VEHICLE-ASSISTED ACCESS TO PUBLIC NATURE TRAIL: A NEEDS ASSESSMENT FOR OLDER ADULT RESIDENTS OF HUMBOLDT COUNTY

By

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Abstract

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The older adult population has the highest rates of disability and depression. Access and ability to engage in outdoor activity diminishes as we age. The Biophilia Hypothesis states that there are cognitive and emotional benefits of exposure to natural environments. The Biophilia Hypothesis supports implementation of programs that increase exposure to natural environments to increase psychological wellbeing. The main purpose of this study was to evaluate interest in a proposed vehicle-assisted nature program among disabled and older adult residents in Humboldt County. A 9-item survey, including quantitative and qualitative response types, was developed for this study. In addition, participants reported demographic and life history information in both quantitative and narrative formats. Statistical and qualitative data analysis addressed factors, including age and type of disability, that may assist in predicting interest or ability to participate in assisted nature trail access programs. One item asked whether the respondent would participate in a vehicle assisted nature outing program if the program existed. I proposed that if 30 percent or more of a sample of at least 100 participants answers yes to that question that it would constitute evidence to recommend the implementation and evaluation of the proposed program in the future. In addition to criterion-based needs
assessment, data was collected to assess other factors that may predict an individual’s likelihood to participate, namely, age, physical perceived ability level, perceived obstacles, and past and present outdoor activity level. Individuals participating in this study reported interest and ability to participate. Past and present outdoor activity level did not correlate with interest in the program. Age was not correlated with interest in this study. These results may have implications for assessing the potential value of public spending to increase nature access for disabled and older adult citizens.
Acknowledgments

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Thank you,

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Vehicle-Assisted Access to Public Nature Trails: A Needs Assessment for Older Adult Residents of Humboldt County

The Biophilia Hypothesis, states, human beings have an innate evolutionary connection to nature. This evolutionary connection is not a mere appreciation of beauty, nor is it based on physical survival. It is common knowledge that human beings use nature such as plants and animals as means of sustenance or shelter. We also interact with nature for entertainment, to “get away”, and relax. Many of us do not know why nature relaxes us or to what extent it is good for us. The Biophilia Hypothesis proposes that the human connection to natural environments and animals is necessary for emotional and cognitive health and survival (Wilson, 1993).

The Biophilia Hypothesis inspires research aimed at understanding cognitive, physical, and emotional effects of exposure to natural environments. Much of this work focuses on populations that are restricted to artificial environments, such as low-income residents of large cities (Takano, Nakamura, & Watanabe, 2002) and hospitalized patients (Raanaas, Patil & Hartig, 2011). Experiences in nature have alleviated cognitive stress (Berman, Jonides, & Kaplan, 2008) and improved mental and physical health (Raanaas et al., 2011; Fuller, Irvine, Devine-Wright, Warren, & Gaston, 2007). The current study examined older adults’ perceived past and present interest in nature. I conducted a needs assessment survey to determine if local older individuals with mobility disabilities were interested in a new program for vehicle-assisted access to selected municipal nature trails. If this needs assessment survey supported the usefulness of such a program, I
intended to present the results to the city of Arcata and, ultimately, seek funding to implement and evaluate the program.

The notion that exposure to natural environments can promote wellbeing is implied in a recent guideline issued under the federal Architectural Barriers Act Accessibility Standards that encourages (and in some cases mandates) parks authorities to enable disability access for federally funded nature trails. These new requirements went into effect on November 25th, 2013, and apply only to “facilities that are built, altered, or leased with federal funds,” but the United States Access Board “plans to follow-up with rulemaking to address non-federal sites under the Americans with Disabilities Act (ADA) at a later date (United States Access Board, 2013).” The new standards emphasize that when possible park trails should be made accessible to all. This includes individuals of different ages and physical abilities.

Older adults are likely to be the main group impacted by these regulations because mobility disability is highest in this population. According to Cornell University’s Disability Statistics, the overall prevalence of disability in the United States in 2012 for individuals between ages 65-74 was 25%, and ‘ambulatory disability’ accounted for 16% of that total. Ambulatory disability is defined as inability or difficulty walking. Disability nearly doubles after age 74. Individuals over 75 years old have 50% prevalence of disability in the population, ambulatory disability accounting for 33% (Erickson, Lee, & Von Schrader, 2014).

