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A Note from the Editor

This issue of *JIR* includes four articles, each providing insight and perspective on the continually evolving discipline of interpretation. This issue takes the reader through a journey in improving and understanding the art and science of interpretation. Why do campers participate in interpretive programming in parks? What does research tell us about audio versus guided programs at a historic site? What are some of the barriers that impact nature play in early childhood programs? These topics plus an empirical review of the “best practices” in interpretation make this issue of *JIR* a great resource for us all.

Remember to ask tough questions, imagine the impossible and think beyond that which is now. In this economic climate, we have to be able to demonstrate our impact to the visitors, the resources and the managers that we serve. If we cannot, we make those tough economic decisions too easy.

I look forward to the future developments of our field through your quality submissions to *JIR*.

—C
RESEARCH
Early Childhood Nature Play:  
A Needs Assessment of Minnesota Licensed Childcare Providers

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Abstract
Due to a growing body of evidence suggesting nature play experiences support the healthy development of young children, a needs assessment of licensed childcare providers in Minnesota was conducted. The purpose was to inform efforts toward ensuring all young children in Minnesota have the opportunities to gain the benefits nature play offers. Based on the results of a cross-sectional survey of 81 licensed childcare providers, results indicate there is a need to increase the amount of time preschool-aged children are playing outdoors, and specifically playing outdoors in natural areas. Results also suggest a need to increase access (or perceived access) to natural areas, and in particular among those providers who report serving primarily children of a lower socio-economic status (SES). Results suggest respondents recognize the benefits of outdoor play, but there may be a need to raise awareness of the benefits of outdoor play in nature. Key obstacles to be addressed in future efforts to encourage nature play for preschool-aged children include lack of access (perceived access) to natural areas, lack of appropriate clothing, safety/liability concerns, and lack of time. Efforts to reduce obstacles may be of particular importance for providers serving children of lower SES. These results may be used to guide future discussions and actions regarding strategies, policies, and programs for incorporating nature play into childcare programs for preschool-aged children.

Keywords
needs assessment, early childhood, preschool, nature play
Introduction

Nature play experiences, unstructured play in natural settings, support the healthy development of young children (World Forum Foundation, 2010). There is a growing body of evidence to suggest that experiences in the outdoors, particularly unstructured play in natural settings, aid in cognitive, physical, social, and affective development during the early childhood years (Lester & Maudsley, 2007). In addition, young children need frequent positive experiences not only to grow in understanding and appreciation of the natural world, but also to grow in the understanding of who they are (Wilson, 1994). At the early childhood level, environmental education can nurture a child’s creativity, sense of wonder, and appreciation of beauty. Further, because curiosity about the natural environment starts early and because many lifelong attitudes and values are developed early in life, environmental education experiences need to start during the early childhood years (Wilson, 1994).

Despite this growing body of research regarding the importance of nature play (unstructured play in natural settings), children are playing less overall and playing less outdoors (Burdette & Whitaker, 2005). While this overall decline of play is troublesome, this decline is potentially accompanied by inequalities in opportunities for outdoor play in natural settings, resulting from differences in access to green space and socio-demographic characteristics (Shores, Scott, & Floyd, 2007). Further, as children are spending increasingly less time playing and less time playing outdoors in nature, the potential increases for new early childhood educators and childcare providers to have grown up without experiences in nature (Crim, Desjean-Perrotta, & Moseley, 2008).

It is in this context that a needs assessment of Duluth, Minnesota, parents and preschool providers was conducted in 2008. Following the needs assessment, a symposium was held where members of the early childhood and EE communities in Duluth gathered to discuss the results and ideas for how to make nature play more accessible for all young children in Duluth. It was suggested that a needs assessment conducted at the state level of parents and childcare providers would further inform efforts toward responding to opportunities, obstacles, and disparities that existed, in efforts to ensure all young children in Minnesota have the opportunities to gain the benefits nature play offers. This state-level needs assessment is the focus of the following article.

Literature Review

Defining Nature Play

Nature play was defined in this study as unstructured play in natural settings. Specifically, nature play involves child-initiated or child-directed interactions with nature that occur in outdoor conditions ranging from relatively undeveloped or unmaintained to wild. Defining characteristics of nature play are further described below.

First, nature play is unstructured, imaginative, and exploratory. Unstructured play, also called free play, offers well-documented benefits to young children and is regarded as an essential component of child development (Burdette & Whitaker, 2005). Such free play is typically self-motivated, spontaneous, pleasurable, non-goal oriented and active (White & Stoeklin, 1997).

Second, nature play occurs in a natural unmaintained outdoor space, such as a forest, an overgrown field, or the wild edges around a yard, playground, or neighborhood. In these settings, nature is full of “loose parts” such as branches,
boulders, or tall grass which have no prescribed purpose, and thus offer unbounded potential for imaginative and creative play (Fjortoft, 2001). Children themselves seem to show a preference for these natural spaces. When children were observed in a school ground setting that offered both natural and maintained spaces, the natural spaces attracted more children (Lucas & Dyment 2010).

Finally, nature play is children playing with nature. According to research by Vadala, Bixler, and James (2007), interactions in the natural setting tend to be either child-child or child-nature focused. Because child-nature interactions are likely to provide implicit pleasurable learning experiences, it may be that child-nature interactions are developmentally critical, even as child-child interactions offer their own benefits (Vadala, Bixler, & James, 2007). While the collaboration required of children playing together in nature offers important social benefits, solitary play offers an opportunity for close observation of nature and may be particularly important to the overall development of children (Wells & Lekies, 2006).

**Benefits of Nature Play**

From a physical perspective, preschool children have highest levels of physical activity during outdoor play (Baranowski, Thomson, DuRant, Baranowski, & Phul, 1993). Considering that since 1980, obesity prevalence among U.S. children and adolescents has almost tripled (Ogdenm, Carroll, Curtin, McDowell, Tabak, & Flegal, 2006), the opportunity to promote physical activity through outdoor play is significant. Additional physical benefits can be gained when outdoor play occurs in natural settings, as research by Fjortoft (2001 & 2004) found young children playing in a natural environment had a greater increase in gross motor skill development, motor fitness, balance, and coordination than their peers in a traditional playground setting. This may be due to the physical challenges and physical diversity that natural landscapes afford, such as crawling through bushes, ducking under tree branches, climbing over rocks, and jumping across small streams of water (Benson & Miller, 2008).

From a cognitive perspective, nature play offers an enriched learning environment, where children’s imaginations, inventiveness, and creativity flourish. Burdette and Whitaker (2005) explain:

… a child is likely to encounter opportunities for decision making that stimulate problem solving and creative thinking because outdoor spaces are often more varied and less structured than indoor spaces. In addition, there are fewer constraints outdoors on children’s gross motor movement and less restriction on their range of visual and gross motor exploration. Together these factors that do not prescribe or limit activity induce curiosity and the use of imagination (p. 48).

This is consistent with research by Charles (2009), which suggests young children’s cognitive flexibility and creativity are enhanced if they experience problem-solving in natural settings as opposed to highly controlled, human-dominated, managed settings. Research also suggests that when children play in natural environments, their play tends to be more diverse, and they are more likely to engage in creative play that fosters the development of language skills (Fjortoft & Sageie, 2000). Research by Grahn (1997) suggests children in a more natural day care center had greater capacity for attention
than did those in less natural day care centers where less time was spent outdoors. Further, research by Kuo and Taylor (2004) suggests time in natural outdoor settings improves concentration and self-control in children with attention-deficit disorders.

Additional benefits of nature play lie in the affective and social domains. Children with more nature near their homes had lower levels of anxiety and depression and higher levels of self-worth than their peers (Wells & Evans, 2003). They found life’s stressful events appear not to cause as much psychological distress in children who live in high-nature conditions compared with children who live in low-nature conditions (Wells & Evans, 2003). Moore (1996) suggests children who play together in nature have more positive feeling toward one another. Further, active play with others provides a critical opportunity to cultivate social skills, including cooperation, self-awareness, and self-regulation (National Research Council and Institute of Medicine, 2000).

Perhaps of greatest interest to environmental educators and interpreters, early childhood nature experiences are related to adult attitudes and behaviors relating to the environment; early childhood experiences in nature stay with children in a powerful way, shaping subsequent environmental paths (Wells & Lekies, 2006). According to Phenice and Griffore (2003), regular, positive interactions with nature are instrumental to helping children develop a respect for the environment. Fjortoft (2001) suggests nature play results in a marked increase in children’s interest in and knowledge of nature. Research by Ewert, Place, and Sibthorp (2005) suggests the values that a child forms through nature play experiences may serve to “precondition him or her to developing a pro-environment, or eco-centric set of beliefs and attitudes, about the environment later in life” (p. 234).

At the early childhood level, EE in the form of nature play can foster a sense of wholeness and nurture a child’s creativity, sense of wonder, and appreciation of beauty (Wilson, 1994). Further, because curiosity about the natural environment starts early and because many lifelong attitudes and values are developed early in life, experiences in nature need to start during the early childhood years (Wilson, 1994). Williams (2008) suggests early experiences with nature support children’s development of scientific and aesthetic thinking, so they can “appreciate beauty, express creativity, and perceive patterns and variety in sensory dimensions of their worlds and themselves” (p. 24).

The North American Association for Environmental Education (NAAEE), as part of the National Project for Excellence in Environmental Education, developed the Early Childhood Environmental Education Programs: Guidelines for Excellence (2010). Stemming from work by Gardner (1999), the guidelines are grounded in the belief that EE at the early childhood level is more than a cognitive learning process, and needs to incorporate affective experiences that ground young children’s developing knowledge, skills, and dispositions (NAAEE 2010). The guidelines state that while formal K–12 EE tends to use a more structured approach, EE for young children is about discovery (NAAEE, 2010). Because young children lack the cognitive and coping skills to make sense of environmental problems, EE should focus on helping children bond with nature, laying the groundwork that may encourage examination of issues and appropriate action when they are older (NAAEE, 2010). One of the key characteristics of excellence in early childhood EE is play and exploration, which emphasizes the importance of using the natural world and natural materials for open-ended exploration, investigation, creativity, and discovery (NAAEE, 2010).
Decline in Nature Play

Despite this growing body of research regarding the importance of nature play, children are playing less overall and playing less outdoors interacting with nature (Burdette & Whitaker, 2005). Based on a meta-analysis of 37 studies including a total of over 10,000 preschool-aged children (aged 2–6), nearly half of preschool-aged children do not engage in sufficient physical activity, based on physical activity guidelines from the National Association for Sport and Physical Education (Tucker, 2008). These guidelines suggest 60 minutes of physical activity and up to several hours of unstructured play per day for preschoolers (National Association for Sport and Physical Education, 2002). Further, research by Juster, Ono, and Stafford (2004) found that children spend only four to seven minutes a day in unstructured outdoor play, yet they spend more than seven hours each day in front of electronic media (Roberts, Foehr, & Rideout, 2005). An emphasis on early academic training has further encroached upon time for creative, child-initiated play (Alliance for Childhood, 2007). Louv (2005) suggests fear as a barrier—fear of traffic, crime, strangers, and of nature itself—and an overall decline in natural places, resulting from the on-going shift from a rural to highly urbanized and suburbanized environment.

Inequalities in Opportunities for Nature Play

While this overall decline of play is troublesome, this decline is potentially accompanied by inequalities in opportunities for nature play, which is cause for further concern. The term distributive environmental justice refers to the spatial allocation of public urban services in relation to the distribution of social groups in the city (Omer & Or, 2005). This concept has been studied in the context of unequal access that different socio-economic and ethnic groups have to green spaces in a city. For example, studies indicate youth from low-income, minority families have relatively limited access to greenways and trails (Strife & Downey, 2009). Further, a Los Angeles study found poorer neighborhoods and Latino, African-American, and Asian-Pacific Islander neighborhoods had significantly lower levels of access to park resources than areas dominated by Caucasians (Strife & Downey, 2009).

Research also suggests that recreation constraints are not equally distributed across society and socio-demographic characteristics influences the prevalence and extent of constraints (Shores, Scott, & Floyd, 2007). Latinos and African Americans are less likely than Caucasians to use outdoor recreation areas, local parks, and nature centers; this differential participation has been attributed to complex and interrelated factors, such as cultural preferences, racial discrimination, language differences, lack of transportation, lack of access to safe green spaces, and lack of diverse staff that make minority and low-income families feel unwelcome (Strife & Downey, 2009). Thus, it is possible that unequal access to green space, along with socio-demographic characteristics, may be influencing the amount of time young children are spending in nature play resulting in unequal opportunities to gain the benefits this type of play offers.

Research Questions
The following questions guided the needs assessment:

1. How much time do licensed childcare providers in Minnesota provide for outdoor play for their preschool-aged children? How much of this outdoor playtime is nature play?
2. Is the amount of outdoor playtime related to access to outdoor play space and/or socio-economic status (SES) of children served?

3. What motivates childcare providers to incorporate opportunities for outdoor play for their preschool-aged children into their schedules?

4. What do childcare providers perceive as obstacles to nature play for their preschool-aged children?

5. What type of assistance or resources do providers’ perceive as increasing the likelihood of providing opportunities for nature play for their preschool-aged children?

Theoretical Grounding
The theoretical grounding for this research project lies in the constraint negotiation literature in leisure research. Leisure research shows that constraints do not necessarily reduce or prevent participation in leisure activities (Kay & Jackson, 1991); consequently, participation is not dependent on the absence of constraints, but on the negotiation through them (Jackson, Crawford, & Godbey, 1993). Negotiation of constraints refers to overcoming obstacles to participation through effort and initiative (Samdahl, Hutchinson, & Jacobson, 1999). Whether or not one is successfully able to negotiate through the constraints to participate in the desired activity depends on the strength of those constraints and the strength of one’s motivation (Jackson, Crawford, & Godbey, 1993). Thus, the interrelationships among constraints, motivation, and negotiation strategies are integral to understanding participation in leisure (Hubbard & Mannell, 2001). In the context of this needs assessment, constraints (obstacles to providing nature play), motivations, and negotiation strategies (assistance and resources useful for overcoming obstacles) were explored.

Methods
For this study, a needs assessment was defined as the process of collecting and analyzing information to develop an understanding of the issues, resources, and constraints of the population of interest (in this study, Minnesota licensed childcare providers), as related to identifying solution strategies and informing program development (McKenzie, Neiger, & Thackeray, 2009). A cross-sectional survey, in the form of a written questionnaire, was selected as the means for gathering primary data, as it offers the advantage of having members in the priority population directly answer the questions specific to this study. The process described in Rossi, Lipsey and Freeman (2004) guided the methods for this needs assessment.

