part of a community (+) Give back to community (+) Like-minded people (+) Physical exercise (+) I feel qualified to be a TreeKeeper (+) Experience for a career (+)

Table 10 continued.

Involvement Dimension		Motivations for...			
		Antecedents	Experiential elements	...signing up for program	...continuing with program
For all survey respondents	(4) Breadth of involvement	Identifying as female (~) Personal efficacy: Local environment (+) Participating in other Openlands programs (+) Volunteering with other environmental organizations (+)	Length of time a TreeKeeper (-)	Address heat, pollution, flooding (+) Help mitigate climate change (+) Increase trees and canopy (+) Learn about trees (+) New/advance career (+)	Openlands is responsive (+) Ownership in TK program (+) TreeKeepers has an impact (+) Say in TK (+) Like organization of TK program (+) To be part of a community (+) Give back to community (+) Like-minded people (+) Physical exercise (+) I feel qualified to be a TreeKeeper (+)
	(5) Event leadership	Age (+) Participating in other Openlands programs (+) Volunteering with other urban forestry organizations (+)	Length of time a TreeKeeper (+)	Increase trees and canopy (+) Replace recently removed trees (+)	Ownership in TK program (+) I feel qualified to be a TreeKeeper (+) Time to reflect (+) Get away from busy demands (+)
Involvement intensity (index of (1)-(4) above, examined for those remaining involved only)		Homeowner (+) Volunteering with other <i>non</i> -environmental organizations (total # involved with: -)	Length of time a TreeKeeper (-) Leading an event (+)	Sign-up factor: Recreation (+)	Motivation factor: TK Program Structure (+) Motivation factor: Competence (+) Motivation factor: Psychological (-) Motivation factor: Values-Based (-)

those who identify as TreeKeepers, we turned to qualitative, text responses to open-ended survey questions by respondents with unexpected combinations of responses to these involvement and participation questions. Of these, many stated that they still consider themselves involved with the TreeKeepers community despite an inability to physically participate in events; their involvement in the program may mainly be through online methods (reading or contributing to newsletters/emails, social media, spreading the word, advocating for trees in other ways, etc.) or through giving money to Openlands/TreeKeepers (for example, one respondent stated, “Advancing years have limited my physical abilities. My support is now just financial”). Other respondents stated they have since moved away from the area or are no longer able to make time for TreeKeepers events but support the program in spirit. Our survey results also revealed that it matters how long someone has been a TreeKeeper, with those who matriculated in the program earlier more likely to have led an event, but to be involved less frequently, less recently, less broadly, and with overall less intensity.

To a volunteer program like TreeKeepers, which requires sustained engagement of individuals and strives to *maintain* the urban forest (that is pruning, mulching, advocacy—not just planting trees), developing skilled volunteers with expertise and commitment in the issues is crucial to achieving program objectives. Westphal (1992: 16) noted in the early study of the TreeKeepers program development and launch that municipal stakeholders had initial concerns that “volunteers would presume more expertise than they actually had, and become a hindrance instead of a help.” Based on the authors’ conversations with TreeKeepers program managers and Chicago municipal foresters, this has not been true generally of TreeKeepers. Further, one way of making sure that the resources Openlands and other partners invest in volunteer training doesn’t go to waste is to make sure that the volunteers not only continue their involvement but are also broadly and frequently involved. Breadth of involvement may not matter to all kinds of volunteering, but for urban forestry stewardship initiatives like TreeKeepers with a multitude of topic and skill areas, having sustained volunteers who participate across multiple activity areas strengthens the program.

Motivations: Trees, Community, and Program Design

We investigated the relationship between dimensions of involvement, initial and continuing motivations, and volunteer antecedents. To summarize in words, individuals signed up for the trees, continued for the community, intensified their involvement because of the TreeKeepers program structure (Table 10).

TreeKeepers reported overwhelmingly being motivated by wanting to learn about trees. Further, those who were motivated to sign-up by the functions of trees (benefits, increased canopy) were more likely to declare remaining involved, and were more frequently, recently, and broadly involved (Table 10), even though these kinds of motivations were not the most highly ranked (Table 2). The proportion of respondents motivated by tree functions/environmental benefits in our study mirrors that of a survey of volunteers at MillionTreesNYC tree-planting events conducted in 2010, where 30% of respondents mentioned the environmental benefits of trees (Moskell et al. 2010). However, among those volunteers who declared remaining involved, the tree functions sign-up motivations factor was not a significant predictor of overall involvement intensity. Instead, those motivated to sign-up as recreation were more likely to be

more intensely involved, which is logical since intense involvement would afford one more opportunities to exercise and get outside. Takase et al. (2019) also observed exercise and recreation as two of the top three most highly ranked reasons for Japanese citizens engaging in conservation volunteering.

Community-related motivators also ranked highly among all survey respondents. We observed that TreeKeepers motivated by community factors were more likely to declare having remained involved, and were involved more frequently, recently, and broadly. Some previous qualitative research has also found that community factors motivated volunteers (Pike et al. 2020; Foster 2021), though quantitative studies using survey data tend to find other motives rank more highly (see studies summarized in Table A2 in the Appendix). However, as for tree function motives, among those TreeKeepers declaring to have remained involved, we did not observe the community motivational factor significantly related to involvement intensity. This is contrary to Asah and Blahna (2012) who observed a significant impact of community motivations on volunteer commitment.

That neither tree functions nor community reasons sufficiently motivate increased involvement intensity may be connected to the consistently positive impact of TreeKeeper program structure on all dimensions of involvement and involvement intensity. For TreeKeepers, it is not only the general community but specifically the TreeKeeper program they find motivating. Respondents who are more strongly motivated by the TreeKeeper program structure, who feel that they have a say/ownership in the program, and who agree that Openlands is responsive to their input are more frequently, recently, and broadly involved, and with an overall greater intensity (Table 10). This aligns with urban environmental stewardship research by Ryan et al. (2001), which is one of the only other studies that considered volunteer program characteristics as a motivational factor they called “Project organization.” That factor included the following motivational items: “Projects are well organized,” “Feeling needed,” “Knowing what is expected of me,” and “Working with a good leader” (Ryan et al. 2001). These authors used a multiple regression analysis to assess the impact of motivations on volunteer commitment and found that the project organization factor was a significant and positive predictor of commitment, with a stronger relationship than the other motivational factors.

Findings from the broader volunteering literature have also observed that organizational and volunteering program characteristics matter. It is possible that being motivated by TreeKeepers structure and organization is in fact a measure of how integrated socialized a TreeKeeper is into the program. Garner and Garner (2011) examined the motivations of volunteers as connected to volunteer retention and communication with the organization with whom individuals are volunteering. They observed that volunteer “satisfaction with integration”—that is, how integrated they felt with the organization—was positively connected to retention (Garner and Garner 2011: 826). In a study of the relationship between volunteering motivations and “organizational socialization,” defined as “the process by which a new volunteer becomes a full member of the organization and acquires expected behaviors, values, and skills necessary to assume [their] role,” Livi et al. (2020: 252) found that a connection between prosocial personalities of volunteers and an intention to continue volunteering was mediated by organizational socialization.

Research on the nonprofit organizations themselves connects the structure of the parent organization to the quality of volunteers' experiences. Arnon, Almog-Bar, and Cnaan (2023), in a synthesis of the volunteering and nonprofit management literatures, proposed the concept of *engageability*, "which refers to the ability of volunteer-employing nonprofit organizations to engage, motivate, and manage volunteers to maximize their potential and sustain the volunteering human resource" (p. 1649). The Arnon et al. (2023) framework proposes four sets of organizational characteristics relating to values/organizational ideology, management of volunteers, physical and other resources dedicated to volunteers, and "supportive connections" that when optimized result in an engaged volunteer-organizational relationship. Our survey results indicate that Openlands' TreeKeepers program meets many of these characteristics for engageability, especially as related to cultivating a positive volunteer culture.

Who Volunteers? Antecedents to Volunteering

We close this Discussion with a reflection on the characteristics of volunteers and the socio-cultural factors connected to their propensity for volunteering. Who volunteers are before they volunteer matters primarily for two related reasons. First, *recruitment*: knowing who volunteers are as connected to their motivations can help with targeted recruitment efforts. This can yield either more of the same kinds of volunteers – appealing to the motivation of spending time with "like-minded people" – or more of the kinds of volunteers who are different from existing volunteers, yet more representative of the target communities in which volunteering is occurring. This latter kind of recruitment leads to the second reason it is important to know who volunteers: *diversity*. Making sure urban environmental stewardship volunteer groups include diverse individuals, experiences, and points of view is crucial to their long-term success. Representativeness has been discussed in the volunteering literature. Among the eight dimensions proposed by Nesbit, et al. (2018) for examining volunteer involvement is volunteer representativeness of relevant communities. In a recent study using volunteering data from the U.S. census from 2002 to 2014, Jo, Paarlberg, and Nesbit (2023) examined impact of community racial composition on the volunteering behaviors of people of color. They found Black and Hispanic people are less likely than Whites to volunteer with any kind of organization (religious, children's, and social/community service organizations), but that Hispanics increase their volunteering for community organizations as the percentage of Hispanics in the community increases (Jo et al. 2023). This indicates that having a group of volunteers where demographics mirror the broader community may be important to recruiting and sustaining involvement.

