FACTORS INFLUENCING OPINION LEADERSHIP ON WATER ISSUES IN RESIDENTIAL NEIGHBORHOODS SURROUNDING AN URBAN LAKE

by

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CHAPTER 1: INTRODUCTION

Background and Problem Analysis

Social science research recognizes that human behavior is the driving force behind our society’s most pressing environmental challenges. Navigating this variable presents a significant hurdle even as technical solutions to natural resources issues are increasingly well understood. For example, an Intergovernmental Panel on Climate Change special report (2018) notes that most approaches to mitigate and adapt to climate change will require changes in human behavior and recognizes significant knowledge gaps on how to effectively promote these changes on a global level. In places facing climate-driven increases in large rainstorms, understanding private decisions to adopt desired water-related behaviors presents a similar challenge on a more local scale.

While blind spots remain, research over the past several decades has provided insight into human nature that can be applied to natural resource problems. For example, studies have found that while mass media campaigns can increase issue awareness and knowledge, and targeted changes in behavior in some cases, these approaches alone may not be sufficient to produce the desired outcome (Noar, 2006). Given the faults in the long-practiced deficit model of public opinion, where information alone is presumed to prompt changes in attitudes (Jones, 2008), communicators have looked for other ways to persuade their audiences. One key area of investigation has been social factors that influence human behavior. People often look to what others are doing, known as descriptive social norms, or what they think is expected of them, known as injunctive social norms, when deciding how they themselves should behave (Cialdini & Goldstein, 2004). This has been found especially to be true when there is higher uncertainty about how to behave (p. 597) – as often surrounds complex environmental issues that implicate
individual behavior. Experimental studies have found that social norms consistently act to influence behavior, including in environmental domains such as energy and water conservation, recycling, and climate change (Griskevicius et al., 2008; Nolan et al., 2008). While individuals may cite a variety of rationale for their actions, simple cues that suggest what other people have chosen to do often are enough to tip the scales in favor of the socially accepted behavior.

Given impressive experimental results, many environmental communicators have sought to incorporate social determinants of behavior into communication strategies. For example, Community-Based Social Marketing, which instructs communicators on how to select behaviors, identify barriers and benefits, and design commitment strategies, is one popular framework around which to design behavior change campaigns (McKenzie-Mohr, 2021). These campaigns seek to activate social cues to instill social norms that prompt desired behaviors, like keeping dogs on leash near bird nesting sites, often with demonstrated success over traditional approaches. When faced with a discrete goal within a bounded area, these frameworks have been helpful tools to guide communication efforts and prompt simple behavioral changes.

In some contexts, however, activists have criticized campaigns that frame changing the behavior of individual people as central to addressing environmental crises, rather than holding larger actors, such as corporations, accountable for environmental harm. In fact, investigative journalists have found evidence of decades of deliberate marketing efforts by the plastics and oil industries to focus attention on individual actions and away from industry reform (Sullivan, 2020). Well-funded behavior-change campaigns framed consumer plastic recycling efforts as a moral imperative even though industry actors privately recognized that plastics recycling would likely never be economically viable (para. 8), a prediction realized decades later as the U.S. was left with shiploads of mixed plastics exports rejected by importing countries for their low value
and high cross-contamination. Campaigns to raise awareness about personal carbon footprints—a measure of how a person’s lifestyle contributes to greenhouse gas emissions—have been similarly criticized for putting the responsibility on consumers to reduce their contributions to climate change rather than focusing on regulating the industries burning fossil fuels (Yoder, 2020). This phenomenon has been described as the “individual-blame bias,” (Rogers, 2003, p. 118) where the individual rather than the system is put at fault. In fact, in a set of hypothetical policy-making experiments, researchers found that giving participants the option to implement a low-cost “nudge” to prompt marginally better behavior by consumers—such as conserving energy at home—eroded support for enacting more substantive, broader-reaching policies within the same domain, such as a carbon tax (Hagmann et al., 2019). The “crowding-out” effect persisted across policy domains, where the option to use social science principles to promote individual changes decreased support for broader policy efforts (p. 484). Studies have long documented the potential for persuasive messages to backfire and produce unintended results (Cialdini & Goldstein, 2004; Griskevicius et al., 2008). When used as a substitute for addressing systemic problems, even well-meaning normative behavior change campaigns directed at the individual decisions of private individuals risk detracting from more meaningful needed changes.

Despite these concerns, there are many areas where communities must enlist private residents in changing behaviors, especially on private land. Human-driven changes in the landscape and climate—including increases in built surfaces that shed water paired, in some regions, with localized increases in climate-driven intense rain events—mean that more water is running through farm fields, streets, basements, storm sewers, and into nearby waters, often in more damaging bursts (Wisconsin Initiative on Climate Change Impacts, 2011). While land ownership in the United States sits at about 60:40 private to public ownership (Rasker, 2019),
unequal distribution of this public land towards larger states means that the average state is 74% under private ownership, leaving a balance of only about a quarter of land in a typical state under public control (J. J. Morgan et al., 2019). This degree of private ownership has implications for approaches a community takes to respond to natural resource management challenges and shifting priorities. Natural resource managers rarely focus only on concerns pertaining to public lands: rather, they must work effectively with private residents and corporate landowners to address broader resource concerns that impact the public interest, especially when additional regulations are not politically feasible or where compliance is encouraged rather than strictly enforced.

Historically, attention to individual-level engagement for larger environmental issues has grown from a Community-Based Environmental Protection context, as set out by the U.S. Environmental Protection Agency (EPA) in its framework report (U.S. EPA, 1999). The approach marked a new shift by the EPA towards voluntary government-community partnerships, designed for environmental issues stemming from “individual behaviors or choices” (p. 10), also known as “co-management” (Plummer & Arai, 2005, p. 222). From its early days, skeptics have sounded out strengths as well as limitations, including questioning the ability to tackle complex environmental issues through voluntary participation and compel stakeholders to make “actual sacrifices” (Nickelsburg, 1998, p. 1381). While information sharing and common objectives present advantages, differing views of intent and failure to fulfill commitments can hamstring cooperative efforts (Plummer & Arai, 2005, pp. 228–229). In contrast, researchers note that contemporary community-based efforts may draw on community participation not to fill staff or budget shortfalls, as co-management originally promised (p. 224), but to orient broader efforts to place-specific contexts and social structures. Since governments
cannot feasibly engage individually with all citizens who are stakeholders for a particular issue, engaging existing social structures offers one way to work with willing private residents towards shared objectives.

Taking the scope of historical and research context into consideration, a social and interpersonal influences approach presents opportunities and challenges for communicators seeking to encourage pro-environmental behaviors on private residential land. When implemented alongside sound environmental policy, programs that employ social science research will better reflect the reality of how voluntary behavior change spreads through a community.

**Theoretical Approach**

While many studies about human aspects of urban water issues focus on factors determining whether people engage in pro-environmental outcome behaviors, such as conserving water or installing a rain barrel (e.g. Chang, 2013; Gao et al., 2016), this thesis focuses on factors influencing whether residents seek to engage in interpersonal outreach and advocacy about these issues, such as by speaking to neighbors about pro-environmental behaviors. To investigate social factors influencing outreach behaviors, this project draws from interpersonal communication models: Opinion Leadership (the two or multi-step model), described by Katz and Lazarsfeld (1955), the Diffusion of Innovations model (Rogers, 1962, 2003), and the Theory of Planned Behavior (Ajzen, 1985, 1991). Taken together, these theories provide a framework for how socially influential people adopt innovations and spread them within their social networks as well as how social scientists can understand human behavior.

The two-step flow of communication model, often now considered more accurately to be a multi-step model, theorized that media messages do not flow directly to all media consumers
but rather are disseminated through opinion leaders who serve as nodes to spread a message to
people in their network. An early set of studies looked at how intermediary social factors such as
interpersonal influence and persuasion influence whether a message or behavior communicated
through mass media is taken up by the members of the public (Katz, 1957). Researchers
identified chains of social influence that explained doctors’ prescription of a new pharmaceutical
drug or voters’ intent to cast a ballot for a certain candidate. Since this model was developed, it
has been a popular reference point for people such as social scientists and marketing
professionals interested in understanding the networks, and especially the influential people,
through which information and behaviors travel.

The Diffusion of Innovations model provides a framework that builds on the concept of
interpersonally mediated messages to describe how innovations spread within a normal curve of
individuals more to less eager to adopt a new behavior. Rather than conceptualizing individuals
as information conduits within a social network, as the opinion leadership/multi-step model does,
Rogers’ model groups people by when they adopt an “innovation” such as a new technology or
change in behavior compared to their peers. Each standard deviation of the curve represents a
segment of the population: the earliest adopters are termed “innovators,” the next set is known as
“early adopters,” followed by the “early” and “late” majority at 34% each, with the final two
standard deviations constituting the “laggards.” Rogers (2003) tied this model to Katz and
Lazarsfeld’s work, noting that “the success or failure of diffusion programs rests in part on the
role of opinion leaders” (p. 99). Within the Diffusion of Innovations curve, early adopters are
often opinion leaders: they are trusted within their social circle, capable of absorbing information
and spreading it to others in their sphere of influence (p. 283). This model provides a framework
where influential people are not just conduits for media messages, but actively seek out and test innovations and even reinvent them to suit the needs of themselves and their peers.

Finally, the Theory of Planned Behavior takes a closer look at factors, including beliefs about the behavior, subjective norms, and perceived behavioral control, predicting an individual’s intent to complete a selected behavior. This final theoretical component differs from the prior two models in that it can be applied to any behavior, not just social influence, over which a person has a degree of volitional control and in that its primary goal is to explain and predict (Ajzen, 1991) rather than describe. Since this model identifies thought processes that drive the decision to act, groups hoping to change behavior often look to this model for variables upon which they might act.

Researchers have tested different ways to apply these theories of interpersonal social influence on behalf of pro-environmental behavior. For example, researchers in Wisconsin identified bait shop owners as opinion leaders for Aquatic Invasive Species prevention efforts, finding that normative social pressures and media messages influence whether owners asked boaters moving between bodies of water to follow prevention protocols (Dalrymple et al., 2013; Howell et al., 2015). Theory of Planned Behavior variables have been used to predict whether anglers take steps to prevent the spread of Aquatic Invasive Species (Witzling et al., 2015). Researchers found that Honduran farmers trained in Integrated Pest Management disseminated the information on alternatives to pesticide use to other farmers, demonstrating the usefulness of opinion leadership and Diffusion of Innovations models (Wyckhuys & O’Neil, 2007). Furthermore, findings highlighting the importance of interpersonal influence for environmental campaigns match standard practice within marketing and fundraising, where face-to-face asks are a gold standard over more impersonal channels such as emails or letters (Yandow, 2017). In
the case of urban water advocacy, adopting new pro-environmental behaviors such as installing a rain garden or reducing winter salt use can be likened to a big ask with opinion leaders as the social salespeople equipped to make the pitch.

Research has also looked at how the messenger influences the strength of the impact of interpersonal communication on attitudes and behavior. For example, research on the power of social norms has clarified the comparatively greater influence of “similar others,” where interpersonal influence strengthens the “closer and more similar” the reference group is to oneself (Griskevicius et al., 2008, p. 11). Residential neighborhoods present a case where people living near one another are more likely to be similar in education and socioeconomic status, making for a good case study on how interpersonal factors influence behaviors that protect urban water quality.

**Research Context and Aims**

In the Midwestern United States, natural resource managers face a unique set of private land management challenges. Wisconsin, which prizes the Lake Michigan coastline on its eastern boundary and the Mississippi River to its west along with its abundant freshwater lakes and rivers, is a case study in these challenges.

First, agencies in charge of protecting water quality continue to struggle with private land management challenges. In northern Wisconsin, nearshore development of impervious on private land surrounding freshwater lakes has been shown to drive degradation of water quality (Hunt et al., 2006), and the National Lakes Assessment identifies habitat destruction tied to shoreline development as one of the largest threats to lake health (U.S. EPA, 2009). Likewise, in the southern part of the state, private land in the form of residential and commercial properties can make up a sizable portion of land area contributing to runoff issues (Friends of Lake Wingra,
2003). This reality means that agencies throughout the state are bound to work with private landowners on a broad set of water quality challenges.

In addition, communities often run into conflict over urban versus rural contributions to water quality issues. For example, communities may debate who is responsible for nutrient pollution: residential, urban areas or agricultural operations cited in more rural areas. Is it worth spending time on residential contributions if farm operations are to blame? In the broader Yahara River watershed of which Lake Wingra is a part, research has found that both agricultural and urban sources of phosphorus contribute to water quality issues (Lathrop & Carpenter, 2014). In fact, researchers found that summertime water quality in shallower, downstream lakes in the Yahara River chain tends to be driven by local rather than upstream sources of phosphorus (McDonald & Lathrop, 2017). In some watersheds, this means that urban runoff may have a meaningful seasonal impact on water quality when lakes are most likely to be used, even if agricultural runoff contributes a greater proportion of excess nutrients on an annual basis.

Additionally, changes in practices in residential areas have been found to improve stormwater quality: for example, removing leaf litter decomposing on streets before rainstorms reduces phosphorus concentrations by about 80% compared to no removal (United States Geological Survey, 2016). This research has turned community attention within the Yahara River watershed to how people living in urban areas, including private residents, can contribute to healthier waters.

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1 While pollution from private farm operations also poses natural resources management challenges, agricultural land management is outside the scope of this project.
Importantly, the midwestern United States as a region is predicted by climate change models as likely to experience wetter weather as warming continues and has already seen the impact of climate-driven increases in intense storms (Wisconsin Initiative on Climate Change Impacts, 2011). This creates increased local urgency and political attention to addressing issues tied to rainfall that moves contaminants from their source to receiving waterbodies including surface and groundwaters which are used for drinking, habitat, industry, recreation, and aesthetic enjoyment.