Participants
The population of interest was licensed childcare providers in Minnesota (family childcare providers, child care centers, Head Start programs, and preschool programs). Childcare providers were selected as the focus for this needs assessment, due to the number of Minnesota children being cared for in childcare settings (according to a November 2005 report by Wilder Research, Child Care Use in Minnesota: 2004 Statewide Household Child Care Survey, about three-fourths of Minnesota families with children regularly use some form of childcare). Preschool-aged children (age three through before starting kindergarten) were emphasized, due to the importance of early experiences.
in nature from an EE perspective, and due to nature play being an age-appropriate EE strategy. Further, this age group was selected as less is known about this age group, as compared to school-aged audiences and environmental education experiences, and there is likely a different set of obstacles/motivations pertaining to infants and toddlers. While data from both parents and childcare providers would be useful, targeting both population groups in one needs assessment was not feasible due to the resources available for the study. Thus, the intention was to implement a needs assessment of childcare providers, and depending on the results and needs identified, implement a subsequent needs assessment of parents.

The Minnesota Child Care Resource and Referral Network provided the sampling frame for the needs assessment, which was drawn from the public list maintained by the Minnesota Department of Human Services of licensed childcare providers. Of this list of approximately 13,000 providers, a sample of 400 providers was drawn using stratified random sampling (stratification geographically and by provider type, based on a +10% sampling error rate and an assumed 30% response rate, with 95 being the desired number of respondents needed to generalize to the population, based on Dillman, 2000).

**Instrument**
The questionnaire used in phase one of this project (the Duluth, Minnesota, needs assessment) was modified based on the questions articulated for this state-level needs assessment, and from the results of needs assessment conducted at the Duluth-level. The questionnaire contained fixed-response items, Likert-type items, and open-ended questions. The questionnaire addressed a range of topics relating to outdoor play and nature play including amount of time, motivations, barriers, and assistance needed. The following terms, stemming from the prior needs assessment, were defined for participants on the questionnaire:

- **Nature play**: unstructured outdoor play in natural areas that involves playing with nature or interactions with nature;
- **Unstructured play**: child-initiated or child-directed play; free play; unstructured play doesn’t mean unsupervised, as parents or providers can “watch over” children in unstructured play, but children are guiding the play, rather than the adults; and
- **Natural**: a range of conditions from relatively natural to wild; used to describe a space that is unmaintained or undeveloped, as opposed to spaces such as a playground, basketball court, mowed grass, landscaped backyard, etc.

**Procedures**
The questionnaire was administered by mail in March 2010. The questionnaire was accompanied by consent information and a self-addressed, stamped envelope. Forty-nine of the 400 questionnaires were returned due to incorrect addresses, or the addressee no longer providing care. Eighty-one providers responded, resulting in a response rate of 23%. Of the respondents, seven (8.5%) were from the northwestern region, nine (11%) were from the northeastern region, 19 (23%) were from the midwestern region, 39 (49%) were from the metro region, and seven (8.5%) were from the southern region. Of the 81 respondents, 68 (84%) were family (in-home) childcare providers, seven (8.6%) were childcare center providers, and six (7.4%) were preschool program providers. None of the respondents were from a Head Start program. With the exception of lack of response...
from Head Start programs, these percentages are relatively proportional to the sampling frame in terms of geographic region and provider type.

Due to the possibility of non-response bias (participants interested in outdoor or nature play responding at higher rates than those not interested) and the relatively low response rate, phone interviews were conducted with five randomly-selected non-respondents from each region in the sample. The results of these phone interviews suggest less non-response bias than anticipated. Providers consistently seemed to not remember receiving the questionnaire or indicated not having time to look at it; their responses to the questions were very similar to the results of the providers who responded by mail. The data from the questionnaires returned by mail were analyzed using descriptive statistics and correlation analyses. Data from open-ended responses were summarized for data reduction and interpretation.

**Limitations**
Because of the low response rate, generalizations should be made cautiously. However, there appears to be less non-response bias than anticipated. While the study may be limited by a relatively low response rate, it provides insight into nature play opportunities for preschool-aged children while in childcare settings that can inform future research, as well as future action toward encouraging additional opportunities for nature play.

**Results**
For clarity and in light of the five questions explored in this needs assessment, the results will be organized and presented by needs assessment question.

*How much time do licensed childcare providers in Minnesota provide for outdoor play for their preschool-aged children? How much of this outdoor playtime is nature play?*
All 81 respondents indicated having outdoor play in their daily schedule for preschool-aged children, with the specific amount of time varying by weather conditions. See Table 1. When asked as to where the majority of this outdoor play occurs, almost all of the respondents (74, or 92.5%, of the 80 respondents to this question) indicated that the majority of their outdoor playtime was spent on the playground equipment, with the remaining respondents indicating the majority of their outdoor playtime was spent in maintained/developed spaces other than playground equipment. None indicated using

<table>
<thead>
<tr>
<th>Frequency of Participants Indicating Less than One Hour</th>
<th>Frequency of Participants Indicating One hour or More</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every Day Regardless of Weather</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Every Day during Nice Weather</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>26</td>
</tr>
</tbody>
</table>

Table 1. Amount of Daily Outdoor Playtime
unmaintained or natural areas for the majority of their outdoor playtime. Regarding type of play, of the 80 respondents to this question, 72 (90%) indicated the majority of their outdoor playtime was unstructured, with the remaining eight (10%) indicating the majority of their outdoor playtime was structured. Thus, these results suggest that very little if any of the outdoor play could be considered nature play, as while much of the outdoor play was unstructured, the majority of play was occurring in developed/maintained rather than natural settings.

Is the amount of outdoor playtime related to access to outdoor play space and/or socio-economic status (SES) of children served?

Because it was anticipated that very little time for nature play was being provided, this question was purposefully phrased to ask about outdoor playtime, so as to be relevant to more of the respondents. Almost all respondents (79 of 80) indicated having either playground equipment or maintained/developed outdoor space at their home/center for use by preschool-aged children for outdoor play. Twenty-five (30.9%) indicated having access to a natural area at their center/home, and another 41 (50.6%) indicated being within walking distance of a natural area in a park or public green space. Fifteen (18.5%) indicated not having access to a natural area, either on-site or within walking distance. There was no significant relationship between amount of time spent in outdoor play and access to outdoor play space, as all respondents had access to some place for outdoor play (whether maintained/developed or natural, whether on-site or within walking distance). Further, there was no significant relationship between amount of time spent in outdoor play and perceived access to a natural area ($r = -.12, p = .45$).

Two-thirds of respondents (54 of 81, 66.7%) indicated the majority of their children were from middle-level SES backgrounds. Ten (12.3%) indicated the majority of their children were from lower-level SES backgrounds, and four (5%) indicated the majority of their children were from upper-level SES backgrounds. Thirteen (16%) reported serving children from a wide range of SES backgrounds. There was no significant relationship between amount of time spent in outdoor play and SES of majority of children served. For those indicating daily outdoor play, the relationship between minutes per day and SES was $r = .09, p = .57$; for those indicating daily outdoor play when they considered the weather/season “nice,” the relationship between minutes per day on nice days and SES was $r = .08, p = .61$. However, there was a significant relationship between perceived access to a natural area and SES of majority of children served ($r = .31, p = .02$). The positive direction of this relationship suggests greater access (or perceived access) to natural areas for those providers who report having the majority of children they care for be from higher SES levels.

What motivates childcare providers to incorporate opportunities for outdoor play for their preschool-aged children into their schedules?

As was the case with the prior question, this question purposefully addressed outdoor play, as it was anticipated that few providers were incorporating nature play into their preschool-aged childcare. All respondents were in strong agreement with the importance of daily outdoor play for preschool-aged children (see Table 2.)

While all respondents were in agreement regarding the importance of daily outdoor play, four (of the 75 respondents to this item, 5%) indicated outdoor play should not be a part of their daily schedule. Of the 71 who indicated outdoor play should be a part of
daily schedules, 21 (30%) indicated *outdoor play in maintained spaces* should be a part of daily schedules, but not outdoor play in natural areas. Thus, a third of respondents (25 of the 75) indicated lack of support for daily outdoor play in natural settings.

The most frequent reasons as to why respondents included outdoor play for their preschool-aged children were relating to the physical and health benefits of fresh air and exercise, as well as the outdoors being good for them in general or good for their overall well-being. Other less-frequently listed responses to this open-ended question were because it provided an opportunity for free/unstructured play, the social and mental benefits of outdoor play, and children’s enjoyment of outdoor play.

What do childcare providers perceive as obstacles to nature play for their preschool-aged children?

Respondents were asked to rate a series of potential obstacles to nature play (unstructured play in natural settings) as to how strong of obstacle they perceived each to be. The three strongest obstacles to nature play were children lacking appropriate outdoor clothing, lack of access to natural areas, and safety or liability concerns. See Table 3.

Twenty-nine of the 81 respondents (35.8%) indicated they would like their preschool-aged children to spend more time in outdoor play (of any kind), and 26 of those 29 (or 32% of the 81 respondents) would like their preschool-aged children to spend more time specifically in nature play. For those who indicated wanting to include

<table>
<thead>
<tr>
<th>Table 2. Respondents’ Perceptions of the Importance of Daily Outdoor Play for Preschool-Aged Children</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
</tr>
<tr>
<td>Physical Health</td>
</tr>
<tr>
<td>Mental Well-Being</td>
</tr>
<tr>
<td>Physical Development</td>
</tr>
<tr>
<td>Cognitive Development</td>
</tr>
<tr>
<td>Social Development</td>
</tr>
<tr>
<td>Development of Appreciation for Nature</td>
</tr>
</tbody>
</table>

Note. 1=Strongly Disagree; 5=Strongly Agree

Note. N = 80

Table 2. Respondents’ Perceptions of the Importance of Daily Outdoor Play for Preschool-Aged Children

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...
More outdoor playtime and/or nature playtime, open-ended responses regarding obstacles to increasing the amount of outdoor playtime in general and obstacles to increasing the amount of nature play were similar. The most frequently listed obstacles were lack of time (both schedule constraints and the amount of time needed for getting children ready), mixed ages of children in their care (having infants or toddlers in their care that would also need to go outside), lack of staff, and weather (cold weather, messiness of mud/snow). Additional responses included safety concerns (cougar spotted, Lyme disease), children’s preference for playing with electronics, and management of children outdoors. Unique to nature play was the obstacle of lack of access (the most frequently listed obstacle, listed by half of the respondents to this open-ended question).

There was a significant relationship between SES of majority of children served and

<table>
<thead>
<tr>
<th>Obstacle</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children lacking appropriate outdoor clothing</td>
<td>2.79</td>
<td>1.42</td>
</tr>
<tr>
<td>Lack of access to natural areas</td>
<td>2.58</td>
<td>1.59</td>
</tr>
<tr>
<td>Safety or liability concerns</td>
<td>2.00</td>
<td>1.29</td>
</tr>
<tr>
<td>Lack of enough staff to supervise nature play</td>
<td>1.94</td>
<td>1.36</td>
</tr>
<tr>
<td>Too many other important things to fit into the day</td>
<td>1.79</td>
<td>1.09</td>
</tr>
<tr>
<td>Children in my care prefer to play outside on the playground</td>
<td>1.75</td>
<td>1.17</td>
</tr>
<tr>
<td>Lack of comfort/confidence for taking children outside for nature play</td>
<td>1.73</td>
<td>1.11</td>
</tr>
<tr>
<td>Lack of ideas for what to do or how to go about nature play</td>
<td>1.53</td>
<td>.94</td>
</tr>
<tr>
<td>My lack of interest in nature play</td>
<td>1.51</td>
<td>.88</td>
</tr>
<tr>
<td>Medical conditions of the preschool-aged children in my care</td>
<td>1.23</td>
<td>.74</td>
</tr>
<tr>
<td>Children in my care prefer to play inside</td>
<td>1.22</td>
<td>.50</td>
</tr>
<tr>
<td>Parents prefer their preschoolers aren’t taken outside for play</td>
<td>1.22</td>
<td>.65</td>
</tr>
<tr>
<td>My home/center is located in an unsafe neighborhood</td>
<td>1.18</td>
<td>.71</td>
</tr>
</tbody>
</table>

Note. 1 = Not an obstacle; 5 = Very Strong Obstacle
Note. N = 80

Table 3. Obstacles to Nature Play as Perceived by Childcare Providers
two of the 13 obstacles to nature play: children lack appropriate clothing for nature play \((r = -.39, p < .01)\) and lack of sufficient staff for supervising nature play \((r = -.24, p = .04)\). Providers who indicated the majority of their children were from lower SES perceived these as stronger obstacles than those serving middle or higher-level SES children. There were no significant relationships between type of provider (in-home, center, or preschool) and strength of any of the 13 obstacles to nature play.

**What type of assistance or resources do providers perceive as increasing the likelihood of providing opportunities for nature play for their preschool-aged children?**

The two forms of assistance respondents selected as being most helpful in increasing the likelihood of providing nature play opportunities were brochures/materials to give parents regarding the benefits of nature play and information on how to create a natural area at their home/facility. See Table 4 for the types of assistance and respondents’ indication as to how helpful each would be. Additional open-ended responses provided by respondents included the need for assistance in transportation to a natural area (access), ideas/assistance relating to handling a mixed-age group in nature (infants and toddlers, in addition to preschool-aged children), and the need to address concerns about Lyme disease.

### Table 4. Childcare Providers’ Perceptions as to Helpfulness of Possible Resources for Encouraging Nature Play

<table>
<thead>
<tr>
<th>Resource</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brochures/materials for parents regarding the benefits of nature play</td>
<td>3.03</td>
<td>1.48</td>
</tr>
<tr>
<td>Information on how to create a natural area at my home/site</td>
<td>2.99</td>
<td>1.50</td>
</tr>
<tr>
<td>Having extra outdoor clothing for children to use</td>
<td>2.75</td>
<td>1.26</td>
</tr>
<tr>
<td>Information on research-based benefits of nature play</td>
<td>2.74</td>
<td>1.26</td>
</tr>
<tr>
<td>Information as to how to go about including nature play</td>
<td>2.57</td>
<td>1.60</td>
</tr>
<tr>
<td>Information as to where I can take my children for nature play</td>
<td>2.55</td>
<td>1.44</td>
</tr>
<tr>
<td>Access to someone who could help me figure out how to incorporate</td>
<td>2.16</td>
<td>1.14</td>
</tr>
</tbody>
</table>

*Note. 1 = not helpful; 5 = very helpful*

*Note. N = 73*
## Discussion

Regarding the amount of time licensed childcare providers are providing their preschool-aged children for outdoor play and specifically nature play, it is important to note the American Academy of Pediatrics Council on Sports Medicine and Fitness and Council on School Health (2006) recommend young children be physically active for at least 60 minutes per day. They recommend meeting this requirement through a combination of structured activities and active lifestyle, including outdoor play. Because the majority of respondents were family-based providers, and if it is assumed that physical activity is occurring primarily outdoors, rather than family providers having space indoors for physical activity, it appears about half of the respondents may not be meeting these guidelines. Of the 81 respondents, only about half (41 of 81) are including 60 minutes or more of outdoor play in their daily schedules (with 26 of those 41 including this amount only when they consider it “nice” outside). Thus, there appears to be a need for increasing the amount of time spent in outdoor play, and potentially increasing the amount of time spent in outdoor play during seasons/weather not perceived as “nice.” While there is not an agreed-upon recommended amount of time for nature play, research clearly suggests the benefits of nature play, benefits beyond what can be gained through outdoor play. Since the results of this needs assessment suggest little if any nature play is occurring, there appears to be a need for increasing not only the amount of time spent in outdoor play, but specifically the amount of time spent in nature play.