Another reason older adults are likely to benefit from increased access to public nature areas is the disproportionately high rate of depression in this
group. Advancements in medicine addressing obesity, heart disease, and other health issues have increased life expectancy. It is increasingly important to understand factors that affect psychological wellbeing in the growing older adult community. Common stresses of aging include declining sensory, cognitive, and physical function, financial stress, and loss of social supports, independence in mobility, all of which contributes to high rates of depression in this population (Rothermund & Brandtstadter, 2003). Individuals over the age 65 commit twenty-five percent of the nation’s suicides (Center of Disease Control and Prevention, 2012). Many older individuals with depression go untreated due to a variety of reasons including the myth that depression is a natural part of aging. If outdoor nature experiences can alleviate stress or depression, older populations that suffer at high rates may benefit from increased access to nature. Unfortunately, many older adults do not have the opportunity or ability to go out in nature (Shores, Scott, & Floyd, 2007).
Review of Literature

This section reviews available research on the relationship between health and nature exposure. I was able to identify only 8 studies that addressed this question using scientific research designs, all of which were published before 2002, indicating how new this field of research is. These studies, along with scientific reviews of the field, are described below. The specific hypothesis that nature exposure promotes health stems from two broader conceptual frameworks, the Biophilia Hypothesis and attention restoration theory, which are also explained in this section.

Biophilia Hypothesis

The Biophilia hypothesis posits that an emotional affiliation with nature was evolutionarily adaptive and underlies innate emotional and affiliative responses to nature in people today. According to evolutionary biologist, E. O. Wilson, the Biophilia hypothesis also implies that depriving people of access to nature can be harmful to emotional and physical health (Wilson, 1993). Many studies demonstrate psychological benefits of exposure to nature and outdoor activity. Well-known findings supporting the Biophilia Hypothesis, summarized below, include preferences for natural landscapes and indoor plants, an increased sense of psychological wellbeing in natural environments, and even positive effects of views of natural versus artificial environments. For example, individuals with window views of nature from their homes report less stress, higher satisfaction with their neighborhood, and participate in more outdoor activities, then matched controls without nature views (Kaplan, 2001). Intriguingly, psychological
benefits of visiting outdoor nature areas increases with greater biodiversity of the areas visited (Fuller et al., 2007)

Since the time that Biophilbia was first introduced, researchers have attempted to examine and quantify the benefits of nature on human physical and mental health. The health and psychological benefit of exposure to nature has some empirical support, but overall, research-based support is limited. There have been relatively few studies overall, most have used use correlational or observational methods, most studies focus on western cultures, and most do not evaluate possible negative effects of nature (Grinde & Patil, 2009).

Research on Health Effects of Nature Exposure

In a qualitative review of the research, three distinct types of interactions with nature have been studied with regard to human health effects: Incidental contact, defined as non-intentional viewing of nature scenes, intentional contact, including activities such as hiking, camping, wildlife viewing, or gardening, and indirect contact, defined as viewing nature through a window or media (photograph or movie). Evaluation of 57 different studies show measurable benefits of all three of these modes of contact with nature, including improvements in mood, cognitive functions such as attention, stress levels, blood pressure, healing time after surgery, cardiovascular disease indicators, and occurrence of illness (Keniger, Gaston, Irvine, & Fuller, 2013). Studies on mood, cognitive, and physical health effects of nature exposure are reviewed below.

Many older adults suffer from depression, and some evidence suggests that exposure to nature can mitigate depression in older adult patients. It is important to note
that growing older does not in itself cause depression (Turner & Noh, 1988). Instead, research has shown that the positive relationship between age and depression is likely mediated by disability. In other words, disability itself leads to depression, and the relationship is due to higher rates of disability with age. Moreover, disability and depression may be reciprocally reinforcing (Mollaoglu, Tuncay, & Fertelli, 2010). In a sample of 105 men and 134 women over the age of 65, individuals who engaged in outdoor activities (defined as any time one left one’s home) were less likely to be depressed and engaged in more social activities, however, this effect is seen only in men, who also reported more outdoor activities overall compared to women (Ishikawa et al., 2006). The amount of time spent doing outdoor activities was also negatively related to physical pain, but again only in men. Outdoor activity was also associated with lower levels of drinking and smoking.

Benefits to psychological well-being from nature exposure are seen in a study that was primarily designed to test the effects of nature exposure on post-surgery recovery time. This study examined 250 individuals recovering from lung surgery and 245 participants recovering from heart surgery. The mean age of participants in this study was 62 years old. Individuals in a residential rehabilitation center were randomly assigned a room with a blocked view, a partially blocked view, or a panoramic view of an outdoor area with trees and gardens. Individuals with panoramic views showed greater improvement throughout recovery compared to individuals with blocked or partially blocked views, and these benefits were related to decreased self-reported stress and a greater sense of relaxation while in the room compared to patients without such outdoors
views (Raanaas et al., 2011). This study stands out for using a true experimental design (random assignment of participants to levels of the independent variable) and having a large sample size relative to other benefits of nature studies, so the results support for the Biophilia Hypothesis is compelling.