To this end, the management plan for the Lake Wingra watershed in Wisconsin’s capital city, the setting for this thesis project, identifies community engagement as one of its top four priorities, alongside addressing infiltration, chloride, and phosphorus issues (City of Madison Wisconsin, 2015). Within the watershed lies the 1,200-acre grounds of the University of Wisconsin-Madison Arboretum, founded in the 1930s as a land restoration experiment and now with a mission that includes advancing restoration ecology and fostering the land ethic. While the Arboretum appears to many visitors as a natural landscape, it receives millions of gallons of stormwater runoff from nearby communities each year. The Arboretum has worked with nearby municipalities and the Wisconsin Department of Transportation to improve stormwater quality within and outside its grounds but recognizes that high volume and poor water quality continues to present serious management challenges. Decisions made on private land surrounding the Arboretum directly impact the quality and quantity of stormwater runoff. Groups such as the Friends of Lake Wingra, City of Madison, Dane County, Madison-Area Municipal Stormwater Partnership, Wisconsin Salt Wise, Clean Lakes Alliance, and U.S. Geological Survey are also active within the Lake Wingra watershed and would like more effective strategies for engaging the thousands of residents whose decisions impact water quality. This project was conducted as
part of a 2019 Arboretum Research Fellowship award addressing residential behavior around urban water issues that indirectly impact the Arboretum’s operations. The central question of the research project was “How and why do certain individuals choose to adopt, advocate, and spread desired water-related behaviors on a neighborhood scale?”

To address these questions, the graduate student researcher developed a mixed-methods approach including semi-structured interviews (n = 14), which were primarily qualitative, and an electronic questionnaire (n = 154), which was primarily quantitative, alongside a review of literature. Chapter 2 presents findings from the qualitative portions of the study and Chapter 3 presenting findings from quantitative measures. Understanding what motivates or prevents residents from using their social influence to diffuse stormwater innovations should help actors like the University of Wisconsin-Madison Arboretum develop and implement effective behavior change campaigns to benefit urban water quality.
CHAPTER 2: RESIDENTS’ EXPERIENCES WITH OPINION LEADERSHIP

Introduction

Property owners, including homeowners, landlords, and to a lesser extent, renters, have a fair amount of control over land use decisions on private residential land. While local ordinances and, in some cases, homeowners’ associations may stipulate building and landscaping standards, many choices remain up to an individual property owner or renter. Furthermore, residents hold influence as constituents or decision-makers over non-residential lands such as schools, parks, and churches and provide public input on building and infrastructure projects. These choices impact water quality in stormwater systems that is discharged, with or without treatment, into bodies of water and which may infiltrate closed sewage treatment systems. Within the swaths of many cities that remain zoned for low-density residential use, or in suburbs where the typical residence has a sizable footprint of land, land managers want to know the best ways to encourage private land management choices that keep contaminants out of the system and reduce the total or peak volumes of water that municipal infrastructure must handle.

While municipalities hope their messages reach a receptive audience, most residents are not actively looking to change the way they manage their home and yard and may not change their behavior without more prompting. Research has identified that socially influential people known as opinion leaders (OL) act as intermediaries in seeking out information on a topic and dispersing it to other people within their social networks, known as the two-step flow of communication (Katz, 1957). Opinion leaders have been identified across disciplines such as health (Valente & Pumpuang, 2007), marketing (Iyengar et al., 2011), and the environment (Jansson et al., 2017), as well as within the context of new communication channels such as online and social media (Shi & Salmon, 2018). This study explores the experiences a set of
residents have had with engaging on urban water issues in residential neighborhoods in a mid-sized Midwestern city. The aim is to provide context about residents’ interactions with messages about water as a case study in factors influencing their willingness and ability to serve as opinion leaders by advocating on behalf of pro-environmental campaigns on residential land.

The Theory of Planned Behavior (Ajzen, 1991, 2005) and the Diffusion of Innovations Model (Rogers, 2003), which identify variables related to the adoption and spread of behaviors (see Chapter 1), informed selection of themes for inclusion in the interview script. This case study seeks to describe how residents who self-identify as caring about issues that affect their neighborhood conceptualize their decisions to get involved or not get involved in a topic, and what resources they feel they need to be better advocates for water issues.

Methods

Data Collection

The present study uses semi-structured interviews to understand and analyze residents’ experiences advocating for issues that affect their neighborhood, especially as they relate to water. The study population is people living in neighborhoods within the watershed of an urban lake who self-identified as caring “about the future of [their] community” and were willing to answer questions about their “experiences with leadership, thoughts on issues their community faces, and opinions on specific topics including urban water issues.” Recruitment followed a convenience sampling procedure, where cases that meet criteria are selected on a first-come, first-served basis (Robinson, 2014). Guidance on qualitative research protocols describe this approach as suitable for sample universes defined as “demographically and geographically local” (p. 32). Because this project sought to interview people who already engaged within small and relatively homogenous existing networks in order to make generalizations about that group, a
convenience approach suited the project’s aims. More specifically, a snowball (also known as chain or referral) approach was selected, where informants refer others to be a part of the sample (D. L. Morgan, 2008). Individuals who have more social connections within a sampling area are more likely to be sampled, which aligns with the present study’s purpose of learning about individuals who are well-connected and seen as influential by their peers.

To recruit participants, the researcher developed a matrix of seven regions within the study area to guide geographical representation. Then, the researcher compiled an initial list of organizations with publicly listed contact information, including associations, businesses, centers, schools, and other public-facing entities. The researcher reached about 325 initial contacts via email, web submission form, or a social media account with messaging function and posted about 40 recruitment posters in public spaces in the study area (See Appendix A). According to the snowball sampling procedure, contacts were able to express interest in being a participant as well as recommend anyone else they believed the interviewer should talk to, individually or by sharing the recruitment information to a contact list. The researcher scheduled interviews with anyone who wished to participate based on the recruitment description while confirming the individual resided within the study area.

From July to December of 2019, the researcher conducted fourteen in-person semi-structured interviews amounting to about 20 hours of recorded conversations. The semi-structured approach to qualitative inquiry allows a researcher to follow an “interview guide” alongside a “variety of probes that elicit further information,” using open-ended, non-leading questions along with “brief summary statement[s]” as needed (Ayres, 2008, para. 2-3). Interviews can allow for more in-depth and generative results but are more time-consuming than data collected by paper or electronic survey, for example. In qualitative research, the objective is
to create a “holistic account” of an issue, learning about “participants’ meanings” through “emergent design” that can flex according to developing knowledge gained about the issue (Creswell, 2007, p. 47). Consistent with qualitative research guidance, the selected sample size “provides scope for developing cross-case generalities, while preventing the researcher from being bogged down in data” (Robinson, 2014, p. 29). During the process, the interviewer should look for theoretical saturation of data within interviews, where more collection of data no longer meaningfully adds to theory development (Corbin & Strauss, 2008). An initial sample range (10-14 participants) was selected, and the researcher continued to schedule interviews until, based on development of themes across interviews, the data collected had met this standard.

One open-ended question was also included in an electronic survey (n = 154) that was distributed within the study and greater metropolitan area following interviews. The question asked, “What do you think would make it easier for you to have an impact in your neighborhood in changing behaviors?” In many cases, responses align with and expand on themes found in interviews. These responses are presented alongside interview data where relevant to better represent the breadth of themes present in qualitative measures within this project.

**Interview Format**

On a scheduled meeting date, the researcher met the participant at a centrally located meeting spot within the study area or another location of the participant’s choosing where privacy could be maintained. The researcher and the participant went through a verbal informed consent process. After obtaining consent, the researcher recorded the interview using Apple Voice Memos software on password-protected mobile phone and portable computer devices. The interview script covered six themes relevant to leadership and environmental behaviors: identity
and motivation to lead, social and neighborhood involvement, environmental concern (Gifford & Nilsson, 2014), experiences engaging with water issues including barriers and benefits (McKenzie-Mohr, 2011), place-based meaning (Spartz & Shaw, 2011; Stewart et al., 2013), and reflection on strengths (Harvey, 2014). While literature is cited where useful to contextualize themes, questions within each subject are designed to be open-ended discussion prompts eliciting descriptions of participants’ experiences rather than representing specific variables as part of a theoretical model. Participants were encouraged to discuss experiences and perspectives that differed from how the interviewer framed the topic and add additional information that they wanted the researcher to know. The interview script is included in Appendix B.

As interviews progressed, sub-prompts that elicited meaningful responses were maintained and some questions that provoked many of the same responses or were not effective in developing the conversation were omitted, but most themes and guiding questions were maintained as presented in the original script. Participants were asked optional demographic questions to help researchers better understand demographic representation within the study, including age, household income, race and ethnic identity, gender identity, and education. The research protocol obtained a determination of exemption under the U.S. Code of Federal Regulations Title 45: Part 46 following review by the University of Wisconsin-Madison Education and Social/Behavioral Science Institutional Review Board.

Data Analysis

Following interviews, the researcher listened to and manually transcribed audio recordings of interviews. The graduate researcher was guided in analysis of qualitative data by an inductive method of reasoning called grounded theory, drawing methods from constructivist approaches (Charmaz, 1993, 2014). The researcher used the NVivo qualitative data analysis
software package to assign descriptive phrases, called codes, to participants’ responses. Following the grounded theory approach, the researcher used the codes to organize participant responses into categories and develop theoretical meaning from the data. In addition to participants’ meanings, constructivist grounded theory considers researcher positionality within the research context and require reflexivity, where the researcher reflects on how their experiences and identity influence the research (Charmaz, 2014, p. 13). While preparing for the research process, this researcher reflected on their positionality as a white, cis-gender, college-educated female with professional background working in an environmental non-profit organization, with a similar socio-economic background to many of the study participants. At the time of the study, the researcher had lived in the city where the study was based for nine years and had worked and volunteered within the water advocacy community in the area for five years. This perspective gave the researcher an insider’s perspective into dynamics within the environmental and advocacy communities, while an early-career status within the profession allowed the researcher to remain open-minded about differing perspectives within the field and ask questions from a relative novice’s standpoint.

**Results**

Themes identified in interviews include considerations for getting involved in neighborhood issues and resources needed to support their involvement as neighborhood leaders (Table 1). While existing literature informed the selection of themes for inclusion in interviews, grounded theory in the constructivism framework allows for development of new theory based on themes generated by participants rather than requiring researchers to fit participants’ meanings within existing theoretical frameworks. Therefore, the following table of themes is
presented, to the extent feasible, independently of existing frameworks for understanding the research topic.

Table 1. Interview Themes

<table>
<thead>
<tr>
<th>Hurdle</th>
<th>Cues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention (see p. 18)</td>
<td>Perception of Problem Urgency</td>
</tr>
<tr>
<td></td>
<td>Perception of Problem Relevance</td>
</tr>
<tr>
<td>Value (see p. 20)</td>
<td>Visibility of Community Commitment</td>
</tr>
<tr>
<td></td>
<td>Priority Over Other Issues</td>
</tr>
<tr>
<td>License (see p. 22)</td>
<td>Clear and Simple Ask</td>
</tr>
<tr>
<td></td>
<td>Perceived Social License to Act</td>
</tr>
<tr>
<td>Resources (see p. 26)</td>
<td>Topical Support</td>
</tr>
<tr>
<td></td>
<td>Outreach Training</td>
</tr>
<tr>
<td></td>
<td>Availability of Reliable Authority</td>
</tr>
</tbody>
</table>

Some clear themes emerged as considerations that influenced whether participants acted on an issue that affected their neighborhood. These are organized conceptually in a set of hurdles, from how an issue attracts the participants’ attention, to how the participant assesses the value of acting and determines if they have license to act, to the resources participants feel they need to support meaningful involvement. A corresponding set of cues act as heuristics, or mental shortcuts, that residents use to assess whether each of the perceived hurdles is likely to be cleared.

Attention

Perception of Problem Urgency. First, participants described how an issue got their attention. Many participants noted that determining whether an issue is a critical concern influenced whether they got involved. While participants noted that having safe and abundant drinking water is important, many felt the issue is not pressing enough to motivate their involvement. One participant said, “drinking water quality is also kind of a high priority but I feel like, at least here in the Upper Midwest, we’re okay with that. So even though it’s important,
I don’t feel like there is a great need to do anything about it.” Another said, “I guess you could talk about [water] more but quite honestly, it doesn’t come up in discussion… our water seems to be clean and safe.” The water concerns mentioned most frequently in interviews were flooding, groundwater contamination such as by per- and polyfluoroalkyl substances (PFAS), and lake water quality, all which affect the community around the sample area.

One participant noted, conversely, that they had more success talking about positive outcomes then negative when sharing their native plant garden with neighbors. Rather than discussing just “the water quality issue,” they talked about attracting pollinators to their gardens as a “positive thing… creating a landscape [that] is more friendly to life.” Another cautioned against focusing on “a big problem” if “you can’t really do anything about it… then there’s really no point in focusing on that big problem if there’s a smaller problem that you can 100% eliminate, that’s more effective.” Comments such as these clarify that while respondents wish to see that an issue is urgent, additional framing is needed to make a serious issue palatable to a non-expert planning to volunteer their time.

**Perception of Problem Relevance.** Besides needing to see that a problem is serious, participants expressed they need to see that a problem is relevant to them or affects them directly. Sometimes the problem is tangible, like flooding affecting their property, neighbors or family or visible algae blooms in the lakes that prevent swimming. Other times, respondents described being made aware of drinking water quality issues through nearby contamination problems. One participant said, “the well just up the street from us was closed due to contamination. So that made me very aware of where some of the wells in the city were situated and what types of contamination were occurring and what remediation efforts were made on those.” One respondent described, “anybody most feels they have to act when they’re
immediately impacted by something.” Home ownership also made a difference for this group, with one saying, “I didn’t really get too much involved in community things. We lived in an apartment either on campus or near campus…. Once we bought a home, yeah, I got a lot more involved.” For an issue without immediately apparent direct relevance, outside prompts such as direct requests from people within one’s social circle or a community group appeared to be more important in getting participants to attend to an issue (see Attention, p. 18).

Value

*Visibility of Community Commitment.* Once their attention was grabbed by an issue, interviewees described weighing the value of their involvement in that particular issue. Participants wanted to see visible evidence that the relevant leadership and formal entities (e.g., the City of Madison, the Arboretum, homeowners’ associations, local businesses) are committed to addressing the issue. On the topic of invasive species, some participants expressed hesitation at making efforts in their own neighborhoods if they perceive portions of public land where invasive species have grown without apparent management (such as along Arboretum roads, or in woods in park areas), or if city or private application of salt use appears to contradict stated goals without consequences. For example, one participant stated it would be easier to have an impact “if the Homeowners Association would adopt these policies.” Another said that greater demonstration of commitment to water issues by the City would motivate them to do outreach about salt use, noting “I have a hard time talking to neighbors about using less salt when the highest applications are done by the city and contractors.”

