

THESIS

FORGING FAMILY OUTDOOR IDENTITY: NATURAL CONVERSATIONS ABOUT THE
EFFECT OF OUTDOOR EXPERIENCES ON ATTITUDES TOWARD ENVIRONMENTAL
SCIENCE

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ABSTRACT

FORGING FAMILY OUTDOOR IDENTITY: NATURAL CONVERSATIONS ABOUT THE EFFECT OF OUTDOOR EXPERIENCES ON ATTITUDES TOWARD ENVIRONMENTAL SCIENCE

This study used a qualitative, “walking interview” method to explore how families’ outdoor experiences and parent-child interactions affected their attitudes about environmental science. Members of six families—at least one parent and one child—were interviewed during a walk in a city-maintained natural area in Fort Collins, Colorado. The discussion examined the themes of family time spent outdoors, engagement in science topics at school, family discussions about environmental science, and family media use. The conversational data was analyzed using idiographic and nomothetic approaches, from which emerged the theme of family outdoor identity—the extent to which families perceive themselves as outdoor-oriented. Parents in the study exhibited varying degrees of guiding behavior in discussions about environmental science, regardless of whether one of the parents had a science background. Although this study indicated that young children in particular consume very little print media, older children use electronic media, particularly web-based search tools, to find information about environmental topics. In addition, social media emerged as a useful media tool for parents seeking information about environmental topics.

Keywords: Environmental science, environmental literacy, family communication patterns, outdoor experience, walking interviews, media use

TABLE OF CONTENTS

INTRODUCTION	1
LITERATURE REVIEW	3
Environmental Literacy	3
Observation-Based Learning	4
Informal Learning	6
Media’s Role in Environmental Literacy.....	10
Family Communication	11
METHODOLOGY	15
The Walking Interview	18
Participants.....	19
Data Collection	20
Analysis	22
RESULTS	24
Family B Profile.....	24
Family D Profile	25
Family J Profile.....	27
Family M Profile.....	27
Family P Profile	29
Family S Profile	31
Cross-Family Themes.....	33
Family Outdoor Identity	34
Family Discussions about Environmental Science Topics	40
DISCUSSION.....	45
Limitations	45
Implications	45
CONCLUSION.....	48
REFERENCES	50
APPENDIX A: COVER LETTER	58
APPENDIX B: SURVEY QUESTIONNAIRE FOR PARENTS	59
APPENDIX C: DISCUSSION GUIDE	61
APPENDIX D: SAMPLE CONVERSATIONAL DATA	63

INTRODUCTION

In the early years of the 21st century, the continued breathless pace of technological advances and the trend toward urban living has resulted in a populace that is becoming more disconnected from the natural world (Balmford, 2012; Clements, 2004; Coyle, 2005; Hubert, Frank, & Igo, 2000; Louv, 2006; Pergams & Zaradic, 2006). “Whatever the reason, from video games to other less outdoors-oriented activities, urban youth populations in general appear to have lost connections with the natural environment and the respect and admiration associated with the understanding of its systems through participation or interaction” (Hubert et al., 2000).

Research indicates that one of the negative outcomes of children’s declining time spent outdoors might be their decreasing knowledge about environmental science (Balmford, 2012; Bebbington, 2005; Pergams & Zaradic, 2006), which is one of the foundations of environmental literacy (Coyle, 2005; Hollweg, Taylor, Bybee, Marcinkowski, McBeth, & Zoido, 2011). The consequences of declining environmental literacy among children and adults could have devastating consequences for a world in which solving environmental problems increasingly will require understanding and action from an informed citizenship (Coyle, 2005; Hollweg et al., 2011). Moreover, although researchers have documented the benefits of outdoor experiential learning for increasing environmental literacy (Barker, 2002; Coyle, 2005; Hale, 1986; Kinchin, 1993; Lindemann-Matthies, 2005, Lindemann-Matthies, 2006), current education policies emphasizing back-to-basics curriculum and standardized testing have impeded educators’ efforts to engage students in hands-on, outdoor, informal learning (Coyle, 2005; Ruskey, Wilke, & Beasley, 2001).

One of the less-researched aspects of declining environmental literacy is the effect of parent-child interactions regarding outdoor experiences and attitudes toward environmental

science, which is an important component of environmental literacy. The effect of parent interaction on children's outdoor experience is becoming more significant as modern concerns of safety reduce the instances of children being outdoors without direct supervision by an adult (Clements, 2004). Science education researchers have explored the effect of family interactions and parental involvement in children's interest in science (Pingree, Hawkins, & Botta, 2000; Schmeinck & Thurston, 2007; Tenenbaum, Rappolt-Schlichtmann, & Zanger, 2004; Valle & Callanan, 2006). Many of these studies have focused on informal learning opportunities in museums and other learning venues, but few have examined how parents interact with their children in outdoor settings, and how those experiences might provide opportunities to increase children's environmental literacy. In addition to mediating children's outdoor activities, parents play a key role in governing children's media consumption, which is their primary source of information about the environment (Coyle, 2005).

The current study focuses on gaining better understanding of the factors that contribute to parents engaging with their children about environmental science topics, particularly in outdoor settings. These engagements might have potential to increase environmental literacy, which is deemed critical to counteracting the multitude of problems resulting from the impact of human activities on the global ecosystem (Coyle, 2005; Hollweg et al., 2011).

LITERATURE REVIEW

Environmental Literacy

Environmental literacy encompasses a number of measurable skills—such as the ability to read and use numbers—“but also requires the more demanding capacity to observe nature with insight, a merger of landscape and mindscape” (Orr, 1992, p. 86). Established definitions of environmental literacy include dimensions of knowledge, skills, attitudes, and behavior (Coyle, 2005; Hollweg et al., 2011; McBeth, B., Hungerford, H., Marcinkowski, T., Volk, T., & Meyers, R., 2010). The current study focused on the dimension of knowledge, which was defined at the 1977 UNESCO-UN Environment Programme (UNEP) Intergovernmental Conference at Tbilisi as achieving a “variety of experience in, and basic understanding of, the environment and its associate problems,” (UNESCO, 1978), a definition that has become widely recognized (Hollweg et al., 2011).

The National Science Teachers Association (NSTA) adopted a position statement that established environmental education as a method of fostering environmental literacy in students and support for programs that include both formal and informal learning experiences and that include “observation, investigation, experimentation, and innovation” (NSTA, 2003). A review of the research underlying the importance of observation in learning as well as informal learning environments provided the framework for the current study.

Observation-Based Learning

The importance of observation is a cornerstone concept of scientific inquiry (AAAS, 1989; Haury, 2002; Slingsby, 2006). Slingsby (2006) argued that “not only is Biology poor science without fieldwork but that outdoor experience is the missing ingredient which is needed to restore vibrancy and relevancy to Chemistry and Physics as well” (p. 51). He further defined proper science learning as “off timetable, unpunctuated by bells and lesson changes. It takes place in an unfamiliar environment away from home and school which inspires curiosity before it even starts” (p. 51).

A review of key advancements in cognitive development theory provides the foundation for the importance of observation-based learning. Cognitive development research is a vast landscape with origins in the work of Swiss psychologist Jean Piaget, whose theories dominated child development research for much of the 20th century and remained largely unchallenged until the 1970s. Contrary to the prevailing 19th-century views that children were passive receptors of knowledge, Piaget saw children as “active explorers, engaged in discovering things for themselves and constructing their own understanding” (Robson, 2006, p. 13). His approach, constructivism, holds that thought is internalized action, actions form the processes of reasoning, and children learn by doing. He defined four stages of cognitive development: sensorimotor (birth to about two years), preoperational (two years to about seven years), concrete operational (seven years to about 12 years), and formal operational (adolescence onward) (Robson, 2006). The concrete operational stage is most often the platform on which science literacy researchers base their investigations, as in this stage children’s thinking becomes increasingly systematic and logical. Piaget’s findings, which documented the importance of children learning by doing,

inform the work of many environmental literacy researchers (e.g., Hannust & Kikas, 2006; Inagaki & Hatano, 1993; Schmeinck & Thurston, 2007; Tenenbaum et al., 2004).

Another child development researcher whose findings are significant for the current study is Lev Vygotsky, a Russian psychologist who advanced the idea of social constructivism. He shared the idea with Piaget that children construct their understanding as a result of their experiences, but Vygotsky believed that this process happens in the context of interactions with others. He believed that humans are social, and context is everything. Whereas Piaget asserted that development leads to learning, Vygotsky held that learning is key to development, that play is a critical element of learning, and that a gap exists for any person between what he can do alone and what he can do with a skilled guide, a concept Vygotsky dubbed the zone of proximal development (Vygotsky, 1978):

It is the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers. (p. 86)

Vygotsky's zone of proximal development (ZPD) theory is used, or referred to, in a wide range of studies about teaching and learning in subject matters including reading, writing, mathematics, science, and second-language learning (Chaiklin, 2003), and has formed the foundation of studies seeking to better understand methods of student assessment (e.g., Allal & Ducrey, 2000). Of specific interest to the current study is research conducted to illustrate an approach for collecting and analyzing family conversations at museums and other informal settings (Ash, 2003). Ash adopted ZPD, a view that "presupposes that language is a negotiating

medium for teaching and learning” (p. 139), as the frame of reference for the study. Ash’s study, and myriad others that use, or refer to, ZPD theory, provide a broad foundation of research that expounds on Vygotsky’s basic assertion that “children’s learning begins long before they attend school” (Vygotsky, p. 84), which is particularly important to the examination of informal learning.

Informal Learning

The importance of informal learning experience is a cornerstone of environmental literacy research (Coyle, 2005; Hollweg et al., 2011; Orr, 1992; Quay, 2003). Informal learning encompasses “lifelong, life-wide, life-deep science learning” (National Research Council, 2009, p. 28). Lifelong learning refers to acquiring knowledge over the course of one’s life. Life-wide learning refers to “the learning that takes place as people routinely circulate across a range of social setting and activities” (National Research Council, 2009, p. 28). Life-deep learning refers to “beliefs, ideologies, and values associated with living life and participating in the cultural working of both communities and the broader society” (National Research Council, p. 28).