Psychological mood, vitality and vigor improve after exposure to nature (Takayama et al., 2014). Researchers randomly assigned 45 participants to walk in an urban area or a forested area in Japan. Individuals both walked in their assigned environments for 15 minutes and viewed the scenery for 15 minutes. On the second day of the study individuals were assigned the opposite environment and tested again. Each participant completed four questionnaires. Questionnaires evaluated constructs such as state mood, tension, anxiety, affect, enthusiasm and depression. The forest walk condition resulted in a decrease in negative affect and an increase positive affect and subjective vitality, relative to the control group. Energy and enthusiasm also increased after the forest walk. In contrast, mood and restoration decreased in individuals assigned to urban walks. These findings support psychological benefits of even brief exposure to natural environments. It should be noted that the sample size of this study was relatively small and included only male university students.

Several studies have shown evidence for cognitive benefits of exposure to natural environments. Everyday cognitive tasks demand active, directed attention. Whether it is navigating a busy street or following instructions, differentiating important information from non-important information is critical for survival. Kaplan (1995) first proposed that stress can inhibit attentional performance and that exposure to natural environments
could improve attention and problem solving by reducing stress. He termed this proposal, Attention Restoration Theory (Kaplan, 1995). Two studies were designed to determine whether outdoor recreational experiences activated passive attention strategies. In passive attention individuals look at and pay attention to things that are interesting or aesthetically pleasing rather than having to focus attention on information related to a specific task. The authors predicted that engaging in passive attention activities such as sightseeing in natural environments allows the cognitive mechanisms for active attention a chance to “rest” and regenerate. In the first experiment, baseline affect and cognitive performance (operationalized as performance on a backwards digit span task) were measured in a group of healthy young adults, and then subjects were randomly assigned either a walk in the park or a walk through the streets of downtown Ann Arbor. A second test of cognitive performance after the walk showed that walking in a park (passive attention) improved cognitive performance more than walking in the city, supporting the idea that nature exposure can be beneficial by permitting the regeneration of cognitive systems for active attention. In the second experiment researchers hypothesized that nature viewing experience would result in better performance on executive functionality (alerting, orienting, and executive attention). They found that viewing images of nature was associated with better performance in executive attention (Berman et al., 2008). The two studies examined active and passive attention in young adults. These experiments agree with previous research that nature experiences may improve executive functioning by regenerating attentional capacities (Hartig, Book, Garvill, Olsson & Garling, 1996). However, the hypothesis that urban and natural environments tax active and passive
attention differently was not directly tested in these studies so the mechanism through which nature experiences improved cognitive performance is not certain. Nevertheless, Attention Restoration Theory has received increasing attention in the scholarly literature; at the time this thesis was completed, the PubMed database provides 15 articles in a search for “Attention Restoration Theory,” and 10 were published since the year 2012.

Given the physical, social, and cognitive decline associated with aging and disability, the potential cognitive benefits of nature experiences would seem likely to be present in older and disabled people. Directed attention restoration should be especially important in the older adults because deficits in attention contribute to stress, distractibility and disordered thoughts (Berman et al., 2008). Having greater room for improvement means that older the adult population might be strong responders to this strategy for cognitive restoration.

**Physical Benefits**

In addition to cognitive benefits, interacting with nature has also provided physical benefits to humans (Keniger et al., 2013). In a study of over 3,000 older adults researchers found that those who lived near walkable green spaces, defined as public parks or tree lined streets, had higher survival at a five year follow up (Takano et al., 2002). This finding held up after controlling for socioeconomic status, age, and sex. Another finding suggested a mechanism for the effect of proximity to green spaces, namely, that proximity was associated with increased physical activity, greater number of hours of sunlight exposure, and higher levels of socializing. Overall, the survival rate was higher for individuals who lived near green spaces. The finding that nature exposure
promotes physical health in the older adults by encouraging healthful behaviors) is relevant to the current hypothesis about nature effects on mental health because of the reciprocal relationship between disability and depression in older adults (Mollaoglu et al., 2010). But we must examine the evidence critically. Research has shown that individuals who live near walkable green spaces lived longer, socialized more, and were physically more active (Takano et al., 2002). Should we be surprised that individuals who live near and have greater access to environments that permit outdoor activity would engage in these healthy behaviors more often? Individuals who live near green spaces have access may more often take advantage of the opportunity. Whereas people who do not live near green spaces, especially older adults would have greater difficulty in engaging in outdoor activity due to lack of transportation, or access.