The perception that companies do not follow guidelines also causes concern. A survey respondent shared, “Overall, most of my neighbors use lawn & snow removal companies for this work. We need to get lawn & snow removal COMPANIES involved. People are at work, hire the
task out and abdicate any responsibility for the leaf removal and reducing salt use. Local businesses are the same. They shrug their shoulders and remark that the company they hire just ‘uses that much salt.’” Visible cues of community commitment or lack of commitment appeared to be a strong signal of the value of participants’ involvement in a neighborhood issue.

**Priority Over Other Issues.** Participants also described considering whether water issues should be prioritized over other pressing issues. Some participants described weighing the question, “where should we be putting our energies?” Some people mentioned considering what issue needs the most attention or said that they do not have extra time to do more. Because the study city is perceived to have strong existing environmental advocacy, and abundant water, some respondents do not see the issue of water advocacy as most critical or directly affecting the perceived largest number of people in the community. One informant described thinking, “I’m not going to take it up unless neighbors start complaining. Because we have enough issues on our plate right now. And as any leader will tell you there, they have limited bandwidth, either institutionally or personally, and so you pick your mark, pick your projects, pick your fights. Every community has to decide individually and collectively what’s important right now.”

Another said, as a consideration for whether to get involved in water issues, “It’s priorities. And right now, my priority is working within the neighborhood on the food program…. I see children coming to school on Monday morning, not hungry and being able to pay attention in class as little ones, pay attention in class and get something out of their class.” This issue was also described as a zero-sum competition for available funding, as one participant cautioned, “We don’t want to waste resources…. Throwing away money on something that doesn’t really work means that that money won't be spent elsewhere…. There are huge problems in the community and we should be careful how we spend what bit of money is available for the public interest.”
However, sometimes, this manifested synergistically when respondents saw connections between water issues, which may be perceived as less critical, and pressing concerns like climate change, development, public health, and social justice. One respondent said, “the neighborhood has come together over a couple of issues and those big issues… are not immediately apparent as water quality issues. Water quality does come up in these discussions because development’s going to impact that so, you know, I think that in the process of engaging people around these big immediate issues, if we start talking about other issues that related to that, you know, that’s an opportunity to start bringing [water issues] up.” In reference to sitting on a city committee, they reflected, “I think [water] is kind of at the top of the priority list as we become engaged in… climate change.” Another looked to their faith and mentioned, “I would look to Detroit, Michigan or Flint, Michigan… it’s really not fair that children would suffer academically because of lead poisoning, in their water. That’s inexcusable in the United States. It’s inexcusable as a person of faith. It’s deeply saddening, deeply troubling. When I look at systemic racism, how can we not bond together over these critical basic human right issues which is access to clean water?” One informant described concern for equitable access to clean water, noting, “I think a lot about water in terms of social justice. I’m always going to be able to get water [but] there’s a lot of people who need city water, so it’s very important for me that we keep those resources. I think that the land ethic applies to water, right? Like thinking about water and those ecosystems as part of a community that we’re in, rather than a resource to be exploited.”

License

*Clear and Simple Ask.* Once problem seriousness and the value of getting involved is established, respondents generally expressed needing further prompting to feel they should personally get involved. For example, many participants want to be directly asked to do
something specific before becoming more active on urban water issues. Some noted that they haven’t heard that water is an issue or priority, and that, in their experience, people do not generally come to speak to their neighborhood groups about water. In many cases, participants expressed not having considered doing more.

Respondents wanted materials that are easy to understand and share, with a consistent message. For example, one survey response asked for “things I can do that are simple to understand and communicate.” An interview participant shared, “I expect [public officials] to come and tell us what role we should play, and [if] there is a role for us to play then it’s nice to know… In other words, we all have so much to do in our lives. Please only bring us what we need [to know]… and if somebody does have a question, make it easy [to get an answer].”

The idea of simpler communication especially came up for rain gardens. One interviewee suggested starting “a little smaller.” They described, “Say you’ve got to put in a rain garden – [people] look at what’s described in the plans that people write for rain gardens and it’s like doing some kind of a big water engineering project. And that is sometimes necessary, but very seldom it is, so I think that it intimidates people if they don’t have the knowledge of what it takes to put in what I would call a rain garden, which is just a lower area and put some plants in, and it can be very small even, to make a contribution to start out. What I’m interested in doing is to have some people put something other than bluegrass in their front lawn.”

**Perceived Social License to Act.** Many participants express social barriers to acting on water issues, such as not wanting to irritate neighbors. On the survey, a respondent shared hesitation: “These issues are important to me but I’m not sure I feel comfortable telling my neighbors what to do.” Another wanted a “way to present suggestions about leaf pick up and rainwater that did not seem ‘preachy.’” Many others also suggested a delicate approach in any
campaign. For example, other survey comments suggested “do not raise a fracas” and warned “you are not going to change neighbors, just alienate them.” Another survey respondent commented “I think that most every neighbor I have is aware of what they are being asked to do - therefore talking to them as if they have never heard of these things is not going to help. Nor is haranguing them for not doing them.” One informant talked about the importance of how their neighbors perceive their involvement, explaining, “I guess if I knew I wasn’t going to come across as so bossy [I would get involved]. Most of the people in our neighborhood are very thoughtful and wise and I don’t think I should tell them what to do in a soapbox way. If we’re doing it as a mutually motivated, cohesive group… then that would motivate me.”

Other saw the social energy needed to engage on water issues in their neighborhood as a barrier to getting more involved, such as one informant who said, “I think the thing that seems most exhausting to me about those kinds of engagement is that it would require me to figure out ways to get large groups of people that I don’t know to care about an issue.” Another said that their neighborhood group, as a rule, “doesn’t get involved in problems… it’s not our purpose.” Another interviewee said, in reference to their native landscaping, “I don’t know how [neighbors] view, the fact that my backyard looks like a weed patch…. this is not a crusade with me. I’ve been around long enough to know that you're not going to be confrontational and get anywhere except an argument.” One respondent who is active in restoration and keeps bees described their difficulty in engaging with neighbors about pesticide use without alienating them:

I’ve tried to talk to some neighbors about pesticides. But it doesn't always go well. As I mentioned earlier, I don’t like conflict. I’ll kind of do it [like], ‘Oh my God, your lawn is so pristine looking, that's so great if you’re comfortable with that.’ …. Sometimes they have no idea what is being put on there. So I try not to do it direct, like confrontation. It’s more of like a, “Do you know what's been put on your lawn, whether that’s toxic or not?” I want everyone to live happily ever after. But what somebody does to their lawn next to me affects my lawn and affects my water…. That part’s just hard. Who am I to say what they can do? I am a beekeeper also and so I let people know ‘we have to help out the
pollinators,’ so it’s a little bit removed from why it upsets me, to use the birds and the bees as being the voice, instead of my own…. [It has] to be done without attacking because, we want [outreach] to be [about] what positive things can we do.

The participant describes a conflict between wanting to be true to themselves and their values while also respecting their neighbor’s autonomy. If they perceive their neighbor shutting down, they choose to back off to avoid damaging their relationships with neighbors. In these situations, they describe feeling unsure how to have productive conversations – stay true to their values – without violating their social license to engage and offending a neighbor, which they see as being counter-productive to the goal of a continued dialogue and relationship with that neighbor.

Conversely, social aspects can motivate people to engage or make efforts to address urban water issues more successful. The same interviewee noted, “we have a lot of people that go to neighborhood events that have a social base and it’s a gathering point… people of all ages really appreciate that.” Another said that a motivator for getting involved in water issues would be if the issue could also act as a social event; for example, if “somebody said, ‘let’s do it together’ [or] I could say, ‘Hey folks, do you want to get your water tested together?’” They described how they make themselves available to people on their block in their role in their neighborhood association: “I go around and kind of stay informed with local issues… I don’t send little emails around like other people, I don’t do Facebook, but I will just knock on the door every now and then before the [neighborhood association] membership drive. I’ll send one email saying, ‘in the next two weeks, I’ll be there’… so they're not surprised when I come by.” The interviewee observed that “it’s the social component” driving their involvement in their neighborhood: “people I like whose ideas I respect, they teach me a lot in their work parties, and we talk about a lot of different things while we're working. So I like to use my volunteering [as]
a learning and social activity.” The social ramifications of getting involved seemed to weigh on participants’ decisions on whether and how to act.

**Resources**

**Topical Support.** Beyond the factors determining whether participants thought they should and are expected to act, they also needed resources to feel that their involvement would be meaningful. First, the need for training and resources on topical skills related to water emerged in interviews: accessible information on topics they feel they do not know enough about like salt, leaf, and rainwater management. An informant from a school setting noted,

“You have to be aware of what the issues are. When you’re running a school you’re not thinking about… the environment around you and so I had no idea that our runoff went down to [the lake]. It's not something I thought about on a daily basis or even thought about ever, until I knew about it, so I think what I would have to have would be more education, more people in the community coming forward to tell us and to give us information, because as a staff other than the three or four teachers who are really into the environment, I don’t think we’re aware of a lot of things in our environment. And if we had more information, you could use that in our classroom too.”

One interviewee described a citywide annual gardening conference in support of community gardening, developing leadership and providing training, where attendees had the chance to discuss and learn from peers. They noted that “people retain information better when it comes out of their own mouth.” Another interviewee suggested to “make [trainings] fun so that people want to come back,” highlighting how social aspects of engaging can intersect with participants’ desire for topical training.

**Outreach Training.** Respondents asked for training on how to do more effective outreach about environmental topics. They acknowledged that people are busy, limited by money and knowledge, are often trying their best, and do not always like being told what to do. Therefore, many felt that they needed more training before feeling equipped to ask others to change their behavior or feared that their efforts would do more harm than good. The need for training on
how to do outreach came up many times. One interviewee shared their experience encountering efforts in their neighborhood they wished they had known about sooner and only found by actively seeking out. They noted, “Outreach is always the hardest part for almost any organization… outreach and motivation. How do you let people know what’s going on?… there are folks who do have capacity and that would help on a number of issues, or volunteer or participate if they knew.”

For example, an interviewee learned from one workshop about how “the way that you motivate and communicate younger people is not at all like the way [older generations] were motivated when we were growing up and joining organizations” and was able to implement these strategies in recruiting for a neighborhood group’s volunteer events. This type of content that trains the trainer seems to be in high demand. Another interviewee suggested that “the most… common missed opportunity I think is lack of networking and connection between groups doing similar things… [lack of] facilitator training… training on relationships.” Desire for facilitation training was echoed by other participants, although one noted that, in their experience, “people are super resistant to [facilitator training] … they feel like we should be able to do it on her own or it’s too expensive or they think they’re [already] really good at it but nobody really is. I think if you haven’t been exposed to those types of training, you don’t know what your deficiencies are.”

**Availability of Reliable Authority.** Even participants who already demonstrate leadership within their neighborhood expressed the need to be able to stand behind the authority of a trusted and respected individual when they act. Respondents communicated the value of clean water and were able to describe a personal connection to water. However, participants described wanting clear leadership from an outside source before acting. An interviewee discussed, “If I had a
leader to go behind… [the leader] would get my strong support on these issues… and then it would be easier for me to engage with people in my more tight-knit groups as an advocate for that leader.” One survey respondent also emphasized the need for consistency from outside sources, asking leadership to “keep a consistent and frequent message in front of people… [this] may get better results than getting the message out haphazardly.”

Several interviewees emphasized how important it is having a real person to engage with neighborhood groups on a regular basis. One mentioned city alders that “stepped up when there are community meetings” and another mentioned seeking out “trustworthiness,” “integrity,” and “truth-telling,” that they associate with worthwhile sources, such as university researchers, and the need for “deep, strong leadership.” These leaders can act as trusted sources of information that can be shared with others as an invitation for them, according to one informant, to “get on board” and so that “they would then have something they can do.” They shared that information isn’t lacking but that “there’s so much out there that it’s hard to weed through.” Accessible, trusted leaders appear to take some of the burden of authority and decision-making from individual residents and make getting involved an easier decision to make.

Discussion

Community-engaged informants describe a set of criteria that they believe guides whether they choose to engage in an issue. First, the issue must cross a threshold of importance to gain their attention: it should be deemed serious and time sensitive enough to merit immediate concern and it should infringe upon their territory (such as themselves, their family, or their social realm) and therefore achieve relevance. The issue should be a valuable use of one’s capacity to engage. For example, existing community commitment provides good evidence that efforts will be fruitful, as does priority over or intersection with other pressing societal issues.
Final barriers include license to intervene, given by direct asks from local groups and belief engaging on the issue is socially acceptable, as well as resources, like access to a reliable authority as well as topical and outreach training.

This conceptual framework represents a set of hurdles that an issue must clear before even highly engaged advocates will choose to get involved. Communicators wishing to work with neighborhood advocates should consider that residents may be looking for reasons why they should not get involved, including:

- This issue isn’t critical.
- It doesn’t affect me.
- Institutions aren’t committed to solving it, so my involvement won’t matter.
- It’s not as important as other pressing issues.
- I haven’t been asked to do anything.
- I don’t want to bother people.
- I don’t know enough.
- I don’t know how to tell others.
- I don’t know who to ask.