One promising area of inquiry for increasing environmental literacy among children is the potential benefits of parent-child interactions in informal learning environments. Although many studies of parent-child interactions in informal learning environments have focused on museum excursions (Valle & Callanan, 2006; Crowley, Callanan, Jipson, Galco, Topping, & Shrager, 2001; Tenenbaum et al., 2004), researchers who have situated studies in natural environments have uncovered some illuminating interactions between children and members of their families or their communities. Lindemann-Matthies (2005) studied how children’s interest in local plant and animal life could be enhanced through observations in nature. In the study,

children “placed a picture frame around a plant (or, if possible, animal) that they especially valued on the way to school” (p. 658). The children were encouraged to explain “to other children, parents, passers-by and, in some cases, also to the media why they had selected these particular objects” (p. 658).

One of the difficulties in studying the effect of informal learning situated outdoors is defining “outdoors,” which is becoming a key venue in several areas of study, including the rising incidence of obesity among children (Wen, Kite, Merom, & Rissel, 2009; Cleland et al., 2008), children’s sense of environmental stewardship (Basile & White, 2000; Brossard, Lewenstein, & Bonney, 2005; Chawla, 1998; Ewert, Place, & Sibthorp, 2005), and science literacy (Hale, 1986; Haury, 2002; Hubert et al., 2000; Quay, 2003; Slingsby, 2006). The concept of being outdoors at first seems easily conveyed: If a person is surrounded by four walls, then that person is indoors. If not, then the person is outdoors. But being outdoors at an open-air shopping mall is different from hiking on a county-maintained trail, which is different from camping in a remote wilderness area. Each of these activities provides different opportunities for observing natural phenomena. One study that promises to have an important impact on research regarding children’s time spent outdoors is the National Kids Survey (Larson, Green, & Cordell, 2011), a partnership between the U.S. Forest Service, the University of Tennessee, and the University of Georgia. The National Kids Survey has been conducted since 2007 and establishes a baseline for detecting trends in children’s time spent outdoors and the nature of their outdoor activities. The findings indicate that children might be spending significant time outdoors, but the nature of their activities is shifting away from nature-based activities.

Tanner (1998), who attempted to define outdoor experience in the context of environmental awareness, contended that studies were needed to determine what types of

childhood outdoor experiences inspired concern for the environment. His research questions focused on whether those with environmental awareness had “rural and small-town backgrounds, which allowed frequent experience with more or less woodsy habitats? ... Will group experiences in the out-of-doors be satisfactory or must the child experience a great measure of solitude to have sufficiently deep experience?” (p. 420).

In the context of outdoor education, Loeffler (2005) defined outdoor experience fairly narrowly in an exploratory study of the significance of “structured” outdoor experience for participants. Loeffler defined outdoor experience as participation in backpacking, rock climbing, whitewater kayaking, or sea kayaking programs. Similarly, researchers studying changes in motivations for pursuing outdoor recreation among participants with different levels of development (experience level, perceived skill, and frequency of participation) defined outdoor experience as participation in a particular outdoor education setting: a 13-day course that included seven days in a structured program in a camp-like residence setting with a dining hall and amenities and six days on a wilderness canoe trip (Todd, Anderson, Young, & Anderson, 2002).

Tarrant and Green (1999) examined the effect of outdoor experience on development of environmental awareness and attitudes toward stewardship. To describe outdoor experience, they developed a categorization system that reflected the impact on the environment of various activities. The authors divided outdoor activities into three categories: appreciative (activities that have little adverse impact on the environment, such as bird-watching), mechanized (motorized), and consumptive (for example, mushroom hunting). Ewert, Place, and Sibthorp (2005) used these three subcategories of activity as three of seven independent variables in their

study. Only one other of these variables was a measure of outdoor experience: involvement with organizations that provide outdoor experiences.

Bixler, Floyd, and Hammitt (2002) expounded on the importance of early childhood outdoor experience on environmental attitudes in adulthood and emphasized the significance of unsupervised play in natural settings. “If the home range is large enough, children will have daily opportunities to explore, without supervision, diverse areas ... The autonomy to explore is both a key motivation and reward because all other travel by the child through the molar physical environment involves being led somewhere by parent, older sibling, school bus driver, or other adult” (p. 798). The authors emphasized the importance of distinguishing between different types of outdoor experience, all of which are valid for influencing children’s sense of the natural world: wilderness experience, urban experiences, and backyard experience.

As an exercise in defining outdoor experience through children’s memories of nature features, Owens (2005) used a combination of quantitative and qualitative approaches to describe children’s outdoor experiences and analyze “how these had been laid down into memory and how this affected the development of their values, skills, knowledge and capacity for action” (p. 323). The study used a combination of concept drawings and taped interviews with children, informal interviews with staff, observations of practice, a case study, and a “snapshot” study to gather the data.

Two dimensions of the Owens study are particularly relevant to the current study: The Owens study focused on children at four different schools, which were in locations categorized as “inner city,” “urban periphery,” “urban center,” and “village.” In measures of outdoor learning and acquisition of environmental vocabulary, the children in the village school had a higher number of remembered nature features than did children in the other schools. In addition,

whereas children in less urban areas could recall more nature features, “the types of features mentioned by children were often linked with playtime opportunities as this was a predominant and constant outdoor experience” (p. 325). These results indicate that the extent to which a child’s outdoor experience occurs away from urban areas has a significant effect on children’s recall of nature features, but also that time spent outdoors in any sort of setting has some value. Both types of experience are valid, to different degrees, for acquiring firsthand science and nature knowledge.

Central to the theme of the current study is the evidence that the role of parents in mediating their children’s outdoor experiences is increasing, particularly as concerns for safety have made parents reluctant to let their children be outside without direction supervision by an adult (Clements, 2004). This increased role presents an opportunity for parents to engage their children in outdoor experiences that would ultimately increase environmental literacy.

Media’s Role in Environmental Literacy

Another area of enormous influence parents have with their children is their consumption of media, which, according to the National Environmental Education Training Foundation (NEETF), is the source of 83 percent of children’s environmental information (Coyle, 2005, p. x) and is “by far the leading source of environmental information for adults” (Coyle, p. 15). Because environmental education is decreasing in schools, parents’ involvement in monitoring and mediating children’s media consumption becomes increasingly important.

Television is the media source that ranks highest as the source of environmental information for children (Coyle, p. 69). In general, children’s media consumption has increased dramatically over the years, with only print media consumption declining (Rideout, Foehr, &

Roberts, 2010). In addition to the rapid rise in media consumption contributing to the decreased amount of time spent outdoors (Coyle, p. 97), media outlets rarely provide the depth of information about environmental topics that would best serve children and adults (Coyle, p. 17). Hubert, Frank, and Igo (2000) noted that “... public perception, or misperception, is affected by television and periodical coverage overdramatizing these industries’ activities and impacts on non-renewable resources” (p. 527).

Given the prevalence of media as a source of environmental information for adults and children, the impact of media as a potentially positive contributor to children’s environmental literacy is an interesting area of inquiry. In the current study, the impact of family discussions about environmental science topics in the media is a particular area of interest.

Family Communication

The effect of parental interaction with children on their ability to understand science information and their ability to critically evaluate media accounts of science-related topics has recently proven a rich area of exploration. Because parents necessarily control the extent and the type of outdoor experience a child has, they are a significant, if not primary, influence on children’s attitudes toward the outdoors and their interest and engagement with science topics. Ewert et al. (2005) investigated the effects of early-childhood experience on environmental attitudes, arguing that “early-life recreational pursuits of an individual can often be viewed as a time of exploration, discovery, and play” (p. 226). Chawla (1992) found that environmentalists attributed their commitment to ecological values stemmed from hours spent outdoors in a well-loved wild place in childhood or adolescence, and an adult who taught respect for nature. Sobel (2008) notes the extent to which parents can inhibit access to outdoor experiences: “Even in rural

and suburban settings where patches of woods and ponds are available, parents' concerns about pollution and abduction make these places unavailable. And so the task of providing access to semi-wild places with the tutelage of caring adults often falls to environmental educators" (p. 15).

The effect of parents' attitudes toward science topics can be profound. Steinke et al. (2007) argued that "[C]hildren's perceptions of scientists and engineers are likely to be influenced by a number of social and cultural factors, including those found at home and conveyed by parents" (p. 36). Another factor underlying all discussions among parents and children about science topics is the extent to which children in a particular family are encouraged to debate any topic with their parents. McLeod and Chaffee (1972) described two disparate styles of communication between parents and children. In the socio-oriented style, the primary objective of the parent is to foster harmonious interactions with their children, encouraging a peace-keeping approach in discussions and discouraging dissension to the extent of exerting parental control and using verbal and restrictive punishment to limit expression of views contrary to that of the parents. In contrast, parents in families that engage in concept-oriented communication encourage children to challenge one another's beliefs (including the parents' beliefs), and exhibit less control over the children's expression of ideas. Ritchie and Fitzpatrick (1990) described family communication patterns as more complex than originally presented by McLeod and Chaffee, suggesting that, for example, children's perception of family communication changes with maturity, and that mother-child communication is different from father-child communication. These communication patterns might play a role in parents' discussion of science topics with their children, particularly in discussions of controversial

science topics or in cases where parents might feel inadequately prepared to discuss science topics with their children because of their own lack of knowledge.

In a study conducted at an informal science education center in a gravitational-wave observatory, Szechter and Carey (2009) explored “education and attitudes toward science” (p. 847). The authors studied the effect of parents’ schooling and experience with science education on their interactions with their children in the observatory. They also sought to examine the way in which parent and child attitudes toward science contributed to interactions at the observatory. The authors “combined the control of a laboratory with the naturalness of a museum to examine the nature of parent-child interactions” (p. 848). The authors made several observations about the nature of the parent-child interactions. For example, children “initiated engagement with exhibits and manipulated exhibits more often than parents” (p. 855) but parents engaged in several different types of “learning talk”—“describing evidence, giving direction, providing explanations, connecting to past experiences, and making predictions” (p. 855).