Additionally, not only is there a need for increasing the amount of time provided for outdoor play and nature play for preschool-aged children, but potentially a need for changing providers’ perceptions as to if the amount of time they currently provide for outdoor play is sufficient, as only about a third of respondents indicated they would like to include more time for outdoor play, yet at least half, perhaps more, may not be meeting the recommended daily amount of 60 minutes of physical activity. This points not just to the need to increase time, but also to the need to change providers’ perceptions as to whether or not they are spending sufficient time in outdoor play and nature play, or perhaps awareness-building as to what the daily recommendations are.

The results regarding the relationship between outdoor playtime and access to outdoor play space suggest there likely isn’t a need to increase access to outdoor play space in general, but potentially a need for increasing access (or perceived access) to natural areas that can be used for outdoor play, assuming the goal is to increase the amount of time children spend in unstructured play in natural areas and since access to a natural area is needed for this type of play (41 of the 81 respondents would have to have children walk off-site to access a natural area and another 15 would have to drive their children to a natural area). Increasing access (or perceived access) to natural areas may be of particular importance for providers whose children are primarily of lower SES backgrounds, due to the significant relationship between respondents’ perceived access to natural areas and the SES of the children they served. Increasing (perceived or actual) access to nature might involve helping providers recognize places on-site or nearby that could be used for nature play. Further, additional research might be conducted to explore providers’ perceptions as to what constitutes a natural area for outdoor play and to better understand their access to natural areas. It may be that lack of access is really a perceived lack of access. For example, they may have a place in their yard that could be used for unstructured play in nature, but think they need an acre of nature for this type of play.
On the other hand, those respondents who did report having access to natural areas still used maintained outdoor space, primarily playgrounds, for the majority of their outdoor space; thus, access to natural areas is likely not the sole solution to increasing nature play.

In light of what motivates childcare providers to provide outdoor playtime, efforts to encourage nature play may need to address the health and physical benefits because respondents were incorporating outdoor play primarily for this reason and this could be a “selling point.” If providers already recognize that outdoor play is beneficial, it may be they need help understanding what added/different benefits nature play provides. Further, while providers seemed to recognize the benefits of daily outdoor play, and while almost all thought both outdoor play and unstructured play should be part of daily schedules, about one-third did not feel nature play (unstructured outdoor play in natural settings) should be a part of daily schedules. Thus, there may not be a need to raise awareness of the benefits of outdoor play or the benefits of unstructured play, but a need to raise awareness of the benefits specific to nature play. This may encourage those who currently don’t think nature play should be a part of daily schedules to recognize the need for it.

Lack of access to natural areas is a primary obstacle to be addressed. About 20% of respondents in the state-level assessment and did not have or perceived not having access at all to a natural area, with another 50% of respondents indicating needing to walk off-site to access a natural area. Given that lack of time was a frequently-listed obstacle to nature play, it might be considered unlikely that providers have time to walk their children off-site for nature play; thus, it may be appropriate to focus efforts on increasing access (creating access) to natural areas on-site. Other obstacles to be addressed in efforts to encourage the provision of outdoor play, and nature play in particular, include lack of appropriate clothing, safety/liability concerns, and lack of time (or the perception of too many other important things to fit into the schedule). The obstacles of safety/liability concerns and lack of time are consistent with the environmental education literature regarding barriers faced by school-aged children (Ernst, 2007). A cluster of obstacles seem to be regarding the “know-how” to incorporate this type of play (how to reduce the time involved in getting children ready for going outside, how to incorporate this type of play when there are also babies/toddlers to care for and additional staff are not available, how to provide this type of play safely, how to incorporate this type of play even in the winter or in the messiness of snow-melt and mud, etc.). Perhaps there is an opportunity for addressing these obstacles through professional development workshops or even more informal avenues, such as sharing ideas or “tricks” that providers have already figured out.

The results regarding assistance needed by providers to increase the likelihood of providing nature play opportunities are somewhat consistent with the obstacles identified by respondents, particularly in pointing to the need for reducing the obstacles of lack of access to a natural area on-site, lack of clothing, difficulty of mixed-age groups (babies/toddlers along with preschoolers) in nature. While respondents indicated materials for parents regarding the benefits of nature play would be helpful, they didn’t indicate lack of parent support as an obstacle in an earlier section; thus it is unclear as to the need for this assistance. Their indication of information on research-based benefits of nature play perhaps is consistent with an earlier discussion point regarding the need to raise awareness of the benefits of nature play in particular, as opposed to the benefits of outdoor play. Future research might explore this area, along with obstacles, in more detail. Perhaps focus groups of providers might generate more detail that would signal
where efforts should be focused in order to reduce these obstacles to providing nature play opportunities. This research strategy might also be useful for gaining ideas as to how the obstacles of lack of appropriate clothing, safety concerns, and lack of time can be negotiated.

Conclusion

The rationale for and significance of this early childhood nature play needs assessment lies in the growing body of research on the beneficial effects of the natural environment on children's health and well-being. The results of this study suggest there may be a need for increasing the amount of time preschool-aged children spend in both outdoor play and nature play while they are in the care of licensed providers. The results also suggest that in order to do increase the amount of nature play, there is a need to increase access (or perceived access) to natural areas, particularly among providers serving children of a lower socio-economic status; there also is a need to reduce the obstacles of lack of appropriate clothing, safety/liability concerns, and lack of time. Strategies such as assistance in creating on-site natural areas, as well as materials for parents highlighting the benefits of nature play, may help childcare providers negotiate through constraints to providing nature play for children in their care.

While additional data is needed, such as data from parents of preschool-aged children in Minnesota and non-licensed childcare providers in Minnesota, these results can inform Minnesota's efforts relating to this national initiative to reconnect children and nature, and in particular provide insight into populations that may need targeted efforts to improve access to nature play opportunities. This study also serves as a reminder of the important role needs assessments play in program development. Through understanding a target population in terms of opportunities, obstacles, and motivations, programs can be developed in ways that are tailored to the specific needs of a group and in ways that are more likely to be effective in reaching overarching goals and program objectives.

Acknowledgements

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Works Cited


Exploring empirical support for interpretation’s best practices

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Abstract  
Since Freeman Tilden defined interpretation, numerous authors have proposed methodological best practices. The purposes of this meta-analysis were to identify best practices and examine the empirical evidence linking them to visitor outcomes. We identified 17 best practices from key texts used for interpretive training. Our investigation examined the relationships between hypothesized best practices and outcomes in 70 peer-reviewed articles. The most commonly reported of these best practices used in the programs evaluated in these articles were: resource/place-based messaging (53%), actively engaging the audience (51%), and thematic development and cognitive/affective messaging (both 49%). Knowledge was the most commonly evaluated outcome (33% of studies), and awareness the least (9%). Positive results were most commonly reported for satisfaction, 91%, while 32% of studies evaluating the influence of interpretation on attitudes showed no impact. Results provide general support for each of the 17 hypothesized best practices and their linkages to desired outcomes. However, the evidence remains circumstantial because the practices were rarely isolated or explicitly tested.
Keywords

best practices, visitor outcomes, evaluation trends, empirical support, meta-analysis

Introduction

Less than 20 years after Freeman Tilden published his six principles in 1957, interpretation had grown into a sophisticated communication vehicle crafted to influence audiences’ knowledge, awareness, and satisfaction, as well as a strategic tool to cultivate agency image and accomplish mission-based management objectives (Sharpe, 1976). A contributing factor to this growth was the broadening of interpretation’s theoretical foundations and applications. When Enos Mills (2001) wrote, “The nature guide finds treasure to right and left for his followers in territory which to most people appears barren” (p. 138), it may have seemed unlikely, although not improbable, that interpretation would emerge as a major component of natural resource management (Cable, Knudson, Udd, & Stewart, 1987; Ham, 2010), tourism (Ham & Weiler, 2002; B. Weiler & Ham, 2001), and visitor satisfaction models (Morgan & Dong, 2008).

Modern roles of interpretation are highly varied, and the principles guiding the delivery of interpretive programming and messages have undergone numerous revisions over the past 90 years. However, one consistent theme remains: that of, “through interpretation, understanding; through understanding, appreciation; through appreciation, protection.” This anonymous quote, attributed by Tilden (1957, p. 38) to a U.S. National Park Service administrative manual has become a core philosophy of interpretation. In a recent essay, Ham (2010) addressed the validity of this widely adopted statement, made in the absence of evidence. Drawing on support from cognitive and social psychology, Ham teases apart each phrase and provides theoretical support to the causality of the proposed chain of events.

An important point that emerges from Ham’s (2010) essay is that it is necessary to critically examine widely held beliefs about the efficacy and value of interpretation in light of modern understandings of communication and psychology. While there is much anecdotal evidence to support the basic principles of interpretation, there is often a gap in empirical evidence for whether these principles influence visitor outcomes such as knowledge, awareness, and behavior and if so, how they do so. Further difficulties arise due to the proliferation of recommended best practices, definitions and principles.

In the midst of this continued growth, a single universal set of best practices for interpretation is somewhat elusive. Despite, or perhaps due to, widespread use by numerous agencies in highly varied settings with highly diverse audiences, interpretation in both theory and practice is difficult to evaluate across contextual boundaries (Ham & Krumpe, 1996). Also complicating the matter are the multi-disciplinary roots of interpretation. For example, many best practices for interpretation draw from theoretical and empirical work in the fields of education, communication, and psychology, and each of these have their own set of assumptions and limitations regarding practical applications.

Although specific definitions and applications may vary across texts, most empirical evaluations and researchers seek to understand the influence of interpretation on the visitor, resource, agency, and/or community. Generally, these research approaches investigate the efficacy of one program in a particular context in an effort to measure outcomes and improve programming. This approach does not allow researchers to isolate particular programmatic characteristics or compare multiple programs in an effort to tease out what best practices lead to desired outcomes under particular conditions.
Table 1. Sources used to identify best practices

<table>
<thead>
<tr>
<th>Source/Title</th>
<th>Year</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpretation for the 21st century: Fifteen guiding principles for interpreting nature and culture (2nd ed.)</td>
<td>2002</td>
<td>Beck &amp; Cable</td>
</tr>
<tr>
<td>Personal interpretation: Connecting your audience to heritage resources</td>
<td>2002</td>
<td>Brochu &amp; Merriman</td>
</tr>
<tr>
<td>Environmental interpretation: A practical guide for people with big ideas and small budgets</td>
<td>1992</td>
<td>Ham</td>
</tr>
<tr>
<td>Communication skills for conservation professionals</td>
<td>1999</td>
<td>Jacobson</td>
</tr>
<tr>
<td>Interpretation of cultural and natural resources (2nd ed.)</td>
<td>2003</td>
<td>Knudson, Cable &amp; Beck</td>
</tr>
<tr>
<td>Interpreting for park visitors (9th ed.)</td>
<td>2005</td>
<td>Lewis</td>
</tr>
<tr>
<td>Making visitors mindful: Principles for creating quality sustainable visitor experiences through effective communication</td>
<td>1999</td>
<td>Moscardo</td>
</tr>
<tr>
<td>Module 101: Fulfilling the NPS mission: The process of interpretation</td>
<td>2003</td>
<td>National Park Service</td>
</tr>
<tr>
<td>Module 103: Preparing and presenting an effective interpretive talk</td>
<td>2003</td>
<td>National Park Service</td>
</tr>
<tr>
<td>National Park Service. Module 210: Prepare and present an effective conducted activity</td>
<td>2003</td>
<td>National Park Service</td>
</tr>
<tr>
<td>National Park Service. Module 220: Prepare and present an interpretive demonstration or other illustrated program</td>
<td>2003</td>
<td>National Park Service</td>
</tr>
<tr>
<td>National Park Service. Module 230: Interpretive writing</td>
<td>2003</td>
<td>National Park Service</td>
</tr>
<tr>
<td>National Park Service. Module 311: Interpretive media development</td>
<td>2003</td>
<td>National Park Service</td>
</tr>
<tr>
<td>Interpreting the environment</td>
<td>1976</td>
<td>Sharpe</td>
</tr>
<tr>
<td>Interpreting our heritage (3rd ed.)</td>
<td>1957</td>
<td>Tilden</td>
</tr>
<tr>
<td>Interpretive master planning: the essential planning guide for interpretive centers, parks, self-guided trails, historic sites, zoos, exhibits and programs (2nd ed.)</td>
<td>1998</td>
<td>Veverka</td>
</tr>
<tr>
<td>Conducting meaningful interpretation: A field guide for success</td>
<td>2006</td>
<td>Widner Ward &amp; Wilkinson</td>
</tr>
</tbody>
</table>

To gain a better understanding of empirical support for the influence of consensus-based best interpretive practices on visitor outcomes, we 1) compiled a list of best practices from professionally acknowledged key sources, and 2) reviewed interpretive research designed to measure the influence of programs on visitor satisfaction, awareness, knowledge, attitudes, intentions, and behavior. Our goals were to document
which best practices were present in the programs being evaluated and to uncover trends and relationships between best practices and outcomes. In doing so, we are also able to characterize general trends in recent evaluation research of interpretive programs.

**Methods**

To differentiate interpretation from other forms of communication and education, we used Tilden’s (1957) definition of interpretation, which is: “An educational activity which aims to reveal meanings and relationships through the use of original objects, by firsthand experience, and by illustrative media, rather than simply to communicate factual information” (p 8). We further clarified interpretation as public programs regarding a site’s natural and cultural resource themes, which can be both formal, scheduled activities and informal contacts.

The two primary objectives of this study were to 1) produce a consensus-based list of interpretive best practices that appear theoretically important for predicting outcomes and could be empirically evaluated, and 2) perform a meta-analysis (Salkind, 2009) of peer reviewed literature to investigate the influence of these practices on six visitor outcomes (attitudes, awareness, behavior, behavioral intentions, knowledge, satisfaction). Consistent with Creswell (2007), we determined consensus within key texts by identifying consistently described practices and based on saturation (i.e., no new best practices emerged). Our meta-analysis followed Salkind’s (2009) recommended steps and was performed by: collecting a representative group of studies on a particular phenomenon, designating a common metric for comparison across studies, designating a coding structure for independent variables, and lastly performing a series of descriptive or correlational techniques to examine the outcomes of the studies as a whole.

**Identification of Best Practices**

To create a list of best practices, we selected and reviewed 18 key sources used for interpretive training (Table 1). These sources were selected on the basis of their influence in developing practitioner training and certification programs, as well as professional recommendations. Sources were also identified from NAI’s certification program and NPS training manuals. Texts that focused on interpretive planning were excluded. Next, we followed steps recommended by Creswell (2007), such as identifying consistently described practices across all texts to develop the list of consensus-based best practices.

**Meta-Analysis Article Selection**

We selected articles that explicitly aimed to measure the influence of exposure to an interpretive program on at least one of the visitor outcomes. To be included in the study, articles also needed to provide a detailed enough description of the interpretation for us to be able to identify program characteristics associated with our identified best practices. Interpretive “programs” included first-person programming, mixed media presentations, signage, printed materials/brochures, and self-guided experiences.