Behavioral campaigns informed by social and environmental science provide answers to many of these questions. They may develop institutional partnerships – commonly used in health contexts (Roussos & Fawcett, 2000) – that remove barriers at different stages of a desired behavior. Targeted campaign messages provide relevant information to different segments of people (Dietrich et al., 2016) and make connections between local environmental issues and broader concerns, such as climate change (U.S. EPA, 2021). Good campaigns will use non-divisible, end-state asks – requests that represent a single task achieving a desired outcome.
(McKenzie-Mohr, 2011, p. 13) such as removing leaves from the street before it rains – and offer prompts like text alerts (p. 84). Well-funded campaigns also offer a contact point for topical questions, such as a staff person paid to attend community meetings and develop relationships with neighborhood groups who serves as a trusted authority. Additionally, attention to obstacles aligns with the community-based social marketing framework, where barriers to completing a behavior are identified and addressed in order to promote a selected behavior (McKenzie-Mohr, 2011, p. 9)

However, paying for human hours to do outreach has a cost. If the program coordinator has other responsibilities, time in the office may have priority over evenings at community group meetings. In addition, support for additional outreach staff to carry out door-to-door campaigns can be cost-prohibitive. For example, in a pilot program encouraging residents to remove leaves from the street in front of their home, staff determined that the high touch approach, which included personal visits to homes, was not cost-effective (Clean Lakes Alliance, 2016). While additional staff support for face-to-face outreach may be available through limited-time grants or for smaller-scale pilot projects, municipalities responsible for addressing urban water issues may not release the extra funding needed for on-the-ground outreach staff unless there are high financial stakes. Municipalities across the country face limitations on revenue generation and expenditures (McFarland & Hoene, 2015). To reduce program costs or increase impact despite limited funding, some initiatives may seek to capitalize on free labor by asking residents to spread the word to their neighbors (e.g. "Outreach Tools" page on Wisconsin Salt Wise Partnership, 2021). This choice requires a campaign that asks residents to change their own behavior as well as to influence their neighbors. These are two different tasks: a behavior that
takes places independently within one’s household and one that requires residents to use their social capital outside the home.

How can these barriers be addressed? Some perceived hurdles can be directly addressed with existing social marketing strategies. For example, visibly tying an action to a norm can more visibly signal community commitment to an issue. The City of Madison, Dane County, and Clean Lakes Alliance partnered to wrap several municipal leaf-collection trucks with an advertisement showing someone raking leaves out of the street, accompanied by the message, “PROTECT OUR LAKES. KEEP STREETS LEAF-FREE.” When the city removes leaves from the street, they now tie a desired action with a community norm that streets should be free of leaves. Environmental behavior campaigns that hire a dedicated outreach staff person similarly provide residents with an accessible, outside authority on an issue, reducing the perceived personal risk to getting involved. Efforts that make community commitment more visible and reliable authority more accessible will likely diminish these perceived hurdles.

Compared to other items, perceived social license to act appeared to be the most significant unaddressed barrier in existing community efforts. Outreach behaviors present unique perceived challenges to residents who participated in interviews for this study, so successful campaigns should consider the level of outreach training provided for volunteers. Social backlash is a real concern; the stereotype that “nobody likes an environmentalist” likely stems from distaste for behavior that appears to infringe on individual freedom to behave as one pleases. One strategy to address this concern is to start by focusing on reframing outreach; since social norms influences others, it is possible to encourage pro-environmental behaviors among one’s peers by example without having to tell anyone what to do. Many interviewees also expressed a desire for strategies for having more effective conversations about environmental
issues. Thankfully, there are strong existing traditions supporting outreach efforts. For example, some practices used by community organizers, such as strategies for recruiting and engaging volunteers, may also be appropriate to adapt (McKnight, 2015). Community-based social marketing approaches consider the social aspects of behavioral campaigns, such as social norms and social diffusion (McKenzie-Mohr, 2011). Even counseling psychology may have applications to environmental outreach campaigns, including strategies for effective conversations about change with easy-to-remember acronyms that can apply to everyday conversations (Miller, 2013). Identifying specific behavioral targets, for outreach as well as environmental behaviors, is an important step in developing an appropriate training plan. Setting clear behavioral targets will allow for organizers to examine existing strategies and work with participants to determine what types of training are needed for the campaign.

As with any campaign, possibility for unintended consequences of outreach efforts should be considered. Here, advice from survey participants, cited earlier in this chapter, may be appropriate to revisit: warning “you are not going to change neighbors, just alienate them” and reminding that “talking to [neighbors] as if they have never heard of these things is not going to help. Nor is haranguing them for not doing them.” It is entirely possibly that an ill-informed or executed campaign can do more harm than good in a community. Reactance theory, which describes how people fearing loss of behavioral freedom may react by doing more of the behavior they feel is threatened (American Psychological Association, 2020), has been demonstrated in environmental contexts. In one case, researchers found that messaging that preserves perceived behavioral control and operates within subjective norms reduced reactance against messages promoting water conservation (Liang et al., 2018). Best practices in marketing include pilot testing all campaign materials and getting feedback along the way, such as through
focus groups (Krueger & Casey, 2014). Furthermore, community-engaged research norms emphasize the value of engaging community members as equal members of an effort rather than recipients of an externally designed intervention (Mills, 2005). Finally, campaign managers should recognize that the attitudes that inform beliefs are usually closely-held and built over time; behavioral campaigns are best served “navigating” rather than changing environmental attitudes (Heberlein, 2012). Care taken in building a campaign can impact the success of current as well as future efforts to address the issue of concern.

In contrasting environmental and outreach beliefs, these interviews also raised questions not currently addressed in the research literature, especially regarding factors influencing residents’ involvement in pro-environmental advocacy within their neighborhoods. For highly engaged residents, is belief in the value of the pro-environmental behavior enough to spur them to pitch in on environmental campaigns? How important is it to address barriers to outreach such as “I don’t want to bother people” and “I don’t know how to tell others” along with addressing barriers to the pro-environmental behaviors? In Chapter 3 of this thesis, a survey of residents examines the difference between residents’ beliefs about environmental and outreach behaviors to provide some context for how environmental campaign managers can effectively balance environmental and outreach messages.
CHAPTER 3: RESIDENTS’ ENVIRONMENTAL VS. OUTREACH BELIEFS

Introduction

While most human dimension studies of urban water issues focus on what factors determine whether someone will adopt a pro-environmental outcome behavior, like installing a rain barrel on their property or signing up for a green energy program through their utility, this study focuses on factors influencing intermediate outreach behaviors to spread adoption of a pro-environmental behavior. These behaviors will be referred to as opinion leadership, a term defined by Katz (1957) to describe influential individuals who mediate mass media messages and communicate them within their social circles.

Opinion leadership has been used to explore interpersonal factors influencing adoption of behaviors in a variety of contexts, including religious leaders’ influence on congregants’ support for organ donation (Vincent et al., 2011) and, in a new media context, Twitter users’ influence on the civility of public discourse following a mass shooting (Rohlinger et al., 2020). The present study is modeled on opinion leader research identifying factors influencing whether bait shop owners encourage transient anglers to prevent the spread of aquatic invasive species when moving their boat from one waterbody to the next (Dalrymple et al., 2013; Howell et al., 2015). While the present study also examines factors influencing environmental outreach behavior, it involves a residential rather than a commercial setting, with engagement initiated among neighbors rather than as an interaction with a customer during a purchase. The study location is a mid-sized midwestern city, including residents in neighborhoods around a small urban lake and within the greater metropolitan area.

A set of four desired behaviors were selected for this study based on existing community efforts to promote those actions:
1. Using less salt on sidewalks and driveways (e.g., shoveling and applying sand first, using salt carefully if at all)

2. Removing leaves from the street before it rains (e.g., clearing leaves from the street gutter in the fall and managing them with the rest of your yard waste)

3. Making changes to allow rainwater to soak into the ground (e.g., directing gutter downspouts to lawn or garden, planting a rain or native plant garden, using a rain barrel, using fewer hard surfaces like concrete or asphalt)

4. Encouraging neighbors to do these behaviors (remove leaves from the street, use less salt, make changes to allow rainwater to soak in)

The selected issues represent critical environmental concerns in the study area: chloride pollution, phosphorus pollution, and infiltration of stormwater runoff. Years of salt applications contribute to chloride contamination of surface and groundwater, threatening wildlife and drinking water quality (Wenta, 2020). Stormwater running over decaying leaf litter in urban areas can contribute to nutrient pollution, with phosphorus as a limiting factor, which promotes harmful algal and cyanobacteria blooms in nearby lakes and rivers among other concerns (Carpenter, 2008; Schindler et al., 2008). Infiltration concerns, on the other hand, pertain to volume and peaks in stormwater runoff; hard surfaces in urban areas increase the amount of water that runs over land when it rains and impairs water quality (National Research Council, 2008). Finally, local watershed planning with stakeholders has identified resident engagement with urban water issues as a priority (City of Madison Wisconsin, 2015). While items do not uniformly meet the non-divisible standard for targeted behavior change campaigns, they were selected to describe a set of behaviors that fulfill a broader community-desired outcome: wise salt use, leaf-free streets, less runoff, and community engagement.
Based on previous studies of factors influencing adoption of innovations and outreach behavior (see Table 2), the following hypotheses were identified:

H1: Experience with pro-environmental and outreach behaviors will be positively associated with willingness to do outreach

H2: Self-reported psychometric opinion leadership score will be positively associated with willingness to do outreach

H3: Agreement with constructs for adoption (relative advantage, compatibility, complexity [reverse-coded], observability, and trialability) for pro-environmental behaviors will be positively associated with willingness to do outreach

H4: Agreement with constructs for adoption for outreach behaviors will be positively associated with willingness to do outreach

**Methods**

An electronic questionnaire was developed and conducted using Qualtrics Survey Software and contained a base set of 31 questions covering eight conceptual areas including opinion leadership self-assessment, behavioral items for four target behaviors (leaves, salt, infiltration, outreach), perceived issue priority, beliefs regarding behavior ‘constructs for adoption,’ preferences and trust for sources of information, willingness to do outreach behavior in the future, and demographic items (Table 2). Supplementary questions were queued in software for more detail on specific items where applicable based on prior responses, such as more information about behaviors, for a total set of up to 54 questions. The survey text is included in Appendix C.
Table 2. Survey Concepts

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<tr>
<th>Concept</th>
<th>Literature</th>
<th>Items</th>
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<td>Opinion Leadership</td>
<td>Adapted from Jungnickel (2018, p. 2712)</td>
<td>Self-assessment covering:</td>
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<td>• Giving advice</td>
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<td>• Influence on opinion</td>
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<td>• Leadership personality</td>
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<td>• Agenda setting</td>
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<td>Past Behavior</td>
<td>Fishbein &amp; Ajzen (2009, p. 22)</td>
<td>Times done behavior in the past year</td>
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<td>Perceived Priority</td>
<td>Interviews. Also see personal priorities,</td>
<td>Perception of issue priority to self and to others</td>
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<td></td>
<td>(Kollmuss &amp; Agyeman, 2002), public arenas model (Hilgartner &amp; Bosk, 1988)</td>
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<td>Perceived Behavioral Control</td>
<td>Fishbein &amp; Ajzen (2009, p. 64)</td>
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<td>• Relative advantage</td>
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<td>• Compatibility</td>
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<td></td>
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<td>• Easiness (substituted for reverse-coded complexity)</td>
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<td>• Trialability</td>
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<td>• Observability</td>
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<td>Trust</td>
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<td>Rating of trust in entities to suggest changes in ways to manage salt, leaves, or rainwater</td>
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<td>Behavioral Intention</td>
<td>Ajzen (2005, p. 100)</td>
<td>Willingness to do outreach behaviors</td>
</tr>
<tr>
<td>Demographics</td>
<td>Ajzen (2005, p. 141)</td>
<td>Education, income, and age</td>
</tr>
</tbody>
</table>

Survey information with a link to the online survey instrument was sent to 193 initial publicly available email addresses for individuals and neighborhood groups within the Lake Wingra watershed and the Greater Madison area, including associations, local businesses,
community centers, alders, and advocacy groups, who were encouraged to share with additional contacts who may be interested in taking the survey. The survey was conducted by entities familiar to most people in the community: researchers from a public university located in the study city with funding from a division of the university that manages 1,200 acres of land along an urban lake used for research, education, and recreation. A reminder email was sent one week before the survey closed.

Results

From November 25, 2019 to January 9, 2020, 154 electronic survey responses were recorded. After responses were filtered to include those who completed a minimum set of questions for meaningful contribution to analysis (at least 40% survey completion), 128 responses were retained. Responses were analyzed variable-by-variable (see Exploratory Data Analysis) and were used to build a model (see Regression Analysis, p. 54).

Exploratory Data Analysis

The researcher conducted exploratory data analysis to investigate distributions of responses to study measures, including background information about the respondents and their behaviors and beliefs. Given the quantity of variables, each item is discussed briefly in this section and further analysis is reserved for the discussion.

About the Respondents

Figure 1. Residence Years

Residence. The median time respondents have lived in the area is 18 years. Most respondents came from the west side of town followed by the Lake Wingra watershed, the east side, outside Madison, and other areas within Madison (
Table 3).
Table 3. Responses by Area

<table>
<thead>
<tr>
<th>Area</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madison west side</td>
<td>42</td>
</tr>
<tr>
<td>Wingra watershed (see Figure 2)</td>
<td>40</td>
</tr>
<tr>
<td>Madison east side</td>
<td>10</td>
</tr>
<tr>
<td>Outside Madison</td>
<td>10</td>
</tr>
<tr>
<td>Madison south side</td>
<td>9</td>
</tr>
<tr>
<td>Madison north side</td>
<td>5</td>
</tr>
<tr>
<td>Madison campus/downtown</td>
<td>5</td>
</tr>
<tr>
<td>No response</td>
<td>4</td>
</tr>
<tr>
<td>Madison isthmus/near east</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>128</strong></td>
</tr>
</tbody>
</table>

Respondents living within the Lake Wingra watershed (n = 40) were asked which neighborhood they live in, mapped in more detail in Figure 2. Nine neighborhoods were represented, plus six respondents who did not specify a neighborhood.

**Figure 2. Map of Response Distribution Within the Lake Wingra Watershed**

Demographics. Excluding missing responses, respondents’ median reported age range was 55-64 years old (Figure 3), the median reported annual household income range was $100,000-$149,999 (Figure 4), and the most commonly reported educational attainment was
Master’s or Professional degree (Figure 5). Figures display the proportion of respondents (y-axes) who selected each response item (x-axes).

**Figure 3. Age**

![Figure 3. Age graph]

**Figure 4. Annual Household Income**

![Figure 4. Annual Household Income graph]

**Figure 5. Highest Educational Attainment**

![Figure 5. Highest Educational Attainment graph]
Most respondents were employed (n = 48 full time or n = 11 part time), followed by retired (n = 49, the most common response if employment levels are separated), homemaker (n = 3), and unemployed not looking for work (n = 1) (Figure 6).