At the time of our surveying in late 2019, the vast majority of TreeKeeper participants are White. TreeKeeper participant demographics mostly align with those found in the urban forestry volunteering literature reviewed by (Elton et al. 2023): volunteers are generally college-educated, working White females aged 61 or older who own their own homes (cf., (Moskell et al. 2010; Fisher et al. 2015; Johnson et al. 2018; Wolf et al. 2021). The demographics of our contemporary TreeKeepers somewhat matched those of Westphal's 1992 survey of the earliest participants in the program, who were two-thirds female and 85% White, but were younger than our respondents. Sixty percent of Westphal's respondents fell into the 30-49 age range, and some of those TreeKeepers are still involved nearly 30 years later and responded to our survey (Figure 2). However, the overall population in the City of Chicago is 42% White, 29% Black, and 29% Hispanic or Latino (<https://www.census.gov/quickfacts/chicagocityillinois>).

Some efforts at recruiting greater racial diversity into the TreeKeepers program were ongoing at the time of our research and since. At the time of this writing, efforts to recruit more diverse TreeKeeper cohorts are already well underway at Openlands, beginning in 2022 and 2023 with the first Spanish-language classes that graduated 29 new TreeKeepers and counting. Cities and organizations across the United States are becoming more focused on meeting diversity, equity, and environmental justice goals. The U.S. Forest Service \$1.1 billion of Inflation Reduction Act funding in 2023 explicitly targeted “disadvantaged communities,” reflecting this equity-focused approach (<https://www.fs.usda.gov/managing-land/urban-forests/ucf/2023-grant-funding>). In Chicago, in 2021, the city launched “Our Roots,” which aims to plant trees in target community areas with the lowest overall tree canopy cover and with recent declines in canopy cover (<https://www.chicago.gov/city/en/sites/our-roots-chicago/home.html>). Our Roots empowers Tree Ambassadors, organizations from these target areas trained to advocate for trees in the community and encourage 311 resident requests for street tree planting. By design, Tree Ambassadors are representative of their neighborhoods and, although not true “volunteers” since they are compensated for their work to promote trees, this kind of program is a model for obtaining a more diverse group of urban forest stewards.

The other major finding of our examination of antecedent factors was related to the socio-cultural factors. Personal efficacy and social capital in the form of volunteering *outside of* TreeKeepers were both positively associated with many of the dimensions of involvement (Table 10). This aligns with Forbes and Zampelli’s (2014) findings that individuals with higher social capital, including formal group involvement, were more likely to volunteer. Other studies in urban forestry have observed that volunteers engaged in stewardship are also involved in other volunteering efforts: Research in New York city observed that 34% of the volunteer tree stewards/planters were involved with other environmental organizations, and volunteers were more likely than the national average to have attended a recent meeting “at which there was discussion of community affairs” (Fisher et al. 2015: 56). In our study, we found an even larger proportion of our study population engaged in other kinds of volunteering. Sixty-six percent of respondents reported volunteering with another local environmental organization (Table C3 in Appendix C), and sixty-four percent volunteered with some kind of non-environmental organization (Table C4); 89% volunteered in some capacity in addition to the TreeKeepers program. However, it is also possible that some of these folks may be *more* involved in other organizations than they are with TreeKeepers, since we observed that the more non-environmental organizations an individual was involved with, the less intensely they were involved with TreeKeepers.

Interestingly, Westphal’s 1992 survey found that over 40% of early TreeKeepers were *not* involved with any other environmental organizations (though 34% were in two or more groups). Given the 89% of our respondents who volunteer with other groups, it may be that since the TreeKeepers program began, those who are involved in TreeKeepers are joining other organizations at greater rates. It may be that contemporary TreeKeepers are coming to the program with stronger social networks: For the first TreeKeeper courses, the bulk of recruitment was through the Illinois Master Gardener program and public service announcements on Chicago’s National Public Radio (NPR) station (Westphal 1992). Of course, at the beginning, there were no other existing TreeKeepers to recruit newbies into the program, which is a common recruitment method at present. contemporary TreeKeepers responding to our survey

nearly 30% were recruited through another TreeKeeper or a friend or family member (Table C6 in Appendix C).

Regardless of the mechanism, TreeKeepers in our study are “joiners,” meaning they are the kinds of people who seek out social opportunities for group membership. The question from an implications and recruitment standpoint then becomes the extent to which the TreeKeepers parent organization Openlands wants to lean into this finding. Currently, only 10% of TreeKeepers come through other environmental organizations (Table C6 in Appendix C). Openlands could target TreeKeepers recruitment through other environmental organizations where there might be individuals interested in addressing heat, pollution, flooding, and climate change through tree-related stewardship activities. Based on our survey results, these kinds of individuals would be likely to remain involved at high levels, *as long as* they are not also involved too intensely with too many other kinds of non-environmental volunteer groups. However, this approach may be at odds with the desire for a more diverse volunteer base.

CONCLUSION AND IMPLICATIONS

The results of this survey-based research can be summarized as, *come for the benefits of trees, stay for the community, dig in for the program*. TreeKeepers were highly motivated to learn about trees, those who were motivated by the heat-, pollution-, and climate change-mitigating functions of trees stayed and became more intensely involved. Further, TreeKeepers were motivated to continue volunteering with the program to be part of and give back to the community, but also and perhaps especially by the structure and organization of the TreeKeepers program, which encouraged volunteers to “dig in,” so to speak, and become more intensely involved in the TreeKeepers program. That the structure and organization of the program mattered so consistently to volunteer involvement levels has implications for practice. Based on our research, we recommend that the Openlands continue to involve TreeKeepers volunteers closely in the program, to ensure they keep individuals feeling that the organization is responsive and individual volunteers have a say in the program. As this and other urban forestry volunteering programs continue to diversify their volunteer base, keeping volunteers well-integrated into the program will make sure that these new, diverse volunteers are committed not just to the trees and the community, but to the mission of TreeKeepers as “leading neighbors in protecting our urban forest” (<https://openlands.org/programs/treekeepers-certification-and-program/>).

AUTHOR CONTRIBUTION STATEMENT OF CRediT

Author contributions for the above work, as defined by the Contributor Roles Taxonomy (<https://casrai.org/credit/>), are as follows: JV (principal investigator; Conceptualization, Funding Acquisition, Methodology, Investigation, Data Curation, Formal Analysis, Supervision, Visualization, Writing – Original Draft Preparation), AN (Methodology, Investigation, Data Curation, Formal Analysis – preliminary), CC (Methodology, Investigation, Data Curation, Formal Analysis – preliminary), AD (Conceptualization, Methodology, Writing – Review & Editing).

APPENDIX A. LITERATURE REVIEW DETAILS

Table A1. Antecedent factors that have been linked to volunteerism, as summarized by Synder and Omoto (2008) and Wilson (2012). All factors positively associated unless followed by a minus sign (-) to indicate a negative association or tilde (~) to indicate a mixed relationship (evidence has observed both positive and negative or non-linear associations) or a categorical variable.

<p><i>Demographics</i></p> <ul style="list-style-type: none"> Educational achievement Youth Older adults (retirees) Being female Race (~) Immigration status (~) Citizenship Married with children Working part-time Having job autonomy Middle-income Low-income (-) <p><i>Religiosity</i></p> <ul style="list-style-type: none"> Religious involvement during youth Religious definitions of morality Spirituality 	<p><i>Self-interest related</i></p> <ul style="list-style-type: none"> “Being seen doing good” To make friends/social connections To prepare for labor force reentry (when unemployed) New career opportunities Gaining skills Lack of free time (-) <p><i>Personality traits</i></p> <ul style="list-style-type: none"> Extraversion Agreeableness Empathy Resilience Being a “helper” Low self-esteem and negative self-perceptions (-) Socially anxious (-) 	<p><i>Socio-cultural factors/Social capital</i></p> <ul style="list-style-type: none"> Solidarity with others Escaping social stigma (e.g., of being unemployed) Extensive social networks Positive feelings about one’s neighborhood/community Ethnically diverse communities (-) Democratic societies (~) Collectivist societies “Modernized” societies
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Table A2. Motivational categories for select QUANtitative, QUALitative, and SYNthesis (literature review) studies in the urban greening-related volunteering literature. Listed in chronological order.