To find articles for the meta-analysis, we reviewed all published abstracts between 1996 and August 2009 from the following journals: *Journal of Ecotourism, Journal of Interpretation Research, Journal of Leisure Research, Journal of Park and Recreation Administration, Journal of Sustainable Tourism, Leisure Sciences*, and *Society and Natural Resources*. This review produced 37 articles that met our criteria. To further expand our sample size, the literature cited in the initial 37 articles was reviewed to
find additional studies that met our criteria. EBSCO and Web of Science were also used to generate citation maps of the initial 37 articles. These supplemental searches generated 33 additional articles. A total of 70 articles from 24 journals were selected for the meta-analysis. Articles excluded by our criteria were meta-analyses, theory reviews, and management framework recommendations and analyses. Additionally excluded were articles in which the evaluated audience was not visitors or the direct recipients of interpretation. Non-peer reviewed (“grey”) literature was excluded from this study as there is no consistent heuristic to assess experimental rigor, nor is there a systematic method for retrieving the literature, such as abstract review. The following is a summary of the criteria used to select research articles included in this analysis:

- There was clear evidence that subjects were exposed to an interpretive program
- At least one outcome (attitudes, awareness, behavior, behavioral intentions, knowledge, or satisfaction) was empirically assessed
- Assessment of outcome(s) was conducted by sampling the recipients of interpretation
- A description of the interpretive program was sufficient enough to identify the presence of program characteristics associated with identified best practices

**Article Coding**

We coded each of the 70 articles for: type of interpretation offered; audience demographics; location; presence/absence of the 17 best practices; and which of the six outcomes was being assessed. Several articles assessed more than one outcome. The presence of best practices was inferred from the description of the interpretive delivery system. It was possible to record the presence of multiple best practices within a single article.

**Operational Definitions of Assessed Visitor Outcomes**

The following are the definitions and sources used to code the assessed outcomes reported in the 70 articles selected for the meta-analysis.

- **Attitudes**: individual participants’ change in attitude toward subject of interpretation (Ajzen & Fishbein, 1977).
- **Awareness**: individual participants’ change in recognition or cognizance of issues or concepts.
- **Behavior**: individual participants’ self-reported behavior change/reinforcement, or staff observations of behavior change/reinforcement following exposure to interpretation (e.g., Powell & Ham, 2008).
- **Behavioral Intentions**: individual participants’ self-reported intent to change a behavior after exposure to interpretation (Powell & Ham, 2008; Powell, Kellert, & Ham, 2009).
- **Knowledge**: individual participants’ change in knowledge of subject after exposure to interpretation.
- **Satisfaction**: individual participants’ overall satisfaction or enjoyment levels associated with the interpretive experience (R. L. Oliver, 1993; Powell & Ham, 2008).
<table>
<thead>
<tr>
<th>Best Practices</th>
<th>Operational Definition</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theme development (TD)</td>
<td>Interpretation delivery system had a clear theme(s).</td>
<td>(Beck &amp; Cable, 2002; Brochu &amp; Merriman, 2002; Ham, 1992; Knudson et al., 2003; Lewis, 2005; Moscardo, 1999b; Sharpe, 1976; Tilden, 1957; Veverka, 1998; Widner-Ward &amp; Wilkinson, 2006)</td>
</tr>
<tr>
<td>Link tangibles to intangibles to universals (LI)</td>
<td>The interpretation made a link between tangible and intangible concepts and objects and demonstrated the relationship to universal concepts.</td>
<td>(NPS Module 101; Beck &amp; Cable, 2002; Brochu &amp; Merriman, 2002; Ham, 1992; Knudson et al., 2003; Lewis, 2005; Moscardo, 1999b; Tilden, 1957; Veverka, 1998)</td>
</tr>
<tr>
<td>Multisensory (MS)</td>
<td>Interpretation delivery system intentionally designed to engage one or more senses.</td>
<td>(Knudson et al., 2003; Lewis, 2005; Moscardo, 1999b; Tilden, 1957; Veverka, 1998)</td>
</tr>
<tr>
<td>Actively engage audience (AE)</td>
<td>The interpretation was designed to facilitate audience participation in the interpretive experience.</td>
<td>(Knudson et al., 2003; Moscardo, 1999b; Sharpe, 1976; Tilden, 1957; Veverka, 1998)</td>
</tr>
<tr>
<td>Multiple activities (MU)</td>
<td>The interpretive experience consisted of a variety of activities and opportunities for direct audience involvement.</td>
<td>(Moscardo, 1999b; Widner-Ward &amp; Wilkinson, 2006)</td>
</tr>
<tr>
<td>Multiple delivery styles (MD)</td>
<td>Interpretation delivery system employed a mixture of first person interpretation, brochures, signs, exhibits etc.</td>
<td>(Knudson et al., 2003; Moscardo, 1999b)</td>
</tr>
<tr>
<td>Relevance to audience (RA)</td>
<td>Interpretive delivery system communicated relevance of subject to audience.</td>
<td>(Beck &amp; Cable, 2002; Brochu &amp; Merriman, 2002; Ham, 1992; Jacobson, 1999; Lewis, 2005; Moscardo, 1999b; Sharpe, 1976; Veverka, 1998; NPS Module 101; Tilden, 1957)</td>
</tr>
<tr>
<td>Resource and Place based messaging (PB)</td>
<td>Interpretive message focused on relationship between visitor and the site/resource</td>
<td>(Beck &amp; Cable, 2002; Knudson et al., 2003; Lewis, 2005; Moscardo, 1999b; Sharpe, 1976; NPS Module 101)</td>
</tr>
<tr>
<td>Best Practices</td>
<td>Operational Definition</td>
<td>References</td>
</tr>
<tr>
<td>--------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Physical engagement with the resource (PE)</td>
<td>Interpretive delivery system intentionally provides direct physical experiences and interactions with the site/resource to build relationship between the visitor and the site/resource</td>
<td>(Beck &amp; Cable, 2002; Knudson et al., 2003; Lewis, 2005; Moscardo, 1999b; Sharpe, 1976; NPS Module 101; Tilden, 1957)</td>
</tr>
<tr>
<td>Tailored to audience (TA)</td>
<td>Interpretive delivery system was developed specifically for a pre-defined audience or user group (e.g. age appropriate).</td>
<td>(Brochu &amp; Merriman, 2002; Ham, 1992; Jacobson, 1999; Moscardo, 1999b; Sharpe, 1976; NPS Module 101)</td>
</tr>
<tr>
<td>Cognitive-based messaging (CM)</td>
<td>Interpretation delivery system provided accurate, fact-based information as part of interpretation</td>
<td>(Jacobson, 1999; Lewis, 2005; Tilden, 1957; Widner-Ward &amp; Wilkinson, 2006)</td>
</tr>
<tr>
<td>Affective messaging (AM)</td>
<td>Interpretation delivery system provided affective messages.</td>
<td>(Jacobson, 1999; Lewis, 2005; Tilden, 1957; Widner-Ward &amp; Wilkinson, 2006)</td>
</tr>
<tr>
<td>Cognitive/Affective messaging (CAM)</td>
<td>Interpretation delivery system had a combination of cognitive and affective messages.</td>
<td>(Jacobson, 1999; Lewis, 2005; Tilden, 1957; Widner-Ward &amp; Wilkinson, 2006)</td>
</tr>
<tr>
<td>Best Practices Specific to Behavior and/or Behavioral Intentions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrates benefits of action (BA)</td>
<td>Interpretation delivery system used messaging to present the potential results of desired actions.</td>
<td>(Ham et. al., 2007; Jacobson, 1999; Knudson et al., 2003; Moscardo, 1999b)</td>
</tr>
<tr>
<td>Social norms (SN)</td>
<td>Interpretation delivery system presented messaging focused on social norms regarding a particular behavior or desired action.</td>
<td>(Ham et. al., 2007; Jacobson, 1999; Knudson et al., 2003; Moscardo, 1999b)</td>
</tr>
<tr>
<td>Ease of action (EA)</td>
<td>Interpretation delivery system used messaging to present the ease of visitors adopting desired actions.</td>
<td>(Ham et. al., 2007; Jacobson, 1999; Knudson et al., 2003; Moscardo, 1999b; Tilden, 1957)</td>
</tr>
<tr>
<td>Demonstrates action (DA)</td>
<td>Interpretation delivery system provided examples of, or opportunities for desired action(s).</td>
<td>(Beck &amp; Cable, 2002; Knudson et al., 2003; Moscardo, 1999b; Sharpe, 1976; Widner-Ward &amp; Wilkinson, 2006)</td>
</tr>
</tbody>
</table>

Table 2. Interpretive best practices identified from key interpretive training texts
<table>
<thead>
<tr>
<th>Program Characteristic</th>
<th># of Articles (n=70)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Audience Demographics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Public</td>
<td>59</td>
<td>84%</td>
</tr>
<tr>
<td>Specific activity group</td>
<td>7</td>
<td>10%</td>
</tr>
<tr>
<td>Children (4&lt;sup&gt;th&lt;/sup&gt; – 6&lt;sup&gt;th&lt;/sup&gt; grade)</td>
<td>4</td>
<td>6%</td>
</tr>
<tr>
<td><strong>Audience Role</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-captive</td>
<td>51</td>
<td>73%</td>
</tr>
<tr>
<td>Captive</td>
<td>19</td>
<td>23%</td>
</tr>
<tr>
<td><strong>Program Type</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Person</td>
<td>40</td>
<td>57%</td>
</tr>
<tr>
<td>Mixed Media</td>
<td>17</td>
<td>24%</td>
</tr>
<tr>
<td>Signage</td>
<td>9</td>
<td>13%</td>
</tr>
<tr>
<td>Print/brochure</td>
<td>3</td>
<td>4%</td>
</tr>
<tr>
<td>Self-guided</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>42</td>
<td>60%</td>
</tr>
<tr>
<td>Australia</td>
<td>21</td>
<td>30%</td>
</tr>
<tr>
<td>Ecuador</td>
<td>2</td>
<td>3%</td>
</tr>
<tr>
<td>Antarctica</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Belize</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Canada</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Korea</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Panama</td>
<td>1</td>
<td>1%</td>
</tr>
</tbody>
</table>

*Note: Program characteristics were not mutually exclusive*

Table 3. Summary of interpretive program characteristics from reviewed articles

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualitative</td>
<td>8</td>
<td>11%</td>
</tr>
<tr>
<td>Quantitative</td>
<td>53</td>
<td>76%</td>
</tr>
<tr>
<td>Mixed</td>
<td>9</td>
<td>13%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample Size</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1– 100</td>
<td>16</td>
<td>23%</td>
</tr>
<tr>
<td>101 – 200</td>
<td>14</td>
<td>20%</td>
</tr>
<tr>
<td>201- 300</td>
<td>13</td>
<td>19%</td>
</tr>
<tr>
<td>301 – 400</td>
<td>9</td>
<td>13%</td>
</tr>
<tr>
<td>401 – 500</td>
<td>7</td>
<td>10%</td>
</tr>
<tr>
<td>501 – 1000</td>
<td>6</td>
<td>9%</td>
</tr>
<tr>
<td>1001-1500</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>1501 – 3000</td>
<td>3</td>
<td>4%</td>
</tr>
<tr>
<td>&gt; 3000</td>
<td>1</td>
<td>1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Timing of post-program data collection n=72*</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate</td>
<td>56</td>
</tr>
<tr>
<td>1 week – 6 months</td>
<td>11</td>
</tr>
<tr>
<td>6 – 12 months</td>
<td>3</td>
</tr>
<tr>
<td>1 – 2 years</td>
<td>1</td>
</tr>
<tr>
<td>2+ years</td>
<td>1</td>
</tr>
</tbody>
</table>

*Two studies used immediate and a longer-term follow up data collection technique; percentage calculated on n=72.

Table 4. Summary of study designs and methods from meta-analysis articles
Table 5. Summary of evaluated outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Number of times outcome was evaluated</th>
<th>Total Number of evaluations w/positive results</th>
<th>Number of evaluations w/no impact</th>
<th>Percent^</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes</td>
<td>25</td>
<td>17</td>
<td>8</td>
<td>32%</td>
</tr>
<tr>
<td>Awareness</td>
<td>10</td>
<td>9</td>
<td>1</td>
<td>10%</td>
</tr>
<tr>
<td>Behavior</td>
<td>13</td>
<td>9</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>Intentions</td>
<td>15</td>
<td>11</td>
<td>4</td>
<td>27%</td>
</tr>
<tr>
<td>Knowledge</td>
<td>37</td>
<td>33</td>
<td>4</td>
<td>11%</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>11</td>
<td>10</td>
<td>1</td>
<td>9%</td>
</tr>
</tbody>
</table>

*count exceeds 70 due to articles with more than 1 evaluated outcome

‡Percentage calculated on n=111

^Percentage calculated on total number of times outcome was evaluated

Table 5. Summary of evaluated outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>Adelman et al, 2000; Ballantyne &amp; Hughes, 2006; Benton, 2009; Christensen et al, 2007; Frauman &amp; Norman, 2003; Goldman et al, 2001; Morgan, 2009; Moscardo, 1999; Silverman &amp; Masberg, 2001; Stewart et al, 1998</td>
</tr>
</tbody>
</table>

Table 6. Evaluated outcomes by articles surveyed
**Table 7. Summary of best practices found in articles**

<table>
<thead>
<tr>
<th>Program Characteristic</th>
<th>Total number of times program characteristic was present*</th>
<th>Percent‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theme development (TD)</td>
<td>34</td>
<td>49%</td>
</tr>
<tr>
<td>Link tangibles to intangibles (LI)</td>
<td>6</td>
<td>9%</td>
</tr>
<tr>
<td>Multisensory (MS)</td>
<td>33</td>
<td>47%</td>
</tr>
<tr>
<td>Actively engage audience (AE)</td>
<td>36</td>
<td>51%</td>
</tr>
<tr>
<td>Multiple activities (MU)</td>
<td>13</td>
<td>19%</td>
</tr>
<tr>
<td>Multiple delivery styles (MD)</td>
<td>33</td>
<td>8%</td>
</tr>
<tr>
<td>Relevance to audience (RA)</td>
<td>13</td>
<td>19%</td>
</tr>
<tr>
<td>Resource &amp; place based (PB)</td>
<td>37</td>
<td>53%</td>
</tr>
<tr>
<td>Physically engage resource (PE)</td>
<td>28</td>
<td>40%</td>
</tr>
<tr>
<td>Tailored to audience (TA)</td>
<td>11</td>
<td>16%</td>
</tr>
<tr>
<td>Cognitive –based messaging (CM)</td>
<td>15</td>
<td>21%</td>
</tr>
<tr>
<td>Affective persuasive messaging (AM)</td>
<td>4</td>
<td>6%</td>
</tr>
<tr>
<td>Cog./Aff. Messaging (CAM)</td>
<td>34</td>
<td>49%</td>
</tr>
<tr>
<td>Benefits of action (BA)</td>
<td>24</td>
<td>34%</td>
</tr>
<tr>
<td>Social norms (SN)</td>
<td>21</td>
<td>30%</td>
</tr>
<tr>
<td>Ease of action (EA)</td>
<td>21</td>
<td>30%</td>
</tr>
<tr>
<td>Demonstrates action (DA)</td>
<td>3</td>
<td>4%</td>
</tr>
</tbody>
</table>