**Figure 6. Employment**

![Bar chart showing employment distributions.]

*Involvement.* Respondents selected the capacities in which they currently engage in neighborhood issues in a multiple-select question with the ability to mark all applicable responses. The survey reached individuals with a variety of perspectives on neighborhood issues (Table 4). Engaging as a homeowner, then as part of a neighborhood association, a community organization, or as a parent or guardian were the most common responses. Educational institution or faith community involvement were also represented. Involvement as a landlord or property manager, renter, or as part of a for-profit business was represented to a lesser extent. Homeowners were represented in greater proportion than renters in this sample.

**Table 4. Responses by Involvement**

<table>
<thead>
<tr>
<th>In what capacity do you currently engage in neighborhood issues?</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>As a homeowner</td>
<td>118</td>
</tr>
<tr>
<td>As part of a neighborhood association</td>
<td>49</td>
</tr>
<tr>
<td>As part of a community, non-profit, or advocacy organization</td>
<td>33</td>
</tr>
<tr>
<td>As a parent or guardian</td>
<td>29</td>
</tr>
<tr>
<td>As part of an educational institution</td>
<td>18</td>
</tr>
<tr>
<td>As part of a faith community</td>
<td>17</td>
</tr>
<tr>
<td>As a landlord or property manager</td>
<td>10</td>
</tr>
</tbody>
</table>
Opinion Leadership

Respondents rated their agreement, from Strongly disagree (1) to Strongly agree (7) with a 6-item opinion leadership question set (Table 5), adapted from opinion leadership criteria summarized in Jungnickel (2018). Although opinion leadership scales have been developed, such as Gnambs & Batinic’s (2011) reduced question set which emphasizes perceived influence on others’ behavior, this question set was chosen since it used meta-analytical methods to represent a broader set of opinion leadership criteria present in studies conducted in the last 20 years.

Table 5. Opinion Leadership Criteria

<table>
<thead>
<tr>
<th>Criterion from Jungnickel (2018)</th>
<th>Questionnaire item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giving information</td>
<td>“I like to learn and share information about issues that affect our community”</td>
</tr>
<tr>
<td>Agenda setting</td>
<td>“My friends and acquaintances often discuss subjects that I brought up”</td>
</tr>
<tr>
<td>Influence on behavior</td>
<td>“People in my social circle often act on my advice”</td>
</tr>
<tr>
<td>Giving advice</td>
<td>“People come to me for advice about issues that affect our community”</td>
</tr>
<tr>
<td>Influence on opinion</td>
<td>“I often influence people's opinions about issues that affect our community”</td>
</tr>
<tr>
<td>Leadership personality</td>
<td>“I like to take the lead in my social circle”</td>
</tr>
<tr>
<td>Interpersonal communication</td>
<td>Omitted – considered separately in model</td>
</tr>
</tbody>
</table>

Interpersonal communication was omitted from this question set since it is topic-specific ("I talk to other people about…") rather than a general opinion leadership characteristic; giving information most closely relates to this dimension. Instead, the survey asks about topic-specific interpersonal communication behaviors as a separate measure (see Past Behavior and
Experience, p. 43), which is considered separately as a dependent variable in the regression model. This allowed researchers to examine the influence of past behavior separately.

**Figure 7. Distribution of Self-Reported Opinion Leadership by Dimension**

![Bar chart showing distributions of self-reported opinion leadership by dimension](image)

Distributions of respondent agreement with statements are summarized in Figure 7. Respondents rated each item from strongly disagree to strongly agree. Only about 16% of respondents agreed or strongly agreed with the statement prompting the least agreement, “I like to take the lead in my social circle,” whereas about 78% of respondents agreed or strongly agreed with the statement prompting the most agreement, “I like to learn and share information about issues that affect our community.”

**Past Behavior and Experience**

Respondents were asked about experiences and behaviors related to each pro-environmental behavior selected for this study. Prior to this question set, each item was presented alongside examples of behaviors that fit the description (see Introduction).
Who Manages Behavior. First, respondents indicated who (someone in their household, someone they hire, or their landlord) manages each domain.

Figure 8. Who Manages Behaviors

Times Heard. Respondents estimated how many times they heard about each issue in the past year.

Figure 9. How Many Times Respondents Heard About Issues in Past Year
**Heard by Word-of-Mouth.** Respondents were asked if they had heard about each behavior by word-of-mouth, defined as “someone you know sharing information about the behavior” (Table 6).

**Table 6. Percent of Respondents Who Heard About Issue By Word of Mouth**

<table>
<thead>
<tr>
<th></th>
<th>Heard by Word of Mouth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salt</td>
<td>55%</td>
</tr>
<tr>
<td>Leaves</td>
<td>50%</td>
</tr>
<tr>
<td>Rain</td>
<td>48%</td>
</tr>
</tbody>
</table>

**Times Done and Shared.** Respondents estimated how many times they did each behavior or maintained previously installed features like rain gardens during the past year (Figure 10), or shared information about each of the selected behaviors with someone else during the past year (Figure 11).

**Figure 10. How Many Times Respondents Did Behaviors in Past Year**
Figure 11. How Many Times Respondents Shared Information About Behaviors

Ways Respondents Shared Information. Respondents were asked what ways they have shared information that affects their neighborhood, including knocking on doors, hosting an event, handing out information, putting up signs or flyers, sharing information on social media, forwarding an email, and talking to neighbors (Figure 12). Respondents marked how often they had done each behavior over the past three years, from never to very many (10+) times. This question set covers three years to account for year-to-year variation in availability to participate in campaigns, while still covering a period over which people could reasonably estimate their involvement.
Figure 12. How Often Respondents Did Outreach Behaviors in Past Three Years

Perception of Priority

Respondents were asked to rate how much of a priority each of the selected environmental issues behaviors is to themselves, and, in their opinion, to other residents, businesses, and the neighborhood association in their immediate neighborhood, as well as to leaders in their larger community (e.g., local officials; city, town, or village leadership). Items were rated from not a priority to high priority. Response distributions are arranged in a grid in Figure 13. Each column represents one of the selected environmental issues. Each row represents a group for which respondents rated priority or perceived priority, such as themselves or their neighbors. Level of priority (from “not a” to “high” priority) is shown on the x-axes on the bottom row and the proportion of responses for each level is shown on the y-axes on the far-left column.
Figure 13. Perception of Issue Priority by Group

Perception of Resident Behavioral Control

Respondents rated whether residents play an important role in efforts to address each issue (Figure 14). The question serves as a measure of respondent perception of residents’ control over outcomes for the pro-environmental and outreach behaviors.
Beliefs about Behaviors

Respondents’ beliefs about the selected behaviors were measured using a set of questions representing Diffusion of Innovations Constructs for Adoption, including relative advantage, compatibility (split into compatibility with personal values and with household schedule), reverse-coded complexity (operationalized here as non-reverse coded easiness so that all questions have the same valance), observability, and trialability. Respondents rated their agreement with questions representing each construct for each behavior (Table 7).

Table 7. Diffusion of Innovations Constructs for Adoption

<table>
<thead>
<tr>
<th>Construct</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative advantage</td>
<td>“In my opinion, this behavior is a useful change in the way we do things”</td>
</tr>
<tr>
<td>Compatibility (schedule)</td>
<td>“I could realistically fit this behavior into my household’s schedule”</td>
</tr>
<tr>
<td>Compatibility (values)</td>
<td>”This behavior is consistent with my personal values”</td>
</tr>
<tr>
<td>Easiness</td>
<td>“This behavior would be easy to adopt”</td>
</tr>
<tr>
<td>Observability</td>
<td>“This behavior would make an observable difference in my neighborhood”</td>
</tr>
</tbody>
</table>
Trialability | “I could try doing this, without investing too much time or money”

Figure 15 shows the distribution of agreement, from strongly disagree to strongly agree, for each statement asked about each selected behavior. This behavior set includes beliefs about “encouraging neighbors to do [pro-environmental behaviors],” marked under “Outreach.”

Response distributions are arranged in a grid. Each column represents a selected issue, and each row represents a Diffusion of Innovations construct, so that each cell in the grid represents a belief about a target behavior. Agreement with the construct is shown on the x-axes on the bottom row and the proportion of responses is shown on the y-axes on the far-left column. For the “relative advantage” construct, respondents were provided a “standard” behavior against which to rate their agreement with the relative advantage of the selected behavior: “not removing leaves, letting city remove leaves,” “using same amount [of salt] or more,” “not making changes [to allow rainwater to soak into the ground],” and “letting city do outreach.”

Examining response distributions for Figure 15 in a grid format highlights where respondent beliefs differ by behavior and by construct. While there is generally high agreement with the constructs for adoption, comparisons across behaviors (columns) and constructs (rows) show interesting deviations. For example, there are clear differences in pro-environmental compared to outreach beliefs. This chart also highlights differences in ratings of the behaviors’ compatibility with values, an idealistic concern, compared to compatibility with household schedule, a more practical consideration. Possible reasons for these less favorable beliefs are highlighted in the chapter discussion.
Figure 15. Agreement with Constructs for Adoption for Behaviors

![Bar chart showing agreement levels for different constructs.]

**Communication**

Respondents rated the effectiveness of different ways to reach them, arranged from highest to lowest mean effectiveness in Figure 16.

Figure 16. Communication Preferences

![Bar chart showing communication preferences.]

Rating

<table>
<thead>
<tr>
<th>Issue</th>
<th>Using less salt</th>
<th>Removing leaves from street</th>
<th>Letting rain soak into ground</th>
<th>Doing outreach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compatible (sched)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compatible (values)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ease</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Respondents rated how much they trust different sources of information to suggest changes in the way they manage salt, leaves, or rainwater (Figure 17).

**Figure 17. Average Trust Ratings**

*Willingness to Do Outreach*

Respondents were given the following debriefing statement near the end of the survey that identified local threats to water quality, highlighted the ability of the selected pro-environmental behaviors to protect water, and emphasized the effectiveness of interpersonal communication to change behaviors:

Nutrient pollution, salt use, and stormwater runoff seriously threaten water quality in our community. The behaviors described in this survey that people like you can do have been selected for their potential to help keep our water safe and usable now and in the future. Social science research has shown that person-to-person communication is one of the most effective ways to help get more people to do these things.

*Willingness.* Following this appeal, respondents rated how willing they would be to share information about managing leaves, salt, or rainwater in the following ways over the upcoming
year (Figure 18), organized from least willing (knock on doors) on the top left to most willing (talk to neighbors) on the bottom right.

**Figure 18. Respondent Willingness to Do Outreach Behaviors**

![Bar chart showing respondent willingness to do outreach behaviors](chart.png)

Volunteer. At the end of the survey prior to a set of demographic questions, respondents had the option of providing their contact information to be informed about “future efforts to promote the following behaviors in my neighborhood” and were able to check boxes individually to indicate their interest in being contacted about a topic. Responses are ordered from most to fewest volunteers. Respondents who completed at least 40% of the survey (n = 128) but exited before this item (n = 11) were marked “no.”

**Table 8. Percentage Interested in Being Contacted**

<table>
<thead>
<tr>
<th>Issue</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainwater</td>
<td>23% (n = 30)</td>
</tr>
<tr>
<td>Salt</td>
<td>18% (n = 23)</td>
</tr>
<tr>
<td>Leaves</td>
<td>18% (n = 23)</td>
</tr>
<tr>
<td>Outreach</td>
<td>17% (n = 22)</td>
</tr>
</tbody>
</table>
**Contact Information.** Respondents who marked their interest in any of these issues were then provided a space to fill in contact information. Of the n = 37 respondents who expressed interest in being contacted on any of the selected issues, n = 36 provided their email, n = 36 provided their name and n = 27 provided their phone number.

**Regression Analysis**

Survey variables were used to develop a multiple regression model analyzing factors associated with respondents’ greater self-reported willingness to share information about managing leaves, salt, and rainwater. For the regression model analysis, only respondents who responded to the question set comprising the outcome measures, Willingness to do Outreach Behaviors, were included in analysis (n = 117, equivalent to about 75% survey completion). Respondents who quit the survey prior to responding to questions willingness to do outreach were omitted, since it is the variable of interest for this regression model. In addition to the hypotheses listed above, factor analysis is used to assess the ability of the opinion leadership question set to measure a single underlying construct.

**Control Variables**

Mid-point estimators were used for demographic variables that were measured within the survey using categorical bins. The midpoint approach is supported by Von Hippel et al. (2016) for its characteristics such as bin consistency, where estimates converge on the estimated value as bins get narrower. Administering this survey electronically allowed for fairly numerous bins that should allow midpoint estimates to be close to actual values: no more than five years for age and $5,000 for most income categories. Using ordinal values would provide a similar level of control for demographics with less easily interpretable units that do not represent real-world values.
**Age.** To control for respondent age, age in years was coded by substituting the midpoint of the categorical age variable. For example, respondents who selected 25-34 were coded as 29.5, the midpoint between the lower and upper range. The upper bound category, 85 or older, was coded as 89.5 to maintain equal category sizes.

**Income.** Responses for income were included to control for income in the regression model. The program “topcat” for STATA was used to fit a pareto-lognormal distribution onto binned household income responses for the full dataset and estimate midpoint values, including for the open top category (Logan, 2020). This approach allows for robust estimation from binned incomes, better accounting for real-world income distributions (Von Hippel et al., 2016). For ease of analysis, units were converted into tens of thousands of dollars.

**Education.** To control for respondent education, categories were recoded with values corresponding to the number of years typically needed to complete degree work in the United States. ‘High school graduate’ was recoded as 12, ‘Two-year degree’ as 14, ‘Four-year degree’ as 16, ‘Master’s or professional degree’ as 18, and ‘Doctorate’ as 21. ‘Some college’ was coded as 14.

**Predictor Variables**

**Times Heard, Done and Shared Behaviors.** These variables, each coded with their numeric Likert scale value from 1 = Never to 5 = Very Many (10+) Times, are included in the model to control for previous exposure to messages about the pro-environmental behaviors and experience doing and sharing information about the behaviors.