Limitations in Research

The available research generally supports psychological and health benefits of nature experiences but there are some reasons to be skeptical of concluding that nature exposure itself is producing these effects. There is relatively little research testing The Biophilia Hypothesis or the benefits of nature specifically. Only a few research groups have contributed in this area (the most commonly referenced authors are Terry Hartig, Roger Ulrich, and Stephen Kaplan). There is also an “optimistic” bias in researchers’ interpretation of studies regarding the benefits of nature. Many authors appear to overstate and misinterpret or misrepresent research. For example, Weng and Chaing state, “Warburton, Nicol, and Bredin (2006) suggested that people are now experiencing greater physical and mental problems due to a decline in undertaking activities in natural
environments (2014, pg. 204).” However, a close review of the referenced article does not support this statement. The primary focus of the article is the benefits of physical activity and does not emphasize benefits or consequences of outdoor activity.

One concern is that personal experiences and “common sense” bias researchers and readers to assume that nature is good, and this bias has resulted in an inflation of claims in the research literature. In addition, methodologies differ greatly in the research that has been done, including different methods of nature exposure (pictures, window views, walks, strenuous backpacking, etc.), and many different outcomes measures. When methodologies vary radically, it is misleading to state that two studies support the same theoretical concept. It is well understood that every study has unique limitations or confounding variables. With that said, a study about the benefits of outdoor backpacking can hardly be compared to a study of older individuals preferring photographs of nature, yet many researchers in the field do. While this work is necessary for demonstrating the breadth of Biophilia effects, it may be more useful for the field to validate positive results with larger samples and rigorous controls.

Research surrounding the Biophilia Hypothesis and the benefits of nature gives a theoretical basis for implementing an outdoor program for older adults and disabled individuals. The primary intent of the current study is to conduct a needs assessment to assess interest in an outdoor program in this population. A needs assessment identifies a problem, exploring what currently exists and what should exist. The current study demonstrates interest and need for programs that assist older and non-ambulatory individuals in accessing nature areas in their local communities.
The Current Study

Statement of the Problem

The literature reviewed above presents a theoretical basis for expecting positive effects of exposure to natural environments on health, cognition, and psychological wellbeing, and why these effects may be especially relevant to older adult populations. The current proposal applies past findings on the benefits of nature as a rationale for an outdoor program for the elderly. Our primary intention was to conduct a needs assessment survey among older adults residents of Humboldt County, California, to assess the need for a program that would provide vehicle-assisted access to local nature trails. This study follows standard methods for needs assessment research (Witkin & Altschuld, 1995) that includes the following steps: Identify the major concern, identify desired outcomes, determine a needs indicator, determine a target group, identify causes and summarize the findings. In this context, the primary concern and target group is the lack of nature access for older adults and non-ambulatory community members, the desired outcome is that the results serve as a needs indicator for the proposed program of a vehicle-assisted trail access.

According to my research and the Humboldt Senior Resource Center (personal communication) there is only one program that encourages public park use for the older adults in Humboldt County. It is a once a week walk through the Arcata Marsh put on by Friends of the Marsh. The program is limited to individuals who are able to use walkers or able to walk independently. There are no vehicle-assisted outdoor access programs for individuals with mobility disabilities that prevent them from walking.
This thesis addresses whether the target population perceives a need for such a program.

**Research Hypotheses and Questions**

**Hypothesis 1.** In a sample of at least 100 older adult participants from the Arcata area, at least 30 percent will report interest in participating in a program that would provide regular vehicle outings on local public nature trails.

*Rationale.* A program aimed at promoting psychological wellbeing among disabled older adult community members that had the potential to reach up to 30 percent of the target population is proposed to be worthwhile. If at least 30 percent of the sample report interest, this outcome is taken as evidence that the target population perceives a need for such a program. Thirty percent was considered a moderate estimation of individuals over the age of 65 that would be able to participate. While moderate, 30 percent still represents a significant number of individuals who could both benefit and be able to participate in the program. For example, if one extrapolates from the US census, thirty percent represents approximately 6,000 individuals over the age 65 residing in Humboldt County (United States Census Bureau, 2012).

**Hypothesis 2.** Levels of current and past outdoor activity will be positively correlated with interest in the proposed vehicle-assisted trail access program.

*Rationale.* Logic suggests that people who have already spent more time doing outdoor activities probably enjoy them more and will therefore be more likely to participate in future opportunities for outdoor activity.
**Hypothesis 3.** Age will be negatively correlated with level of interest in the proposed vehicle-assisted trail access program.

**Rationale.** Age elevates risk for depression and disability, which may deter participation from the eldest seniors.

**Research Question 1.** What percentage of respondents would be physically able to participate in a vehicle-assisted nature trail access program?

**Rationale.** Successful implementation of the proposed program requires not only willingness but also ability for non-ambulatory individuals to participate.