Citation	Methods	Motivational categories or themes, listed in descending order of dominance, importance or significance if available
Ryan, Kaplan, and Grese (2001)	QUAN: Factor analysis of 19 survey items	5 factors, <i>ranked by mean agreement scores</i> : Helping the environment, Learning, Project organization, Social, Reflection + 2 items not in factors (Doing something useful, Making decisions about projects)
Measham and Barnett (2008)	SYN: Qualitative, narrative assessment of environmental volunteering literature	6 themes, <i>unranked</i> : Contributing to community, Social interaction, Personal development, Learning about the environment, General ethic of care for the environment, Attachment to a particular place
Moskell et al. (2010)	QUAL: Thematic coding of open-ended questions from face-to-face surveys	6 themes, <i>ranked by % of respondents mentioning</i> : Environmental benefits of trees, Community service, Benefits to youth, Enjoyment from planting trees, Need for more trees, As part of a school class
Bramston, Pretty, and Zammit (2011)	QUAN: Factor analysis of 16 survey items	3 factors, <i>ranked in order of average factor score</i> : Environmental caring, Social belonging, Learning
Asah and Blahna (2012)	QUAN: Factor analysis of 24 survey items	6 factors, <i>ranked in order of average item score</i> : Environment, Community, Social interactions, Ego defense and enhancement, Escape and exercise, Caring and learning
Asah, Lenintine, and Blahna (2014)	QUAL: Thematic coding of narrative responses to open-ended survey questions	24 “subthemes,” <i>by frequency of expression</i> : Positive emotions, Community, Socializing, Meaningful action, Values, Learning, Altruism, Dependence on volunteers, Career, Satisfaction, Health, Help environment, Sharing knowledge and using skills, Ego defense and enhancement, Social identity, Get outside, Protect the environment, Personal growth, Preventative-protection, Recreation, User, Legacy for future generations, Time rather than money, Convenience
Johnson et al. (2018)	QUAL: Thematic coding of interviews	8 themes, <i>ranked by % of respondents mentioning</i> : Values, Contribute, Educate/learning, Incentive, Fun/enjoyment, Past experience, Outdoors, Social/meet people
Pike, Brokaw, and Vogt (2020)	SYN: Non-exhaustive literature review of 11 studies on environmental, urban conservation, and urban forestry volunteering (<i>from literature reviewed in Introduction</i>)	9 themes, <i>ranked by number of citations examining each</i> : Learning-related, Social interaction, Environmental stewardship, Personal development, Community-driven, Place attachment, Career-focused, Feeling of doing something useful/wanting to contribute, Values, esteem, and ego
	QUAL: Thematic coding of open-ended survey responses (<i>from the original researcher presented in Results</i>)	14 themes, <i>ranked by % of respondents mentioning</i> : Help the community, Help the environment, Community service, Appreciate nature, Social interaction, Fun experience, Organization partnership, Knowledge-based, University partnership, Extra credit, Employer partnership, General desire to help, Career-related
Foster (2021)	QUAL: Thematic coding of interviews, participatory observation, and walking tours	3 themes, <i>equally dominant</i> : Attachments to community, Attachments to neighbors and fellow participants, Attachments to non-human others
Wolf et al. (2021)	QUAN: Factor analysis of 16 survey items	8 factors, <i>ranked in order of average item score</i> : Outward caring, Legacy commitment, Group cohesion, New understandings, Personal esteem, Enhancement, Social esteem, Protective mood, Career development
Elton et al. (2023)	SYN: Semi-systematic literature review of 15 urban forestry and urban greening volunteering literature	8 categories, <i>ranked by number of citations examining each</i> : Social, Environmental, Personal/psychological, Educational, Economic, Recreational, Aesthetic/functional, Skills/professional development-related

APPENDIX B. SURVEY

The full questionnaire administered in Qualtrics online survey software that was utilized for this study appears on the subsequent pages.

It has been approved by the Institutional Review Board of DePaul University, study number JV100219CSH-R2.

Survey information and consent page

Q1.

Thank you for your interest in the TreeKeepers Survey!

This research study is being conducted by DePaul University. We are interested in why and how individuals become involved with the TreeKeepers program, and the motivations and barriers to continue engagement through TreeKeepers events and continuing education.

If you agree to be in this study, you will be asked to fill out the following online survey. The survey will include questions about your involvement in the TreeKeepers program, attitudes about trees and the environment, and basic demographic questions. The demographic questions ask about age, race, gender, education and career status, living situation, and household income. The questions hope to gain a better understanding of the motivations and barriers that affect TreeKeepers' volunteer engagement, and their volunteer experience with TreeKeepers thus far. We also ask about other volunteer experiences, environmental attitudes, and perceptions of trees. The survey will be completed online via Qualtrics. If there is a question you do not want to answer, you may skip it.

This study will take about 20 minutes of your time. Research data collected from you will be confidential.

Your participation is voluntary, which means you can choose not to participate. There will be no negative consequences if you decide not to participate or change your mind later after you begin the study.

You can withdraw your participation at any time. If you change your mind while answering the survey, you may simply exit the survey. You can withdraw your participation after completing the survey and submitting your responses by contacting the researcher, Jess Vogt, at jess.vogt@depaul.edu. Since the information you gave me is still identifiable and linked to your email address, I can remove your data from the research at any time.

Your decision to participate or not in the research will not affect your status as a TreeKeeper or with Openlands.

You must be age 18 or older to be in this study. This study is not approved for the enrollment of people under the age of 18.

If you have questions, concerns, or complaints about this study or you want to get additional information or provide input about this research, please contact Jess Vogt at jess.vogt@depaul.edu.

If you have questions about your rights as a research subject, you may contact Susan Loess-Perez, DePaul University's Director of Research Compliance, in the Office of Research Services at 312-362-7593 or by email at sloesspe@depaul.edu. You may also contact DePaul's Office of Research Services if:

Your questions, concerns, or complaints are not being answered by the research team. You cannot reach the research team. You want to talk to someone besides the research team. You may print this information for your records.

By completing the survey, you are indicating your agreement to be in the research.

Please click the button below to begin the survey.

Principal Investigator: Dr. Jess Vogt, Assistant Professor, Department of Environmental Science and Studies, DePaul University, Chicago, IL, USA

Survey questions 2 through 6

Q2. How did you first hear about the TreeKeepers program?

- | | |
|---|--|
| <input type="radio"/> Another active TreeKeeper | <input type="radio"/> News article or news outlet (including on the radio) |
| <input type="radio"/> An organized event (like Earth Day or an Openlands tree planting) | <input type="radio"/> Community organization |
| <input type="radio"/> Environmental organization | <input type="radio"/> Mailing list |
| <input type="radio"/> My employer/company | <input type="radio"/> Social media |
| <input type="radio"/> A college/university professor/teacher | <input type="radio"/> Already a member of Openlands |
| <input type="radio"/> Friend, family member, or acquaintance | <input type="radio"/> Other: <input type="text"/> |

Q3.

At the time you first became interested in TreeKeepers, did you know someone who had previously attended the TreeKeepers program?

- Yes
 No

Q4. Why did you sign up for the TreeKeepers program? Check all that apply.

- | | |
|--|---|
| <input type="checkbox"/> To have a positive impact on the community | <input type="checkbox"/> Beautify the neighborhood |
| <input type="checkbox"/> Community service hours or opportunity | <input type="checkbox"/> I enjoy gardening |
| <input type="checkbox"/> To meet new people | <input type="checkbox"/> To get outside |
| <input type="checkbox"/> To act locally | <input type="checkbox"/> For exercise |
| <input type="checkbox"/> Know more about local government | <input type="checkbox"/> New career or to advance my career |
| <input type="checkbox"/> Help mitigate climate change | <input type="checkbox"/> Employer suggested/required it |
| <input type="checkbox"/> Address heat, pollution, or flooding issues | <input type="checkbox"/> As a hobby |
| <input type="checkbox"/> Learn about trees | <input type="checkbox"/> Seemed interesting |
| <input type="checkbox"/> Increase trees and canopy cover | <input type="checkbox"/> Other reason. Please specify: <input type="text"/> |
| <input type="checkbox"/> Replace recently removed trees | |

Q5. Have you remained involved in TreeKeepers since completing the TreeKeepers classes?

- Yes
 No

Q6. When was the last TreeKeepers event you participated in?

Survey questions 7 through 13

Q7. How many TreeKeepers events do you participate in per year?

- 0 events per year
- 1-2 per year
- 3-5 per year
- 6-10 per year
- 11-15 per year
- More than 15 events or activities per year

Q8. Have you ever led or participated in a group that organized a TreeKeepers event?

- Yes
- No

Q9. How many TreeKeepers events have you led/organized?

Q10. When was the most recent event you led/organized?

Q11. What worked well for this event?

Q12. What obstacles, barriers, or problems did you encounter for this event and how did you solve them?

Q13. What TreeKeepers activities do you currently participate in? Check all that apply.

- Planting
- Pruning
- Mulching
- Watering
- Teaching
- Inventory/Adopting a park
- Advocating (for example, contacting a representative); please specify:
- Other:
- I am not currently active in any TreeKeepers activities

Survey questions 14 through 15

Q14. Have you experienced other Openlands programs or project areas? Please select all that apply.

- | | |
|--|--|
| <input type="checkbox"/> TreePlanters Grants | <input type="checkbox"/> ComEd Green Region |
| <input type="checkbox"/> Public Forestry Events | <input type="checkbox"/> Openlands Lakeshore Preserve |
| <input type="checkbox"/> Tree-Mendous Tree Stories | <input type="checkbox"/> Hackmatack National Wildlife Refuge |
| <input type="checkbox"/> Building School Gardens | <input type="checkbox"/> The Chicago Region Trees Initiative |
| <input type="checkbox"/> Eco-Explorations | <input type="checkbox"/> None |
| <input type="checkbox"/> Space to Grow | <input type="checkbox"/> Other: <input type="text"/> |
| <input type="checkbox"/> Birds in my Neighborhood | |

Q15. Are there other organizations outside of Openlands and TreeKeepers with whom you've been engaging in urban forestry or tree activities?

- Yes, please specify:
- No

Q16. Have you volunteered with any of the following **environmental organizations** in the past 2 years? Check all that apply.

