IJQM
International Journal of Qualitative Methods

UNIVERSITY OF ALBERTA
INTERNATIONAL INSTITUTE
FOR QUALITATIVE METHODOLOGY

Article

"It was Fun": An Evaluation of Sand Tray Pictures, an Innovative Visually Expressive Method for Researching Children's Experiences with Nature

Cara D. Linzmayer, PhD
Faculty of Physical Education and Recreation
University of Alberta
Edmonton, Alberta, Canada

Elizabeth A. Halpenny, PhD
Faculty of Physical Education and Recreation
University of Alberta
Edmonton, Alberta, Canada

Abstract

In order to study children's subjective experiences, researchers need to employ methods that are interesting and engaging but at the same time can produce data that answers research questions. This article critically reflects on the use of an innovative visually expressive method, sand tray pictures, which allows children to communicate their multi-dimensional subjective experiences with nature. In this study, sand tray pictures were compared with photographs taken and pictures drawn by the children as approaches for understanding children's experiences in a public botanic garden during a five-day summer camp. Sand trays were identified as a highly effective tool in eliciting insights about children's subjective and socio-cultural experiences in nature.

Keywords: children, nature, subjective experiences, visually expressive methods, sand tray pictures

Since Richard Louv first introduced his book *Last Child in the Woods* in 2005, there has been an explosion of research into children's relationships with their natural environment, particularly in fields such as geography, environmental psychology, environmental education, leisure and recreation, health, and social work. In conducting preliminary research on this topic, the first thing that became obvious to us was a lack of research conducted from the child's perspective. As Gurevitz (2000) stated, "there has been relatively little work to investigate how children value and experience their environments from their own perspective since the seminal work of Hart (1979)" (p. 256). Many of the studies into children's experiences of nature have looked exclusively at external vantage points or objective phenomena and have utilized methods such as behaviour mapping, adult recollections, laboratory observations, parent reports, and questionnaires. The results of these methods reflect others' interpretations of children's experiences, or adults' recollections of their childhoods, and may not necessarily reflect children's lived experiences in nature as they represent them. This suggested to us that there is a need to research children's experiences with nature from their own unique perspective. Our next task became choosing methods that would both allow us to answer our research questions and be respectful of the unique needs and competencies of child research participants. Punch (2002) and others warned that despite the recent increase in innovative image- or visually-based methods employed to consider children's unique needs and competencies, "such techniques should not unquestionably be assumed to be more appropriate for conducting research with children" (p. 322). Furthermore, she suggested that "researchers should engage in a critical reflection of the use of such 'child-centered' methods in order to explore the advantages and disadvantages of how they work in practice" (p. 322).

With this caution in mind, this article argues that the sand tray method is an effective method for examining children's subjective and socio-cultural experiences with nature. We examined the performance of sand tray pictures in comparison to more common visually expressive methods of child-authored drawings and photographs in documenting children's experiences with nature. We use the term visually expressive methods throughout this article to represent a broad range of expressive and creative methods that include participant drawing, photography, and sand tray illustrations. We acknowledge that sand tray illustrating is a method that is characterized by components, processes, and outputs that are more than just visual in nature. We also acknowledge that these methods could potentially be categorized under other method categories. Visually expressive methods (drawing, photo-taking, and sand tray creation) were chosen because we were curious about how they might bridge potential gaps between the children's expression and their communication. These methods were also used to help us understand, from the children's perspective, how the children made meaning about nature with those modalities. In this article, we consider the robustness of the data that came from semi-structured interviews based on these visual expressions.

This article draws evidence from a larger study that was conducted to achieve greater understanding of children's experiences in nature and to inform theory and practice related to fostering children's positive relationships with nature (Linzmayer, Halpenny, & Walker, 2013), thereby nurturing the development of future environmental stewards (Chawla, 1998). In the original study, a botanic garden was used as the research site. The purpose of the original study was to explore the subjective and socio-cultural experiences of children in a natural setting. Experiences were conceptualized as being multi-dimensional in nature: cognitive, affective, behavioural, and sensory (Linzmayer, Halpenny, & Walker, 2013). The garden afforded a diverse range of contexts for nature-based experiences because it included wetland areas, treed areas, grassy areas, floral garden areas, and a butterfly pavilion. The primary researcher (Linzmayer) directed activities with the children in specific areas of the garden. Data were collected from a group of five children (aged 6 to 10 years) that spent five days in the botanic garden. During the

study, children were given one hour of free time in a particular area of the botanic garden. Following the hour of free time, or during the hour in the case of participant-employed photography, children were invited to take photographs, produce drawings, or create sand tray pictures that illustrated what was important to them about their preceding one hour experience in the botanic garden. Children were then interviewed separately by the primary researcher, with the remaining children engaged in free-play activities in the same area of the garden. The visual expressions created by the children in this study were used to elicit interview data, which served as the primary source of data for this analysis of methods. The primary researcher took photographs of the sand tray pictures and drawings and made copies of the children's photographs. These served as memory cues for the primary researcher and inspiration for further reflection as the researcher moved through the analysis process.