*count exceeds 70 due to articles assessing more than one best practice

‡Percentage calculated on n=70

---

**Table 8. Frequencies and percentages of best practices associated with evaluated outcomes and percent associated with positive influence**

<table>
<thead>
<tr>
<th>Best Practices</th>
<th>Satisfaction</th>
<th>Awareness</th>
<th>Knowledge</th>
<th>Attitudes</th>
<th>Intentions</th>
<th>Behaviors</th>
<th>Positive Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theme development (TD)</td>
<td>8/9 (89%)</td>
<td>4/5 (80%)</td>
<td>11/13 (85%)</td>
<td>3/5 (60%)</td>
<td>3/5 (60%)</td>
<td>0</td>
<td>29/35 (83%)</td>
</tr>
<tr>
<td>Link tangibles to intangibles (LI)</td>
<td>1/1 (100%)</td>
<td>4/4 (100%)</td>
<td>0</td>
<td>0/1 (0%)</td>
<td>0</td>
<td>0</td>
<td>5/6 (83%)</td>
</tr>
<tr>
<td>Multisensory (MS)</td>
<td>4/5 (80%)</td>
<td>7/9 (77%)</td>
<td>17/18 (95%)</td>
<td>2/4 (50%)</td>
<td>1/1 (100%)</td>
<td>0</td>
<td>31/37 (84%)</td>
</tr>
<tr>
<td>Actively engage audience (AE)</td>
<td>9/9 (100%)</td>
<td>4/5 (80%)</td>
<td>19/21 (90%)</td>
<td>2/4 (50%)</td>
<td>1/1 (100%)</td>
<td>1/1 (100%)</td>
<td>36/41 (88%)</td>
</tr>
<tr>
<td>Multiple activities (MU)</td>
<td>1/1 (100%)</td>
<td>4/4 (100%)</td>
<td>4/6 (66%)</td>
<td>1/2 (50%)</td>
<td>1/2 (50%)</td>
<td>0</td>
<td>10/13 (77%)</td>
</tr>
<tr>
<td>Multiple delivery styles (MD)</td>
<td>4/5 (80%)</td>
<td>5/6 (83%)</td>
<td>12/14 (86%)</td>
<td>2/3 (66%)</td>
<td>3/4 (75%)</td>
<td>1/1 (100%)</td>
<td>28/33 (85%)</td>
</tr>
<tr>
<td>Relevance to audience (RA)</td>
<td>2/2 (100%)</td>
<td>2/2 (100%)</td>
<td>7/8 (88%)</td>
<td>1/2 (50%)</td>
<td>1/1 (100%)</td>
<td>0/1 (0%)</td>
<td>13/16 (81%)</td>
</tr>
<tr>
<td>Resource &amp; place based (PB)</td>
<td>5/5 (100%)</td>
<td>7/8 (88%)</td>
<td>13/16 (81%)</td>
<td>2/3 (66%)</td>
<td>4/4 (100%)</td>
<td>1/2 (50%)</td>
<td>33/39 (85%)</td>
</tr>
<tr>
<td>Physically engage resource (PE)</td>
<td>4/4 (100%)</td>
<td>2/3 (66%)</td>
<td>12/14 (86%)</td>
<td>2/4 (50%)</td>
<td>0</td>
<td>0</td>
<td>23/28 (82%)</td>
</tr>
<tr>
<td>Tailored to audience (TA)</td>
<td>3/3 (100%)</td>
<td>2/2 (100%)</td>
<td>2/2 (100%)</td>
<td>2/3 (66%)</td>
<td>0</td>
<td>1/1 (100%)</td>
<td>10/11 (91%)</td>
</tr>
<tr>
<td>Cognitive –based messaging (CM)</td>
<td>3/3 (100%)</td>
<td>1/1 (100%)</td>
<td>10/13 (77%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>14/17 (82%)</td>
</tr>
<tr>
<td>Affective persuasive messaging (AM)</td>
<td>1/1 (100%)</td>
<td>1/1(100%)</td>
<td>2/2 (100%)</td>
<td>1/1(100%)</td>
<td>0</td>
<td>0</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>Cog./Aff. Messaging (CAM)</td>
<td>1/2 (50%)</td>
<td>5/7 (71%)</td>
<td>19/21 (90%)</td>
<td>1/2 (50%)</td>
<td>6/6 (100%)</td>
<td>2/3 (66%)</td>
<td>35/42 (83%)</td>
</tr>
<tr>
<td>Benefits of action (BA)</td>
<td>1/2 (50%)</td>
<td>3/3 (100%)</td>
<td>6/7 (86%)</td>
<td>2/3 (66%)</td>
<td>6/7 (85%)</td>
<td>3/4 (75%)</td>
<td>21/25 (84%)</td>
</tr>
<tr>
<td>Social norms (SN)</td>
<td>1/2 (50%)</td>
<td>3/3 (100%)</td>
<td>5/6 (83%)</td>
<td>0/1 (0%)</td>
<td>6/6 (100%)</td>
<td>3/4 (75%)</td>
<td>18/22 (82%)</td>
</tr>
<tr>
<td>Ease of action (EAM)</td>
<td>1/2 (50%)</td>
<td>3/3 (100%)</td>
<td>5/6 (83%)</td>
<td>1/2 (50%)</td>
<td>6/6 (100%)</td>
<td>1/2 (50%)</td>
<td>17/21 (81%)</td>
</tr>
<tr>
<td>Demonstrates action (DA)</td>
<td>1/1 (100%)</td>
<td>0</td>
<td>2/2 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3/3 (100%)</td>
</tr>
</tbody>
</table>

Total # and % of pairings with positive influence: 50/57 (88%), 57/66 (86%), 146/169 (86%), 22/40 (55%), 39/44 (89%), 12/18 (67%), 331/394 (84%)
Results

Best Practices
From the 18 key instructional texts, we identified 17 best practices for interpretation. Table 2 identifies each best practice and its corresponding definition and citations. Of the 17 best practices, 13 are applicable to any of the six visitor-based outcomes, while four are specific to influencing behavior and/or behavioral intentions.

Meta-analysis
A total of 70 articles from 24 journals were selected for the meta-analysis. Table 3 presents a summary of the characteristics of the interpretive programs evaluated by these 70 articles. Within our sample, 84% of the articles evaluated interpretation for the general public (i.e. not specific/special interest groups), and 81% of sampled studies dealt with non-captive audiences (audiences that are free to leave a program) (Ham, 1992). First-person interpretation was the predominant delivery method (57%). Studies were most frequently conducted in the United States of America (60%) and Australia (30%). Of the remaining locations, studies were conducted exclusively by western, i.e., non-resident, researchers.

Table 4 presents a summary of research designs and methods employed in the 70 articles. The studies were predominantly quantitative (76%). Twenty-four percent of the studies employed qualitative methods, but only 11% of these articles were solely qualitative. Most (78%) of the studies assessed outcomes immediately after a program. Longer-term assessments (i.e. one week or more post-program) occurred in 22% of the studies.

Of the 70 articles, 25 evaluated more than one outcome (Tables 5 & 6). This yielded a total of 111 evaluations of outcomes. Results reported for outcomes and program characteristics analyses are therefore calculated on a sample size of 111. Of the six outcome categories, knowledge and attitudes were measured in the largest number of studies, 33% and 23%, respectively. Only 22 (20%) of the 111 evaluations reported results that had no effect on the outcome. Within studies reporting no influence on an outcome, attitude was the most common, with eight evaluations.

The most common best practices (program characteristics) reported in the articles were: resource and place-based messaging (53%), actively engaging the audience (51%), thematic development (49%), cognitive & affective messaging (49%), and multisensory (47%) (Table 7). An example of how each of these best practices were reported in the studies follows.

• Resource and place-based messaging: Powell and Ham (2008) report that the interpretation on the Galapagos Islands tour focused on topics directly related to daily experiences with the wildlife and the conservation issues of the islands.

• Actively engage audience: Wiles and Hall (2005) describe how interpreters interacted with visitors, “They also attempted to personalize the message in ways that would cause people to reflect on their own lives.” (p. 22)

• Thematic development: “The thematic version of the interpretive program included a theme. (Bats are the most misunderstood creatures of the night.)” (Tarlton & Ward, 2006, p. 13).
• **Cognitive and affective messaging:** Wiles and Hall (2005) describe affective messaging as incorporating emotionally arousing elements, such as birth or death, and cognitive messaging as focusing on factual information (e.g., fire nutrient cycle).

• **Multisensory:** Orams (1997) describes the “dolphin experience” as including direct interaction with the dolphin, first-person interpretation, signs, posters, and video presentations.

Best practices were associated with assessed outcomes a total of 394 times. Several papers evaluated more than one outcome, and most reported the employment of multiple best practices. Table 8 lists how often each best practice was associated with an outcome and the number and percentage of times that association was positive. For example, of the 25 times that attitudes were evaluated at the programmatic level, 40 pairings with particular best practices were generated. Of those pairings, 55% were correlated with positive outcomes. When examining the performance of each individual best practice, most were related to predominantly positive outcomes at similar rates. Overall, the hypothesized best practices had a positive influence on outcomes in 84% of pairings (331/394).

When examining the relationship between outcomes and the group of best practices collectively, knowledge had the most pairings (n=169; 43%) and was positively influenced in 86% of pairings. Positive linkages were also noted in 86% of the 66 measurements of awareness. Satisfaction was positive in 88% of 57 pairings; intentions were positive in 89% of the 44 observed pairings; attitudes were positive in 55% of 40 the observed pairings; and behavioral outcomes were positive in 67% of 18 the observed pairings.

**Discussion**

Interpretation is a highly adaptable tool that can be used to fulfill a variety of strategic goals. It has been used to enhance visitors’ enjoyment (e.g., Powell & Ham, 2008), awareness of park resources, and knowledge (e.g., Powell, et. al., 2009). Interpretation has also been shown to influence visitor behaviors such as: decreasing vandalism (Ward, 2003), minimizing resource impact (Marion, 2007), and fostering adoption of long-term pro-environmental behaviors (Wallace & Gaudry, 2002). To better understand how interpretation could be utilized to influence visitor outcomes, this study had two main objectives. The first objective was to develop a list of consensus-based best practices by reviewing 18 key sources (Table 1) used for interpretive training. This review produced a list of 17 best practices (Table 7) that could influence visitor outcomes. Our second objective was to examine the empirical evidence for those best practices’ ability to influence the six visitor-based outcomes.

Within the 70 articles selected, our analysis identified 394 pairings of a best practice with a visitor outcome (Table 8). Overall, these pairings provide general support for each of the hypothesized best practices (84% of pairings show a positive influence). However, this support is tempered by several limiting trends that were revealed regarding the current state of interpretation research. The first trend is the relatively small sample size for specific pairings of best practices and outcomes. In many instances, a best practice was associated with a visitor outcome fewer than five times, and several best practices had no pairings with an outcome. Additionally, few articles attempted to isolate the effect of a specific best practice. Thus, while each hypothesized best practice had similar percentages of positive influences on outcomes, we cannot generalize about relative effectiveness.
Another limiting trend was the often incomplete descriptions of the interpretive program being evaluated. Authors may not have fully described all aspects of a program, choosing to focus on a subset of program characteristics in their studies. As a result, we could not confirm the absence of any given best practice from the interpretive programs under study. This may have led to an under-identification of certain best practices. Furthermore, articles did not directly address the quality or quantity of a best practice. Therefore, the presence or absence of a best practice only reflects the program’s design rather than the quality of its implementation.

A third limiting trend was that most articles reported only positive findings, suggesting the possibility that negative or null results may be published less frequently. This trend was evidenced by the high number of pairings showing a positive influence on all six visitor outcomes (Table 8). Even attitudes and behaviors, which had the lowest total number of positive pairings, 55% and 67% respectively, show a strong trend of reporting positive findings.

A possible explanation for this trend may be the predominance of short-term pre/post testing. Of the 111 evaluated outcomes, only five evaluations conducted a post-test more than six months following the event. If Tilden’s (1957) and Beck and Cable’s (2002) principles for interpretation are used as foundations, then long-term influence of visitor outcomes should be more routinely assessed. Additionally, given the current abundance of knowledge evaluations, future researchers should carefully consider if knowledge is indeed the outcome they wish to measure. Due to the relative ease of measuring a change in knowledge, it may be tempting to gauge the overall effectiveness of an interpretive program simply via an increase in knowledge. However, if one bears in mind the goal of provocation over instruction as well as a life-long change in understanding and action (Ham, 2010), short-term assessments of knowledge through pre/post tests appear to be of minimal significance.

Conclusion

If long-term management of the resource is reliant upon sustainable use by visitors, and interpretation is shown to have a positive influence on visitor attitudes, intentions and behavior, then these outcomes need to be explored more fully. A more nuanced understanding of changes to these visitor outcomes can provide managers support for prioritizing projects and funding. By explicitly linking best practices with outcomes, managers can improve the context for applying interpretation, and thus better fulfill strategic initiatives (Brochu, 2003; Jacobson, 1999).

As we attempt to better understand how best practices influence interpretation, future research could incorporate methods that are more explicit, attempt multi-program comparisons, and seek to isolate best practices. Studies could also be designed to specifically address gaps in our knowledge of under-studied outcomes and best practices. For example, specific behaviors such as philanthropy or volunteering may be linked with theme development, cognitive and affective messaging, or place-based messaging to improve visitor support. Additionally, we encourage researchers to provide more detailed descriptions of programs under study so that readers may have a greater ability to identify best practices. Furthermore, practitioners and researchers alike need to prioritize resources to advocate for more long-term follow up studies as well as support dissemination of null or negative findings.

Understanding how to bridge our gap in understanding the link of best practices to
outcomes will be an important function of interpretation research in the 21st century (Knapp & Benton, 2004). By undertaking multi-program comparisons that isolate specific practices or groups of practices and their link to specific outcomes, researchers can provide empirically supported and useful benchmarks for delivering successful interpretation.

References


National Park Service. Module 220: Prepare and present an interpretive demonstration or other illustrated program (2003).