As Bixler, Floyd, and Hammitt (2002) observed, unsupervised play in natural settings can provide children an increasingly rare opportunity to explore in a time when nearly every other trip a child takes is under direct supervision of a parent, sibling, or other adult. Science education scholars are increasingly focusing attention on out-of-school, everyday life conversations about science, which might help spark children’s interest in and aptitude toward science (Szechter & Carey, 2009). Callanan and Oakes (1992) found that parent-child discussion of science topics contributed to children’s understanding of science topics. Crowley et al. (2001) observed that current developmental theory “is underspecified with respect to the role that parents may play in guiding children’s scientific reasoning processes and in structuring children’s creation and use of theories” (p. 713). Valle and Callanan (2006) explored in particular the idea that “parents’

conversational practices might help children use similarity comparisons, especially relational analogies, to understand science topics” (p. 97).

The review of research regarding environmental literacy and family communication patterns suggests that children are “active explorers” who learn by doing, that children’s time outdoors is increasingly monitored and mediated by adults, and that media consumption by children is increasing and serves as a key source of environmental information. Moreover, researchers have documented the important role that parents can take in guiding their children’s environmental science learning in informal environments. The research questions that are the particular focus for the current study are:

RQ1: How do families’ outdoor experiences affect their conversations about environmental science topics encountered by children in school lessons, in the media, and during family outdoor activities?

RQ2: How do parents assist in their children’s learning in informal, outdoor settings?

METHODOLOGY

Many studies in the fields of media literacy, cognitive development, education, science literacy, and environmental literacy are based on the quantitative methods that are customary in those disciplines. But an examination of the cross-section of these disciplines is, in fact, a new enterprise that would benefit from foundational explorations that use qualitative methods. As an example, Akerson and Hanuscin (2006) used a variety of qualitative methods for their study of science teachers' attitudes toward inquiry-based learning, stating that these methods were appropriate because their research was "interpretive and emergent in nature" (p. 662). Exploring the ways in which children's outdoor experience affects their attitudes toward environmental science requires a rich understanding of diverse, complicated factors that influence behavior patterns—from family communication patterns to outdoor experience to media habits. Field research is appropriate in this case because of its usefulness in recognizing "nuances of attitude and behavior that might escape researchers using other methods" (Babbie, 2004, p. 282).

Of the disciplines that intersect to form the foundation of the study of children's outdoor experience and science media, perhaps scientific literacy has been measured with the broadest number of methods, including qualitative approaches. Brossard and Shanahan (2006), in their discussion of building a scientific literacy measurement instrument, noted that sociologists and science educators have used a sociological approach to science literacy. Although their study focused on public opinion research, they pointed out that they "do not dispute the validity of the sociological approach that relies on small-scale, context-specific, qualitative studies" (p. 49). Researchers also have used qualitative methods to inform the development of quantitative methods. Pingree, Hawkins, and Botta (2000) used qualitative methods to better define their

quantitative instruments, conducting focus groups and pilot studies to build their survey questionnaires.

Another study of science literacy embraced qualitative methods to form a rich portrayal of how a professional development program influenced science teachers' views of inquiry-based science teaching methods (Akerson & Hanuscin, 2006). The main data collection method was video-taped classroom observations, supplemented with an open-ended questionnaire, interviews, and field notes from teacher workshops. The project involved several phases of study, each of which informed the next phase. For example, the researchers conducted classroom observations in the first month of study. Analysis of the results showed that teachers did not approach science teaching through inquiry, so the researchers then designed the next workshop to engage the teachers in scientific inquiry. The researchers extol the benefits of the qualitative method in their procedures discussion, stating that "data collection and ongoing analysis informed the delivery of subsequent professional development workshops and on-site support." The authors adopted a model of analytic induction for collecting data that was based on work by Bogdan and Biklen (1998), in order to "maximize the study's flexibility and responsiveness" (p. 662).

Vosniadou and Brewer (1992) used an interviewing procedure with "factual and generative questions as well as drawing tasks in different cultures" to determine three types of models for science learning. Hannust and Kikas (2006) discussed qualitative approaches that were used to construct models that they tested in their examination of children's knowledge of astronomy. The researchers used a mixed-method approach in their study. In addition to assessing science knowledge with a test, they analyzed transcripts of lessons to "examine whether misconceptions and synthetic notions about the Earth could be induced by specific

teaching methods or materials” (p. 98). This analysis yielded information that the researchers likely could not have gathered through quantitative means. For example, the cases that the researchers presented indicated important findings about how students interpret objects viewed from different perspectives.

In developing the methodology for a study of children’s environmental values, Owens used a combination of qualitative and quantitative approaches because the former “would enable individual voices to be heard” and the latter “would afford generalizations or permit themes to emerge” (p. 323).

Duncan (2006) used focus group sessions to study the way citizens use maps and GIS technology to understand science and natural resource issues. The method proved effective for exploring the abstract ideas proposed by the study. The author conducted focus group sessions, transcribed the sessions, and performed a content analysis using N4 software. The author applied a coding method that was not informed by a priori knowledge; it was “frequently in vivo, deriving labels from actual words used repeatedly by focus group participants” (p. 418). This method allowed themes to truly emerge from the data, rather than the author extracting data that confirmed preconceived notions about the topics. In the analysis, Duncan used a diagramming method that illuminated links between the major emergent themes of 1) effects of clashing epistemologies, 2) effects of alternate story-making, 3) shifting learning goals, and 4) process as a tool of change, all of which could contribute to social change in using GIS maps in natural resource management.

As discussed, the use of qualitative research methods is well documented in studies involving children, science literacy, and the media. In this study, a field research approach was chosen to allow a “deeper and fuller understanding” (Babbie, 2004) of key

dimensions—attitudes toward environmental science, outdoor experiences, media use, and parent-child interactions —the intersection of which will likely “defy simple quantification” (Babbie, p. 282). Denzin and Lincoln (2005), in their explication of qualitative research, articulated the approach that guided this study: to “study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them” (p. 3). Within the qualitative research realm, this study was conducted with a post-positivist perspective: Multiple methods of “capturing reality” were used, the study attempted to verify specified theories, and the study employed tradition evaluation criteria (such as internal and external validity) in addition to qualitative procedures that contributed to the structured analysis (Denzin & Lincoln, p. 11).

Within the post-positivist paradigm (using more than one method of “capturing reality”), two key tools served as the basis for this study: 1) a simple survey that captured a baseline profile of each participant family’s background, demographics, and outdoor experience, and 2) a “walking interview” held in an outdoor setting, which allowed observation of myriad details specific to the natural setting and the interactions among the family members. These details of setting and interactions, combined with the actual text of the conversation, formed a more complete and nuanced analysis than could have been achieved through interviews in a traditional, “neutral” setting.

The Walking Interview

In their primarily phenomenological approach, Skår and Krogh (2009) used “walking interviews” to explore some themes similar to the current study. The authors discussed that children’s use of natural areas in Norway has changed substantially from being free-form and

self-directed to adult-controlled (p. 339), and that this shift might have a significant effect on children's relationships to nature. The interview subjects were children between about 5 and 11 years (because 5 is about the age that children should be able to play outdoors without adult supervision, and 11 years marks the beginning of adolescence) and their parents. The researchers described many benefits of the walking interviews: They "helped to establish a common experience of, and relationship to, the places about which the informants spoke" (p. 344). The researchers felt that this format was conducive to an open and positive atmosphere, and provided opportunities to pause and reflect. Being outside also provided conversation triggers, according to the researchers. In this way, "the positive effects of being in nature became apparent within the research process" (p. 345).

Following the approach of Skår and Krogh, this study used a series of walking interviews with families to explore various themes with children's outdoor experiences and the connection to attitudes toward environmental science. Although the discussion guide provided some guidance on topics, the intent was for important themes to emerge from the interviews.

Participants

Six families with one or more children in the 5 to 11 age range living in or near Fort Collins, Colorado, were selected to represent a cross-section of different family recreation patterns. Fort Collins, Colorado, is a mid-sized city (population of 143,986 in 2010 census) located on the Front Range of the Rocky Mountains. Although it's well-known for its outdoor recreation opportunities (30,000 acres of natural areas and 20 miles of off-street hiking and biking trails), Fort Collins is only 60 miles from the 2.8-million-population Denver metro area. Despite its urban amenities, Fort Collins is a gateway to abundant wilderness areas, including Rocky

Mountain National Park and Roosevelt National Forest. The Cache la Poudre River—Colorado’s first National Wild & Scenic River—runs through Fort Collins. Fort Collins provided an interesting sample population for this study because its residents can pursue primarily urban activities, outdoor or nature-based activities, or a mix of both.

Participants were selected through a “snowball” mechanism, whereby families with children in the 5- to 11-year-old age range recommended other families to participate. Snowball sampling, also called chain referral sampling, produces a study sample through referrals to people who have characteristics that are of research interest (Biernacki & Waldorf, 1981). The initial family for the study was identified through inquiries among the researcher’s work colleagues, many of whom have children in the 5-11 age range. The researcher administered a simple questionnaire to prospective study participants, the results of which provided information about the families’ types of outdoor experience, science and non-science college degrees, and varying childhood outdoor experiences among the parents. The questionnaire established a baseline profile for each family, a foundation of information upon which the interview data contributed more details, in some cases more accurate information, than was captured by the questionnaire. All the parents were 36 to 45 years old, and nearly all had college degrees (some with significant post-graduate education).

Data Collection

Each prospective family invited to participate was given a cover letter (Appendix A) that included a summary of the study objectives and completed the questionnaire (Appendix B). All of the interviews were conducted at the trailhead of the Pineridge Natural Area in Fort Collins, which is a popular hiking, biking, and fishing area near a public park on the southwest edge of

town. This site, which was familiar to some of the participants but not to others, was chosen as a relatively neutral setting for the interview, skewing neither toward an indoor/urban setting nor toward a wilderness setting. This area is adjacent to the popular Spring Canyon Community Park and the Horsetooth Dog Park. Although it accommodates outdoor activities such as hiking, the park is also used for team sports, picnics, and other activities.

Each walking interview was scheduled for one hour, and participation included at least one parent and one child. In two cases, two siblings contributed to the interviews. Each interview was recorded with a digital voice recorder that minimized interference from distant conversations, wind, and other distractions. In order to reduce cognitive overload for the researcher, the interview was conducted in two sections: 1) a short walk to discuss an informational sign at Pineridge Natural Area, located approximately one-half mile from the Spring Creek parking lot, during which the interviewer primarily asked background questions and made notes of parent-child interactions; and 2) more in-depth questions conducted while the researcher and family participants were seated at the picnic tables at Spring Canyon park. Five of the six interviews were conducted in this manner; the sixth was conducted in the parked vehicle of the participant family because of inclement weather.