Literature Review

Searching for Child-Friendly Methods

Greene and Hill (2005) posited, "children in most societies are valued for their potential and for what they will grow up to be but are devalued in terms of their present perspectives and experiences" (p. 3). Children have been increasingly recognized as having some social and cultural agency and as having experiences that are fundamentally different than adults' (Barker & Weller, 2003; Einarsdottir, 2005; Gurevitz, 2000; Matthews & Limb, 1999; Mitchell, 2006; Punch, 2002; Rasmussen, 2004). This recognition in the wider society is slowly being reflected in research. Conducting research into children's subjective experiences, from their perspective, demands methods that can accomplish this goal (Christensen & James, 2000; Einarsdottir, 2005; Morrow & Richards, 1996). Child research subjects have differing needs, capabilities, and competencies than adult research subjects and therefore require different or adaptive research methods (Morrow & Richards, 1996; Punch, 2002). Children have less power and authority than adults. This cannot be eliminated in the research process, and does need to be recognized and mitigated as much as possible. Methods need to be both developmentally appropriate for children and effective in acknowledging the influence adults may have on children. The following section explores these dual needs in more depth.

Meeting the developmental needs of child participants.

A review of the literature demonstrated that many studies of nature experiences with children employ methods, such as questionnaires or interviews, which assume a certain developmental competence in language skills. One study used traditional question-answer interviews with children as young as 32 months (Phenice & Griffore, 2003). According to Piaget's stages of cognitive development, some children, especially boys, do not have highly developed verbal skills until the age of 10 to 12 years (Keenan, 2002). Rasmussen (2004) wrote that the physical sensations children experience related to places "are not always verbally accessible, and they are often difficult or even impossible to communicate to others" (p. 159). Many other scholars conducting research with children advocate for visually expressive methods because they have observed that these methods can elicit a depth of expression that children are often incapable of achieving verbally (Clark, 1999; Clark-Ibáñez, 2004; Dale & Lyddon, 2000; Epstein, Stevens, McKeever, & Baruchel, 2006; Mizen, 2005; Yamashita, 2002). For example, Mizen (2005) argued that in combination with their verbal accounts, children's photographs are packed with information and rich in detail and insight.

To be more child-centered, methods should be developmentally appropriate but not patronizing (Greene & Hill, 2005). Demonstrably, visually expressive methods have been shown to be

sensitive to these needs (Barker & Weller, 2003; Coad, Plumridge, & Metcalfe, 2009). Wright (2007) posited that children often develop creative arts skills prior to developing language skills; therefore, creative arts-based methods can be more sensitive to children's limited developmental capabilities. Additionally, she argued that because many visually expressive activities are non-verbal, they can potentially depict information stored in children's visual-spatial and motor memories, thus mitigating the limitations of verbally-based methods such as questionnaires and interviews. Vygotsky (1978) posited that arts-based activities, such as drawing, can be effective means for even very young children to share and express their inner thoughts and feelings.

Active engagement.

Methods need to balance power differentials in a variety of ways: (a) by valuing the active participation of children in the research process, (b) by valuing children as subjects rather than objects, and (c) by acknowledging power differentials that can potentially arise between adult researcher and child participant (Barker & Weller, 2003; Gabhainn & Sixsmith, 2006; Greene & Hill, 2005; Mauthner, 1997; Mayall, 2000; Morrow & Richards, 1996). When children are susceptible to power imbalances with adult researchers their responses can be lead more by their desire to please or gain perceived acceptance than by being truthful or reflective (Greene & Hill, 2005; Mayall, 2000). To balance this power, Clark-Ibáñez (2004) argued that photo-elicited interviews "disrupt some of the power dynamics involved with regular interviews" (p. 1512) by allowing the child to actively and subjectively interpret their photographic images.