- | | |
|--|---|
| <input type="checkbox"/> Audubon Society | <input type="checkbox"/> The Morton Arboretum |
| <input type="checkbox"/> Blacks In Green | <input type="checkbox"/> The Nature Conservancy |
| <input type="checkbox"/> Chicago Botanic Garden | <input type="checkbox"/> NeighborSpace |
| <input type="checkbox"/> Chicago Wilderness | <input type="checkbox"/> Sierra Club |
| <input type="checkbox"/> The Field Museum | <input type="checkbox"/> Student Conservation Association (SCA) |
| | <input type="checkbox"/> A local nature learning center (for example, Dunes Learning Center) |
| <input type="checkbox"/> Faith in Place | <input type="checkbox"/> A garden club or similar |
| <input type="checkbox"/> Forest Preserve District or Friends of the Forest Preserve group (Cook, DuPage, etc.) | <input type="checkbox"/> A high school/college/university environmental club or organization |
| <input type="checkbox"/> Friends of Parks (Chicago Parks District), or other parks group | <input type="checkbox"/> A "green team" or work-related environmental group |
| <input type="checkbox"/> Gods Gang | <input type="checkbox"/> A neighborhood environmental group (block clean-up, recycling group, etc.) |
| <input type="checkbox"/> Greenpeace | <input type="checkbox"/> Other environmental group not listed above:
<input type="text"/> |
| <input type="checkbox"/> Habitat 2030 | |
| <input type="checkbox"/> Little Village Environmental Justice Organization (LVEJO) | |

Survey questions 17 through 20

Q17. Have you volunteered with any of the following types of **non-environmental organizations** in the past 2 years? Check all that apply.

- Community services organization (homeless shelter, soup kitchen, animal shelter, etc.)
- Cultural organization (museum, aquarium, etc.)
- Health group (hospital, community health center, etc.)
- High school or college group or club, not related to the environment (as a student)
- Neighborhood group (neighborhood association, local chamber of commerce group, etc.)
- Parent group (Moms group, Dads group, parent teacher association, etc.)
- Political group (local political party, poll worker, etc.)
- Religious group (church, synagogue, mosque, etc.)
- Youth services organization (after school/extracurricular, youth sports, etc.)
- Other:

Q18. How much influence do you think someone like you can have over the following?

	A lot of influence	Some influence	Very little influence	No influence
National government decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Local government decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The global environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Local environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q19. Do you describe yourself as an environmentalist?

- Yes
- No

Q20. What has motivated you to stay involved in the Tree Keepers program?

Survey question 21

Q21. The following is a list of statements with reasons people might volunteer with a group like TreeKeepers.

Please rate the extent to which you agree or disagree with each statement.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	N/A
I volunteer with TreeKeepers to help protect the environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I volunteer with TreeKeepers to feel connected to my surrounding landscape	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I volunteer with TreeKeepers because I want to gain experience for a future career	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I volunteer with TreeKeepers because I enjoy learning new things about trees	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I volunteer with TreeKeepers to be part of a community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	N/A
I volunteer with TreeKeepers so I can give something back to my community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I volunteer with TreeKeepers because I enjoy the physical exercise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I volunteer with TreeKeepers to get away from the busy demands of everyday life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I volunteer with TreeKeepers because I enjoy being with like-minded people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I volunteer with TreeKeepers because it allows me to feel less guilty about the problems we cause to the environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	N/A
I volunteer with TreeKeepers because their work aligns with my values	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I volunteer with TreeKeepers because I like the way the program is organized	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I volunteer with TreeKeepers because it allows time to reflect	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey questions 22 through 26

Q22. The next couple questions ask about how you get to TreeKeepers events.

Q23. How long was the commute to the most recent TreeKeepers event you participated in?

- Under 15 minutes
- 15 - 30 minutes
- 30 - 45 minutes
- 45 - 60 minutes
- 60 - 90 minutes
- 90+ minutes

Q24. What was the longest commute you've experienced in order to attend a TreeKeepers event?

	Hours:	Minutes
Total Time	<input type="text"/>	<input type="text"/>

Q25. How do you usually get to TreeKeepers events? Please select as many as apply if you use multiple forms of transportation.

- Bus
- CTA Train ("E" or "L")
- Metra
- Bike
- Taxi, Uber, Lyft, or shared ride
- Personal vehicle
- Walk
- Carpool

Q26. If Tree Keepers organized carpooling to events is this something you would use?

- Yes
- No

Survey questions 27 through 30

Q27. This next set of questions asks for your opinion and knowledge about trees.

Q28. Please list up to 5 benefits of trees you can think of, in order of importance:

1 (most important)	<input type="text"/>
2	<input type="text"/>
3	<input type="text"/>
4	<input type="text"/>
5	<input type="text"/>

Q29. Please list up to 5 costs/drawbacks of trees you can think of, in order of impact:

1 (largest impact)	<input type="text"/>
2	<input type="text"/>
3	<input type="text"/>
4	<input type="text"/>
5	<input type="text"/>

Q30. Please rate the extent to which you agree or disagree with the following statements.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	N/A
I feel proud being a TreeKeeper.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel like I have a say in the direction of TreeKeepers work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Openlands is responsive to the needs of my community related to trees.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
TreeKeepers has an impact on my community.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	N/A
I feel a sense of ownership in the TreeKeepers program.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel qualified to be a TreeKeeper.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I see value in planting trees.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I see value in pruning trees.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey questions 31 through 35

Q31. Please rate the extent to which you agree or disagree with the following statements.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	N/A
It is easy for me to find out when and where TreeKeepers events are happening.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of transportation prevents me from attending TreeKeepers events.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel comfortable bringing my kids to TreeKeepers events.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	N/A
A busy work week prevents me from going to TreeKeepers events.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
TreeKeepers events are generally at a time of day that is convenient for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical or mobility issues prevent me from attending TreeKeepers events.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q32. Thank you for your completion of the survey so far! We have just a few more questions that ask about your opinions on trees, and then some basic demographic questions.

Q33. Is there a particular tree or kind of tree that is (or was) special or important to you?

- Yes
- No

Q34. What is (or was) special or important about this tree or trees?

Q35. For each of the following, select the option that best describes how much you know about that topic.

	A lot	A moderate amount	A little	None at all
Tree identification	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tree planting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tree pruning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tree watering	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mulching trees	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other post-planting tree care (pest/disease identification, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advocacy on behalf of trees	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey questions 36 through 37

Q36.

For each of the following, select the option that best describes how confident you are that you could do that task.

	Very confident	Moderately confident	Slightly confident	Not confident at all
Identify the species of a tree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Properly plant a tree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Properly prune a tree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Water a tree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Properly mulch a tree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How to contact my representative about tree concerns	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q37. This last set of questions asks you about the environment where you grew up as well as some standard demographic questions. We really appreciate your completion of our survey.

Survey question 38

Q38. Which picture best depicts the environment where you grew up?

A forest with lots of trees



Rural agricultural fields



City neighborhood without trees



City neighborhood with trees



Neighborhood in the desert



Neighborhood in the mountains



City apartment building without trees



City apartment building with trees



Suburban neighborhood without trees



Suburban neighborhood with trees



Street with high-rise buildings, without trees



Street with high-rise buildings, with trees



Survey questions 39 through 47

Q39. In what year were you born?

Q40. Please identify your gender.

Q41. What race(s)/ethnicity(ies) do you consider yourself to be?

Q42. Which of the following categories best describes the highest educational level you completed?

- Less than high school
- High school or GED equivalent
- Some college or technical training
- College graduate
- Some graduate training
- Post graduate degree

Q43. Which of the following best describes your current employment status?

- Working full time for pay
- Working part time for pay
- Full-time student
- Part-time student
- Unemployed or laid-off
- Unemployed and not seeking employment
- Retired

Q44. Which of the following best describes where you live?

- Own your own place of residence
- Rent from a private individual or company
- Live in public housing
- Live with family

Q45. Including yourself, how many people live in your household?

Q46. How many are under the age of 18?

Q47. What is your family status?

- Married or marriage-like relationship
- Divorced or seperated
- Widowed
- Single

Survey questions 48 through 51 (end of survey)

Q48. During 2017, what was your yearly household income before tax? Your best estimate is fine.

- Under \$15,000
- \$15,000-\$49,999
- \$50,000-\$99,999
- \$100,000-\$149,999
- \$150,000-\$249,999
- More than \$250,000
- Prefer not to answer

Q49. Are there any particular positive or negative experiences with the TreeKeepers program that you would like to tell us about? Please do so here.

Q50. Would you be willing to be contacted to participate in a follow-up interview with researchers about your experiences with the TreeKeepers program? *(Note that your interview participation and responses would also be kept confidential and shared with Openlands only in the aggregate, along with the responses of other interview participants.)*

- Yes
- No

Q51. Thank you for responding to our survey!

Click the arrow below to submit your responses.

APPENDIX C. ADDITIONAL SURVEY RESULTS

Table C1. Involvement of survey respondents in other Openlands programs.