**Research Question 2.** What obstacles prevent older adult community members from accessing public nature areas?

**Rationale.** Understanding the specific perceived obstacles to participating, such as transportation to and from the program location, will assist in designing a program that maximizes opportunities for members of the target population to benefit.
Method

Participants

All procedures were reviewed and approved by the Humboldt State University IRB (approval #IRB 13-154). Participants for face-to-face interviews were recruited through California United Homecare Workers Union Fortuna Rehabilitation and Wellness Center and through Humboldt Senior Resource Center and their “sister” organization located in Eureka. In addition to snowball sampling, researchers asked friends and family to forward an invitation to anyone who might be interested in participating in the online survey.

Inclusion was primarily based on age. Participants over the age of 65 were considered ideal participants. Participants under the age of 65 (mean age = 56) were only included if they were disabled. The question, “What prevents you from spending time outdoors?” was used to discriminate disability.

Survey Procedures

Each participant was read a consent statement. The verbal informed consent procedure used in this study is outlined in Appendix A. It is a 9-item self-report questionnaire and includes quantitative and qualitative responses. The original form of the questionnaire appears in Appendix B. The investigators designed the questionnaire so an interviewer could read the questions aloud and record the responses on the basis of verbal feedback by the participant. The questionnaire was designed to be easily understood and read by novice interviewers. Quantitative questions included “How important has spending time in nature been in your life?” and asked participants to rate
the questions on a scale of 1-5. One indicated *not important* and five indicated *very important*. Individuals reporting a 4 or 5 on the 5-point scale were categorized as *interested*. Open-ended questions included “What prevents you from spending time outdoors?” The survey also included yes or no questions, for example, “If this program was available, do you think you would be physically able to participate?” The question ‘Interest’ was evaluated with the survey question, “If there were a weekly, hour-long trip to the Arcata Marsh or Community Forest for people who can’t walk easily themselves, would you participate? I imagine using an open-air, golf cart vehicle that would carry 6 people. The vehicle would be quiet and would move at a walking pace. Would you be interested in regular outing like that?” Individuals reporting a 4 or 5 on a 5-point scale were considered “interested”.

Interviewers included researchers and individuals known to the participant including homecare workers, friends, and family members. Researchers distributed surveys and instructions to a meeting of the California United Homecare Workers Union where caregivers volunteered to administer surveys to their clients. Volunteer interviewers were all trained by the investigator to read the informed consent, questionnaire and debriefing. Other resources for participant recruitment and interviews came from Humboldt Senior Resource Center, Arcata Community Center, The Fortuna Rehabilitation and Wellness Center and the Alzheimers Day Care, Resource Center and California Homecare Workers Union members. Participation was always dependent on facility manager recommendation as well as individual willingness. Participants were not offered any incentive for participating.
Face-to-face interviews were primarily one-on-one. Researchers were seeking 100 non-ambulatory and older adults, men and women ages 65 and older. This number of participants was based on the feasibility of completing data collection within the available time. In some cases due to structure of programs at the resource centers the researcher was required to perform 3 interviews at a time. After the survey was completed participants were given a debriefing form that outlined the purpose of the study. They were provided the University and researcher’s contact information if they had any follow-up questions or concerns about the study. See Appendix C.

**Analysis**

Quantitative survey data was entered into SPSS and Microsoft Excel to generate descriptive statistics (to evaluate Hypothesis 1 and Research Question 1) and correlation coefficients (to evaluate Hypotheses 2 and 3). Two raters identified themes in participant responses relating to perceived obstacles to engaging in outdoor activities. For example, for the question, “What prevents you from spending time outdoors?” answers were coded into one of three categories, physical disability, transportation, or none, and entered into SPSS. Responses were coded as “no obstacle” when no disability, transportation, or other specific obstacle was mentioned, and included responses such as nothing, no, don’t want to, and occupied with other interests.
Results

Participant Characteristics

A total of 101 participants were recruited for the study. Twenty participants were excluded due to missing data ($N = 4$), being under the age of 65 with no reported disability ($N = 11$), or missing age data with no reported disability ($N = 5$). Of the remaining 81 participants, 69 were over the age of 65 (mean age = 78) and 12 were under age 65 (mean age = 56) and were included because of a reported physical disability.

Hypothesis 1. Needs Assessment and Perceived Ability to Participate

I hypothesized that at least 30% of the sample would report interest in participating in the proposed trail access program. Fifty-nine percent of participants, 95% CI [45.8, 67.5], reported that they were interested in the program, as defined by an answer of 5 (“very interested”) or 4 (between “moderately” and “very” interested) on the 5-point scale measuring interest.