The interview discussion guide (see Appendix C) started with general questions about the parents' family backgrounds and history of outdoor recreation with their parents. Other themes explored included the participant children's experiences with science classes in outdoor settings, daily time spent outdoors at home, family outdoor experiences, concerns about safety in outdoor settings, remarkable incidents such as wildlife encounters, use of media in general and in relation to environmental science topics, and perceptions of the family's orientation toward outdoor activities.

During the first interview section, the researcher walked with the family participants to the information sign, which included various photos of wildlife found in the Pineridge area, including mule deer, red-tailed hawks, elk, dragonflies, and other animals. The researcher showed this display to the family participants and asked whether the family had seen any of the animals. The researcher then followed with further probing questions, based on the initial responses, to elicit information about how common or rare such sightings are for the family, how much detailed information the family could provide about the experience, and what sort of science-based discussions resulted from the sighting.

Analysis

The researcher transcribed the interviews and combined that data with field notes in an Excel spreadsheet developed to track each theme that emerged from the interviews. Using an idiographic/nomothetic approach (Windelband & Oakes, 1894/1980), the researcher first conducted an idiographic analysis by examining each individual family interview for patterns. Next, the researcher conducted a nomothetic analysis to discover common themes across the cases. Through an iterative process of reviewing each section of the transcripts, some themes emerged that were unique to families, and some that were common across all cases, or across subsets of cases.

The researcher analyzed the data with a view toward uncovering information about:

- How the family defined “outdoor experiences”
- Whether having a science background affected the parents’ conversations with their children about environmental science and nature topics

- Whether the parents perceive media to be credible sources of environmental science information
- The types and extent of media consumption in the household, and how much of that consumption focused on nature or environmental science topics
- What sorts of conversations about environmental science does the family have outdoors
- Whether the parents were satisfied with the amount of time they and their children spend outdoors
- What sorts of observations the child made during the walking section of the interview
- How the parent interacted with the child during the interview
- How the parent and/or child represented themselves and their families in their stories about their outdoor experiences

RESULTS

The results document the ways in which six families living in or near Fort Collins, Colorado, spend time outdoors and shed light on how their experiences affect their attitudes about environmental science, which might have an impact on environmental literacy. The following family profiles provide baseline information about each of the families, and highlight the significant themes that emerged in their discussions about their outdoor experiences. These profiles are presented in no particular order—the initial letter identifying each family was chosen at random.

Family B Profile

Father (38), Mother (39), Son (7), Daughter (3)

Interview participants: Mother and Son

This family consists of two working professionals (a water scientist and a publisher) with two young children. Father B grew up on a farm in southeastern Colorado and spent most of his free time helping the family with the farm. Mother B grew up in Omaha, Nebraska, and the family's recreational activities included camping in tents, spending time at state parks, and traveling to their cabin in Crested Butte, Colorado, to ski and mountain bike.

The family lives in town. Father B hunts elk in the fall. As a couple, Father B and Mother B go backcountry skiing. Every family member (including the three-year-old) skis and bikes. Planned excursions this year include backpacking in the Canyonlands and a cross-country ski trip to Agnes Creek cabin in the Never Summer mountains northwest of Fort Collins. Son B was

fairly quiet throughout the interview, but became excited when his mother prompted him to describe a four-night backpacking trip with his dad:

“We found some Indian ruins. We had to hike up a whole mountain to get into them. We camped in places with fire rings, but we didn’t get to the light fires because it was too windy. We didn’t want to start a fire there.”

Son B could not recall any outdoor science activities at school, but he did remember spending a day at the local Environmental Learning Center where “they teach you how to survive outdoors.” Most of the environmental science knowledge he demonstrated came from his parents, such as the discussion he had with his dad while backpacking about the dangers of lighting campfires in windy conditions. He also talked about his friends having rattlesnakes in their yards and learning from his parents that these snakes have “a rattle and venom in their teeth.” Seeing a picture of an elk on the Pineridge information sign prompted him to imitate his dad bugling elk.

Although Family B was one of the families in the study with the most diverse outdoor experience, Mother B expressed a keen desire to get out in the wilderness more with the children, and that “the dynamics of having two has made it a little harder.” She continued: “We backcountry ski a lot, my husband and I, but we haven’t taken the kiddos to do that because it’s hard—at seven—to climb a mountain on your skis.”

Family D Profile

Father (39), Mother (42), Son (12), Son (9)

Interview participants: Mother and 9-year-old Son

This family consists of a working dad (IT manager), a mother who spent 17 years teaching pre-kindergarten and is now in graduate school pursuing a master's in education, and two boys. Mother D grew up in Parker, Colorado, "when it wasn't really a town yet," and her family had a swimming pool in the back yard that was the focal point for their recreation, in addition to day trips to the mountains. Father D grew up in Fort Collins, and his family, according to Mother D, "camped a lot and spent more time outdoors in the wilderness than we did because we would stay home and swim."

The family lives in town. Their primary outdoor recreation as a family is day hiking on local trails and in Rocky Mountain National Park. They have "friends with boats," so they go to Horsetooth Reservoir "a lot." Mother D talked about various members of the family wanting to go backpacking, but "they just haven't yet." One highlight of the year for the family is going up to Rocky Mountain National Park with a picnic dinner at dusk to listen to the elk bugle.

Although Son D could not recall being outside for a science class, he was well versed in the terrain around his school. He talked about the school fence being moved to make way for construction, and the effect on some caterpillars living by the fence. He also talked about seeing garter snakes around the school, and the "really neat" algae in the pond near the school. He described spending morning-until-dark days with his friend at the local park. When asked how he would conduct research about birds living in his neighborhood, he started to talk about a library-based search, but then stopped and said: "I would just go to my backyard. I would count how many robins there are, how many birds and what colors they are. One time when we were walking the dog, we saw, I think, a woodpecker. It had brown and white and blue feathers. It was really cool."

Family J Profile

Father (41), Son (16), Son (12), Son (9)

Interview participants: Father and two younger sons

Family J consists of a fairly recently divorced father (the mother also lives in the area and they share custody), and three sons. Father J grew up in Utah suburbs, and his family “did not do a whole of outdoor stuff.” Father J said a typical vacation for his family was going to restaurants and visiting museums in the Pacific Northwest.

They live in town and go hiking a couple of times each week and fishing a couple of times during the summer. Father J: “We just go to Lake Loveland and do that for a couple of hours.” Father J and the middle son camped for a week a couple of years ago on a Boy Scout outing. Father J talked about wanting to learn to ski with the boys.

Son J had very few stories about being outside. He said he rarely goes outside for science classes. He recalled from the Boy Scout camping trip having seen lots of birds and bats. He said he doesn’t see many animals in his neighborhood, but recalled hearing coyotes when he lived in Connecticut. He said his class had a discussion last fall about Hurricane Sandy: “We talked about why it was so bad, and the places it was going to hit, and how much damage it would cause. I think my teacher got some information from news on TV or web sites about it.”

Son J speculated that he spends at least as much time outdoors as his friends: “A lot of my friends pretty much don’t do anything. They’re usually playing video games.”

Family M Profile

Father (45), Mother (42), Daughter (13), Son (10), Daughter (5)

Interview participants: Mother , Son, and 5-year-old Daughter

This family consists of a working father (veterinarian in academic position) and mother (publishing executive) and three children ranging from 5 to 13. Both parents grew up in farming communities in southeast Iowa. Mother M, one of seven children, said her parents “didn’t do camping.” She remembers taking one vacation with the family when she was young, to an amusement park near St. Louis. They stayed in motels: “We just stuffed into two rooms, I’m sure, a Howard Johnson’s or something disgusting like that.” For recreation, they typically would go on family picnics at a lake or go to their grandmother’s house, where the kids would play in the yard. Father M’s family camped fairly frequently, occasionally driving to Colorado to go camping.

They now live more than a mile from any neighbors at about 7,500-foot elevation outside of Livermore, and have a number of horses and dogs. The parents took their first child camping when she was four months old, an experience Mother M describes ruefully: “I regretted it because we were up at midnight and we had this screaming baby, and I was thinking, ‘What are we doing out here in the Flat Tops with a baby and she’s screaming and cold?’ But we didn’t really know better.”

Now that all three children are deemed old enough to “handle it,” the family frequently goes camping and skiing, and Father M hunts. Mother M and Son M carried on a constant, convivial conversation about their encounters outdoors throughout the interview, often interrupting each other to add highlights, refute descriptions, or offer theories. Five-year-old Daughter M often interrupted the conversation to ask whether she could pet dogs walking past. Son M rattled off stories of several encounters with animals:

Dad has seen a mountain lion. We hear a lot of coyotes—they make the dogs bark. I saw a rattlesnake once. I saw a bear—they caught a bear right by our school. It was just a baby one.

Son M goes to a mountain school for which the curriculum includes a project measuring water quality of the Poudre River. The students go outside for that project and occasionally for other classes. At home, he likes to go outside and play with the family dogs, shoot his gun at targets, and ride the family's dirt bikes and ATVs. He said that if he were looking for information about animals, he would start online with Geo Wild. He said that he was recently researching jaguars: "I didn't know they were endangered, and now I do just from looking at web sites about them. And it shows all their body parts, and their heads and how they're structured."

Family P Profile

Mother (45), Son (13), Daughter (10)

Interview participants: Mother , Daughter

This family consists of a single mother (she was divorced from the father, who's now deceased), and two children. Mother P works at home as a writer and editor. Son P (who didn't participate in the interview) has a diagnosed anxiety disorder. Mother P grew up in a small, agricultural town in western Colorado. As a house painter, her father was outside frequently but "not in a nature type of way." Her mother stayed at home. They rented a house on farm property. Although Mother P doesn't describe her parents as athletic or outdoor-oriented, she was "outdoors all the time" with the barn animals on the landlord's farm.