The Effect of Tour Type on Visitors’ Perceived Cognitive Load and Learning

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Abstract
This paper discusses the effect of audio versus guided tours on visitors’ cognitive load at a national historic site. As more sites employ digital media devices to engage visitors, a better understanding of the impact of these devices on visitors’ experiences at sites is needed. This research took place during the summer of 2008 at a Canadian national historic site and examined how tour type (audio or guided) impacted the visitor’s learning process (cognitive load) and outcomes (learning transfer). The contextual model of learning, cognitive load theory, and learning transfer research were used as foundations to examine free-choice learning and the visitor’s experience. The results show that the type of tour taken does affect the learning experience. Specifically, audio tour participants indicated greater cognitive load than guided tour participants. Participants’ ability to transfer learning was not affected by tour type. Theoretical and practical implications are discussed and directions for future research are identified.
Keywords
interpretation, historic site, audio tour, guided tour, cognitive load

Introduction
Many cultural attractions offer visitors enhanced experiences through interpretive programs. Interpretation is used to meet a range of cognitive and affective goals set by site managers and desired by visitors. Tilden (1977) described interpretation as an educational opportunity that gives a site meaning by giving visitors firsthand experience. When discussing the role of interpretation at heritage sites Herbert (1989) states, “to make people more aware of the places they visit, to promote interest which leads to greater enjoyment and perhaps responsibility” (p. 191). More recently, Benton (2009) identified four ways of conceptualizing interpretation (a) connecting visitors to resources, (b) conveying agency mission and influencing behavior, (c) encouraging environmental literacy, and (d) promoting tourism outcomes. Many techniques have been used to deliver interpretive programs including signage, activities, presentations, and tours. Increasingly, attractions are employing mobile technology to deliver interpretive programs. In the past, many museums used various types of audio devices to offer audio tours to patrons but with the increasing accessibility of mobile digital media devices more sites are able to deliver digitally based interpretive programs to visitors. Sites deliver interpretive programs using audio tours for a variety of reasons, including making the tour more accessible to a broad audience and taking advantage of the unique qualities of audio recordings. While many cultural attractions world-wide have begun to offer mobile device driven tours, little is known about the implications for the visitor’s experience.

Research conducted by Mayer and others (Mayer, 2001; Mayer & Anderson, 1991; Mayer & Anderson, 1992; Mayer & Moreno, 1998; Moreno & Mayer, 2000; Moreno & Mayer, 2004; Sweller, 2005) reveals that multimedia learning environments present unique challenges and design of multimedia educational material should be carefully considered. Cognitive load theory has been used to understand how various types of instructional (interpretation) media affect people’s cognitive functioning (Sweller, 2005). The research presented in this paper uses cognitive load theory as a framework to better understand the difference between audio and guided tour experiences in a free-choice learning environment.

Literature Review
Learning at cultural and historic attractions is different from learning in formal environments like school. Free-choice learning is used to describe out of school non-compulsory educational environments where people freely choose to engage in learning activities (Falk, 2005). The interpretive program audience is considered non-captive since they can simply ignore a lesson without fear of punishment (Ham, 1992). In recreational or free-choice learning settings, learning is based on personal, social, and environmental factors. The Contextual Model of Learning highlights the complexity of learning in these environments by recognizing the personal context, the physical context, and the socio-cultural context as part of the free-choice learning experience (Falk & Dierking, 2000). Falk and Dierking (2000) assert that while this descriptive model was created to deal with learning in museum environments, it is useful for conceptualizing learning in diverse environments.
Falk and Dierking (2000) have identified key components of each context. The personal context includes motivations, expectations, prior knowledge and experience, interest, choice and control. The socio-cultural context includes the social interactions that take place within the museum and the visitor’s own social group (Falk & Dierking, 2000). Finally, the physical context consists of advance organizers and orientation, design, and reinforcing events and experiences outside the museum. While Falk and Dierking provide a descriptive overview of factors affecting free-choice learning, this model does not suggest causal relations between the variables described. Furthermore, the connection between the contexts, the learning process, and learning outcomes are not explicitly demonstrated with Falk and Dierking’s (2000) contextual model of learning. Mayer (2002a) provides a depiction of the learning process in Figure 1.

While Mayer does not include all of the same inputs into the learning process as presented in the Contextual Model of Learning, most notably he does not include the social environment where learning takes place, he does demonstrate the relation between learning inputs and outcomes. Mayer (2002b) shows that numerous factors impact the learning process, which in turn impacts the learning outcomes (no learning, rote learning, meaningful learning) that are then demonstrated in the outcomes performance (tests of learning).

The purpose of this research was to examine the effect of tour type on the visitor learning; therefore, understanding the cognitive process and learning outcomes could not be overlooked. Cognitive load theory provides insight into the cognitive process during learning, while learning transfer research will be reviewed to better understand learning outcomes (performance).

**Cognitive Load Theory and Instructional Design**

Much of the past research examining the relation between interpretive media design (e.g. displays, tours, activities, brochures) and learning has focused on the inputs (learning material) and outcomes (what has been learned), with less attention paid to the process. Research has repeatedly demonstrated that the way in which interpretive information is presented to the visitor impacts learning (Mayer, 2002a; Falk & Dierking, 2000). Moreover, Falk and Dierking (2000) state that design, as one component of the physical context, is an element of the free-choice learning experience that impacts visitor learning.
and can be influenced by site staff. Many researchers studying free-choice learning have recognized that interpretive program design has significant implications for the learner (Frauman & Norman, 2004; Moscardo, 1996; Loomis, 1996; Prentice et al., 1998). Cognitive load theory (CLT) emerged in the 1980s and contributes to our understanding of how instructional design can affect the learning process (Allen, 2004). However, cognitive load has rarely been discussed in the free-choice learning literature, and when it has been, it has not been the focus of the research and instead has been used to explain results (Allen, 2004; Van Winkle, 2007). Cognitive load theory has the potential to help explain why certain types of instructional design affect learning outcomes in free-choice environments.

Cognitive load (CL) can occur when working memory is overloaded during a learning experience and can be divided into intrinsic, extraneous, and germane load. Intrinsic load (ICL) refers to the inherent complexity of the educational material. Alternatively, extraneous and germane cognitive load (GCL) are impacted by instructional design. Extraneous CL (ECL) occurs when working memory is used for activities not directly related to the concept to be learned and can occur as a result of the instructional techniques used to present material (Sweller, 1999). If a learner must use their working memory to process extraneous material their overall learning can be undermined (Sweller, 1999). Extraneous cognitive load is especially problematic when learning material has a high level of intrinsic cognitive load because these forms of cognitive load are additive, resulting in greater overall cognitive load, which can lead to working memory overload and affect learning outcomes. Research has demonstrated that extraneous cognitive load can negatively impact learning (Sweller, 2005) and that instructional designers should attempt to minimize ECL through careful instructional design. Germane cognitive load occurs when information is processed and needs to be integrated into existing schema.

Typically, interpretive programs are developed for a broad audience, so the intrinsic cognitive load is kept to a minimum by ensuring that learning material is not overly complex. Unfortunately, extraneous cognitive load is more likely to present a problem in interpretive settings where a great deal of information is presented in a range of formats. Extraneous cognitive load is an issue when working memory must process material not directly related to the educational material. Often, interpretive settings present a great deal of cognitive stimulus not directly related to the learning material. A recent development in interpretive tours provides an excellent example. Mobile-technology driven interpretive tours may add extraneous cognitive load to the visitor’s experience by asking users to focus some of their mental activity on using the device.

Studies have revealed that secondary task performance increases a burden on working memory and can be used to both create and measure cognitive load (Brünken, Plaas, & Leutner, 2003; Marcus, Cooper, & Sweller, 1996). A review of secondary task performance research conducted by Brünken et al. (2003) revealed that asking people to perform a secondary task while learning from various types of instruction increased cognitive load. Furthermore, Brünken et al. (2003) note:

If a learner has to perform two tasks simultaneously (e.g., a learning task and a monitoring task), and if both tasks require the same resources in verbal and/or visual working memory, then the available verbal and visual resources have to be distributed between both tasks. (p. 57)
In the case of interpretive audio tours, the mobile device may impact cognitive load by imposing a secondary task, which requires users to focus their visual attention on the device in order to operate it, rather than focusing on the interpretive objects or setting that the individual is learning about. The study presented in this paper will examine how taking an audio tour impacts cognitive load differently than taking a traditional guided tour. Furthermore the resulting learning outcome will also be explored.

Learning Outcomes
A goal of many interpretive programs is to provide visitors with meaningful interpretation (Beck & Cable, 2002; Larsen, 2003) and the interpretation literature often discusses the importance of meaningfulness (Knapp & Benton, 2004; Larsen, 2003). Unfortunately much of the interpretation literature is vague about defining and measuring meaningful learning (Ward & Wilkinson, 2006). Van Winkle and Backman (2011) discussed how the educational psychology literature can inform those interested in evaluating meaningful learning in free-choice environments, since educational psychologists like Mayer have articulated that meaningful learning is distinct from rote learning and occurs when information is understood and can be used to solve problems (Mayer, 2002a). Thorndike and Woodworth (1901) presented the identical elements learning transfer theory where they proposed that it is difficult for people to apply learned information to situations that are very different from the original learning context and that learners are best able to use new information in situations that share identical elements to the learning situation. Educational psychologists have repeatedly found that meaningful learning leads to learning transfer, where individuals can apply learned material to various situations (Mayer, 2002a; Mayer & Moreno, 1998). Therefore, learning transfer is often measured using open-ended questions requiring the learner to apply the material to a different situation. Responses are then coded using an answer key (Mayer & Moreno, 1998).

Purpose of this Study
The purpose of this study was to examine the effect of tour type on perceived cognitive load and learning transfer in a free-choice learning environment. The research questions addressed in this paper are:

1)  Does interpretive tour type (audio vs. guided) affect perceived cognitive load?

2)  Does interpretive tour type (audio vs. guided) affect learning transfer?

3)  Does perceived cognitive load impact learning transfer?

Method
The Winnipeg Exchange District is a Canadian national historic site celebrating the manufacturing and trade history of the Canadian prairies. Winnipeg’s Exchange District Business Improvement Zone (BIZ) is a not-for-profit group that offers interpretive tours of this historic site, located in downtown Winnipeg, Canada. In the past, an interpreter hired by the Exchange BIZ guided these tours. In an effort to expand tour offerings, increase the availability of tours and appeal to a diverse public, the BIZ decided to begin offering MP3 self-guided pre-recorded audio tours using iPod Touch devices during the summer of 2008. Guided and audio tour content was based on the same tour script, took the same route through the historic district and stopped at the same historic buildings.
Because the same core information was presented in both guided and audio tours this tour program presented a unique opportunity to compare guided and audio tour participants’ experiences.

Data was collected from July to September 2008. Individuals who arrived at the Exchange District and inquired about taking an interpretive tour were asked if they would be willing to participate in this study. If people agreed to participate they were assigned to either the guided or audio tour treatment condition. If someone was not willing to take the tour in the format to which they were assigned (audio or guided) then they were not included in the study. Tour participants were asked to complete a questionnaire at the end of their tour and were given a rebate for their tour as a thank-you for their participation. The self-administered questionnaire asked tour participants about their demographic information, personal characteristics, tour experience, and cognitive load. Cognitive load was measured by way of two subjective questions that each measured overall cognitive load (Brünken, Plass, & Leutner, 2003). The first question measured cognitive load by asking people to indicate how difficult it was to understand the material presented in the tour, and the second question measured cognitive load by asking participants about how much mental effort they had to invest in learning the material presented in the tour. Participants were asked to respond on a 5-point Likert-type scale and could select from not at all (none) to extremely (a lot). These questions were based on cognitive load research conducted by Moreno (2007). Various subjective scales of cognitive load (using either difficulty or mental effort in the question wording) have been highly sensitive measures of the cognitive load construct (Ayres, 2006; Moreno, 2007; Pass, van Merrienboer, & Adam, 1994; Pass, Tuovinen, Tabbers, & Van Gerven, 2003).

Learning transfer (i.e. outcome/performance) was measured following the technique used by Van Winkle (Van Winkle, 2007; Van Winkle & Backman, 2011) and adapted from Moreno and Mayer (2000). Other publications by Van Winkle provide detailed descriptions of the learning transfer measures used in the present study (Van Winkle, 2007; Van Winkle & Backman, 2011). In summary, research participants were asked to answer four open-ended questions that required respondents to apply knowledge gained from the interpretive tour to a related but somewhat different situation. For example, “a 200-year-old farm settlement grew very quickly when it was first developed, but its growth suddenly halted. Today the area looks much like it did when it first existed. What factors could have contributed to this?” An answer key was used to score participant responses. Each answer could receive a maximum of two points (incorrect responses received no points, partially correct responses received one point, and completely correct responses receive two points). The scores on the four transfer questions were added together to provide an overall learning transfer score. The maximum possible score was eight.

Past research has shown that visitors participating in an interpretive program vary in their existing knowledge about the subject matter presented in a program. Falk and Dierking (2000) have discussed the role of prior knowledge in free-choice learning, and cognitive load research has shown that prior knowledge impacts how instructional design affects cognitive load (Kalyuga, 2005). Prior knowledge was therefore considered when examining the impact of instructional method on cognitive load and learning in a free-choice environment and was measured using four questions that asked participants to rate their existing knowledge of the history of the area, historic preservation, historic designation and topics discussed in the tour.

A pilot test of the data collection techniques and questionnaire instrument took
place during June of 2008 at the same site, using the same tour and questionnaire instrument. In total 23 people participated in the pilot test. The pilot test allowed for tour instructions and survey questions to be refined prior to data collection.

Results

From July to September 2008, 228 individuals were asked to participate in the study and 151 agreed. This resulted in a 66% response rate. A total of 95 study participants took a guided tour and the other 56 took an audio tour. Most respondents were female (62%), were from Winnipeg (60%), and had at least a university education (62%). Fewer than half of the respondents were over 51 years old (48%). Guided and audio tour participants only differed significantly on one demographic variable: age (p < .05). Guided tour participants were older (M = 48) than audio tour participants (M = 42). No relation was found between the demographic variables and the dependent variables; therefore, the demographic variables were not included in subsequent analyses. Additionally, no relation was found between the knowledge variable and the dependent variables and so this item was not included in further analyses.

The null hypothesis for research question 1 was that there is no difference in perceived cognitive load between guided and audio tours in a free-choice learning environment. To examine this hypothesis, data were analyzed by examining the effect of tour type on cognitive load. First, the difference between the two groups (guided and audio) on each of the cognitive load measures was examined. The average rating for mental effort by guided tour participants was M = 2.04 and SD = .901; whereas audio tour participants rating for mental effort was M = 2.46 and SD = .959. Guided tour participants’ average rating for difficulty was M = 1.21, SD = .728; whereas audio tour participants difficulty was M = 1.75, SD = 1.093.

To prepare data for further analyses the two cognitive load measures (DV) were combined following Moreno’s (2007) method: The mental effort and difficulty measures were added together and divided by two. On average, participants perceived that “a little” mental effort (M = 2.21, SD = .949) was required to understand the material presented in the tour. The average response to the difficulty measure was “not at all” (M = 1.41, SD = .914). The combined cognitive load measure had a mean of 1.81 (SD = 0.76) and was positively skewed. To increase the normality of the distribution a data transformation was performed where the natural log of the cognitive load variable was taken. This type of transformation improves the normality of the data and does not impact the integrity of the data (Mertler & Vannatta, 2005). All other assumptions for analysis of variance

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Table 1. ANOVA Summary Table for the Effect of Tour Type on Cognitive Load

Tests of Between-Subjects Effects

Table 2. ANOVA Summary Table for the Effect of Tour Type on Learning Transfer
were met. A one-way analysis of variance revealed that treatment type (audio or guided tour) had a significant effect on cognitive load \((F(1,144)=13.374, p < .01)\); specifically, audio tour participants perceived greater cognitive load than guided tour participants (see Table 1).