**Opinion Leadership Score.** Opinion leadership scores are included in the model to assess the influence of psychometric opinion leadership on willingness to do outreach behaviors. Exploratory Factor Analysis using the “psych” package for R (Revelle, 2021) was performed on
all responses to this measure (n = 128) to assess measurement of an underlying construct or constructs. There is discussion about the best way to estimate scale reliability (McNeish, 2018; Savalei & Reise, 2019) and therefore several measures are presented here. The Cronbach’s alpha coefficient score for the index is 0.83 [95% CI .79-.87], generally representing “good” reliability, or the ability of the index to measure an underlying construct through the included items. The “omega” coefficient, which is similar to Cronbach’s alpha but does not assume equal covariance of items, was calculated and the score of .9 also supported good index reliability (Revelle, 2017). Eigenvalue analysis using the Kaiser criterion using the “eigen” command from the base R package (CRAN, 2021) and Cattel’s scree test with a cutoff of values greater than one using the psych package “VSS.scree” command (Revelle, 2013) further supported a single underlying construct explaining variance, although a second factor is marginal and could be considered (Figure 19). Sample size (n = 128) and variables-to-factors ratio (6-to-1) make this analysis most appropriate assuming a single factor; additional factors could be investigated in a study with more respondents (Mundfrom et al., 2005). For the purposes of this analysis, however, there is clear support for the consideration of included items as representing a single latent variable, opinion leadership.

**Figure 19. Factor Selection Scree Plot**
Direct oblimin rotation and principal axis factoring were used to obtain factor loadings [“fa” command], which were then used to obtain weights for each item using the “factor.score” command (Table 9). The R squared value of correlation of factor scores with the latent factor is estimated at .88. A weighted opinion leadership score (Figure 20) was then calculated for each respondent considered in the multiple regression model (n = 117) using the “weighted.mean” command for the R stats package and the weights obtained through factor analysis.

Table 9. Opinion Leadership Factor Loadings and Weights

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor loading</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giving advice</td>
<td>.85</td>
<td>.36</td>
</tr>
<tr>
<td>Influence on opinion</td>
<td>.84</td>
<td>.31</td>
</tr>
<tr>
<td>Leadership personality</td>
<td>.66</td>
<td>.16</td>
</tr>
<tr>
<td>Giving information</td>
<td>.63</td>
<td>.11</td>
</tr>
<tr>
<td>Influence on behavior</td>
<td>.61</td>
<td>.13</td>
</tr>
<tr>
<td>Agenda setting</td>
<td>.43</td>
<td>.10</td>
</tr>
</tbody>
</table>

Figure 20. Opinion Leadership Score
Beliefs about Pro-Environmental Behaviors and Outreach. A set of scores summarizing respondents’ agreement with statements assessing Diffusion of Innovations Theory Constructs for Adoption for the pro-environmental behavior and for outreach were included in the model. Questions were weighted so that each construct held equal weight in the index, including respondents’ perception of relative advantage, easiness (taking the place of reverse-coded complexity), observability, trialability, and compatibility (with personal values and with household schedule). This set of concepts has been found to be reliably associated with rate of adoption of innovations (Rogers, 2003, p. 221), and therefore provides an appropriate measure of constructs of interest for this study – beliefs about environmental and outreach behaviors that are related to changes in behavior.

Outcome Variable

Figure 21. Mean Willingness to Do Outreach Behaviors

Willingness to do Outreach Behaviors. An index reporting mean willingness to do outreach behaviors (Figure 21) was set as the outcome variable for the regression model.

Willingness to host an event at work (see Figure 18) had a low correlation with other items in the
index, given that responses depend on employment rather than the construct of interest alone, and was excluded.

**Data Preparation**

*Multicollinearity.* Zero-order correlations and variance inflation factors (VIF) were examined for regression variables. Pearson’s correlation coefficients indicating the covariance between regression variables were calculated using the “stats” package for R (R Core Team, 2019). Correlation coefficient values ranged from .1 to .5. VIF values were calculated using the “car” package for R (Fox & Weisberg, 2019); values which all fell under 2 suggest that multicollinearity is not a concern for this regression model.

*Missingness.* For the ten variables included in the full regression model, 91 out of 117 have no missing values (Figure 22). Missingness is concentrated in demographic items, particularly income. Missingness is low overall, comprising 34 out of 1170 data points (about 3%), shown in red in Figure 22.

![Figure 22. Missingness in Regression Variables](image)

*Multiple Imputation.* Multiple imputation was chosen to address missingness given its tendency to produce more accurate estimates than traditional approaches like complete-case analysis (Enders, 2010, p. 344). The “mice” package for R (van Buuren & Groothuis-Oudshoorn,
which allows for multiple imputation using conditional distributions for each variable, was used to perform multiple imputation using predictive mean matching with 5 imputations and 30 maximum iterations. Regression model variables as well as auxiliary variables from the questionnaire, assessed by covariance with variables with missing values, were included in the imputation model. The additional items include years residing in the neighborhood as well as binary measures such as respondent involvement (e.g. parent, landlord, faith group), formal roles within groups, and whether the respondent’s household manages selected pro-environmental behaviors. Imputed variable plots were assessed for convergence. The mice “pool” function was used to run four models comparing blocks of the regression model.

**Model Results**

Hypothesis 1 was partially supported. As predicted, willingness to do outreach about selected pro-environmental behaviors is positively associated with previous outreach behavior. However, contrary to our predictions, willingness to do outreach was not significantly associated with prior experience with the pro-environmental behaviors themselves.

Hypothesis 2 was not supported. While opinion leadership was significant in the prior to adding beliefs to the model (Block 3), it was not significantly associated with willingness to do outreach in the full model.

Hypothesis 3 was not supported. Model 4 shows a positive association between beliefs about pro-environmental behaviors and willingness to do outreach that approaches but does not reach significance (p = .086, does not meet p ≤ .05 cut off).

Hypothesis 4 was supported. As predicted, the full regression model (Model 4) controlling for demographics, past behavior, and opinion leadership score shows that we expect respondents with more favorable beliefs about outreach behavior, including relative advantage,
compatibility, easiness, trialability, and observability (“constructs for adoption”) to be more willing to do outreach behavior.

Model results are reported in Table 10. The full model has a R-squared value of .4 [95% CI .3-.5], and an adjusted R-squared value of .3 [95% CI .3-.5]. The models were compared using the “D1” command for mice (van Buuren & Groothuis-Oudshoorn, 2011), comparing each model with the previous or a null (no parameter) model with the multivariate Wald test. F-statistics supported the selection of the full model, Model 4.

Table 10. Comparison of Multivariate Regression Model Fit

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1 (Standard Error)</th>
<th>Model 2 (SE)</th>
<th>Model 3 (SE)</th>
<th>Model 4 (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prob &gt; F</td>
<td>.55</td>
<td>***&lt;.001</td>
<td>**.006</td>
<td>***&lt;.001</td>
</tr>
<tr>
<td>Constant</td>
<td>***3.5 (.7)</td>
<td>***2.5 (.7)</td>
<td>*1.6 (.7)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Block 1:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Income</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Education</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Block 2:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Times Heard</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Times Done</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Times Shared</td>
<td>***.4 (.1)</td>
<td>***.3 (.1)</td>
<td>**.2 (.1)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Block 3:</strong></td>
<td></td>
<td></td>
<td></td>
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*p-value ≤ .05; **p-value ≤ .01; ***p-value ≤ .001
Discussion

While this survey should not be taken as a representative sample of the community as whole, it provides insight into a subset of people, particularly homeowners, who are likely to engage with neighborhood issues. The findings should be of interest to groups interested in working with engaged homeowners on environmental problems, including urban water issues, especially within highly educated communities.

Exploratory data analysis of survey responses illuminates some trends within the study sample. To start, survey responses reflect the differences between the three selected environmental issues. Two issues, leaf and salt management, have targeted community goals (“Leaf-free Streets for Clean Waters” and “Smart Winter Salting”) that were developed as part of funded campaigns led by the Madison Area Municipal Stormwater Partnership and the Wisconsin Salt Wise Partnership respectively. Efforts encouraging private residents to increase infiltration on their property are broader in scope but less focused, encompassing efforts to subsidize rain barrels and increase native plantings through sale events, encourage the use of rain gardens (including the City of Madison’s 1,000 rain garden goal), reduce impervious surfaces, and direct downspouts to lawns or gardens. While respondents cited managing salt more frequently than other tasks, possibly because managing snow and ice is a frequent task during the winter, “less” salt use is also a relative term, whereas raking leaves out of the street or installing rain-absorbing lawn features are more discrete “yes or no” tasks. Additionally, two behaviors, encouraging neighbors and “making changes to allow rainwater to soak into the ground, had lower ratings of trialability, easiness, and compatibility with household schedules compared to managing salt and leaves. These behaviors have higher stakes, practically and socially, and will likely require more intensive support from sponsoring entities for behavior-change campaigns.
Removing barriers will be especially key to campaigns’ success for these behaviors. For example, behavior-specific supports such as funding and technical assistance may be needed in addition to support for outreach programs.

These differences carried through in how engaged residents hear and communicate about these issues. Respondents reported hearing about managing salt and leaves the most often. This is unsurprising, given the greater level of community coordination and funding to promote a central message and goal for managing salt (“shovel, scatter, switch”) and leaves (“remove leaves from the street before it rains”). While homeowners can purchase rain barrels at season events or opt-in to terrace raingardens during road construction, messaging regarding residential rainwater management is less cohesive. This could be due to lack of message coordination as well as the need for segmentation, given hydrological differences between properties that make strategies like rain gardens effective. About half of respondents had heard from someone they knew about each issue. While making changes to allow rainwater to soak into the ground (“rain”) had the highest proportion of people who had “never” shared information about the behavior, perhaps suggesting a smaller proportion of people who have the expertise to discuss the topic, a higher proportion reported talked about this behavior “many” or “very many” times compared to managing leaves and salt. These responses show evidence for existing opinion leadership behavior among most respondents regarding the selected pro-environmental behaviors. However, casual outreach like talking to neighbors was a more common behavior than knocking on doors and handing out information. Respondents also had lower willingness to knock on doors, host events, or hand out materials in the future. These items suggest coordinated campaigns requiring formal outreach behaviors will require additional support and training, even among highly engaged groups.
The survey also highlights respondents’ current perceptions of issue priority. Respondents rated the priority of each issue to themselves most highly, with managing salt having the most consistent high priority ranking, followed by managing rainwater, and managing leaves. This ranking could reflect the more long-established role of chlorides and runoff as pollutants, whereas many people may be unaware of the contribution of leaf litter, which appears natural, to nutrient pollution in urban runoff. Since the study sample includes individuals who self-identify as caring about issues that affect their neighborhood, including water issues, these priority ratings confirm a high level of environmental concern among respondents. However, this finding could present a barrier to behavior change: one study of lakefront property owners’ ratings of shorelines found that “self-enhancement bias” may deter action to improve shoreline quality (Amato et al., 2012). In contrast, respondents believe their neighbors see these issues as a more moderate priority compared to themselves. Residents’ beliefs that they – and their yard care practices – are more environmentally friendly than their neighbors could reduce the perceived relative advantage of a change. Respondents disagreed on whether neighborhood associations see these issues as a priority, which could be influenced by the differing levels of engagement by different neighborhood associations on these issues. Finally, while respondents generally rated local leaders having these issues as a moderate to high priority, they uniformly rated local businesses’ commitment to these issues as low to nonexistent. This reflects frustration and skepticism expressed in open-ended questions and prior interviews, where residents expressed hesitation to get involved if businesses and community groups visibly violate behavioral expectations.

However, respondents still see a role for residents in addressing these issues. The majority “somewhat” or “strongly” agreed that residents can play an important role in the
community’s efforts to address the selected pro-environmental issues and outreach about those issues. Higher ratings of residents’ efficacy for salt could be due to the wording of the question that specifically identifies private property (driveways) and walkways that residents are responsible for clearing (sidewalks). Overall, most members of the study believed that residents play an important role in the selected behaviors, demonstrating possible openness to efforts to increase resident participation. Research has found that perceived behavioral control influences the formation of behavioral intent, or intention to perform a behavior, which is a direct precursor to behavior (Fishbein & Ajzen, 2009, p. 154). Nearly a quarter of all respondents who started the survey provided their name or email for future contact, demonstrating concrete willingness by this part of the population to be part of ongoing efforts.

In developing this thesis project, several program managers looking to tackle urban water issues asked who their primary audience should be: residents or service providers such as lawn maintenance and snow and leaf removal companies? Within the sample, most respondents managed each issue themselves rather than hiring an outside company. A previous survey within the same greater metropolitan area that sampled from all residents in a neighborhood, rather than a subset, found that the majority managed their own leaves (Clean Lakes Alliance, 2016), indicating that it is reasonable to expect the same is true of the general population in the study area. This indicates that engaging with individual residents regarding salt, leaf, and rainwater management is appropriate. However, since management company behavior may be especially visible, aligning with the “observability” construct for adoption, campaigns in the area should consider working with management companies as well. For example, members of the Madison-Area Municipal Stormwater Partnership developed a certification program training commercial salt applicators in application best practices (City of Madison Wisconsin, 2021).
Exploratory data analysis also provided insight into respondent beliefs about pro-environmental versus outreach behaviors. Responses demonstrate clear hesitation about the role of residents in speaking with other people about pro-environmental behaviors. While beliefs about managing leaves, salt, and rainwater were generally very positive, respondents had less universally favorable beliefs about encouraging neighbors to do these behaviors. Compared to the pro-environmental behaviors, fewer respondents strongly agreed that encouraging neighbors to do pro-environmental behaviors was easy, compatible with their schedule or values, would make an observable difference, and provides a relative advantage to letting the city do outreach. Respondent communication preferences, however, still demonstrate the utility of interpersonal communication channels and trusted information sources: one-on-one conversation was rated most effective on average. Since respondents trust higher education, the UW-Arboretum, and stakeholder groups like the Madison-Area Municipal Stormwater Partnership and Wisconsin Salt Wise most highly, residents may be more likely to share messages with neighbors if they come from these reputable sources, a theme that also came up in earlier interviews.