Mother P and her two children live in an in-town neighborhood adjacent to one-acre horse properties with a creek nearby. Mother P described their outdoor excursions as “restricted” to “more in-town things,” such as biking in town or taking walks. They have been camping on a few occasions at an in-town lake. Mother P explained that the family did not do a lot of hiking because of her concern for Son P:

He was just high-energy, and keeping him safe would have been tricky. When he was younger, I was concerned that he wouldn’t be able to stay on the trails. And with mountain lions and rattlesnakes around, that was a concern. So that’s probably the main reason we’ve kind of restricted our outdoor activity to more in-town things. Which is a bummer, to be honest.

Mother P described efforts to compensate for her perceived lack of outdoor experience: Even though we don’t do a lot of outdoor sporting—skiing, camping or fishing—we try to find ways to talk about things like that [environmental science and nature topics] in everyday life. We’ll go for walks and look for the bald eagles, or try to figure out what kind of bird that is. Or: ‘Something pooped there—what was it?’

Throughout the interview, the child participant, Daughter P, kept up a constant chatter about what she saw along the trail. At one point, she stopped and pointed at a log: “Mom! There are termites in this thing!” When asked how she knew there were termites, she said: “Because there are holes. See, small holes. We learned about that in a bug movie in Disneyworld.”

Daughter P also stopped to point out a geode display and gave a demonstration of the “shell core, outer core, and inner core.” She also was dismayed to see spray painting on a tree: “Spray painting the trees hurts them, and I’m sure they don’t want to be hurt.”

Despite her frequent observations about her natural surroundings during the interview, Daughter P said that for her “science is cool but sometimes it can be kind of boring.” When asked how she would research a nature topic—such as whether grizzly bears could be found in Colorado—she first mentioned using her school’s netbooks and starting with World Book Online. But then she said:

I would think about it and ask myself to get proof. Like—well, you know there are bears up in the mountains. So grizzly bears are a specific type of bear. So I would try to make up my best answer to the question. The closest answer that I can get.

The family’s media consumption is very limited. They subscribe to few magazines. Daughter P said that she typically doesn’t watch nature documentaries because “I’m always afraid that something’s going to get hurt. ... They do talk about their prey and what they eat and how they live and who eats them.”

Family S Profile

Father (45), Mother (36), Son (9), Daughter (6)

Interview participants: Mother , Son, Daughter

This family consists of a working father (publishing manager), a stay-home-mother who is working on an undergraduate degree, and two young children. Father S grew up in Larimer County, and he and his family did “all sorts of backpacking, hiking, staying in tents in the backcountry,” according to Mother S. Mother S grew up in a small eastern Colorado town and

spent time on her grandparents' ranch where she fixed fences, worked cattle, raised sheep, and rode horses. Recreation included water skiing, riding motorcycles, and snowmobiling.

The family recently moved from inside the city limits to a small acreage, where they frequently see deer, coyotes, and elk. Mother S describes their outdoor activities as starting when the children were very young:

We started hiking with [Son S] when he was very, very young. His first camping trip, he was nine months old. They both actually learned to crawl in our camper and do stairs in our camper. They both from a very young age have been four-wheeling. We used to ratchet-strap their car seats [to the four-wheelers].

Son S and Daughter S both go to the Big Thompson Elementary School of Science and Nature. Son S talked about frequently going outside for projects at school and mentioned "lots of trails that lead up different places." He said they've gone outside to learn about animals and land formations. Son S described many animal sightings at his house, including deer, elk, bunnies, bats, snakes, and coyotes. He described a trip where he watched an elk taken down by two wolves. When asked to describe the difference between birds and bats, he said: "Bats have more like—not wings, but more like black connected wings. They do more of a squeaking noise, and birds chirp." Son S is looking forward to a week-long hunting trip with his dad's family.

Although media consumption is limited in the house, Mother S described many conversations with the children about environmental science and nature topics:

Normally, it's: "How did that rock get there? It doesn't look like the rest of them. Or, how does that tree grow sideways like that out of the mountain? How did the mountain get here?" [These topics] come up pretty much every day because of where we live. It is

really a natural conversation at our house, I would say, between the animals and land formations and everything else. ... I would say they know more about nature and what lives in nature than they do about a city and how a city functions.

Throughout the interview, Mother S and Son S discussed many outdoor experiences and several times, Son S would respond to a clarification from Mother S with a note of exasperation, as if he had heard this sort of information many times. For example, they described finding mushrooms, which Mother S had warned Son S not to eat “because there’s certain ones you can, and certain ones you can’t.” Son S reminded her that he didn’t want to eat it. He wanted to throw it in the lake.

Mother S: And what did I say? Could be bad for the fish, right?

Son S: Yes.

Mother S: Cause it could be what?

Son S: Poison! [in a drawn-out voice, with a sigh]

Although Son S contributed more to the interview than 6-year-old Daughter S, she was prompted by her mother to talk about her collection of box elder bugs that she had caught around the house. Her brother commented to her: “You’re obsessed with them. Every time you see one, you have to catch it.”

Cross-Family Themes

Data analysis uncovered observed phenomena that yielded insights about the research topics of interest. As these phenomena were evaluated for both frequency of occurrence and

intensity of each incident, patterns began to emerge that have promising implications for increasing understanding of how parent-child outdoor experiences might provide opportunities to increase environmental literacy.

Family Outdoor Identity

One of the most compelling themes to emerge from this data was that every family projected a creed or mission statement about their relationship with the outdoors. Data that supported the strong family outdoor identity theme included the following expressions, which became the criteria for evaluation:

- Frequency of outdoor experiences described by parents and children
- Expressed sense that they have more outdoor experiences than other families
- Tendency of the parent to highlight or promote the child's outdoor experience during the interview
- Tendency of parent to prompt child to recall outdoor experiences
- More examples of parents guiding discussions about environmental science topics, prompted by outdoor experiences, media coverage, or school projects
- Expressed high value on outdoor learning at school
- Tendency to expose children to outdoor experiences at an early age
- Tendency to downplay animal/nature threats to safety and to express more concern about human/urban threat to safety
- Tendency to persevere with outdoor pursuits despite deterrents

Each of these expressions was logged in a spreadsheet and then evaluated for frequency.

Through this analysis, the families were ranked as to whether they tended more toward a weak

outdoor identity or strong outdoor identity. In some cases, outdoor identity was expressed very strongly, similar to a politician staying “on message.” Some families tended to project a fairly neutral outdoor identity: Outdoor activity was considered part of the family’s life, but it didn’t define them. Some families had a weak outdoor identity, seemingly to have comparatively little interest in outdoor activity or a sense that they wanted to have more outdoor experiences but could not because of unavoidable circumstances. Based on criteria defined below, and supported by the data, the researcher sorted the families along a continuum of weak to strong outdoor identity (see Figure 1).

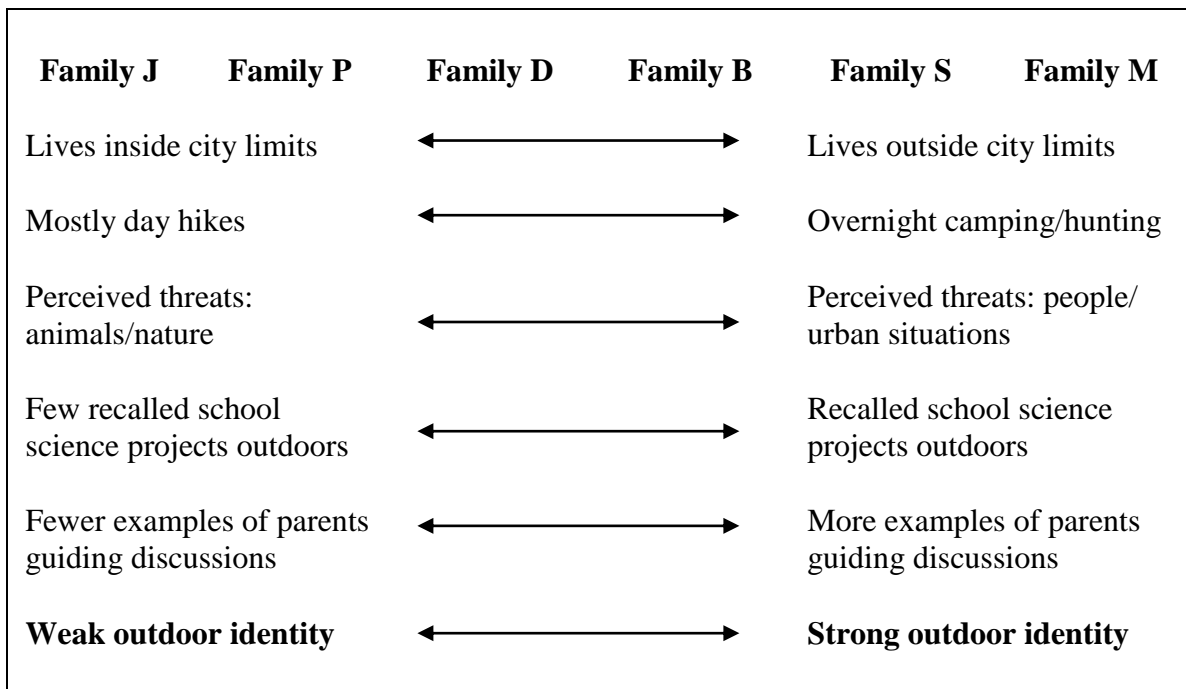


Figure 1: Family participants on continuum of weak outdoor identity to strong outdoor identity

As an example of a family exhibiting strong outdoor identity, following is an expression by Mother S of her family as outdoorsy:

We're very outdoorsy naturally, and I think if you're not raised that way—I hate to say that Loveland and Fort Collins are cities, but they are. As much open land as we do have [in Larimer County] and outdoor opportunities, people who aren't raised doing those things themselves, it's hard for them to comprehend that and do that with their kids. I would say [my children] know more about nature and what lives in nature than they do about a city and how a city functions.

Mother S also gave multiple examples of prompting her son to recall outdoor incidents and highlighting his outdoor experience: “Who came up on the deck?” “What signs do we see, and who do we hear at night?”

Family M also expressed a strong outdoor identity for her own family, and that every family in her area shares a high value of outdoor experiences: “Every neighbor up there has their thing. They're either into horses or fishing or hiking or skiing, but it seems that every family is doing something outdoors.”