Openlands Program Area	# of respondents	% of respondents
Chicago Region Trees Initiative ^a	54	16%
Openlands Lakeshore Preserve	46	14%
TreePlanters Grants ^b	34	10%
Public Forestry Events	33	10%
Birds in my Neighborhood	30	9%
Building School Gardens	22	7%
Space to Grow	15	5%
Hackmatack National Wildlife Refuge	15	5%
Tree-Mendous Tree Stories	14	2%
ComEd Green Region	11	3%
Eco-Explorations	3	1%
Other	24	7%
<i>At least one of the above</i>	<i>142</i>	<i>43%</i>

^a Technically, the Morton Arboretum runs CRTI, but Openlands is a core member and assists with the coordination and publicizing of events so we listed as an Openlands program on our survey.

^b Tree planting grants are in some ways part of the TreeKeepers program since individuals should be a TreeKeeper to request and receive trees for their neighborhood or to plant on public-like land (like a school or church) via these grants; however not all TreePlanters Grant recipients are TreeKeepers and not all TreeKeepers participate in TreePlanters Grant planting.

Table C2. List of other urban forestry-related organizations with which respondents reported volunteering.

135 individuals (45% of respondents) wrote in the name of one or more organizations in response to the question, “Are there other organizations outside of Openlands and TreeKeepers with whom you've been engaging in urban forestry or tree activities?” Number of respondents listing each organization is not listed to preserve respondent anonymity since some organizations were listed by only one or a few respondents. Notes that some of these organizations may not explicitly or exclusively be “urban forestry” or “tree” related in name or mission, but since respondents reported engaging in tree activities with these groups so we take their write-in responses at face value.

<p>47th St. Nature Preserve Arbor Day Foundation Backyard Nature Center Barlett Tree Experts Blue Water Baltimore Canal Shores Bird Monitoring Centennial Volunteers Champaign County Forest Preserve District U of I Chicago Botanic Garden Chicago Park District/CPD Natural Areas Chicago Ornithological Clark Street Beach Bird Sanctuary CommuniTree Conservation Foundation Cook County Forest Preserves CRTI/CRTI Working Groups Dorsey Conservation Restoration DuPage County Forest Preserve District Edgewater Environmental Sustainability Project El Paseo Community Garden Evanston City Parks and Arboretum Evanston Environment Board Evanston Harbert Park Evanston Harley Clarke Mansion Friends of Cook County Forest Preserves Friends of the Chicago River Friends of the Forest Preserves Friends of the Major Taylor Trail Friends of the Park Garden of the Phoenix Garfield Conservatory Glen Ellyn Park District Greencorps Greencorps Chicago Habitat 2030 Hoyt Arboretum I Grow Chicago Illinois Arborist Association Illinois Landscape Contractors Association Illinois Mycology Society Indiana Shirley Heinz Parks International Society of Agriculture Jarvis Bird Sanctuary Keeping Beverly Green</p>	<p>Kramer Tree Specialists LCFDP LaBagh Woods Restoration Libertyville Township Lincoln Park Conservancy Lincoln Park Zoo Local Seminary Project Local Work Logan Square Organization Lurie Garden Madison Park Property Owners Association Master Gardener Master Gardener UIC Master Naturalist Miami Woods Bird Monitoring Morton Arboretum Natural Habitat Evanston NeighborSpace North Branch Restoration Project North Pond Gardeners Oak Park Forestry Commission One Earth Film Festival Openlands Lake Forest PCTI Palos Restoration Project Park Advisory Council Peterson Garden Prairie Crossing Riverside Olmsted Society Rowan Trees Garden Society Save the Dunes SETF Skokie Park District Southeast Environmental Task Force St Scholastica Monastery Garden Student Conservation Association Sunnyside Mall Gardens Sustain DuPage The Nature Conservancy Trees R Beautiful University of Illinois Cooperative Extension US Forest service Wild Ones Wild Ones West Cook Chapter Wrightwood Neighbors</p>
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Table C3. Respondent involvement with environmental organizations. Participants were able to select more than one option.

Other environmental organizations	Count	Percent
Forest Preserve District or Friends of the Forest Preserve group (Cook, DuPage, etc.) ^a	69	21%
A garden club or similar	67	20%
Friends of Parks (Chicago Parks District), or other park groups	64	19%
A neighborhood environmental group (block clean-up, recycling group, etc.)	60	18%
A "green team" or work-related environmental group	28	8%
The Morton Arboretum	27	8%
A local nature learning center (for example, Dunes Learning Center)	26	8%
Audubon Society	22	7%
The Nature Conservancy	21	6%
Chicago Botanic Garden	20	6%
NeighborSpace	19	6%
A high school/college/university environmental club or organization	18	5%
The Field Museum	17	5%
Sierra Club	13	4%
Other ^b	84	25%
<i>At least one of the above</i>	220	66%

^a Some organizations were listed by individual respondents as "urban forestry" while the same organization might be listed by another respondent as an "environmental" organization. We considered these organizations in whatever capacity the respondent considered their involvement to be; thus, organizations like the Forest Preserve District may appear on both the list in Table C2 and in this list in Table C3.

^b Includes 40 organizations that each had a count of under 10: Active Transportation Alliance, AUA/Farmers Market, Bird Conservation Network, Bird Friendly Evanston, Blacks In Green, Chicago Audubon Society, Chicago Bird Collitions Monitors, Chicago Ornithological Society, Chicago Recycling Coalition, Chicago Wilderness, circa 1890, Circle Pines Center MI, Citizens Greener Evanston, Eden Place Nature Center, Faith in Place, Garfield Park Conservatory, Go Green Illinois, Gods Gang, Greenpeace, Habitat 2030, Honeycomb Project, Illinois Odontological Survey, Interfaith Green Network, JPAC, Lincoln Park Conservancy, Little Village Environmental Justice Organization (LVEJO), Master Gardener, Natural Habitat Evanston, One Earth Film Festival, Openlands Lake Forest, PCTI, Rising Tide Chicago, Student Conservation Association (SCA), Sustain DuPage, Urban Wildlife Group, Water Environmental Federation, Wetland Initiative, Wild Ones, and Wilderness Volunteers.

Table C4. Respondents volunteering with other kinds of non-environmental groups (n=207)

<i>Have you volunteered with any of the following types non-environmental organizations in the past 2 years?</i>	Count	Percent
Community services organization (homeless shelter, soup kitchen, animal shelter, etc.)	78	38%
Neighborhood group (neighborhood association, local chamber of commerce group, etc.)	73	35%
Cultural organization (museum, aquarium, etc.)	47	23%
Religious group (church, synagogue, mosque, etc.)	44	21%
Political group (local political party, poll worker, etc.)	37	18%
Youth services organization (after school/extracurricular, youth sports, etc.)	26	13%
Parent group (Moms group, Dads group, parent teacher association, etc.)	24	12%
Health group (hospital, community health center, etc.)	16	8%
High school or college group or club, not related to the environment (as a student)	13	6%
Other	44	21%
<i>At least one of the above</i>	211	64%

Table C5. Connections between kinds of volunteering. Tetrachoric correlation coefficients (rho) with p-values in parentheses for four binary variables: volunteering with other Openlands programs, with other urban forestry organizations, with other environmental organizations, or with other non-environmental organizations.

<i>Volunteering with...</i>	Other Openlands program	Other UF organization	Environmental organization
Other UF organization	0.412 (< 0.0001)		
Environmental organization	0.375 (< 0.0001)	0.595 (< 0.0001)	
Non-environmental organization	0.280 (< 0.0001)	0.324 (0.0006)	0.582 (< 0.0001)

Table C6. How survey respondents reported first hearing about the TreeKeepers program (n=332).

	# of respondents	% of respondents
Another active TreeKeeper	61	18%
Friend, family member, or acquaintance	37	11%
Environmental organization	33	10%
News article or news outlet (including on the radio)	30	9%
Community organization	25	8%
My employer/company	20	6%
Social media	17	5%
Already a member of Openlands	16	5%
An organized event (like Earth Day or an Openlands tree planting)	15	5%
Mailing list	7	2%
A college/university professor/teacher	2	1%
Other (<i>common write in responses below</i>)	69	21%
The Morton Arboretum	9	3%
Don't recall	17	5%

Table C7. Activities participated in by those declared involved in the TreeKeepers program (n=174). Respondents could select more than one response option for the list of specific activities.

Specific activities	# (%) of those <i>not</i> declared involved	# (%) of declaring involvement	# (%) of <i>all</i> respondents
Planting	10 (6%) ^a	94 (54%)	104 (31%)
Pruning	16 (10%) ^a	103 (59%)	119 (36%)
Mulching	8 (5%) ^a	89 (51%)	97 (29%)
Watering	7 (4%) ^a	29 (17%)	36 (11%)
Teaching	3 (2%) ^a	19 (11%)	23 (7%)
Inventory/ Adopt a Park	4 (3%) ^a	41 (24%)	45 (14%)
Advocating	6 (5%) ^a	26 (15%)	32 (10%)
Other	8 (5%) ^a	14 (8%)	22 (7%)
None: "I am not currently active in any TreeKeepers activities"	129 (87%)	43 (19%)	173 (52%)
Number of types of activities participated in			
0 activities	129 (82%) ^a	43 (25%)	172 (52%)
1 type of activity	12 (8%) ^a	19 (11%)	31 (9%)
2 types of activities	5 (3%) ^a	31 (18%)	36 (11%)
3 types of activities	5 (3%) ^a	28 (16%)	33 (10%)
4 types of activities	2 (1%) ^a	31 (18%)	33 (10%)
5 or more types of activities	3 (2%) ^a	22 (13%)	25 (8%)

^aWe assume the small number of respondents who checked boxes for specific activities *yet declared they were not still involved* were thinking about the period of time in the past during which they were involved in TreeKeepers.