Several authors have argued that methods need to be employed with children in a way that encourages a sense of comfort in the process (Punch, 2002; Young & Barrett, 2001). Methods also need to assist in developing rapport between the researcher and the research subject (Punch, 2002; Solberg, 1996). Punch (2002) stated that this helps develop a sense of trust, which children need before they feel comfortable engaging fully in the research process. Greene and Hill (2005) argued that researchers need to allow sufficient time for children to develop this trust. It is also helpful for methods to be fun, familiar, and interesting to children while affording children some degree of control or self-determination (Barker & Weller, 2003; Punch, 2002). Veale (2005) argued that creative methods are more appropriate for studies that intend to actively engage research participants in the process of constructing "externalized representations" (p. 255) of their worlds and experiences. When visually expressive methods are used to elicit interview data by allowing children to interpret their own creations, children become more active in the research process and contribute at some level to the analysis of data (Gabhainn & Sixsmith, 2006; Holloway & Valentine, 2000; Young & Barrett, 2001).

Other Research Considerations

While this article reports an evaluation of methods, the larger goal of our study was to explore children's experiences of nature from a multi-dimensional lens, which included sensory, affective, cognitive, and behavioural dimensions (Linzmayer, Halpenny, & Walker, 2013). Methods that could facilitate the expression of these dimensions were vital. Research cited by Malchiodi (2005) and Steele (2003) suggested that visually expressive methods can facilitate the expression of sensory, affective, and cognitive experiences by providing a non-verbal, symbolic means of communicating something that is non-verbal and often symbolic. Sullivan (2005) argued that visual arts methods are better equipped to access the right hemispheric relational processes that may be predominant in children's experiences in nature in terms of developing an emotional relationship or attachment with nature. O'Shea (2011) stated that imagery is required to bridge the emotional and motivational processes of the right hemispheric limbic system with the language centers of the left hemisphere.

Limitations

Arts-based or visually expressive methods have limitations. Barry (1996) warned that with some populations and in some specific situations they could be "intrusive, time consuming, resistance prone, confusing, frustrating, and dependent on the clinical skills of the researcher" (p. 413). Barry (1996) further questioned whether symbols could be interpreted sufficiently or at all by either the artist/participant or researcher, and he reminds researchers that by ascribing a meaning to a symbol, one is potentially silencing other meanings. Barry (1996) offered a means for overcoming this challenge by using the symbol not as a static representation but as "a gateway to other understandings" (p. 415). This highlights the importance of the researcher to be reflexive of his or her own influences and understandings and be open to explore all the possibilities of a child's understanding. Being aware of how questions are asked and keeping the dialogue as open as possible are important.

Review of Specific Methods

In this section the visually expressive methods used in our study are described briefly, followed by a review of their use in previous studies to elicit individual's experiences. This is offered to establish the rationale behind choosing these methods. In evaluating a new method, triangulating it with two established methods—for example drawing and photography—holds value. Given the vast diversity of children and research projects, it is not realistic to think that one method can necessarily meet all objectives. Multi-method investigations allow the "strengths of individual methods to compensate for limitations in others" (Young & Barrett, 2001, p. 142).

Drawings as elicitation tools.

Drawings and photographs are two visually expressive research methods that are commonly used with children (Clark, 1999; Clark-Ibáñez, 2004; Epstein et al., 2006; Gharahbeiglu, 2007; Kendrick & McKay, 2004; Myers, Saunders, & Garrett, 2003; Yamashita, 2002; Yuen, 2004). The value of drawing as a tool to facilitate children's communication and expression has a relatively long history in psychology where it has been used to achieve therapeutic and assessment goals (Veale, 2005). Barraza's (1999) use of drawings to study children's concern for the environment was based on literature she reviewed that demonstrated that drawings reflect mental images and provide "a 'window' into their thoughts and feelings" (p. 2). Drawings have been found by several researchers to be enjoyable and familiar to children and effective in mitigating linguistic barriers with young children (Alerby, 2000; Barraza & Robottom, 2008; Veale, 2005; Yuen, 2004). Alerby (2000) and Punch (2002) cautioned that drawings can be more a reflection of a child's artistic ability and not a reflection of what the child was thinking about or wanting to reproduce, which can be a limitation of drawings. Punch (2002) further argued that the medium used in drawing can limit a child's ability to change or add to their picture, which limits their sense of self-determination. In using drawings to elicit information, Punch (2002) asserted that children may feel insulted to be asked what they drew. Any of these limitations may negatively affect the information children share during discussions or interviews about their drawing.

Photographs as elicitation tools.