Hypothesis 2. Relationship Between Current and Past Activity Levels to Program Interest

I hypothesized that past and current outdoor activity levels would be correlated with interest in the proposed trial access program. There was no relationship found between current outdoor activity and interest in the proposed vehicle assisted trail access program, $r(79) = .12, p = .29$. Past outdoor activity was also not correlated with interest in the trail access program, $r(79) = .08, p = .47$. Overall, individuals with higher levels of past or present outdoor activity were not more interested in participating in the program than those with lower levels.
Hypothesis 3. Relationship Between Age and Program Interest

I hypothesized a negative correlation between age and interest. Results supported our hypothesis. Age was negatively correlated with level of interest in the program $r(79) = -.28, p = .01$. A curve estimation of the relationship between age and interested was consistent with a simple negative linear relationship rather than a curvilinear relationship since the quadratic fit was not more significant, $r(79) = -.28, p = .01$. Older individuals were less interested in the program. Since non-seniors were also included in the study because of their disability status, this may have influenced the relationship between age and interest, so this was also examined only among the sample of seniors (69 participants who were over the age of 65). Age and interest were also significantly negatively correlated in this group, $r(67) = -.26, p = .025$.

Question 1. Self-Reported Ability to Participate and Obstacles

Seventy-nine percent of participants reported they would be physically able to participate in a vehicle assisted trail access program. Individuals were also asked what currently prevented them from spending time outdoors. Table 1 shows the number and percentage of participants reporting disability-related, non-disability-related, and transportation-specific obstacles to participation.
Table 1. Self-reported obstacles to participating in the proposed trail access program.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of participants</th>
<th>Percentage of group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number reporting obstacles</td>
<td>65</td>
<td>80</td>
</tr>
<tr>
<td>Disability related obstacles</td>
<td>48</td>
<td>59</td>
</tr>
<tr>
<td>Non-disability related obstacles</td>
<td>22</td>
<td>27</td>
</tr>
<tr>
<td>Transportation-specific obstacles</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>Transportation and disability obstacle reported</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

*Note.* Group percentages are calculated based on 81 total participants.
Question 2. Access to Nature Areas

Eighty percent of participants reported that they would spend more time in nature areas if they were easier to get to.

Perceived Ability and Interest

I hypothesized that perceived ability would be positively correlated with interest in participating in the proposed trail access program. Self-rated ability was a “yes” or “no” question on the survey, but answers were not provided on two of the surveys. There was a positive relationship found between perceived ability to participate and interest in participating, $t(76) = 4.9, p < .001$, partial $\eta^2 = .259$. The level of interest among the 64 participants reporting being physically able to participate was $3.98 \pm 1.38$ (mean ± standard deviation) compared to $2.00 \pm 1.35$ among the 14 participants reporting being unable to participate. Among those reporting being physically able to participate, 70% were interested, but among those reporting being unable to participate, only 18% were interested.

Types of Lifetime Outdoor Activities

Participants reported a variety of outdoor activities they have enjoyed in their lives. Activities related to walking and sight seeing were the most common. Forty percent of participants reported sightseeing, hiking, and walking as activities enjoyed in life. Other activities that were reported include cycling, surfing, swimming, hunting, boating, team sports (baseball and soccer), horseback riding, and camping. In 4 cases the activities reported may not be considered outdoor activities in the intended sense of the term, namely, racket ball, barbequing, flying an airplane, and eating.
Discussion

The majority of disabled and older adult residents of Humboldt County that were surveyed reported interest and perceived ability to participate in a vehicle-assisted nature trail access program if it were available in the local community. Since no other study has investigated this question in a directly comparable way, this study provides the best available data for estimating interest in this type of program among the general target population. These findings can support efforts to implement nature access programs for disabled individuals because they justify confidence that the program would be utilized and would benefit participants.

Hypothetical benefits for participants from participation in an outdoor enrichment program such as the one proposed here include improvements in areas of psychological wellbeing such as decreased depression and increased self-efficacy (Ishikawa et al. 2006; Keniger et al., 2013). This hypothesis was critically evaluated in the literature review section of this thesis but was not directly tested in the current study. The evidence for psychological benefits of nature exposure is limited, especially when it comes to controlled experimental studies, and forming general conclusions from existing evidence is complicated by the diversity of nature exposure manipulations and measurements in different studies. Scientific evidence and theory (Biophilic) for psychological benefits of nature exposure does exist, but additional research is needed to confirm it (Wilson, 1993). The high level of interested reported in the current at least suggests that these respondents perceived some benefit in the prospect of participating.
Older adults who placed greater importance on outdoor activity in their past lives and spent more time currently in nature were not found to be more interested in the proposed program. We might assume, when nature has been a consistent and meaningful part of an older adult’s previous life experience, then innate interest in nature might be accentuated. Instead, a majority of respondents (60%) reported interest in the program regardless of time spent outdoor or importance placed on nature. Eighteen percent of individuals reported low past nature experiences, but ten of those participants still reported being interested or very interested in the proposed program. This can be interpreted as support for the Biophilia hypothesis because it proposes that the emotional response to nature is innate (an evolved adaptation) and not experience-dependent.