APPENDIX D. FULL RESULTS FOR PRINCIPAL COMPONENT FACTOR ANALYSES

To generate an Involvement Intensity index and reduce the dimensions of variability in sign-up reasons and continuing motivations

Reducing the number of sign-up reasons from 16 statements to 3 logical factors

Table D1. Sign-up reasons factor analysis results.

Factor	Eigenvalue	Difference	Proportion of Variation	Cumulative Variation
Factor 1: <i>Tree Functions</i>	2.306	0.526	0.144	0.144
Factor 2: <i>Recreational</i>	1.781	0.314	0.111	0.255
Factor 3: <i>Green Thumb</i>	1.467	0.206	0.092	0.347
Factor 4	1.261	0.010	0.079	0.426
Factor 5	1.251	0.011	0.078	0.504
Factor 6	1.240	.	0.078	0.582
N		332	<i>Likelihood-ratio test (for orthogonal varimax rotation)</i>	
Retained factors		6	χ^2	724.16
# parameters		9819	p-value	<0.0001

Table D2. Sign-up reasons factor loadings (pattern matrix). Rotated and sorted principal component factor analysis pattern matrix utilizing 16 sign-up reasons. Strong factor loadings (above +0.50 or below -0.50) are shown in green text, those that are weakly cross-loading (between +0.30 and +0.50 or between -0.50 and -0.30) are shown in orange text. Factor loadings between -0.30 and +0.30 are shown in black text. Factor loadings **bolded** with an asterisk (*) indicate that variable loads primarily to that factor and is evaluated in the Cronbach's alpha coefficient or interitem variation for this group of statements.

Variable	Factor 1 Tree Functions	Factor 2 Recreational	Factor 3 Green Thumb	Factor 4	Factor 5	Factor 6	Uniqueness
Address heat, pollution, flooding	0.779*	0.029	-0.001	-0.031	0.182	0.035	0.357
Help mitigate climate change	0.768*	0.177	-0.034	0.001	0.014	0.078	0.371
Increase trees and canopy	0.684*	0.127	0.222	0.030	-0.083	0.022	0.458
Replace recently removed trees	0.421*	-0.021	0.168	0.194	0.292	-0.333	0.561
To get outside	0.168	0.753*	0.139	0.193	0.055	0.081	0.340
Seemed interesting	-0.031	0.662*	0.217	-0.251	-0.002	0.053	0.448
For exercise	0.140	0.662*	-0.090	0.297	-0.031	-0.097	0.436
As a hobby	0.297	0.467*	0.053	-0.107	0.096	-0.300	0.580
Enjoy gardening	-0.051	0.100	0.745*	0.077	0.050	-0.072	0.419
Learn about trees	0.099	0.129	0.624*	-0.268	-0.181	0.102	0.469
Beautify the neighborhood	0.348	0.071	0.569*	0.275	0.197	-0.029	0.435
Community service opportunity	-0.104	0.124	-0.008	0.742*	0.151	0.136	0.382
To act locally	0.407	0.111	0.155	0.532*	-0.216	-0.037	0.467
Know more about local gov.	0.081	0.003	0.059	0.100	0.800*	-0.079	0.334
New/advance career	0.061	0.105	-0.117	-0.099	0.570	0.567*	0.316
Employer suggested/ required	0.076	-0.027	0.034	0.123	-0.066	0.806*	0.324
<i>Cronbach's alpha for variables loading to this factor</i>	<i>0.676</i>	<i>0.583</i>	<i>0.436</i>	<i>0.280</i>	<i>n/a</i>	<i>0.283</i>	

Reducing the number of continuing motivations from 21 statements to 6 factors

Table D3. Motivations factor analysis results.

Factor	Eigenvalue	Difference	Proportion of Variation	Cumulative Variation
Factor 1: <i>TK Program Structure</i>	3.310	0.577	0.174	0.174
Factor 2: <i>Community</i>	2.733	0.985	0.144	0.318
Factor 3: <i>Competence</i>	1.748	0.053	0.092	0.410
Factor 4: <i>Psychological</i>	1.695	0.068	0.089	0.499
Factor 5: <i>Value-Based</i>	1.627	0.010	0.086	0.585
Factor 6: <i>Career/Learning</i>	1.617	.	0.085	0.670
N		175	<i>Likelihood-ratio test (for orthogonal varimax rotation)</i>	
Retained factors		6	χ^2	1227.54
# parameters		99	p-value	<0.0001

Table D4. Motivations factor loadings (pattern matrix). Rotated and sorted principal component factor analysis pattern matrix utilizing 19 continuing motivations. Strong factor loadings (above +0.50 or below -0.50) are shown in green text, those that are weakly cross-loading (between +0.30 and +0.50 or between -0.50 and -0.30) are shown in orange text. Factor loadings between -0.30 and +0.30 are shown in black text. Factor loadings **bolded** with an asterisk (*) indicate that variable loads primarily to that factor and is evaluated in the Cronbach's alpha coefficient or interitem variation for this group of statements.

Statement	Factor 1 TK Pro- gram Struc- ture	Factor 2 Comm- unity	Factor 3 Compe- tence	Factor 4 Psycho- logical	Factor 5 Value- Based	Factor 6 Career/ Learning	Uniqueness
Openlands is responsive to the needs of my community related to trees.	0.765*	0.189	-0.054	0.106	0.223	-0.033	0.313
I feel a sense of ownership in the TreeKeepers program.	0.732*	0.159	0.408	0.079	0.012	0.202	0.225
TreeKeepers has an impact on my community.	0.713*	0.079	-0.007	-0.163	0.304	-0.090	0.358
I feel like I have a say in the direction of TreeKeepers work.	0.696*	0.019	0.085	0.221	-0.058	0.366	0.322
I volunteer with TreeKeepers because I like the way the program is organized	0.646*	0.373	0.041	0.169	0.203	0.055	0.370
I volunteer with TreeKeepers to be part of a community	0.104	0.872*	-0.024	-0.016	0.015	0.087	0.220
I volunteer with TreeKeepers so I can give something back to my community	0.293	0.659*	0.046	0.354	-0.048	-0.066	0.347
I volunteer with TreeKeepers because I enjoy the physical exercise	0.135	0.610*	0.029	0.115	0.000	0.391	0.444
I volunteer with TreeKeepers because I enjoy being with like-minded people	0.226	0.601*	0.096	0.238	0.362	0.121	0.377
I see value in pruning trees.	-0.083	-0.100	0.853*	-0.063	0.126	-0.121	0.221
I feel proud being a TreeKeeper.	0.453	0.096	0.647*	0.150	0.102	0.103	0.324
I feel qualified to be a TreeKeeper.	0.390	0.324	0.590*	-0.135	0.019	0.090	0.368
I volunteer with TreeKeepers because it allows me to feel less guilty about the	0.005	0.065	-0.085	0.825*	0.181	-0.073	0.270
I volunteer with TreeKeepers because it allows time to reflect	0.278	0.239	0.051	0.670*	-0.076	0.337	0.295
I see value in planting trees.	0.120	-0.045	0.126	0.049	0.875*	0.095	0.191
I volunteer with TreeKeepers because their work aligns with my values	0.353	0.366	0.086	0.176	0.606*	0.026	0.335
I volunteer with TreeKeepers because I want to gain experience for a future care	0.113	0.057	-0.099	-0.047	0.095	0.796*	0.330
I volunteer with TreeKeepers to get away from the busy demands of everyday life	0.012	0.437	0.135	0.361	0.131	0.542*	0.349
I volunteer with TreeKeepers because I enjoy learning new things about trees	0.136	0.290	0.034	0.198	0.289	0.404*	0.611
<i>Cronbach's alpha for variables loading to this factor</i>	<i>0.839</i>	<i>0.758</i>	<i>0.537</i>	<i>0.547</i>	<i>0.412</i>	<i>0.496</i>	

Involvement Intensity index score development

Table D5. Involvement Index principal component factor analysis results (a) and factor loadings pattern matrix (b). Because only one factor was retained, the final factor solution is unrotated.