Mother B, who backcountry skis with her husband and whose very young children ski regularly, was one of the families with fairly strong outdoor identity who expressed more concern about urban threats than natural ones:

We're not really ones to set a whole lot of boundaries when we go outside. ... I feel like it's the time when they should *not* have a whole lot of guidelines. [My husband] is the safety guy, but not about outdoor stuff—it's more about walking around the neighborhood. He has a list of 85 things, like “Don't talk to strangers,” don't blah-blah-blah. He's much more scared about the urban experience. He has

no qualms about putting a two-year-old on skis and letting her figure it out. But riding their bikes to school by themselves? No way.

The families with strong outdoor identities did not express disregard for safety outdoors but tended to take a pragmatic approach to safety. For example, Mother B talked about stepping over a rattlesnake without realizing it. Her husband quietly commented on it after she was safely past the snake. They just shrugged and walked on: “It’s almost better that way, so you don’t react. And then they don’t, either.” Family S took a thorough, but also pragmatic, approach to safety: On hikes, every family member carries a whistle, compass, and water pack. The children walk between the parents. Father S walks in front because he’s usually “packing something or other” [a gun].

Most of the families in the study described conversations with their children about environmental science topics, and demonstrated guided discussions during the interview sessions. The two families with the strongest outdoor identity—Family S and Family M—had almost twice as many occurrences of praising their children’s outdoor experiences or prompting them to recall outdoor experiences. Following are a few examples of these expressions:

Mother M: “You like to do some stuff on your own outside.” “What were you saying about the bear you saw?” “Remember when we had those mule deer drinking out of our horse water that one time?”

Mother S: “What do you guys do if you get lost from mom and dad?” “What’s the newest bug you’ve learned about?” “What did the sign say about catch and release?” “They know the smells of animals.”

The three families represented in the middle of the continuum in Figure 1—Family B, Family P, and Family D—all expressed about the same number of prompting or praising statements.

One key factor intrinsically related to strong outdoor identity was the family's living environment: The decision to live 45 minutes from the nearest town, more than a mile from the nearest neighbor, and in a wildlife-populated area is a choice that is intertwined with a family's values. The two families that were identified as having the strongest outdoor identity live outside of town and see various forms of wildlife out their windows. However, one of these families had just moved to the out-of-town property after years of living in town. The family had clearly engaged in multiple outdoor activities even when they lived in town. But Mother S expressed many times, and in various ways, that where they live is part of who they are.

Another key factor that emerged was the presence of a hunter in the family. In the three families with the strongest outdoor identity, the father was an elk hunter. All three of these families had boys, two of which talked with anticipation about going on hunting trips with their dads when they were old enough. In some cases, the family seemed to live vicariously through the father, celebrating his encounters with wildlife while hunting. For example, Son M mentioned that his dad had seen both a mountain lion and a bear while hunting. But hunting can also provide experiences for the whole family when they get involved in scouting hunting areas, which are typically in remote terrain:

Mother S: We do a lot of scouting for [Father S] and his dad and brother, so we go to a lot of high elevations, and we just go really slow and take our time. Any little shiny object, we would stop and investigate. We would stop and have lunch, and just explore is the biggest thing. So they've learned about scat from the very

beginning. They know footprints. Smells, they know the smells of animals, that type of thing.

The outdoor identity theme was manifested, ultimately, in the extent to which the families viewed outdoor activities as something that you just do—even with small babies—rather than something that you try when all conditions are right. The families with strong outdoor identity might have bemoaned some of their excursions (such as Mother M, who dealt with a cold, screaming baby on a camping trip), but then they would simply reset the course of their outdoor adventures to activities that were more age-appropriate. Moreover, the evaluation of age appropriateness varied from family to family: Son B went on a four-night overnight camping trip with his dad when he was five. In contrast, Mother D had only recently considered letting her 12-year-old son go on an overnight camping trip with his dad: “I think he’s getting to the point where he could make the trek.”

All the families talked about the difficulties of managing logistics for outdoor adventures when more than one child is involved. In fact, the fathers loom large in the early years as the team member who takes the older child on outdoor adventures so the mother can manage the baby. In some cases, mothers spoke of the older child’s need for outdoor time as the impetus for them figuring out how to get everyone—including the baby—geared up for an outdoor excursion even when the father wasn’t around. One of the single parents commented that she would do more outdoor activities with her children if she weren’t “out-numbered and out-gunned.”

Family Discussions about Environmental Science Topics

The walking interview approach offered several opportunities for the researcher to observe parent-child environmental science discussions, some of which the researcher had not anticipated, such as the unprompted comments that the children or parents sometimes made about what they saw on the trail, such as animals (particularly horses and puppies), interesting rocks, termite-ridden logs, and defaced trees. The specific guided discussions that the interview included were:

- Questions about the children's outdoor activities during science class at school
- A prompt introduced at the Pineridge informational sign ("Have you seen any of the animals pictured here?"), followed by additional questions to solicit details from the parent or child about the animal sighting, and questions about how the parents and children talk about environmental science topics while on outdoor excursions
- Questions about the type of media the family consumes, whether they use the media for information about environmental science topics, and what information resources they use when they have environmental science questions

The data collected in this study supports the finding that many schools do not offer much, if any, environmental science learning opportunities, primarily because of a focus on core curriculum "basics" and standardized testing that makes teachers reluctant to introduce electives that involve experimentation or field trips (Coyle, 2005). Only two of the children interviewed could recall outdoor science classes at school. One of them attended an elementary school that

emphasizes science and nature, and the other attends a mountain school that offered an opportunity to students to conduct water quality testing on the local river.

The parent-child discussions prompted by the informational sign and follow-on stories about other animal sightings were characterized by consistent guidance from the parents. As previously mentioned, two of the parents from families identified as having strong outdoor identity had a particularly high number of incidents in which they encouraged their children to recall outdoor events, corrected their children, or made statements highlighting their children's outdoor experience. But across all cases, parents were very engaged with their children in these discussions. The frequency of guiding questions or comments seemed to have no relation to whether the parent interviewed or the spouse had a science background. The parents interviewed for this study seemed to talk easily with their children about science topics, freely admitting what they did and did not know, and sometimes poking fun at themselves and their lack of knowledge about certain topics. On certain occasions, parents would prompt their children to recast their comments, most often in cases in which the children's comment refuted the family's identity as outdoorsy. For example, when her son said that when he's home, he usually plays in the basement, Mother D said: "Yeah, in the winter when it's cold. In the summer, though, what do you and Seth do?" This question prompted Son D to talk about spending hours outside with his friend at the park, which seemed to satisfy Mother D.

The families interviewed said they used media to find out information about environmental science topics in the following situations:

- To find current information about a current, high-profile event (such as the High Park fire that started in June 2012 in Larimer County)

- To look up information about a topic of interest (such as confirming a bird sighting or learning more about extinct animals mentioned on a TV program)
- To find outdoor trip planning information (such as hike descriptions with details about length, difficulty, access points, rules and regulations)

Discussions about media uncovered very little consumption of print media in the family and limited TV consumption for children, particularly for young children. In most cases, the younger the child, the less TV was permitted. A few parents in the current study said that they never have television news programs on while their young children are around, because, as Mother B said: “It’s horrific.” The restrictions that parents of young children placed on media use in this study was corroborated by research demonstrating that as children get older, they have fewer restrictions (Rideout et al., 2010). However, most families had multiple mobile devices, including iPads and other tablets, either freely available to the children or accessible with permission.

Social media emerged as an important media source for families in their discussions about environmental science topics because of its immediacy and its “eyewitness account” nature. For example, Mother P described her reliance on social media to track the High Park fire:

It’s funny, I guess, people text or post things [on Facebook] that they see. [Father M] was just showing us the other day that somebody had a mountain lion up a tree that they had seen. You kind of get it through social media now, where people will have a sighting and they’ll post it and you learn about it that way.

Father J expressed his preference for community-generated content when he was researching hiking venues because typically the writers have first-hand experience:

We go to Alltrails.com—they have reviews. We rely a lot on the reviews of people who have been there before, so the community-generated media type stuff. So that's a good way to verify, you know, if someone's actually done it and written a real review. Someone who's actually there instead of someone in New York who owns the publication.

Some of the parents commented that they will often compare various media sources while an event is occurring:

Father J: During the fires, we were looking at 9News and jumping back and forth between that and the national news to see who had the most up-to-date information. And the *Coloradoan*'s web site. It's so easy to check multiple sites now, and see who's first.

Mother P [Talking about coverage of the High Park fire]: Having worked at the *Coloradoan* and KUSA being a Gannett channel, it was funny and sad to watch the TV station from Denver out-sleuthing the newspaper. It's like: "This is your turf. You should own this story." Their sister station down in Denver totally beat them every day with what they were covering.

Although parents of younger children, in particular, had few recalled incidents of discussing environmental science coverage in the media, Mother P (whose children are 13 and

10), gave an in-depth description of how she talks with her children about environmental science coverage in the media:

One thing that we do talk about in the media a lot is oil and gas. And with the fires—there's not always a lot of media about Colorado. So when we see it, then we talk about it. Because they do have questions: What does the fire mean, and what are we going to do, and are we in danger, and how does this apply to us? Then we talk about that and it's not so much about accuracy as it is to put their minds at rest. Are they [the media] playing this up for drama? Are they playing this up for ratings? Are they playing this up to try to sell you something? ... I want them to be ethically strong and so that is one area in which our environment, and especially our local environment and the media, is a discussion we have a lot. Because I don't want them to just hear something or read something and say, "Oh, that's true because I saw it on the Internet."

Mother P also discussed having conversations with the family about coverage of the High Park fires. Father P is a CSU veterinarian who was in charge of the horse rescue operation at the Budweiser Center, so the family had a unique view of a story about a donkey named Ellie who supposedly led four other animals to safety:

[Father P] was laughing [when he saw the stories], saying, "They've put all these super-human qualities into Ellie, saying she led them out of danger." He's like: "Those animals are gregarious, so they are just going to group up because that's their nature to do so."