Finally, regression modelling of survey variables provided an application of interpersonal communication and behavioral theory to residential urban water issues and tested several hypotheses about willingness to do environmental outreach.

First, the model distinguished between the influence of beliefs about pro-environmental versus outreach behaviors on willingness to get involved. For example, Hypotheses 1, 3 and 4 clarify barriers to pro-environmental outreach behavior within the study population. Willingness to do outreach behavior about selected pro-environmental behaviors is associated with previous outreach behavior and beliefs about outreach, rather than on experience with or beliefs about the pro-environmental behaviors. This finding is well-supported within behavioral theory, where
outcomes depend on attitudes and beliefs most proximal to that specific behavior. Programs that aim to encourage pro-environmental outreach behaviors in a residential setting should recognize that even opinion leaders with favorable environmental beliefs need support in order to effectively use their social influence as part of a formal outreach campaign.

Additionally, the model investigates how self-reported personality characteristics compared to behavior-specific beliefs are associated with the desired outcome behavior, willingness to do outreach. Hypotheses 2 and 4 provide context for the difference between reported personality traits representing an opinion leadership score, and beliefs about the behaviors that are needed to activate that personality for the good of an organized environmental campaign. Opinion leadership score is significantly associated with willingness to do outreach behavior in Model 3, but that relationship disappears once the final block, beliefs about environmental and outreach behaviors, are added.

Prior research has found that polymorphic, or domain-neutral, opinion leadership plus topic-area expertise predicts domain-specific opinion leadership (Gnambs & Matinic, 2012; Jungnickel, 2018). These results suggest that outreach-specific beliefs could be added to models of opinion leadership to better predict willingness to participate in formal outreach campaigns. Further factor analysis could clarify between dimensions of opinion leadership, such as willingness to share information versus desire to tell others what to do. Conceptually, analysis of the opinion leadership question set provides support for the chosen six-item question set, adapted from Jungnickel (2018), as meaningfully measuring a single underlying construct. While this study considered a seventh, topic-specific item – interpersonal communication – separately (see Opinion Leadership, p. 42), future adaptation of the self-reported opinion leadership index could conceptualize that item to be non-topic specific and therefore include interpersonal
communication habits in a psychometric opinion leadership model. A two-dimensional conceptualization of opinion leadership may also be appropriate, given the marginal utility of a two-factor model. More granularity in assessment of opinion leadership alongside measures of outreach-specific beliefs could clarify the relationship between self-reported opinion leadership and willingness to activate social standing on behalf of a behavioral campaign to protect an urban watershed.
CHAPTER 4: GENERAL DISCUSSION

Overview

This case study of residents’ experiences with and beliefs about pro-environmental and outreach behaviors highlights the differences between asking a resident to change their own versus their neighbor’s behavior. Advocating for an environmental issue beyond making personal changes requires that residents be able to navigate the second case: exerting personal influence without sacrificing social standing. Often, residents are expected to do so simply because they care about the environmental issue at hand, with very little or no outreach training. This creates a behavioral request fraught with barriers and ripe for frustration.

Careful inclusion of support for any resident-led outreach component of an environmental campaign is likely to foster more fruitful institution-individual partnerships, where residents have the support they feel they need to do what is asked of them. If a pro-environmental campaign asks individuals to exert influence on others, the behavioral science of personal influence should be addressed as part of the environmental campaign. This should include easy-to-understand training materials for volunteers on the science of behavioral influence. For example, visible behaviors already influence others by establishing social norms; as an extension of this principle, campaigns that make pro-environmental behaviors more visible and accepted can encourage broader adoption. Training can also include strategies for productive discussions, borrowing from research-based academic and popular guides on how have effective conservations about politics (Kelly, 2019) or climate change (Webster & Marshall, 2019), for example. Since many resources focus on the technical aspects of an environmental issue, resources tailored to social aspects could be particularly compelling to people who do not feel like environmental “experts.” In interviews, many respondents expressed doubt in their ability to
have productive conversations with neighbors, especially if they feel the neighbor is not receptive to the topic at hand, such as native gardening, for example. Accessible outreach training materials backed by behavioral science would be a good first step in supporting willing neighborhood advocates.

The study faces limitations in how findings can be interpreted. Qualitative interviews are designed to elicit descriptions of thoughts and experiences that would not otherwise be apparent, which produces data that reflect participants’ perspectives rather than objective records of behavior (Savin-Baden & Howell Major, 2013, p. 358). Responses can be influenced by social desirability bias where participants feel that they need to present themselves in a favorable light (Graeff, 2005). In-depth interviews, scheduled for one and a half to two hours, including an introduction to the study aims, were designed to establish rapport and encourage open discussions about factors influencing involvement in neighborhood issues (Bergen & Labonté, 2020), and interviewees appeared willing to honestly discuss their concerns and hesitations. Social desirability bias can also be a concern for survey measures (Holbrook, 2008). Therefore, neutral survey language was used wherever possible to avoid biasing responses. Respondents were asked to provide information about their own experiences, perceptions, and beliefs rather than those of others, which is a best practice to for obtaining more reliable information (2008).

Additionally, care should be made when generalizing findings from these studies. The sampling procedure was designed to reach a specific subset of the population through referral – neighborhood opinion leaders – rather than as a representative sample of all residents within the study area, so findings should not be construed to represent all residents. Due to convenience recruitment methods, the study is less likely to include individuals who engage in neighborhood issues through less formalized channels outside of neighborhood associations and formal
advocacy groups. These limitations, however, mean that the study more closely reflects the audience many outreach programs are likely to reach: individuals who already engage with existing neighborhood communication channels.

Discussions with informants about their experiences elicited a variety of considerations and challenges to getting involved with neighborhood issues, including concerns specific to environmental and urban water issues as well as social concerns. Respondents clearly measure the political-institutional and social landscape surrounding an issue when determining whether to get involved. These assessments are developed by assessing clues in the landscape: Do institutions take this issue seriously? Will my involvement be legitimized by a trusted authority? The answers determine the perceived utility and desirability of action on a particular issue. These calculations call on social mobilization theory which describes how individuals weigh the costs versus benefits of participating in a social movement (Klandermans, 1984, p. 584). The public arena model (Hilgartner & Bosk, 1988) describes the broader mechanisms by which people and institutions compete to attract attention and resources to different issues. Described by Renn (1992), individual actors may be enticed to enter the arena – a metaphor for the social landscape within which issues compete for resources – or seek to influence outcomes from the outside via public pressure. This case study provides an application of the above-described social mobilization and social arena theories, where residents read the landscape regarding a particular neighborhood issue when deciding whether to enter the fray. This conceptualization has implications for organizations seeking to capitalize on residents as opinion leaders to advance a behavioral campaign. While grassroots campaigns may be built on individual acts in the absence of institutional action, more conventional advocates like those interviewed for this study look to institutions for cues before joining a top-down organized campaign.
Survey analysis further clarified variables associated with residents’ willingness to engage in a formal campaign. Beliefs about doing outreach were identified as a potential stumbling block for recruiting volunteers to spread the word about pro-environmental campaigns, even among people who rate themselves highly on dimensions of opinion leadership and have favorable beliefs about selected pro-environmental behaviors. Future analysis of this dataset could break down beliefs into their component dimensions, such as relative advantage, compatibility, or trialability, to provide more granular information about perceived barriers to doing outreach that can be more easily addressed by targeted communication campaigns.

Additional constructs that were not included in this survey due to limitations in survey length and the theoretical focus of this project may be of interest for future studies of opinion leadership within environmental outreach contexts. For example, social concern and other-oriented focus appeared to generate concern about outreach behaviors among interviewees. Levels of social concern could mediate hesitation about outreach behaviors, whereas people with lower levels of social concern may be more willing to do outreach without considering social implications. Additionally, questions measuring support for policy action could be included in future studies exploring behavioral campaigns to see if unintended erosion of support for policy action is a concern in residential contexts. An enhanced theoretical model of opinion leadership that bridges informal and formal outreach contexts and connects interpersonal influence to broader policy contexts may be of more utility to applied environmental campaigns.

**Context**

This research project is situated within the context of existing community efforts to address the chosen environmental issues. The studies for this thesis targeted three environmental issues ripe for community participation: well-studied concerns that have measurable
environmental impacts, negatively affect the study area, and have been formally accepted as community goals by stakeholder entities within watershed planning documents. This creates a situation where the environmental message is a foregone conclusion, but social barriers appear to reduce the willingness of residents in neighborhoods facing these serious issues to engage. For example, how does a resident concerned about flooding approach their neighbors about addressing flooding concerns through changes on residential land? Should residents reach out to businesses who are spreading too much salt in their parking lots, or is that someone else’s job? On top of individual-level concerns, broader questions arise. Can behavioral campaigns support voluntary changes on residential land while also building support for needed policy changes?

Initiatives within the study area are addressing some of these questions by implementing and evaluating environmental behavioral campaigns. The Wisconsin Salt Wise and Leaf-Free Streets for Healthy Waters campaigns, mentioned in this thesis, have worked to support residents in reaching out to their neighbors regarding winter salt use and street leaf management. The 2020 Dane County Land and Water Resources Department Annual Report cites 394 text subscribers and 344 email subscribers to alerts for leaf-free streets, offered to residents as cues to rake leaves out of the street before it rains (Dane County, 2020). In 2020, the Wisconsin Salt Wise campaign, supported by outreach staff from member organizations since its formation in 2014, hired its first-ever dedicated staff person (Wisconsin Salt Wise Partnership, 2020). The group’s webpage links to road salt and winter maintenance reports by Public Health Madison & Dane County and the Wisconsin Department of Transportation but does not have a stand-alone report. These campaigns provided needed staff support, coherence, and visibility to community goals around critical water resources issues that will continue to present challenges in the coming decades.
Other initiatives exist that aim to bring advocacy and neighborhood groups together. The City of Madison has hosted neighborhood conferences and roundtables over the years addressing topics including neighborhood leadership and facilitate information sharing and collaboration between neighborhood groups. One study participant, reflecting on a now-retired environmental action program, said that a training opportunity “change[d] his life” and how he interacted with other people in the community. Ideally, effective outreach programs will equip residents with skills to successfully navigate the social dynamics of being engaged in neighborhood issues. However, these projects may appear and disappear over time as funding and priorities change with mixed information about long-term effectiveness.

Based on this thesis project, the University of Wisconsin-Madison Arboretum applied for and received a Region 5 Environmental Protection Agency Environmental Education grant for a Water Action to Encourage Responsibility (WATER) project. Project partners are working with residents in the Lake Wingra watershed aiming to “provide a model for community engagement” to minimize the harmful effects of urban stormwater. These awards are unique in that they require 25% of funds granted to be granted to sub-awardees, which in this case are the neighborhood groups surrounding the Arboretum which largely supplied participants for this study. Situated within a research university with access to natural and social science expertise as well as in environmental education, the Arboretum is well-positioned to pilot engagement programs that reach beyond its grounds into surrounding neighborhoods, with attention to themes highlighted in this thesis. In addition, the Arboretum’s status as an established facility with a stable presence in the community, as well as a physical footprint on the landscape, may differentiate its efforts from previous training initiatives that no longer operate. Work examining the differences between environmental and outreach messages in applied settings should support
effective partnerships between residential communities and institutions serving environmental objectives.

Studies within other disciplines have highlighted barriers to performing outreach and evaluated approaches to outreach training. For example, a survey of U.S. scientists who completed a comprehensive engagement training program supported the efficacy of the model, including its ability to help participants develop and practice outreach strategies and influence scientists’ disposition towards outreach, perception of their outreach skills, and the types of outreach they conduct (Stylinski et al., 2018). One study of bait shop owners, on which this thesis project was modeled, looked at predictors of pro-environmental outreach behaviors and intentions (Howell et al., 2015). However, most articles evaluating environmental outreach programs focus on programs that aim to directly administer educational programs, for example, rather than those that train participants to do environmental outreach themselves. Future research examining efforts like the Arboretum’s Water Action to Encourage Responsibility project could provide insight into the effectiveness of these programs in training residents to use their social influence to support environmental goals.

Conclusion

This set of studies contributes to the literature with an application of opinion leadership and other interpersonal influence theories to an applied setting: residential pro-environmental outreach. It also summarizes, following interviews with a set of neighborhood opinion leaders, how some residents conceptualize their decisions to engage or not engage with neighborhood environmental advocacy. A set of perceived barriers are identified, including lack of social license to intervene and not having access to a trusted authority supporting neighborhood advocacy. Notably, this thesis project highlights an association between beliefs about outreach
and residents’ willingness to put their opinion leadership on the line such as by talking to neighbors about leaf, salt, or rainwater management. This finding suggests that models of opinion leadership incorporating outreach-specific beliefs could better predict actual outreach behavior. Ultimately, valuing both pro-environmental and outreach behavioral objectives can lead to more effective neighborhood-based campaigns in support of community environmental goals like cleaner water.
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Theory of Planned Behavior Model to Enrich Understanding of Proenvironmental Behavior.


Appendix A

Interview Recruitment Poster

Are you a leader? Do you care about the future of your community?

We are conducting a study to learn more about the experiences of people like you.

The purpose of the study is to understand how the community can support people who serve as "opinion leaders" among their network.

Study participation involves a 1-2 hour interview held at a location that is convenient to you. Participants will answer questions about their experiences with leadership, their thoughts on issues their community faces, and their opinions on specific topics including urban water issues.

To be eligible, participants should live or work in a neighborhood near the University of Wisconsin-Madison Arboretum.

For more information about the study, please contact:

Theresa Vander Woude, Research Assistant
Department of Life Sciences Communication
University of Wisconsin-Madison
[redacted] [redacted]

Please provide contact information and mention “local leadership study.” Leave a voicemail message if reaching out by phone.

If you are interested in participating, please call or email the contact information at right.

This study is funded by a University of Wisconsin-Madison Arboretum Research Fellowship grant.
Appendix B

Semi-structured Interview Script

Semi-structured interview protocol

I’m a graduate student researcher at the University of Wisconsin-Madison. We’re studying how people who live around the Arboretum experience leadership within your neighborhood, to better understand how local groups can help support people like you. Questions will focus on several themes, and I may ask follow-up questions or direct the conversation to stay within the scope of topics included in this study. You can ask to take a break, skip a question, or end the interview at any time. It’s important to know that there are no right answers. You may not have thought about some of these questions before; it’s OK to take all the time you need to think before answering, or to correct yourself as you talk. If you think about an issue in a different way than how I’ve phrased it, feel free to state how you disagree, ask for clarification, or rephrase the question before you answer – we would really like to understand your perspective.