Photo-elicited interviews and participant-employed photography have been shown to be effective in working with children and assisting them to express in pictures what they are initially unable to do with words (Clark, 1999; Clark-Ibáñez, 2004; Epstein et al., 2006; Yamashita, 2002). Mizen (2005) praised the value of children's photographs in providing visual expression and facilitating

verbal expression of much that has been unknown about children's experiences. Mizen (2005) further argued that in combination with their verbal accounts, children's photographs are packed with information and rich in detail and insight. Gabhainn and Sixsmith (2006) argued that photographs are empowering in that they allow children to create the data. This depth is as important as breadth. Epstein et al. (2006) found photographs to be effective tools for creating comfort and encouraging participation among children. With children in particular, photographs can facilitate a balancing of power within an interview process by providing children a tool for expressing things they may be unable to through words (Clark-Ibáñez, 2004; Epstein et al., 2006). Clark-Ibáñez (2004) found that participant-employed photography and photograph-elicited interviews elicited multiple and layered meanings and gave children a means for positioning in the foreground certain aspects of their experience that may otherwise be interpreted as situated in the background. She asserted that photographs can foster rapport between researcher and participant, help structure an interview, and help stimulate memories. Clark-Ibáñez (2004) concluded that photographs empower "the interviewees to teach the researcher about aspects of their social world otherwise ignored or taken for granted" (p. 1524). She cited further examples of how photographs can access information from a different level of consciousness than words. In arguing for the value of photographs, Rasmussen (2004) stated, "when a photograph … becomes the subject of a narration, it can contribute to explaining something of what is unique about the place, even though feelings, atmosphere and spirit are difficult" (p. 159).

Mizen (2005) reminded researchers to be reflexive and socially and culturally aware in their use of photographs with children, as with other visually expressive methods. Limitations of the use of photographs with children include technical problems that may interfere with the imaging, it can be time consuming and void of a clear format, and the process of photography can detract from the experience being studied if done simultaneously (Meo, 2010). Punch (2002) argued that children's motivations to photograph can be rooted in many things not related to the research, including producing something that is considered socially or culturally as a "good photograph" or something that they may want to give to someone. Young and Barrett (2001) reported that in their study, the novelty of using a camera led some children to use up all their available photos at the beginning of the process; however, they found that the data was not any less rich or valuable because of this. Another drawback identified by Punch (2002) was that photographs can capture spontaneous images and may be unable to reflect historical or otherwise significant images held more in the child's imagination than in their immediate environment. In some research studies, this may be considered a strength; for example, Fasoli (2003) found that photographs by themselves did not provide a complete story, but the photos had value to complement other methods.

Sand tray pictures as elicitation tools.

This article examines the performance of sand tray pictures in documenting children's experiences with nature. Despite the apparent value of using sand trays as a tool for facilitating the verbal expression of children's experiences (Dale & Lyddon, 2000), very few research studies have employed sand tray pictures (see Bingley & Milligan, 2007; Ramirez & Matthews, 2008). Its value in research is yet to be fully realized. Sand trays are collections of figures, and other materials, which can be selected and placed in a sand box by research participants, to illustrate their responses to researcher's questions. We used sand trays because of their potential to be an effective method with child participants and in researching experience. Experience in this study was conceptualized as having four dimensions: affective, cognitive, behavioural, and sensory (Braun, 1988; Nelson, 2007; Turner, 2005; Wilson & Ryan, 2005). Sand tray pictures' limited use as a research method and its established utility in therapeutic fields provided hope that it could be a valuable tool for researching children's experiences with nature in this study and could

overcome some of the limitations experienced by other visually expressive methods. In the following sections our rationale for trialing sand tray pictures as a method is outlined and our critical evaluation of its strengths and limitations in researching children's experiences with nature is provided.

Through sand trays "we see and touch symbols" and "prominent among the features of symbols is the *feelings* they evoke" (Turner, 2005, p. 313). Sand tray work is described as creating "three dimensional scenes, pictures or abstract designs in a tray of specific size, using sand, water and a large number of miniature realistic figures" (Weinrib, 1983, p. 2). The figures used should include a diverse assortment of people representing diverse cultures, vegetation, animals, buildings, boundaries, vehicles, mythical figures, elements such as fire and water, and additional materials, such as paper, clay, and paint, which children can use to construct a symbol that is not available but is desired (Bingley & Milligan, 2007; Dale & Lyddon, 2000). Participants use objects, figures, materials, and sand to create a picture in the sand tray (see Figure 1).

Figure 1. Example of a sand tray picture created by the author.