The second null hypothesis tested was that there is no difference in learning transfer between guided and audio tours in a free-choice learning environment. The learning transfer measure included four open-ended questions requiring participants to apply knowledge gained from the tour to a somewhat different situation. Two independent coders used an answer key to determine if participants demonstrated transfer. The inter-rater reliability computed using Cohen’s Kappa was .815, which is acceptable (Lombard, Snyder-Duch, & Bracken, 2005). Disagreements about coding were resolved by discussing the results until agreement was achieved; typically the lesser number of transfer points were assigned. The maximum number of transfer points on each question was two, therefore, a total of eight transfer points were possible (two points for each of the four questions). The total transfer scores ranged between 0–6, which means that no participant received the total number of possible transfer points.

Transfer was very positively skewed and this is consistent with past research (Van Winkle & Backman, 2011). Data transformations, by taking the log of the grand mean transfer score, were used to improve the normality of the distribution as described above. ANOVA results revealed that treatment type (audio vs. guided) had no impact on learning transfer \((F(1, 146) = .162, p = .688)\) and therefore the null hypothesis was accepted (see Table 2).

The final null hypothesis that was examined stated that learning transfer is not affected by cognitive load. The relation between cognitive load and learning transfer was examined by looking at the Pearson’s correlations. These two variables were not correlated \((r(148) = -.024, p = .770)\) and therefore the null hypothesis was accepted and no further analysis was undertaken (see Table 3).

**Discussion**

Much of the past research examining the relation between interpretive design and learning has focused on the inputs and outcomes, with less attention paid to the learning process (Packer, 2006). This study represents the first published work to measure cognitive load in an interpretation setting to better understand how interpretation tools impact learning.

Evidence presented in this paper supported only one of the three hypotheses
examined. Specifically, there was a significant difference between audio and guided tour participants’ perceived level of cognitive load. While both groups perceived little cognitive load, the guided tour participants showed less CL than the audio tour participants. This was expected considering the attention needed to operate the mobile device, which guided tour participants do not have to attend to. The secondary task performance literature reveals that performing a task that requires the same senses that the learning material requires will increase cognitive load (Brünken et al., 2003). To learn the material presented in the audio tour, participants needed to look at the buildings and architectural features described in the audio but instead they may have focused their attention on the device delivering the audio. A qualitative study by Woodruff, Aoki, Hurst, and Szymanski (2001) examined the impact of electronic guidebooks on visitors’ attention at a historic site. They found that while the electronic guidebook did not dominate visitors’ attention, visitors did state that using the electronic guidebooks took their attention away from the interpretive material. Furthermore, Bitgood (2000) noted that distraction interferes with museum visitors’ ability to pay attention to exhibits. Bitgood provides many examples of the role that interpretive material can play in distracting visitors. The literature suggests that audio tour participants might experience greater cognitive load because people’s attention is distracted from the content of the tour itself. To explore the split-attention hypothesis further, the mediating effect of attention on the relation between tour type and cognitive load should be examined in the free-choice learning context.

Another issue that should be examined in the future, that was not addressed here, is the use of one’s own device versus using a device provided by the site. The research presented in this paper did not ask visitors to use their own device but instead provided them with a device (which has been common practice at many museums and historic sites). If the devices do in fact take attention away from the tour material and act as a distraction perhaps visitors should be encouraged to their own devices and future research could explore whether cognitive load is reduced when tour takers have existing experience with the device.

No relation was found between tour type and learning transfer or cognitive load and learning transfer. This was unexpected since past research has demonstrated that when instructional design increases cognitive load, this negatively impacts learning transfer (DeLeeuw & Mayer, 2008). While these results did not confirm the hypotheses, past research does provide some insight into these outcomes. The interpretive tour material was believed to present a low level of intrinsic cognitive load since it was written for a

### Correlations between Transfer and Cognitive Load

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Table 3. Correlations between Transfer and Cognitive Load
broad audience representing a range of ages, levels of education, and existing knowledge. While the mobile devices may have resulted in an increase in extraneous cognitive load the overall load still remained quite low, not significant enough to impact learning transfer. Marcus, Cooper, and Sweller (1996) note that when a task does not impose intrinsic cognitive load then extraneous cognitive load may not significantly impact learning since working memory is not exceeded. Future research could examine this further by measuring and varying the amount of intrinsic cognitive load presented by the learning material. Additionally, the measures used in this study were based on previous research; however, future research including multiple measures of both cognitive load and learning would provide additional insight into the relation between these concepts.

The questions used to measure learning transfer could also have affected the outcome of this study. Learning outcomes can be measured in various ways and perhaps had a different measurement tool been used to assess learning a significant relation between tour type and learning transfer or cognitive load and learning transfer may have been found. To address this issue future studies could use multiple measures to assess learning outcomes.

**Conclusion**

The results of this study reveal that tour format does impact the cognitive experience visitors have during an interpretive program. While the results presented here might not have shown a reduction in learning transfer it is still important to note that participants had different experiences learning. Packer (2006) presents a strong argument for better understanding the experience of learning rather than just the outcome of learning in free-choice environments and identifies the learning experience as an outcome desired by visitors. Taking this into consideration, a logical extension of the present study is to examine how experiencing cognitive load during an interpretive program affects the overall visitor experience and satisfaction with that experience. The learning experience should always be considered prior to implementing a new tool to deliver interpretive tours for visitors.

The Exchange District audio tours presented a unique opportunity to examine the difference between audio and guided tour experiences. Future research should expand on this work by (1) examining factors mediating the relation between cognitive load and learning, (2) employing a mix of measures for the independent and dependent variables, and (3) examining a range of free-choice learning environments.

**References**


Abstract
Interpretive programs are offered by parks and public lands to inspire the visitors to further appreciate the heritage resources presented and protected within parks. The strategic use of interpretation requires participants, and the broader the audience, the wider the influence. Using an outcome-oriented approach, 40 semi-structured interviews were conducted to better understand the constraints that reduced campers’ participation in park interpretive programs held at state parks. Visitors described an inability to find program information, a desire to experience unstructured time, lifestage barriers, and the relative attractiveness of competing activities. Through increased awareness of constraints to participation, interpreters should be able to strategically schedule programs, use different programming delivery styles, and increase their ability to meet park management objectives.

Keywords
interpretation, constraints, campgrounds, delivery style, lifestage, publicity
Introduction

Parks and public lands are places where cultural, historic, and natural resources are enjoyed and conserved by visitors. An overarching purpose of interpretive services being offered in parks and public lands is to strengthen and enrich affective and cognitive relationships between people and park resources. One method that can help ensure that parks continue to be relevant and garner broad-based political support is to inspire people emotionally and cognitively as they visit a park. Interpreters are the front-line personnel providing opportunities for the public to further their understanding of the importance of the park by deepening visitors’ enjoyment (Tilden, 2007). Most interactions between interpreters and park visitors occur during park programs, yet only a minority of park visitors will have contact with interpreters (Knapp, 2007). When visitors either are not interested in or are unable to attend interpretive programs, important opportunities are missed. This project investigates constraints among campers at state parks to participating in interpretive programs.

Participation in park programs may be increased several ways, including thoughtful scheduling and matching program topics to the interests of potential audiences. Park programs should be scheduled when the greatest number of participants have the freedom to attend (Kraus & Curtis, 2000). Likewise, participating in interpretive programs is a form of free-choice learning, a leisure activity (Falk, 2009). No member of the public is required to visit a park or attend an interpretive program—the program topic has to be at least initially interesting to the park visitor. When parks fail to consider the needs, schedules, abilities, and interests of visitors, the agency creates barriers to participation (Crompton & Lamb, 1986). Park managers and interpreters must consider that visitors often recreate in groups and negotiate among themselves what activities or programs in which they will choose to participate (Falk, 2009). These timing, interest, and social group considerations suggest that the constraints to leisure model (Jackson, 2005) may be useful for strategically designing and scheduling programs. By reducing constraints, interpreters may increase attendance at interpretive programs, broadening the audience who receives interpretive messages about the importance of parks.

The purpose of this study is to gain a better understanding of constraints to attending interpretive programs experienced by campers and develop strategies that may reduce these constraints.

Literature Review

The Purpose of Interpretation

The National Association for Interpretation defines interpretation as “a mission-based communication process that forges emotional and intellectual connections between the interests of the audiences and the meanings inherent in the resource” (Brochu & Merriman, 2008, p. 16). Veverka (1997) has argued that “interpretation is the most powerful and effective communication process any agency has available to it for communicating any message to its publics” (p. 9). Since visitors freely choose to participate in interpretive programs, outcomes from these experiences may be particularly potent and meaningful. Through interpretive programs, park users better understand why a particular park exists and why the park is worth preserving in a way that is personally meaningful, as “people respect the things they appreciate” (Pepi, 1994, p. 1).

Ham (2009) examined the idea that interpretation can be used to meet park
management goals through motivating visitors to actively protect heritage resources. Through enriched understanding comes a change in attitude toward the natural area, and protective behaviors or intentions may follow. Through reducing constraints, a larger and more diversified audience might be engaged in interpretation, allowing park managers to meet management goals.

Constraints to Leisure

The goal of constraints to leisure research is to “investigate factors that are assumed by researchers and/or perceived or experienced by individuals to limit the formation of leisure preferences and/or to inhibit or prohibit participation and enjoyment in leisure” (Jackson, 2000, p. 62). However, constraints can be overcome or negotiated around (Jackson, Crawford, & Godbey, 1993) by individuals, or professionals aware of constraints can structure their programs differently. Constraints are classified into three types: intrapersonal constraints, interpersonal constraints, and structural constraints (Crawford & Godbey, 1987). Intrapersonal constraints “involve individual psychological states and attributes which interact with leisure preference rather than intervening between preference and participation” (Crawford & Godbey, 1987, p. 122). Intrapersonal constraints include lack of interest and/or knowledge of an activity, or aversion to certain types of physical or social environments where a program may take place. Interpersonal constraints describe these effects within personal relationships (Crawford & Godbey, 1987). Examples of interpersonal constraints include not having a leisure partner or leisure partners not wanting to do the same activities. Structural constraints are those “that intervene between preferences and participation” (Jackson, 2005, p. 3); examples include availability of time, the opportunity to participate, and the financial resources willing to be allocated to participation (Raymore, Godbey, & Crawford, 1994).

Constraints have varying intensities, which participants can “negotiate through… and thus succeed in initiating or continuing leisure participation” (Jackson et al., 1993, p. 2). Although the result of a constraint may be non-participation, “this may be only one of many outcomes that are possible; people may instead modify their behavior to maintain a pattern of sustained involvement” (Scott, 1991, p. 323). This assertion is supported in a study by Kay and Jackson (1991), which found that “individuals experienced constraint while continuing to participate in the activities to which the constraint applied…there appears to be only a small proportion of cases in which constraints completely exclude participation” (p. 310). Furthermore, Shaw, Bonen, and McCabe (1991) found that “the evidence suggests that the more frequent reporting of at least some perceived constraints is associated with higher rather than lower participation” (p. 297). This finding is not well explained, but may be due to the concept that “individuals may have to participate in an activity before they can recognize all of the constraints related to the activity” (Raymore et al., 1994, p. 101).

Tilden’s (2007) principles of interpretation nest nicely within the experience economy (Pine & Gilmore, 1999), as the primary goal of interpretation is provocation, which produces an engaging experience between the visitor and the heritage resource. In order for interpreters to capture this audience who is seeking rich experiences, interpreters need “a greater understanding of our clientele” (Atkinson & Mullins, 1998, p. 52). Interpreters need to focus on increasing “audience analysis so the programs we develop for our audience will be well received and rewarding to our clientele, will fulfill management goals, and will provide for greater ecosystem restoration and protection” (Atkinson & Mullins, 1998, p. 52).
In order for interpreters to increase attendance at interpretive programs, informal and formal research must be conducted on the constraints to participation. Different types of parks and service areas within a park may exhibit different types of constraints among visitors. This study identifies these constraints within a population of campers in state park campgrounds using qualitative analysis.

The specific research questions addressed in this study were: (1) What constraints, if any, were experienced by visitors when they considered participating in interpretive programming? (2) What would visitors like to see practitioners do to reduce constraints to attending interpretive programs? (3) In what ways does program structure act as a constraint to participation in interpretive programming?

Methods
This qualitative study sought to develop strategies to improve attendance at interpretive programs at three campgrounds in the southeastern United States. The paradigm of inquiry for this study is pragmatic, which is “outcome-oriented” (Johnson & Onwuegbuzie, 2004, p. 16). The researcher used qualitative methods to answer applied research questions. Data were collected using semi-structured interviews. The interview structure drew upon Seidman’s (1998) phenomenological interview structure, which includes three sections pertaining to the life history of the participant, the “details of experience,” and “reflection on the meaning” of the experience (p. 12). Using semi-structured interviews provided a balance of effectiveness and efficiency toward revealing motivations of campers to participate in interpretive programs. Furthermore, this method can be replicated in other settings by researchers and interpreters to better understand the desires of park visitors.

Site Descriptions
Three state parks with campgrounds in the southeastern United States were selected for data collection. All three parks have had seasonal interpreters working during the summers for over five years. The size of the campgrounds varied from 44 to 105 sites. Two of the parks were of moderate elevation and located in the mountains with lakes offering swimming. One of these two parks allowed for boating and other water sports associated with sizeable lakes. The other park provided swimming in a small lake. The third site was a high-elevation park that was noticeably cooler, providing hiking opportunities and scenic overlooks. None of the parks would be considered iconic, in the sense of Yellowstone, Yosemite, or Grand Canyon National Parks.

Data Collection
Data were collected in campgrounds of parks that offered interpretive programs for visitors between June 5, 2010, and August 6, 2010. Interviews were solicited from visitors staying in the campground on weekdays and weekends and at various times in an effort to capture variation in the campground population. Between 15 and 20 interviews were conducted at each park.

During the course of the study, 57 interviews were conducted. The unit of analysis was the group of people staying at the same campsite. The interviewer asked to speak with an adult; however, comments and opinions from others within the group were not excluded.

The interviewer conducted interviews with one individual from the campsite or the entire group at a campsite, depending on the preference of the participants. However, during these group interviews, one adult was selected by the researcher as the primary
participant. This method of allowing other members to contribute is consistent with how people naturally discuss and make sense of issues. If the participant was concerned about time, the interviewer asked what time the participant would prefer to talk to the interviewer, and the interviewer returned at that time when possible.

The participation rate for the interviews was 98%, which constituted one refusal. The average interview lasted 16 minutes. Only 56 were analyzed due to a language barrier in one interview. The majority of the groups interviewed were immediate family (55.8%) followed by family and friends (21.2%) and extended family (19.2%). The remaining groups came as individuals (1.9%) or groups of friends (1.9%). Data collection was stopped when data saturation occurred (Creswell, 2007), meaning little or no new information was revealed as more interviews were conducted.