DISCUSSION

Limitations

This study uncovered insights that might increase understanding about how families' outdoor experiences affect their attitudes about environmental science topics. However, the study had some limitations that could be addressed in future research efforts. Because of the small sample size, these results can in no way describe a generalized population. The parents in these families were almost all working professionals, and all were white. All families lived in Larimer County, Colorado, which is well-known for its number and diversity of outdoor recreation opportunities, so all these families' outdoor pursuits might outnumber those of families in other geographical areas. In addition, interviews with families who had young children were much less productive (in terms of data collection) than those with older children simply because of the lack of outdoor experience among small children, their difficulty recalling experiences, and their limited exposure to media.

In addition, the conversational nature of the walking interview and the stated purpose of the study might have resulted in the families engaging in social desirability practices—perhaps overstating their outdoor activity in order to achieve some perceived expectation of an adequate level of outdoor experience. Moreover, because Fort Collins is known as an outdoor-oriented town, some families might feel some ongoing pressure—within this study and in general—to present themselves as outdoor-oriented.

Implications

The most promising outcomes were the notion of the family outdoor identity, the walking interview methodology as a tool for understanding parent-child interactions, and, to a lesser

extent, the shifting focus from TV and print media to online and social media as an information source about environmental science topics.

The emerging theme of family outdoor identity, in particular, might provide an interesting basis for further efforts to understand how family communication patterns contribute to the development of the next generations of environmentally literate citizens. Particularly because children have few opportunities in school to learn about environmental science topics, and rarely outdoors, the parents can and do play a key role in fostering discussions about environmental science. One intriguing opportunity for future research would be explorations of whether having a strong family outdoor identity affects parents' environmental science discussions with their children, a line of inquiry that emerged from this study but would need much more development to provide actionable findings.

The walking interview methodology proved to be an effective tool for gathering different types of information—responses to interview questions, impromptu responses to random environmental stimuli, and interactive dialogue between the parents and their children. Taken together, these streams of interactions formed a much richer picture of the parent-child interplay than could have been captured in a traditional interview setting. The most significant outcome of the walking interview was the multiple displays of parent-assisted learning, which could be a valuable area for further exploration. In addition, this type of interview—which combines overt statements with more implicit meanings expressed through gestures, observations, and tone—might provide overlay to existing research that relies on self-reporting by families.

Future studies also could examine whether a desirable outcome for children engaging with nature is not environmental literacy but simply an appreciation of nature, whether outdoor-oriented children are more discerning about media reports of environmental topics, and further

examination of how parents mediate children's consumption of media reports of environmental topics.

Other studies could expand on the strengths and weaknesses of the walking interview as a methodology as well as a discourse analysis of the walking interview to examine the parenting styles exhibited (for example, the extent to which parents work to make their children comfortable in nature).

CONCLUSION

This study sought to explore the ways in which families' discussions about environmental science topics, particularly in outdoor settings, might contribute to children's environmental literacy. The results indicated that families have varying degrees of outdoor identity—the family's perception of themselves as outdoor-oriented. In addition, the results indicated that parents—regardless of whether they have college-level science training—are active guides in children's learning about environmental science topics. Although parent-child interactions have been studied in many informal settings, such as museums, few researchers have examined how parents interact with their children in outdoor settings. Because parents often mediate their children's outdoor experience, these interactions could have promising implications for increasing children's environmental literacy.

The study also provided some additional understanding about how families use media in the context of environmental science topics. Although this study indicated that young children particular consume very little print media, the results pointed toward use of the Internet and social media outlets as important sources of information about environmental science for adults and their children.

Increasing environmental literacy is a goal whose importance is uncontested among the general public, educators, and parents. Because time spent outdoors observing nature is a fundamental tenet of environmental literacy, concern is warranted that today's children will not be prepared as adults to grapple with the environmental problems that inexorably advance as human activities continue to have negative effects on the global ecosystem. Studying the benefits of parent-child interaction on environmental literacy holds intriguing possibilities for equipping

children with the knowledge and skills they will need to ensure that the planet Earth remains a hospitable environment for future generations.

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APPENDIX A: COVER LETTER

Date

Dear Participant,

My name is Michele Crockett and I am a researcher from Colorado State University in the journalism and technical communication department. We are conducting a research study on the way children's outdoor activities affect the way they think and talk about science topics they read or hear about. The title of our project is "No Child Left Inside: The Effect of Children's Outdoor Experiences on Their Ability to Understand Science Media Information." The Principal Investigator is Joseph Champ, associate professor, journalism and technical communication, and the Co-Principal Investigator is Michele Crockett, a master's degree candidate in the department of journalism and technical communication.

We would like you and at least one of your children, age 5 to 11, to participate in the study by being interviewed by the research team about your family's outdoor activities and experiences. We will conduct the interview at Pineridge Natural Area in Fort Collins. Participation will take approximately one hour. Your participation in this research is voluntary. If you decide to participate in the study, you may withdraw your consent and stop participation at any time without penalty.

The information you provide during the interview will be anonymous. Your information will be combined with information from other people taking part in the study. When we write about the study to share it with other researchers, we will write about the combined information we have gathered. You will not be identified in these written materials. We may publish the results of this study; however, we will keep your name and other identifying information private.

While there are no direct benefits to you, we hope to gain more knowledge about the way outdoor activities affect the way children and their families discuss science topics. Your family will receive a \$25 gift card for participating in the study. Although it's possible that you or someone in your family could become injured during the interview, the risks are minimal. It is not possible to identify all potential risks in research procedures, but the researcher(s) have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

If you have any questions, please contact Michele Crockett at 970-556-9956. If you have any questions about your rights as a volunteer in this research, contact Janell Barker, Human Research Administrator, at 970-491-1655.

Sincerely,

Joseph Champ
Associate Professor

Michele Crockett
Graduate Student

APPENDIX B: SURVEY QUESTIONNAIRE FOR PARENTS

1. Please indicate the gender and ages of people in your immediate family:

Parent 1: _____ Male _____ Female _____ Age
Parent 2: _____ Male _____ Female _____ Age
Child 1: _____ Male _____ Female _____ Age
Child 2: _____ Male _____ Female _____ Age
Child 3: _____ Male _____ Female _____ Age
Child 4: _____ Male _____ Female _____ Age

2. Where do you currently live?

City: _____ State: _____

3. How would you describe your home's location:

Within city limits
 Outside city limits but in a residential area
 Outside city limits and more than 1 mile from nearest neighbor
 Farm or ranch

4. What are the current occupations and education of the parents living in the home?

Parent 1: _____
Highest degree received (include field): _____

Parent 2: _____
Highest degree received (include field): _____

5. Indicate your family's experience with the following activities within the previous 12 months. Please include any activities that at least one parent and one child from your family participated in:

Overnight trip(s) outdoors (for example, a backpacking, river trip, or hunting trip) that included camping in a tent or in the open air at least one mile from any public facilities for at least one night. Please briefly describe your trip(s) (e.g., "Backpacking trip in Rawah Wilderness for 2 nights):

Car-camping trip(s) (for example, traveling to a national park and camping in the designated camping areas with a tent or an RV. Please briefly describe your trip(s) (e.g., "3 nights at Yellowstone National Park):

Day hike(s) (for example, walking on a trail in a wilderness or natural area either within our outside city limits for at least 30 minutes): Please briefly describe your trip(s) (e.g., "multiple day hikes on Grey Rock Trail in Poudre Canyon):

Boating excursions (canoeing, rafting, motor boating, sailing): Please briefly describe your trip(s) (e.g., "multiple boating excursions in powerboat on Carter Lake"):

___ Outdoor pursuits engaged in by one or more family members that are NOT organized sports (e.g., fishing, running, bicycling, etc.) Please briefly describe your pursuit(s) (e.g., “3 of us go fly-fishing in various parts of the state at least once a month”):

___ Organized sports engaged in by one or more than one family member that are held outside (e.g., football, baseball, outdoor soccer, etc.) Please briefly describe your sport(s) (e.g., “One child plays outdoor soccer and runs cross-country; one child plays baseball; mother plays softball”):

___ Outdoor chores or work activities engaged in by one or more than one family member (e.g., gardening, tending farm animals, etc.): Please briefly describe your outdoor chores or work activities sport(s) (e.g., “The two older children feed the chickens daily, all help in the garden during the summer”):

Please describe any other outdoor activities that any family member participates in, and give a general description of frequency:

APPENDIX C: DISCUSSION GUIDE

INTERVIEW INTRODUCTION SCRIPT:

- “Thanks for joining me today in this exploration of families and their outdoor activities and experience, and how those activities and experience might affect how they look at science topics. We’re going to walk along this trail at Pineridge Natural Area as we talk because this setting might help stir some memories about recent experiences your family has had outdoors.”
- “When we get to the Pineridge Natural Area information sign up there, we’ll take a look at it for a few minutes.”
 - [At the point in the interview where the interviewer and interviewees reach the sign, the interview will insert the following questions at the soonest natural break in the conversation]:
 - “Let’s take a look at this sign. Pineridge is right on the edge of the city but they’ve got some photos of wildlife seen in this area. Have you or anyone in your family seen any of these animals around Fort Collins?”
 - “What did you do when you saw it?”
 - “What did your family talk about later when they recalled seeing this animal?”

1. How long have you lived in the Fort Collins area, and what brought you here?
2. Do you have experience as a family living in bigger cities or smaller cities?
3. What environment did you grow up in – big city, small town, farm?
4. What did your family do for recreation?
5. Where did your spouse grow up? Tell me about her family background and what they did for recreation.
6. Tell me where you were living when your first child was born.
7. Do you remember when you took your daughter outside for the first time? How old was she?
8. What were your first experiences with your daughter outside as a baby and toddler? What sorts of things did you do outside?
9. Were there any differences in the way you approached outdoor activities with your second child?
10. Have you ever felt concerned about your children’s safety when they were outdoors?