(a)

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	2.724	2.165	0.681	0.681
Factor 2	0.558	0.160	0.140	0.821
Factor 3	0.398	0.078	0.100	0.920
Factor 4	0.320	.	0.080	1
N		300	<i>Likelihood-ratio test (for orthogonal varimax rotation)</i>	
Retained factors		1	χ^2	488.97
# parameters		4	p-value	<0.001

(b)

Variable	Factor 1	Uniqueness
<i>Remaining involved</i>	0.836	0.300
<i>Frequency (Events per year)</i>	0.871	0.241
<i>Recency (Length of time since last event)</i>	0.788	0.378
<i>Breadth (Total number of events participated in)</i>	0.802	0.357

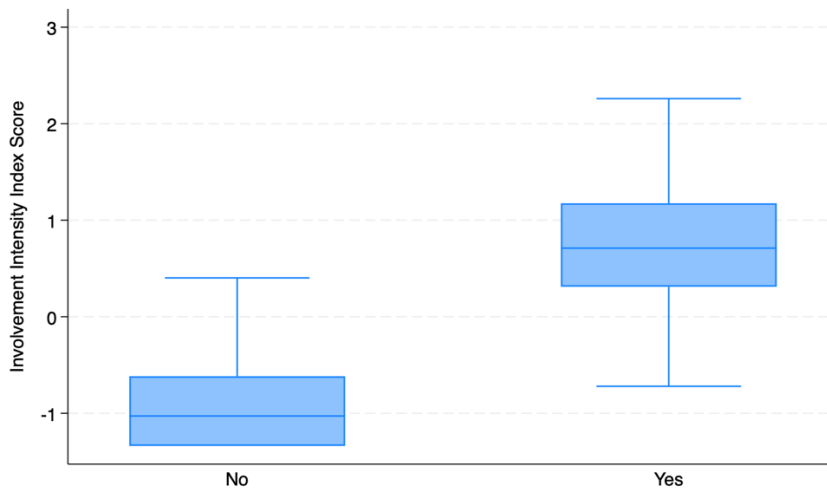


Figure D1. A boxplot comparing the median and range of Involvement index scores by whether or not survey respondents reported they have remained involved in TreeKeepers indicates that the principal component factor analysis generated reasonable index scores capturing the degree of involvement.

APPENDIX E. DETAILED REGRESSION RESULTS

Table E1. Regression coefficients, robust standard errors, and significance comparison for several models to predict Involvement Intensity for those individuals who have remained involved in TreeKeepers. *Regression coefficients; standard errors in parentheses. Stars indicate significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Variables significant in Full Model (best performing model) are **bolded** and rows are grey.*

<i>Variable</i>	(1) Full	(2) How long only	(3) Sign-up reasons only	(4) Motivations only	(5) Demog. only	(6) Exper. factors only	(7) No sign-up reasons	(8) No motivations	(9) No demog.	(10) No experiential	(11) Reduced Model	(12) Null model
<i>Sign-up: Tree Functions</i>	0.006 (0.069)		0.132*** (0.047)					-0.011 (0.067)	0.007 (0.052)	0.083 (0.079)		
<i>Sign-up: Recreational Reasons</i>	0.154** (0.075)		0.069 (0.051)					0.074 (0.074)	0.096 (0.060)	0.190** (0.074)	0.104* (0.060)	
<i>Sign-up: Green Thumb</i>	-0.047 (0.077)		-0.099* (0.051)					-0.036 (0.082)	-0.116** (0.054)	-0.121 (0.085)		
<i>Motivation: TK Program Structure</i>	0.173** (0.083)			0.325*** (0.065)			0.178** (0.084)		0.233*** (0.068)	0.258*** (0.078)	0.243*** (0.068)	
<i>Motivation: Community</i>	0.075 (0.066)			0.043 (0.062)			0.084 (0.072)		0.033 (0.054)	0.077 (0.073)		
<i>Motivation: Competence</i>	0.199** (0.095)			0.077 (0.102)			0.219** (0.102)		0.165** (0.081)	0.126 (0.103)	0.167** (0.081)	
<i>Motivation: Psychological</i>	-0.230*** (0.061)			-0.144*** (0.053)			-0.207*** (0.064)		-0.165*** (0.046)	-0.233*** (0.070)	-0.200*** (0.047)	
<i>Motivation: Values-Based</i>	-0.164** (0.064)			-0.004 (0.081)			-0.182** (0.074)		-0.089 (0.055)	-0.097 (0.075)	-0.104* (0.054)	
<i>Motivation: Career/Learning</i>	-0.032 (0.062)			0.086* (0.051)			-0.035 (0.062)		0.013 (0.046)	0.008 (0.070)		
<i>How long a TreeKeeper (# years)</i>	-0.043*** (0.014)	-0.030*** (0.008)				-0.035*** (0.008)	-0.051*** (0.014)	-0.034*** (0.012)	-0.034*** (0.013)		-0.036*** (0.012)	
<i>Event leadership (0,1)</i>	0.280* (0.150)					0.274*** (0.093)	0.306** (0.151)	0.341** (0.137)	0.165 (0.118)		0.159 (0.118)	

Table E1 continued.

<i>Variable</i>	(1) Full	(2) How long only	(3) Sign-up reasons only	(4) Motivations only	(5) Demog. only	(6) Exper. factors only	(7) No sign- up reasons	(8) No motivations	(9) No demog.	(10) No experiential	(11) Reduced Model	(12) Null model
<i># of barriers reported</i>	-0.052 (0.078)					-0.05 (0.046)	-0.048 (0.076)	-0.154** (0.065)	-0.036 (0.055)			
<i>Age (# years old)</i>	0.005 (0.007)				-0.003 (0.006)		0.003 (0.006)	0.003 (0.006)		0.003 (0.006)		
<i>Female (0,1)</i>	0.064 (0.139)				0.099 (0.136)		0.086 (0.133)	0.003 (0.134)		0.182 (0.152)		
<i>White (0,1)</i>	-0.206 (0.199)				-0.158 (0.131)		-0.004 (0.194)	-0.003 (0.154)		-0.373* (0.223)		
<i>Education level (6 categories)</i>	-0.03 (0.055)				-0.041 (0.058)		-0.036 (0.060)	-0.002 (0.063)		-0.066 (0.057)		
<i>Household income level (6 categories)</i>	0.024 (0.047)				0.049 (0.053)		-0.013 (0.045)	0.000 (0.046)		0.076 (0.049)		
<i>Working (0,1)</i>	0.023 (0.214)				-0.008 (0.184)		0.002 (0.194)	-0.122 (0.191)		0.041 (0.195)		
<i>Home owner (0,1)</i>	0.291* (0.161)				-0.094 (0.154)		0.226 (0.155)	-0.019 (0.159)		0.339** (0.165)	0.156 (0.107)	
<i># kids under 18 in household</i>	0.104 (0.087)				0.115 (0.091)		0.089 (0.080)	0.097 (0.095)		0.141 (0.091)		
<i>Grew up around trees (0,1)</i>	-0.194 (0.208)				0.000 (0.275)		-0.186 (0.218)	0.048 (0.227)		-0.185 (0.228)		
<i>Grew up in city (0,1, rel. to rural env.)</i>	0.094 (0.224)				-0.313 (0.253)		-0.051 (0.190)	-0.007 (0.204)		-0.057 (0.237)		
<i>Grew up in suburb (0,1, rel. to rural env.)</i>	0.02 (0.182)				-0.333 (0.238)		-0.085 (0.182)	-0.096 (0.205)		-0.033 (0.200)		
<i>Environmentalist (0,1)</i>	0.248 (0.173)				0.184 (0.218)		0.331* (0.184)	0.267 (0.177)		0.069 (0.228)		

Table E1 continued.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Variable</i>	Full	How long only	Sign-up reasons only	Motivations only	Demog. only	Exper. factors only	No sign-up reasons	No motivations	No demog.	No experiential	Reduced Model	Null model
<i>Sense of personal efficacy (index, 4-16)</i>	0.017 (0.028)				0.03 (0.032)		0.014 (0.027)	0.028 (0.030)		-0.002 (0.033)		
<i>Involved in other Openlands prog. (0,1)</i>	0.122 (0.159)				0.214 (0.145)		0.146 (0.152)	0.199 (0.138)		0.119 (0.163)		
<i>Other urban forestry volunteering (0,1)</i>	0.055 (0.166)				0.026 (0.146)		0.034 (0.142)	-0.076 (0.129)		0.165 (0.176)		
<i>Total # env. orgs. involved with</i>	0.003 (0.050)				0.081* (0.047)		0.019 (0.042)	0.035 (0.045)		0.016 (0.050)		
<i>Total # non-env. orgs. involved with</i>	-0.120** (0.060)				-0.170*** (0.064)		-0.125** (0.057)	-0.093 (0.057)		-0.169** (0.068)	-0.04 (0.027)	
Constant	0.15 (0.486)	0.950*** (0.064)	0.700*** (0.051)	0.706*** (0.059)	0.853 (0.550)	0.912*** (0.087)	0.401 (0.534)	0.504 (0.610)	0.891*** (0.108)	0.38 (0.489)	0.718*** (0.175)	0.735*** (0.050)
N	82	169	169	110	102	169	82	102	110	82	110	169
F	4.8	13.5	5.0	5.6	1.3	9.7	4.3	3.6	5.4	3.4	7.4	0.0
Model df	29	1	3	6	17	3	26	23	12	26	9	0
Residual df	52	167	165	103	84	165	55	78	97	55	100	168
Model signif. (prob > F)	0.0000	0.0000	0.0030	0.0000	0.2400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	.
R2	0.63	0.10	0.08	0.23	0.18	0.16	0.59	0.39	0.42	0.53	0.40	0.00
Adjusted R2	0.42	0.10	0.06	0.19	0.01	0.14	0.40	0.21	0.34	0.30	0.34	0.00
RMSE	0.48	0.62	0.63	0.58	0.62	0.60	0.49	0.55	0.52	0.52	0.52	0.65
RSS	11.79	63.73	65.61	34.09	32.15	60.10	13.00	23.88	25.98	15.03	26.82	71.14
MSS	19.87	7.42	5.54	10.33	6.82	11.04	18.66	15.10	18.44	16.62	17.60	0.00
AIC	133.68	318.78	327.69	197.30	207.71	312.88	135.70	189.35	179.44	147.60	176.92	335.38
BIC	205.88	325.04	340.21	216.20	254.96	325.40	200.68	252.35	214.54	212.58	203.93	338.51