**Interview Instrument**

The interview script was composed of open-ended questions and conducted by a single researcher. Open-ended questions were directed towards uncovering possible constraints to participation in interpretive programs. Below is a sample of some of the questions that were asked. The term *interpretive program* was replaced by *ranger-led program* to increase the understanding between the researcher and the participant. Also, the researcher did not use the word *constraint* as it is a technical social science term not in common use.

- Why are you staying at the park? What types of things are you here to do?
- Can you tell me about your previous experiences with ranger-led programs? What did you like or not like about them?
- What types of things might keep you from coming to a ranger-led program?
- What could park staff do to make it easier for you to come to ranger-led programs?
- What types of people attend ranger-led programs?
- Is the information about ranger-led programs convenient and easy to find?
- Where would you like information about the times and topics of ranger-led programs to be available in this campground?
- What times would you prefer ranger-led programs to happen in this campground?
- If there was an “ask the ranger a question” time when the ranger would walk through the campground, would you occasionally have a question for the ranger?

The researcher asked follow-up questions that probed for more details about campers’ interests and constraints. Participants were also asked about how many children were with the group along with their ages to assist in understanding the context of the participant’s answers.

**Survey Instrument**

In the survey instrument, the questions were asked verbally and focused on revealing any constraint that may be associated with the type of interpretive program. This set of questions asked about the delivery style of interpretive programs, ranging from interpreter-driven to audience-driven. Interpreter-driven programs are typically lecture based with a
predetermined topic, and the interpreter does the majority of the talking. Audience-driven programs are opportunities that are scheduled by interpreters but largely produced and controlled by the participants. The description of each delivery style type presented to the participants were:

- A program where you sit and a ranger talks, and the ranger might have some interesting things to look at.
- A demonstration where the ranger shows you how to do something or how something was done.
- A hands-on activity where you learn and practice a skill.
- A set time where the ranger is “in” and available to answer your questions at the Nature Center orVisitor Center.
- A drop-in social event centered around a topic, and other people interested in that topic would attend.

The participants were asked to rank each program delivery style from 1, meaning “awful, I’d never go” to 4, meaning “that sounds great.” Often participants would elaborate on their numeric answers, and those responses were transcribed and included in the qualitative analysis of interviews.

The researcher used a digital voice recorder then transcribed the interviews verbatim and uploaded them into a software package specifically designed for qualitative analysis. Data analysis involved reading interview transcripts and coding. Drawing on phenomenology, transcripts were broken down into significant statements, and those significant statements were coded (Moustakas, 1994). The coding process drew upon Miles and Huberman (1994), which includes “defining clear categories (codes)” and “organizing these [codes] into a more or less explicit structure” (p. 45). Codes included researcher generated or a priori (Creswell, 2007) codes and open coding. The a priori codes, created before coding began, included leisure constraints, visitor interests, and actionable strategies for improvement. Open coding allowed the researcher to identify unexpected themes or values (Creswell, 2007). Themes were built by combining relevant codes, both a priori and open, by “blending inferences drawn directly from the displayed data” (Miles & Huberman, 1994, p. 131).

Not all the interviews were coded. Of the 57 interviews conducted, 17 were not coded due to factors such as the participant’s answers did help answer the study questions or the responses to interview questions were mostly “yes” and “no” answers.

As qualitative research is inseparable from its context (Creswell, 2007), the researcher used cumulative statements rather than generalizations to create strategies to relieve constraints to participating in interpretive programs. A cumulative statement answers the “what works in what situation for what type of visitor” question (Pawson & Tilley, 1997). These statements describe strategies for reducing constraints while acknowledging that the nature of the constraint is partially context dependent.

Reliability
The study employed a digital voice recorder and adherence to a list of interview questions. The interview questions were pilot tested. Intercoder reliability was also employed on both selective and open coding. Interviews were independently coded by the researcher...
and a Ph.D. student with a similar understanding of qualitative coding methods. After discussing the discrepant codes, agreement reached between 81% and 90%, which is within the recommendations of Miles and Huberman (1994).

**Validity**
The study employed bracketing, memoing, debriefing, and triangulation. The researcher clarified her biases using the bracketing technique, where the “researcher sets aside, as far as is humanly possible, all preconceived experiences to best understand the experiences of the participants in the study” (Creswell, 2007, p. 235). During the data analysis stage, the researcher maintained a notebook that contains the evolving conclusions about the data and possible themes, “writing down ideas about...emerging categories or some aspects of the connection of the categories” (Creswell, 2007, p. 239). A field notebook was kept by the researcher for the duration of the study.

Debriefing occurred between the researcher and a debriefer; through these discussions, the debriefer asked “difficult questions about methods, meanings, and interpretations” (Creswell, 2007, p. 208). The researcher kept a written account of these debriefings.

**Results**

**Interview Results**
An analysis of all codes and text created four themes. These themes represent some variety of constraint to participating in interpretive programming while staying at a developed campground.

1. **Camping means unstructured time.**
Some overnight park visitors explained that their purpose for camping was to experience relaxation and a lack of structure. Making the effort to attend a formal interpretive program, which takes place at a certain time at a certain place, would be to impose structure on their purposefully unstructured time. When asked about why she comes camping, one participant concluded her response with:

   And no organization. My life is full of organization, so I just like the flexibility and you know, just being able to relax…. As far as an organized program, or whatever, I honestly would not be interested in that (Respondent 1).

One camper illustrated this desire for a lack of structure by putting away his watch for his camping trip: But I don’t even know what time is. I forget time when I go camping” (Respondent 31). The goal for these campers is to be impulsive and spontaneous, which necessitates the freedom not to plan and not to make commitments.

2. **Interpretive programs should not compete with the main attraction at the park.**
This theme describes why visitors come to these parks, which are providing opportunities for outdoor recreation as opposed to being iconic attractions. For instance, at one park, campers came to use their boats and swim, especially in the hot summer afternoons. Participating in these water-based activities during hot summer days generally preclude campers from attending afternoon interpretive programs. “The ones they had at 10 am
seems like a good time. The ones at four in the afternoon, that time is like absolutely no way” (Respondent 15). When planning interpretive programs, staff persons must consider the motivation for campers at their park and work around that motivation if they hope to entice a broad cross section of visitors to participate in interpretive programming.

3. Campers do not have easy access to program information. When advertising interpretive programs, staff persons attempt to be both effective and efficient by placing a few program schedules in locations that are heavily used, such as the bathhouse in the campground. However, some overnight visitors have all the facilities they need within their RVs and trailers and do not visit the bathhouse. “We like to take our own bed where we go. We don’t like to sleep in motels. We like to use our own bathrooms” (Respondent 50). To infer, this segment of the overnight visitor population may remain uninformed about park programs due to not seeing a program schedule posted at the bathhouses that they do not use. Another camper stated, “I don’t wear my glasses to the bathroom, so I’d miss it” (Respondent 52); since this camper did not expect to find the program schedule at the bathhouse, she was not predisposed to look for the information.

Another weakness in the distribution of program schedules occurred when visitor centers placed the schedules on a counter or in a pamphlet holder and expect the campers to retrieve a schedule. While many returning campers were aware of and satisfied with this arrangement, new campers failed to locate the program information. A majority of the overnight park visitors had the same suggestion about publicizing park programs: “Handing it to you without being asked would be helpful” (Respondent 17). Park staff needs to consider multiple avenues of advertising and publicity to create the greatest number of opportunities to reach the most people. Interpreters must work with visitor services staff to make sure that program schedules are distributed to everyone.

4. Lifestage affects participation. The daily schedule and habits of toddlers, teenagers, and senior citizens vary. Interpreters must take into account these differences when planning programs. One grandfather was asked if the mid-afternoon would be a good time to have a program for his grandchildren, who were toddlers. He said that after lunch the children would “nap two hours almost” (Respondent 2). When asked for a better time, his wife said that “four o’clock, after their nap” (Respondent 2) would be a better time to have a program for the young children. Conversely, when a mother of two teenagers was asked if she would attend an afternoon program, she said, “if there’s anything at that [time] would be more for the kids. That would be like, ‘go.’ We would send the kids off to something like that” (Respondent 19). When planning programs, interpreters need to consider how the lifestage of the visitors might impact the times that a particular group is available for a program.

Survey Results
Interest in interpretive programs is partly a function of delivery style, and delivery may be interesting enough to entice visitors to attend the interpretive program. Participants were asked to rank their interest in five types of program delivery from “1” to “4” where 1=awful, 4=excellent, and numerals 2 and 3 were not given a descriptive designation. The mean scores, from highest to lowest, for the delivery types are: hands-on activity = 3.60, demonstration = 3.45, interpretive talk = 2.95, social hour 2.84, and question hour 2.63.
Discussion
The themes above demonstrate the role of constraints in preventing or lessening participation in interpretive programming. Since participating in an interpretive program is a leisure activity, the constraints to leisure framework can be applied to the experiences of the study participants. Practitioners can employ different strategies for assisting park visitors in negotiating these constraints.

Implications for Practice
For those overnight park visitors for whom “camping means unstructured time” (Theme 1), the visitors may be experiencing an intrapersonal constraint through selective attention or a structural constraint where the program delivery style reduces the appeal of participating in a program. Interpreters may increase the engagement of this group by changing the structure of their programs. These visitors want to be impulsive about the activities they participate in, and formal interpretive programming does not allow this type of spontaneity. Engaging this group may be accomplished through the use of roving interpretation (Knapp, 2007), which is defined as “personalized, face-to-face communication where the audience has chosen the venue, the resource is the stage, and the interpreter is the catalyst for knowledge. Roving is planned, personalized communication with visitors in an informal setting” (Ward & Wilkinson, 2006, p. 88). Roving interpretation eliminates the structural constraint of planned programs through spontaneous contact. The use of roving interpretation is an emerging issue within the interpretive community, as this technique has been underutilized due to the “difficulty of the approach” (Knapp, 2007, p. 75). As a minority of park visitors will attend an interpretive program, roving interpretation is critical for reaching more park visitors (Knapp, 2007). This unstructured and spontaneous interaction with a park interpreter provides services that these campers are missing by not attending the formal interpretive programs. Additionally, campers are able to ask questions and structure the interactions with the interpreter around their existing interests.

The theme “interpretive programs should not compete with the main attraction at the park” (Theme 2) essentially means do not create structural constraints to participation in interpretive programs by holding programs during times when visitors are likely to have other goals or plans. Essentially, programs at non-iconic parks cannot compete with highly appealing, outdoor recreation activities. This is an example of how constraints differ across contexts (differences in parks). Practitioners must carefully consider the time, location, delivery, and publicity of every interpretive program to ensure that the visitors have as few barriers as possible that are being created by the park. Interpreters can lower constraints, so visitors do not have to negotiate them. Reduction of constraints by park staff is exceptionally important because the study participants never mentioned any strategies that they used to negotiate structural constraints.

If “campers do not have easy access to program information” (Theme 3), opportunities to participate will be missed. If a camper does not know about potentially interesting programs because of the lack of information, that camper may experience an intrapersonal constraint. When a camper is interested in programs but is unable to locate information, this camper may experience a structural constraint. Practitioners have alternatives to reducing or eliminating a lack of awareness, notably through “a thorough review of the promotion and publicity used” (Searle & Jackson, 1985, p. 245). When posting flyers, park staff needs to consider the locations where people naturally stop and stand and which are
not in the travel path of other visitors. An effective way to reach as many people as possible is to give the program schedule to every camper that checks into the campground, unless they explicitly say that they do not want a schedule. Some campers may not know that programs are offered and will not request a schedule. Program information must be so readily available that even those visitors who do not know to look for a program schedule will stumble across it.

Considering how “lifestage affects participation” (Theme 4), the structural constraint of when programs are offered and the interpersonal constraint of the family unit must be considered. Young children tend to nap in the afternoon, reducing their attendance at mid-afternoon programs, a structural constraint. However, the mid-afternoon is an optimal time to attract older children, approximately eight years old through teenagers, for more advanced programming that the toddlers would not enjoy. With this example, constraints can be used to provide targeted programming (McGuire & Norman, 2005). Also, young children are interpersonally constrained because they require supervision, so programs must be at workable times for the adults responsible for these children.

The results of the program delivery types ratings informs strategies to reduce structural constraints. The rating scale also prompted discussion among campers. While parents did not want to bring children to an interpretive talk because of the attention span of children, a hands-on activity on the same topic was an acceptable method. Similarly, parents were hesitant to rank the social hour very high due to their concern about the supervision and entertainment of their children. One father suggested that showing a G-rated film in the nature center at the same time as the social hour would free parents to socialize while the children were entertained watching the movie. If the participants were asked to repeat the ratings exercise with this change to the social-hour delivery type, it is possible that the preference rating could be higher.

Furthermore, the results of the preference ratings for delivery styles illustrate that park visitors want to see demonstrations and engage in activities, which is consistent with the Ross, Norman, and Dorsch (2003) findings about desired features of a regional wildlife reservation visitor center. In order to provide more active programming, park interpreters need to develop skills to demonstrate and lead mission-relevant activities. This finding has implications for the education and training of interpreters. Universities and other agencies training interpreters may add an additional focus on more hands-on skills to complement didactic approaches. Also, agencies that employ interpreters may need to allocate funds for interpreters to attend workshops to learn skills.

These strategies may be employed to increase awareness of interpretive programs, access to information, and potentially increase attendance at interpretive programs. Outcomes of the strategies employed should be evaluated to determine their effectiveness at the specific park and adjusted for maximum effectiveness.

Limitations
The limitations of this study include the scope of the study and structural constraints on when the data could be collected. Data were collected at three mountain parks without any iconic elements. Also, data were collected during the summer months on certain days because those days were the only days the researcher was free to do the work. Participants self-reported their varied experiences, and social desirability bias could have influenced the participants’ responses to interview questions.
Conclusion
Continued support by the public for parks is likely enhanced by visitor participation in interpretive programs. The constraints to leisure model served as a conceptual framework for interviewing overnight park visitors who stayed at a developed campground. At a pragmatic level, this study validates the three forms of constraints to leisure and provides insights into the lifestyles of campers that are relevant to interpreters. Interpreters can use these findings to guide problem-solving; however, different scenarios probably exist for parks with iconic features or visitors who are not camping. Identifying these additional scenarios may be accomplished by interpreters using this straightforward interview method with visitors. Researchers need to repeat this study in other settings, including beach and iconic parks, and with populations who are not staying in campgrounds.

Note: This unfunded study was based on the masters thesis of Jessica L. Goodrich. The authors acknowledge the contributions of her other committee members (William Norman and Betty Baldwin) and the park staff and campers who contributed their time and thoughts to the project.

References


APPENDIX
Purpose
The purposes of the *Journal of Interpretation Research* are to communicate original empirical research dealing with heritage interpretation and to provide a forum for scholarly discourse about issues facing the profession of interpretation. The *Journal* strives to link research with practice. The *Journal of Interpretation Research* is published by the National Association for Interpretation, the preeminent professional association representing the heritage interpretation profession.

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