Hypothesis 3 predicted that age would be negatively correlated with interest in the program and was supported by the data. One might think that younger seniors may not have as many physical disabilities enabling them to engage in outdoor activities independently and less interested in a vehicle assisted program. This was not found. One explanation for why older seniors were less interested in the program may be because they have higher incidence of disability and depression therefore less motivated to engage in activity. Middle-aged seniors may be the target population for an outdoor vehicle assisted program as they should have less physical ability than the youngest seniors but more motivation than the oldest. However, a curve estimation of the relationship between age and interested was consistent with a negative linear relationship, not a curvilinear one.
Limitations of this study may include failing to have a representative sample of seniors. A majority of participants were recruited from senior centers, rehabilitation centers, or in-home care services. These seniors may have more social support or financial resources. Social economic status was not evaluated in this study. Researchers attempted to use surveymonkey.com and social media sites to obtain data from seniors outside the above mentioned sources. Internet-based recruiting was not effective, zero surveys were collected online. This is likely due to not using optimal online recruiting strategies. Using senior based websites or associations such as AARP to distribute questionnaires may be a better strategy in the future.

Most participants were recruited through health care and support organizations. It is also possible that lower income seniors who could not afford to participate in those organizations were underrepresented in this sample. Considering the high level of interest reported by this sample, an important sampling concern is the possibility of biased toward higher interest and that actual interest in the target population (disabled seniors). Because many participants were recipients of home health care they are more likely to have a disability that prevents them from accessing nature trails and that characteristic may lead greater interest in opportunities to do that. But this group- in need of access assistance but still well enough to participate- is the target population for the proposed program, and in that light I believe my sampling method was broadly representative.

Another design limitation of this study was the possibility that some participants reported being interested in the program because that is what they thought the researcher
wanted them to say (i.e., that the Hawthorne/Demand Characteristics effect was occurring). It was likely evident to participants that the survey was motivated in part by a believe that nature exposure was a good thing, so reporting interest in the program would be expected to please the investigators and reporting no interest might feel like contradicting the investigators. This risk is expected to be greatest when the experimenter is present while the participant is completing the survey, and this was the case for approximately 85% of the surveys. Surveys administered by the participants’ home health care aid, would not have effects such as the Hawthorne effect to have as much influence in those cases.

Inter-rater reliability was not tested. Given that multiple individuals collected data for open-ended questions proved difficult in coding. Some participants stated “transferring” as a limitation to outdoor activities. Transferring referenced moving in and out of a wheelchair. Second rater sometimes misinterpreted this as “transportation”. Unfortunately differences between interviewers could not be analyzed due because interviewer data was not recorded.

Group interviewing may have also been a limitation to this study. Participants responses may have changed based on other participants’ answers. Group interviewing only occurred for approximately nine participants but participants may have conformed or changed their answers to socially desirable answers according to another’ answers. Social desirability effects may have also occurred in one-on-one interviews. Participants who may not need or desire a program may report a need, for moral reasons on behalf of other older adult or disabled individuals.
Another caveat to the current analysis is that behavioral intention (that is, reported interest in participating) does not always predict behavior. Intention predicting behavior is least likely in cases such as addiction or eating, due to physical factors. Due to the novelty of this study it is unknown to what degree reported interest predicts behavior regarding the proposed program. Behavioral plans including too many steps or that are too complex are also less likely to be effective (Consumer Health Informatics Research Resource, 2012). Information regarding the relationship between intention and behavior is particularly important when considering program planning and implementation of the new program. Reviews of the research have found that main moderators of intention-behavior relationship include intention stability over time, perceived ability, risks, benefits, anticipated regrets, proximity of opportunities to engage in the behavior, and normative beliefs about the behavior while age and gender were not significant moderators (Consumer Health Informatics Research Resource, 2012). The current study does not provide enough information to estimate these factors for the proposed program and target population, but it is clear from previous research that self-reported intention or interest overestimates how many people will actually engage. In a recent meta-analysis of exercise adherence in a disability population (cancer survivors) only about 65% of those who stated an intention to adhere to an exercise program actually did so (Kampshoff et al., 2014). Therefore, since 59% of participants in the current study reported an interest in the proposed program, it is reasonable to estimate that only about 38% of them (65% of those reporting interest) would actually participate. That estimate
still exceeds the a priori criteria set forth in this study (30% reporting interest) for demonstrating need for the program.