Table E2. Standardized coefficients (enabling comparison between variables within a model), robust standard errors, and significance comparison for the same models shown in table D1 to predict Involvement Intensity for those individuals who have remained involved in TreeKeepers. *Regression coefficients; standard errors in parentheses. Stars indicate significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Variables significant in Full Model (best performing model) are **bolded** and rows are grey.*

<i>Variable</i>	(1) Full	(2) How long only	(3) Sign-up reasons only	(4) Motivations only	(5) Demog. only	(6) Exper. factors only	(7) No sign-up reasons	(8) No motivations	(9) No demog.	(10) No experiential	(11) Reduced Model	(12) Null model
<i>Sign-up: Tree Function</i>	0.009 (0.069)		0.211*** (0.047)					-0.019 (0.067)	0.012 (0.052)	0.142 (0.079)		
<i>Sign-up: Recreational</i>	0.236** (0.075)		0.108 (0.051)					0.118 (0.074)	0.149 (0.060)	0.290** (0.074)	0.160* (0.060)	
<i>Sign-up: Green Thumb</i>	-0.074 (0.077)		-0.155* (0.051)					-0.058 (0.082)	-0.180** (0.054)	-0.191 (0.085)		
<i>Motivation: TK Program Structure</i>	0.230** (0.083)			0.415*** (0.065)			0.236** (0.084)		0.297*** (0.068)	0.342*** (0.078)	0.311*** (0.068)	
<i>Motivation: Community</i>	0.103 (0.066)			0.058 (0.062)			0.114 (0.072)		0.045 (0.054)	0.104 (0.073)		
<i>Motivation: Competence</i>	0.180** (0.095)			0.064 (0.102)			0.198** (0.102)		0.139** (0.081)	0.114 (0.103)	0.140** (0.082)	
<i>Motivation: Psychological</i>	-0.363*** (0.061)			-0.217*** (0.053)			-0.327*** (0.064)		-0.248*** (0.046)	-0.368*** (0.070)	-0.301*** (0.047)	
<i>Motivation: Values-Based</i>	-0.206** (0.064)			-0.005 (0.081)			-0.230** (0.074)		-0.1 (0.055)	-0.122 (0.075)	-0.117* (0.054)	
<i>Motivation: Career/Learning</i>	-0.051 (0.062)			0.132* (0.051)			-0.054 (0.062)		0.021 (0.046)	0.013 (0.070)		
<i>How long a TreeKeeper (# years)</i>	-0.424*** (0.014)	-0.323*** (0.008)				-0.375*** (0.008)	-0.497*** (0.014)	-0.383*** (0.012)	-0.321*** (0.013)		-0.344*** (0.013)	
<i>Event leadership (0,1)</i>	0.220* (0.150)					0.210*** (0.093)	0.240** (0.151)	0.271** (0.137)	0.128 (0.118)		0.123 (0.118)	
<i># of barriers reported</i>	-0.083 (0.078)					-0.077 (0.046)	-0.077 (0.077)	-0.242** (0.065)	-0.057 (0.055)			

Table E2 continued.

<i>Variable</i>	(1) Full	(2) How long only	(3) Sign-up reasons only	(4) Motivations only	(5) Demog. only	(6) Exper. factors only	(7) No sign- up reasons	(8) No motivations	(9) No demog.	(10) No experiential	(11) Reduced Model	(12) Null model
<i>Age (# years old)</i>	0.116 (0.007)				-0.063 (0.006)		0.07 (0.006)	0.066 (0.006)		0.082 (0.006)		
<i>Female (0,1)</i>	0.05 (0.139)				0.079 (0.136)		0.068 (0.133)	0.002 (0.134)		0.144 (0.152)		
<i>White (0,1)</i>	-0.121 (0.199)				-0.099 (0.131)		-0.002 (0.194)	-0.002 (0.154)		-0.219* (0.223)		
<i>Education level (6 categories)</i>	-0.057 (0.055)				-0.079 (0.058)		-0.068 (0.060)	-0.004 (0.063)		-0.126 (0.057)		
<i>Household income level (6 categories)</i>	0.051 (0.047)				0.105 (0.053)		-0.027 (0.045)	0 (0.046)		0.162 (0.049)		
<i>Working (0,1)</i>	0.015 (0.214)				-0.006 (0.184)		0.001 (0.194)	-0.091 (0.191)		0.028 (0.195)		
<i>Home owner (0,1)</i>	0.218* (0.161)				-0.07 (0.154)		0.169 (0.155)	-0.014 (0.159)		0.254** (0.165)	0.111 (0.107)	
<i># kids under 18 in household</i>	0.142 (0.087)				0.148 (0.091)		0.121 (0.080)	0.124 (0.095)		0.191 (0.091)		
<i>Grew up around trees (0,1)</i>	-0.118 (0.208)				0 (0.275)		-0.113 (0.218)	0.027 (0.227)		-0.112 (0.228)		
<i>Grew up in city (0,1, rel. to rural env.)</i>	0.073 (0.224)				-0.25 (0.253)		-0.039 (0.190)	-0.006 (0.204)		-0.044 (0.237)		
<i>Grew up in suburb (0,1, rel. to rural env.)</i>	0.016 (0.182)				-0.266 (0.238)		-0.068 (0.182)	-0.077 (0.205)		-0.027 (0.200)		
<i>Environmentalist (0,1)</i>	0.111 (0.173)				0.084 (0.218)		0.149* (0.184)	0.123 (0.177)		0.031 (0.228)		
<i>Sense of personal efficacy (index, 4-16)</i>	0.063 (0.028)				0.117 (0.032)		0.052 (0.027)	0.11 (0.030)		-0.008 (0.033)		

Table E2 continued.

<i>Variable</i>	(1) Full	(2) How long only	(3) Sign-up reasons only	(4) Motivations only	(5) Demog. only	(6) Exper. factors only	(7) No sign- up reasons	(8) No motivations	(9) No demog.	(10) No experiential	(11) Reduced Model	(12) Null model
<i>Involved in other Openlands prog. (0,1)</i>	0.098 (0.159)				0.173 (0.145)		0.118 (0.152)	0.16 (0.138)		0.096 (0.163)		
<i>Other urban forestry volunteering (0,1)</i>	0.044 (0.166)				0.021 (0.146)		0.027 (0.142)	-0.061 (0.129)		0.131 (0.176)		
<i>Total # env. orgs. involved with</i>	0.011 (0.050)				0.266* (0.047)		0.064 (0.042)	0.114 (0.045)		0.055 (0.050)		
<i>Total # non-env. orgs. involved with</i>	-0.293** (0.060)				-0.409*** (0.064)		-0.305** (0.057)	-0.223 (0.057)		-0.413** (0.068)	-0.089 (0.027)	
Constant	0.009 (0.069)		0.211*** (0.047)					-0.019 (0.067)	0.012 (0.052)	0.142 (0.079)		

Table E3. Descriptive statistics for variables included in regression, for 82 survey responses included in model (1), the Full, best model.

	Obs	Mean	Std. dev.	Min	Max
Dependent variable: Involvement intensity	82	0.770	0.625	-0.720	1.950
Sign-up: Tree Functions	82	0.210	1.063	-1.254	2.303
Sign-up: Personal Reasons	82	0.097	0.957	-1.805	2.352
Sign-up: Green Thumb	82	-0.078	0.988	-2.089	1.909
Motivation: TK Program Structure	82	0.247	0.829	-2.058	1.975
Motivation: Community	82	0.154	0.850	-2.843	1.774
Motivation: Competence	82	0.182	0.567	-2.501	0.955
Motivation: Psychological	82	-0.008	0.988	-2.995	2.609
Motivation: Value-Based	82	-0.040	0.788	-3.238	1.284
Motivation: Career/Learning	82	0.095	0.981	-2.095	2.389
How long a TreeKeeper (# years)	82	6	6	1	29
Event leadership (0,1)	82	0.39	0.49	0	1
# of barriers reported	82	1.2	1.0	0	4
Age (# years old)	82	49	15	21	75
Female (0,1)	82	0.59	0.50	0	1
White (0,1)	82	0.84	0.37	0	1
Education level (6 categories)	82	4.8	1.19	2	6
Household income level (6 categories)	82	3.5	1.34	1	6
Working (0,1)	82	1.23	0.42	1	2
Home owner (0,1)	82	1.32	0.47	1	2
# kids under 18 in household	82	0.44	0.85	0	3
Grew up around trees (0,1)	82	0.83	0.38	0	1
Grew up in rural (0,1)	82	0.18	0.39	0	1
Grew up in city (0,1)	82	0.37	0.48	0	1
Grew up in suburb (0,1)	82	0.45	0.50	0	1
Environmentalism (0,1)	82	0.91	0.28	0	1
Sense of personal efficacy (add. index, 4-16)	82	10.82	2.33	4	16
Involved in other Openlands programs (0,1)	82	0.51	0.50	0	1
Other urban forestry volunteering (0,1)	82	0.43	0.50	0	1
Total # env. orgs. involved with	82	1.9	2.1	0	9
Total # non-env. orgs. involved with	82	1.4	1.5	0	7

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