Theme – identity / motivation to lead

First, I’d like to know more about you as a person.
1. If you had to pick, what would you most want me (or other people you meet) to know about yourself?
2. Since you responded to an interview about leadership, I’d also like to know… How do you define “leadership”?
3. Why are you interested in talking about your experience with leadership? Probe: Why did you first become engaged in neighborhood or community issues?
4. What about within your community… What inspires you to care about your community?

Theme – opinion leadership

Now I’d like to hear a bit about how you feel about how you interact with others.
5. First, how would you describe your personal social networks/circles? (e.g. the people that you interact with on a personal or professional basis)
6. How would you describe your role within these circles?
7. What, if any, groups or associations are you involved in? (Formal or informal)
8. Do any of these groups ask you or others to act in any way for the good of the community or the group?
   a. If yes, do you participate? Why or why not?
   Great. I’d also like to talk about some specific examples…
9. Can you think of a time that you did something about an issue that affects your neighborhood or larger community?
   a. What prompted you to be involved?
   b. What did you do?
   c. What was the outcome? (e.g, Did you or others continue to be involved? Did something change?)
Theme – local/global environmental concern

Now we’re going to talk about water more specifically. For this study, we’re focusing on urban water issues, or the water in our cities (at your home, in your neighborhood, and in your community). This could mean drinking water, wastewater, stormwater, or the water quality of lakes, rivers, and streams. Confirm comprehension.

10. Are water issues personally important to you? / Do water issues affect you personally? How so / what issues?
11. Are any of these or other water issues concerns for your neighborhood / people in your neighborhood? What issues / How so?
12. How about the larger community? / Do water issues affect your larger community? What issues / How so?
13. How about the world, are you aware of water issues that affect the globe or humankind more broadly? What issues / How so?

Theme – water-related opinion leadership

Now I’d like to come back to the idea of how you feel about your influence within your social group, but this time about water issues specifically. I’d like to hear about specific water-related topics you have served as a trusted source of information for, and a specific example of a time or times you’ve served as a source of information (or opinions, or advice, etc.). If you can’t think of water-related examples, we can talk about environmental or social issues. If you gave examples about water issues before, I may skip a question or two.

14. Any particular issue(s)? Can you describe a specific time?
   a. What prompted you to be involved?
   b. What did you do?
   c. What was the outcome? (e.g. Did you or others continue to be involved? Did something change?) Repeat as needed.

Now, I’d like to hear about what keeps you from trying to learn about an issue and share information from others.

15. Can you think of a water issue that affects your neighborhood or larger community, but that you don’t currently know much about? What issue?
   a. When / How did you first hear about this issue?
   b. Have you been able to find more information about it? Where? If you wanted to know more, where would you go to find information?

16. Thinking back on any of these issues, or an issue we haven’t talked about yet, I want to know if there’s a specific water-related topic you know/care about but are uncertain if you SHOULD do anything or WHAT to do.
   a. What issue? What makes you care about this issue?
   b. What’s keeping you from doing something about it?
   c. What would motivate you to do something? Probe: Can you imagine what it would take for you to decide you had to get involved? What could that be?

17. Now generally, where do you go for more information for water issues that affect you and your community?

18. What practically (e.g. tools, training, or other support) would you need to become more of a leader on water issues within your social network?
Now I’d like to talk about pros and cons of engaging or doing more with water issues in your neighborhood…

19. How might engaging with water issues be a good / useful / easy thing for you and your community? (What could the “pros” or benefits be?)

20. How might engaging with water issues be a bad / not useful / difficult thing for you and your community? (What could the “cons” or risks be?)

Theme – place-based meaning

Now I’m going to talk about your neighborhood. Briefly orient places of interest in the neighborhood on Google Maps (where they spend time, where they visit, where they travel through neighborhood). We’re going to talk about your relationship with water in your neighborhood. Are there any places in your neighborhood that you associate with water or the environment?

21. Label each item and ask,
   a. What would you call this place?
   b. What interactions or associations do you have with this place? (Feelings of ownership or not? Feeling of influence over that area?)
   c. What makes you associate this place with water or the environment?
   d. Do you currently do anything to take care of this place? If so, explain.
   e. Would you be willing to do more to take care of this place? Why or why not?
   f. What would make you feel more willing to care for it?

22. I’d also like to talk about some other areas you might not have identified (e.g. storm drains, ponds, swales, streams, sewers, yards, parks, streets):
   a. What interactions or associations do you have with this place? (Feelings of ownership or not? Feeling of influence over that area?)
   b. Do you currently do anything to take care of this place? If so, explain.
   c. Would you be willing to do more to take care of this place? Why or why not?
   d. What would make you feel more willing to care for it?

Theme – strengths:

Finally, I want to talk about what you and people you know bring to your neighborhood and the community you live in. During the interview, we’ve talked about your relationship with neighborhood leadership. Now I want to hear about what you feel you “bring to the table.”

23. What strengths do you bring to your neighborhood/community? Probe: What makes you different as a leader or advocate? What would the community lack if you weren’t there?

24. Now what about the people that you know? Probe: What would happen if more people like you got involved in issues that affect your neighborhood?

25. When do you feel most inspired to help your community?

26. If asked, do you think you would be willing or able to do more about local water issues? Why or why not?

27. Is there anything else we haven’t talked about that you think I should know?

Demographics:
Finally, I’d like to collect some information about you to better understand demographic representation within this study. To protect your identity, this information will only be presented in aggregate with other respondents and will not be associated with your responses today. Like the rest of the interview, you may choose not to answer any question.

- Zip code:
- Age:
- Household income:
  - Below $20,000
  - $20,000-$50,000
  - $50,000-$100,000
  - $100,000-$200,000
  - $200,000+
- Race / ethnic identity:
- Gender identity:
- Education:
  - High school
  - Some college or technical school
  - Bachelor’s degree
  - Graduate degree
  - None of the above

Thanks so much for speaking with me today.

28. Is there anyone else who you think I should talk to?
Appendix C

Survey – Reproduced in condensed form from Qualtrics Survey Software

1. The green shaded area on this map shows the Lake Wingra watershed. Do you live within the Lake Wingra watershed (green shaded area on the map)? If you are not sure, please make your best guess. [Yes | No]

2. Which neighborhood most closely describes your location in the Lake Wingra watershed? [Dropdown menu]

3. Which of the following areas best describes where you live? [Dropdown menu]

4. Approximately how many years have you lived in this area? [Numerical entry]

5. In what capacity do you currently engage in neighborhood issues? Please select any/all that apply, considering identities that influence how or why you engage with issues that affect your neighborhood. [Multi-select boxes]

6. Do you hold a formal role in the neighborhood association? (e.g. board or committee member, volunteer, or any other regular responsibility) [Yes | No]

7. Do you hold a formal role in the non-profit, community, or advocacy group? (e.g. employee, board or committee member, volunteer, or any other regular responsibility) [Yes | No]

8. Do you hold a formal role in the faith community? (e.g. board or committee member, employee, volunteer, or any other regular responsibility) [Yes | No]

9. Do you hold a formal role in the educational institution? (e.g. employee, board or committee member, volunteer, or any other regular responsibility) [Yes | No]

10. What is your role in the business? (if applicable) [Single-select menu]

11. Please rate, in your opinion, how well you agree or disagree with the following statements.
   a. People come to me for advice about issues that affect our community
   b. I like to learn and share information about issues that affect our community
   c. I often influence people's opinions about issues that affect our community
   d. People in my social circle often act on my advice
   e. I like to take the lead in my social circle
   f. My friends and acquaintances often discuss subjects that I brought up

12. Thinking about the past three (3) years, about how often, if at all, have you shared information that affects your neighborhood in the following ways?

   Please estimate to the best of your ability
   a. Talked to neighbors
   b. Put up yard signs or posted flyers
   c. Knocked on doors
   d. Handed out informational materials
   e. Forwarded informational emails
   f. Shared information on social media
   g. Hosted an event (e.g. at your home, workplace, etc.)
13. Please choose the most applicable statement for each of these tasks in your household (if multiple people support a task, please select who \textit{primarily} is responsible for managing the task).  
[I manage this | Someone else in my household manages this | I hired someone to do this | My landlord takes care of this | Not applicable]

a. Managing fall leaves
b. Clearing snow and ice from sidewalks and driveways
c. Managing yard and landscaping (e.g. plantings, lawn)

Please respond to the following questions about your experiences and behaviors to the best of your ability. If you are not certain about an answer, please estimate or guess. \textbf{We are interested in your opinion, even if you are not currently responsible for each task in your household.}

You may or may not have heard about the behaviors listed. In this survey, we will ask about:

- Removing leaves from the street before it rains (e.g. clearing leaves from the street gutter in the fall and managing them with the rest of your yard waste)
- Using less salt on sidewalks and driveways (e.g. shoveling and applying sand first, using salt carefully if at all)
- Making changes to allow rainwater to soak into the ground (e.g. directing gutter downspouts to lawn or garden, planting a rain or native plant garden, using a rain barrel, using fewer hard surfaces like concrete or asphalt)

14. \textbf{How much of a personal priority} are each of these issues to you?

a. Removing leaves from the street before it rains
b. Using less salt on sidewalks and driveways
c. Making changes to allow rainwater to soak into the ground

15. In your opinion, \textbf{how much of a priority are these issues} to other residents in your immediate neighborhood?

16. In your opinion, \textbf{how much of a priority are these issues} to the neighborhood association in your immediate neighborhood?

17. In your opinion, \textbf{how much of a priority are these issues} to leaders in your larger community (e.g. local officials; city, town, or village leadership)?

18. Thinking about the past year, how many times in total have \textbf{you heard about} the following behaviors, if at all?

\textit{Please consider all sources of information, e.g. word of mouth, mailed publications, websites or web pages, TV, newspapers, magazines, email, newsletters, signs or billboards, flyers, social media.}

19. Have you heard about removing leaves from the street by "word of mouth," i.e. someone you know sharing information about the behavior in person, online, or over the phone? [Yes | No | Don’t know]

20. Have you heard about using less salt on sidewalks and driveways by "word of mouth," i.e. someone you know sharing information about the behavior in person, online, or over the phone?

21. Have you heard about allowing rainwater to soak into the ground by "word of mouth," i.e. someone you know sharing information about the behavior in person, online, or over the phone?

22. Thinking about the past year, how often have you done the following behaviors?
a. Removed leaves from the street before it rains (e.g. cleared leaves from the street gutter and managed them with the rest of your yard waste)
b. Used less salt on sidewalks and driveways (e.g. shoveled and applied sand first, used salt carefully if at all)
c. Made changes to allow rainwater to soak into the ground (e.g. installed rain garden, rain barrel, permeable surface, redirected downspout) OR maintained these features

23. Thinking about the past year, about how many times, if at all, did you share information about the following behaviors with someone else?
   a. Removing leaves from the street before it rains
   b. Using less salt on sidewalks and driveways
   c. Making changes to allow rainwater to soak into the ground

24. Do you agree or disagree with this statement? Residents can play an important role in our community's efforts to...
   a. Remove leaves from the street before it rains
   b. Use less salt on sidewalks and driveways
   c. Make changes to allow rainwater to soak into the ground
   d. Encourage more people to do these things

25. Please rate your agreement with the following statements as they apply to each behavior.
   Note: If the behavior is not applicable to your household, please respond according to your perception of the behavior.
   a. This behavior would be easy to adopt.
   b. This behavior is consistent with my personal values.
   c. I could try doing this, without investing too much time or money.
   d. This behavior would make an observable difference in my neighborhood.
   e. In my opinion, this behavior is a useful change in the way we do things.

26. How much do you trust or not trust the following sources of information to suggest changes in the way you manage salt, leaves, or rainwater?
   This question asks you to consider many different sources. When applicable, please consider local-level entities. If you are unfamiliar with a source, you may select "Don't know." [Matrix rating scale]

27. How effective or not effective are the following ways to reach you about the way you manage salt, leaves, or rainwater?
   a. One-to-one conversations
   b. Presentations at homes in your neighborhood
   c. Locally-advertised workshops
   d. Mailed publications (newsletters, postcards, etc.)
   e. Websites
   f. Newspapers or magazines
   g. Personalized email(s)
   h. Non-personalized email (e.g. e-newsletters, email campaigns, mass email)
   i. Signs or billboards
   j. Phone call(s)
   k. Social media posts or ads (e.g. Facebook, Nextdoor)
   l. Television
Nutrient pollution, salt use, and stormwater runoff seriously threaten water quality in our community. The behaviors described in this survey that people like you can do have been selected for their potential to help keep our water safe and usable now and in the future. Social science research has shown that person-to-person communication is one of the most effective ways to help get more people to do these things.

28. Thinking about the upcoming year, if asked, how willing would you be to share information about managing leaves, salt, or rainwater in the following ways?
   a. Talk with neighbors
   b. Put up yard signs or post flyers
   c. Knock on doors
   d. Hand out information materials
   e. Forward information emails
   f. Share information on social media
   g. Host an event at your home
   h. Host an event at your workplace (if applicable)

29. OPTIONAL short response: What do you think would make it easier for you to have an impact in your neighborhood in changing behaviors?

30. OPTIONAL: I am interested in receiving more information from the researchers and the UW-Madison Arboretum about future efforts to promote the following behaviors in my neighborhood:

   Please select any/all that apply and you will be asked to provide contact information.
   a. Removing leaves out of the street before it rains
   b. Using less salt on sidewalks and driveways
   c. Making changes to allow rainwater to soak into the ground
   d. Encouraging neighbors to do these things

31. Please answer a few questions about yourself.
   a. How old are you?
   b. How many people (total adults and children) are part of your household?
   c. What is your annual household income?
   d. Do you own or rent your current residence?
   e. What is your highest level of education?
   f. What is your ZIP code?
   g. What is your employment status?