The primary purpose of the study was to evaluate interest, and ability in a vehicle assisted program for the elderly. The study also illuminated primary limitations of engagement in outdoor activity for local older adults. These results highlight a desire for assisted nature access programs in local communities for older adult and disabled adults. The willingness of communities to invest in such programs will be influenced by many factors, especially, with limited resources available, by the perceived value of the program relative to other needs of disabled seniors. One risk is that programs aimed at promoting longevity and independence for seniors will be favored at the expense of programs to promote psychological wellbeing and quality of life. Policy makers should consider that increasing access to natural environments may be an efficient and effective way to promote psychological wellbeing for many disabled seniors.
References


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Appendix A: Verbal Consent

“I am a student at Humboldt State University and I am conducting a study about access to parks and nature trails for elderly and disabled people in Arcata, California. Can I ask you a few questions about what nature has meant to you in your life? It would only take about 10 minutes, and your answers would be completely anonymous.”

YES / NO

If NO, say thank you and end interaction.

If yes: “We are interested in your opinion about making community nature trails accessible to disabled people. Many elderly and disabled people cannot access nature trails even within their own communities because of difficulty walking. We hope to create a program for disabled access to the Arcata Marsh and Arcata Community Forest through regularly scheduled tours on quiet, open-air, slow moving electric vehicles. As a first step, we want to know how interested people might be in using this program. Your participation is voluntary, there are no benefits and no real risks, and you may decline to participate or withdraw whenever you want. So, would you be willing to take the survey?”

YES / NO

If NO, say thank you and end interaction.

If yes “Great. We will leave you this flier that has information about the study and phone numbers to contact us if you have any questions later.”
Appendix B: Vehicle-Assisted Access to Public Nature Trails

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How important has spending time in nature been in your life?</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Not important</td>
<td>Neutral</td>
</tr>
<tr>
<td>2. How much time do you spend outdoors in natural areas these days?</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>None</td>
<td>Moderate</td>
</tr>
<tr>
<td>3. If there were a weekly, hour-long trip to the Arcata Marsh or Community Forest for people who can’t walk easily themselves, would you participate? We imagine using an open-air, golf cart vehicle that would carry 6 people. The vehicle would be quiet and would move at a walking pace. Would you be interested in regular outings like that?</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Not Interested</td>
<td>Mildly Interested</td>
</tr>
<tr>
<td>4. If this program was available, do you think you would be physically able to participate? Yes No</td>
<td></td>
</tr>
<tr>
<td>5. If it were easier to get to nature areas in your community, would you spend time doing that? Yes No</td>
<td></td>
</tr>
<tr>
<td>6. What prevents you from spending time outdoors?</td>
<td></td>
</tr>
<tr>
<td>7. What outdoor activities have you most enjoyed in your life?</td>
<td></td>
</tr>
<tr>
<td>8. Please tell us your age:</td>
<td></td>
</tr>
<tr>
<td>9. Do you have any questions or comments?</td>
<td></td>
</tr>
</tbody>
</table>
Appendix C: Participant Information Sheet

Study title:
Measuring interest in vehicle-assisted nature trail access among elderly residents of Humboldt County

About the study:
We are conducting a survey of elderly or disabled individuals in Humboldt County to measure their interest in a program that would offer them vehicle outings on local nature trails. The study is run by Graduate Student Crystal Perez. The study is motivated by the idea that nature experiences can benefit all people, including those who cannot easily access nature areas themselves because of a physical disability. If people are interested, we will work to create a vehicle-assisted nature access program in Humboldt County.

Study Procedure:
We will read you 9 questions about your experiences being in nature and your interest in accessing local nature trails with vehicle assistance. We will write down your answers. This short interview should take only about 10 minutes. We will conduct the interview any place that is convenient for you to do it.

Possible benefits and risks of this study:
By participating you may help our future goal of creating a vehicle-assisted nature outing program for disabled people in Humboldt County. You will not be paid or get any direct benefit for participating. There are no foreseeable risks to participating, since we will just be asking you a few questions. We will not write down your name so your answers are
completely anonymous. You participation in this study is voluntary and you may decline to participate or withdraw at any point without jeopardy.

**Whom to contact with questions about this study:**

If you have any concerns regarding this project, or any dissatisfaction with any part of this study, you may contact the Investigator Crystal Marie Perez cmp33@humboldt.edu, (707) 502-1700 or IRB Chair, Dr. Ethan Gahtan, at eg51@humboldt.edu or (707) 826-4545. If you have questions regarding your rights as a participant, you may report them to the IRB Institutional Official at Humboldt State University, Dr. Rhea Williamson, at Rhea.Williamson@humboldt.edu or (707) 826-5169.