11. Describe the amount of time your children spent outdoors before they were in kindergarten. Did they ever spend time relatively unsupervised – for example, playing in the backyard with an adult nearby but not actively engaged with them?
12. Describe the outdoor activity your children experienced in a school setting in the elementary years.
13. Describe the outdoor experiences your children have that you would characterize as wilderness experiences. How many of these experiences do your children have during the year on average?
14. Have most of the wilderness experiences your children have had been with you or your wife? Any trips with friends or school-sponsored trips?
15. Do you think your children spend more time outdoors than other children their age? Compared to other children in this area? Compared other children across the U.S.?
16. How much time do your children spend per week working on computers? How much time watching TV? Do you think that's more or less than other kids their age?
17. Would you say that your children are interested in natural science topics?
18. Do you engage in discussions about nature when you're outdoors with your children?
19. Do your children like science classes at school?
20. Tell me about your family's use of media. What sorts of media do you engage with on a regular basis.
21. Do you pay much attention to science topics in the media?
22. Can you remember a time when you heard a media report on the radio or saw one on TV and thought that it was inaccurate because you yourself knew something about the topic? Did you discuss this with your children?
23. How much would you say you discuss science topics as a family? Do you think you discuss science more or less than other families do?
24. Do you and your kids ever get into any lively debates about science topics? Can you describe a recent one?

APPENDIX D: SAMPLE CONVERSATIONAL DATA

Table D.1: Sample conversational data

Theme	Family	Text
Observations prompted by hike	D	Son: 1) What's that light up there? It's a commercial plane
	P	Daughter: 1) Mom! There are termites in this thing! 2) Mom, this was a real rock that somehow got cracked in half, and this is the shell core, this is the outer core, this is the inner core. 3) [pointing to tree graffiti] They're being really mean to the environment. Spray painting the trees hurts them, and I'm sure they don't want to be hurt. 4) Can I pet your dog?
	B	Son: 1) Hey, there's two horses!
	M	Daughter: 1) Can we pet the puppy? 2) Look at those dogs! They're playing tag! That little doggie runs like a fox. Kinda slow!
Comments expressing identity as outdoor-oriented	D	Mother [to son]: 1) I can't think of anything in nature you're not interested in.
	P	Mother: 1) Just a couple of days after we brought him [first baby] home, we took him out by Boyd Lake by the trails. 2) I know a lot of people who don't really let their kids wander around unsupervised, and I am not that parent.
	S	Mother: 1) Yeah, they [deer] like hanging out at our house, huh? 2) [Hiking] has been part of our lives forever. They've learned about scat from the very beginning. They know footprints. Smells, they know the smells of animals, that type of thing. 3) We're very outdoorsy naturally, and I think if you're not raised that way ... I hate to say that Loveland and Fort Collins are cities, but they are. As much open land as we do have and outdoor opportunities, people who aren't raised doing those themselves, it's hard for them to comprehend that and do that with their kids. 4) I would say they know more about nature and what lives in nature than they do about a city and how a city functions. 5) So they're pretty observant with their signs. Son: 1) I've already been on a ton of hunting trips! M: You're going for a week with the boys
	B	Mother: 1) Most of our friends are active. 2) We go backcountry skiing a lot. 3) We are going to Agnes Creek to ski at the yurt cabins ... ski in and sled in. 4) We are going to Canyonlands in spring to backpack and will go into the Maze. 5) [Son] and his Dad went backpacking for four nights, sleeping in tents, carrying packs.
	M	Mother: 1) I guess the outdoor recreation and the camping and skiing and the fresh air and sunshine is what keeps bringing us back [to Colorado]. 2) Even the snakes we saw, even the rattlesnake, it didn't really deter us. 3) Every neighbor up there has their thing. They're either into horses or fishing or hiking or skiing, winter sports, or whatever, but it seems that every family is doing something outdoors. 4) [Discussing Denver cousins]: Even to go out

		<p>and pet the horses is a big deal to them. Or watching the sunset or the stars. 5) [Discussing camping trip that Son thought was remote]: Oh, it felt remote. But we weren't actually that far from our house. 6) We have a lot of conversations about animal reproduction, so the kids will talk about breeding a mare, and putting the semen in there, even at the dinner table, and think nothing of it. 7) We reported a few fires ... we saw lightning strike midsummer.</p> <p>Son: 1) I'll live outside of town [when I grow up] probably because I grew up outside of town.</p>
Animal / nature encounters recalled	J	<p>Son 1 [On boy scout trip]: 1) We saw lots of birds and that night there were quite a few bats flying around. 2) We saw a little garter snake. 3) [Animals in your neighborhood?]: 4) Not really. We used to hear coyotes. 5) Snake.</p>
	D	<p>Son [School yard]: 1) There were a lot of caterpillars. 2) Some snakes. Garter snakes, mostly. 3) [In response to mom] Well, there was red algae in the pond, which was really neat. 4) Oh, one time at night, me and Seth were by the sidewalk and all of a sudden this little gray fox sprinted out onto the rainspout and Seth was like, "Kill it!" 5) We see a lot of birds. 6) [In response to mom about what dog brings] Mice. And baby bunnies. 7) What was that one thing where he had totally ripped apart its rib cage and it was brown? Was it a squirrel? 8) [Prompted by mother on bird outside window] Oh, the finches. [what else interested in?] 9) Trees. Rocks. I love rocks. I chip them open. 10) Oh, there's an eagle nest on the power line by grandma's house. 11) [What's that?] A red robin. 12) One time there was a deer sticking its head right through the window at my grandma's. 13) This might be a magpie.</p>
	P	<p>Daughter: 1) I've seen a duck or a goose. 2) A deer. 3) A bald eagle. A white-headed bald eagle (I don't know what they're called). 4) And this, I know it's like a mockingbird. 5) [Recalling Lee Martinez Park] 6) I liked the pony ride. 7) I've seen foxes and bunnies and birds and an eagle. 8) [Conversation about coyotes]: Mother: Didn't you see a coyote over by your dad's condo? Daughter: They were fake. Mother: I thought there were coyotes in the field. Daughter: I know, but I didn't see them.</p>
	S	<p>1) Two baby deer and two mama deer. 2) Elk, bunnies, deer. 3) Sometimes we hear bats, sometimes they fly around our house and sometimes we hear the elk and sometimes we hear the snakes. 4) Coyotes, right up by my window and when it was broken, and it scared me. 5) We saw a bull snake. 6) Two coyotes and a deer. Actually two wolves and a deer. 7) We shot two coyotes and an elk. Two wolves and an elk. The mama deer had blood on its leg and the elk had blood on its leg and then there was like two black wolves. And then we started driving by and we saw the black wolf jump out of the bushes. 8) It was a buffalo we saw back there in Yellowstone. Yeah, and my dad got all the way to it, he was standing right next to it. I'm surprised it [the buffalo] didn't charge him. 9) [Story of Mom and horse]: One of the horses once you got, she would ride it and walk it and it would turn around and go back to the barn. 10) Yes, we have [deer] all the time at our house! 11) Its [the snake's] skin</p>

		isn't poisonous, but its teeth is. I knew that.
	B	Son: 1) [Mother: What do you see in backyard?] Oh, birds. Cats. Dogs. 2) My friends have rattlesnakes in their yards. They have a rattle and venom in their teeth. 3) I saw a fox in my neighborhood. 4) [Prompted by sign]: Dragonfly. [Mother: Where do you see dragonflies] Near ponds. 5) That's a rattlesnake, though. Cause I can see the rattle. 6) [Uncertain about deer/elk]: [Mom prompts about elk seen in Crested Butte] Oh yeah—elk! And my dad's calling them in the middle of the morning [makes elk bugle sound]. 7) There's a heron. I saw one when I was in Omaha.
	P	Son 1) I've seen a robin up there once. 2) Dad has seen a mountain lion. 3) We shot a mule deer over at our friend's house. 4) We hear a lot of coyotes, they make the dogs bark. 5) I saw a rattlesnake once. 6) Saw a bear. They caught a bear right by our school. It was a baby one. 7) Saw a bear run across our yard once.
Safety concerns	J	Father: 1) We had gone up hiking on Horsetooth ... there was a sheer dropff, and I didn't want [Son 3] to go up because I didn't think he was old enough to do it. But he kind of broke down in tears and said, "I really want to do it," so I was scared, but he didn't have any trouble. 2) I guess there's a fear of snakes. 3) A couple of times a dog would come after us.
	D	Mother: 1) We have alley-loaded garages, so I was pretty comfortable with him being out there by themselves when the older was 6 and younger was 3, if they were together.
	P	Mother: 1) He [Son] was afraid that he would get eaten by a lion. 2) I would try to be reasonable and use proper safety precautions when they were down by the creek. 3) But I don't let her go to the park by herself. But I let her brother take her to the park. Or play in the little park that's across from our house. 4) They can play in the field behind our house. You can't drive up in a car and drive away [with them]. That I fully encourage.
	S	Mother: 1) [Regarding hiking]: [Father] takes the front because he normally has the bear spray and is packing in one way or another. 2) We all have whistles and compasses. 3) We all have water packs we carry on our backs, CamelBaks. 4) And the two of them walk between us. And I walk in the back. 5) We just make sure we're very observant about the canyons that we're in and the walls that are around us and they're very aware about putting their hands on certain spots on rocks as we climb up and to look first rather than just put their hands down. 6) We've taught them: Leaves of three, let them be.
	B	Mother: 1) We were less cautious with [Daughter]. From a safety standpoint, and when you have a second child, especially when you have a sibling that's really active, she obviously wants to be doing everything that we're doing. We tried to encourage that, so it resulted in her being exposed to things maybe earlier than he was. She started skiing a little younger than he did. 2) We're not really ones to set a whole lot of boundaries when we go outside. I feel like it's the time when they should NOT have a whole lot of guidelines

		<p>... if we're hiking, we certainly encourage them to be careful, watch where they step, especially in rattlesnake season. 3) If there's equipment involved, meaning bikes, they have to have helmets on when they're biking. 4) [Father] is like that safety guy. He can be like that. But not about outdoor stuff, it's more about walking around the neighborhood ... 5) We lived on a dead end street so there was no through traffic and we knew everyone on the block. ... We were a little more lax about letting [Son] go out and play by himself and ride his bike. 6) We knew other adults had their eye on them, one or another of us was always looking out to make sure kids were still playing and still there. 7) Now there's not a lot of people out in their front yards, so we're more cautious about having them play in the front yard versus going in the back.</p>
	P	<p>Mother: 1) He [Son] had a birthday and we took the boys camping, and they were climbing up a boulder field and throwing rocks at each other. And we said, "OK, guys, you can't do that or you're going to kill somebody." So it's more preventing self-inflicted harm. 2) [Discussing Daughter riding horses] M: She wants to ride by herself this year, instead of with me.</p>