From our own experience using art therapy with children, drawings can place unspoken pressure on a child to produce a "good drawing." Sand tray expressions eliminate this pressure by allowing children to create pictures that do not rely so heavily on a child's artistic ability, development, or manual dexterity. Sand tray work is differentiated from sand play therapy by focusing on expression not therapy (Bradway & McCoard, 1997). Sand tray is a projective technique that was actually used in Frank's personality studies of the 1930s and later in Piaget's research of children's environmental reference systems in the 1950s (Hart, 1979). Time constraints prevented Hart from using this method in his pioneering study of children's place experiences in the 1970s. The interpretation of the sand trays here is within a research, not therapeutic, context. Research has a goal of uncovering or discovering information whereas therapy uses this information specifically and explicitly to intervene or change the individual. Having used this method in their research into the mental health effects of childhood play experiences in nature, Bingley and Milligan (2007) stated, "the researcher has to have a clear sense of the differences between a therapeutic space and a research space" (p. 285). Bingley and Milligan (2007) further stated that despite the limitations of time, space, and intensity, sand trays provide very valuable information for geographic research through a process where individuals can physically reconnect with the earth through touching the sand. The use of a sand tray and miniature objects for elicitation purposes makes children's symbols concrete, tangible, and three-dimensional (Homeyer & Sweeney, 1998). Homeyer and Sweeney (1998) described several benefits of sand trays: they facilitate expression of non-verbal, emotional issues, they have a unique kinesthetic quality, they

facilitate the emergence of metaphors, and they engage children in an interesting and playful process.

Russo, Vernam, and Wolbert (2006) found that the use of sand tray pictures increased the ability of children to tell stories. Dale and Lyddon (2000) reviewed a plethora of qualitative studies that showed sand trays, as a therapy tool, helped elicit an expression of emotions that children with limited verbal skills would be unable to do so otherwise. Ramirez and Matthews (2008) used sand tray pictures in their study of children's refugee experiences. They reported that sand trays produced the basis for rich narratives and were the preferred medium of expression among sand trays, photographs, and drawings, as identified by their child participants. Ramirez and Matthews (2008) found that sand trays "prompted creativity, communication, openness, questions and clarifications, and made conversations purposeful and enjoyable" (p. 96).

Unlike drawing, sand trays could allow children to create pictures that were not as dependent on a child's perceived ability to draw accurately. They would also eliminate the technical drawbacks inherent in participant-employed photography. Sand trays are also more readily changed during the process than some drawing mediums such as charcoal or paints. In this study, it was hoped that the kinesthetic nature of creating the sand tray pictures would, in particular, elicit data pertaining to the sensory dimensions of children's experiences in a way that the other visually expressive methods could not, giving sand trays a possible advantage over other visually expressive methods in the investigation of the multiple dimensions of experience.

Summary

Based on literature cited above, we employed three visually expressive methods that could potentially maximize children's participation in the research process. The efficacy of two of these methods, drawings and participant-employed photography, has been well documented in the literature. Sand tray pictures, while common in therapeutic arenas, are virtually unheard of as a research method. The main purpose of this article then, beyond introducing sand tray pictures as an innovative visually expressive method, is to evaluate the effectiveness of sand trays to meet the developmental needs of child participants and mitigate the imbalance of power in the research process. The remainder of this article will describe the research in more detail and present the evaluative findings related to sand tray pictures.

The Study

Study Participants

We chose to limit the group to five participants to take advantage of the benefits of small group research. The children in this study were between the ages of 6 and 10 years, and all from intact two-parent, middle-income families of Anglo-European heritage who lived in rural, central Alberta, Canada. There were one brother-sister pair (Cloe, 8 years; Colton, 10 years), two other girls (Pearl, 9 years; Angelica, 9 years), and a second boy (Matthew, 7 years). To recruit participants, an advertisement was posted in the newspapers of three communities located within a 30-minute drive of the field research site, a botanic garden. Upon contact from interested parties, the researcher met with each family; children were screened to ensure they had basic developmental capabilities to engage in a group research process, including adequate focusing skills, communication skills, and social skills. At this meeting, explanations were given to the family and the child of what to expect from participating in this research, informed consent and assent were obtained, and basic demographic information about the family and child was obtained.

Schedule and Participant Activities

The daily schedule involved an hour of free time where children had the opportunity for direct, self-exploratory experiences within a selected area of a public botanic garden. Following the free-time activity, children engaged individually in one of the visually expressive methods (drawings, sand trays, and selected photographs developed from the previous day) and subsequent interviews (one at a time) as assigned by the researcher. Both the visually expressive activities and the interviews were conducted in the same area of the garden as the free time.

The visual expressions were created in the company of the other children; however, each child worked independently. The children were invited to take photographs, create drawings, or make sand tray pictures that represented what was important to them about their experience in nature. The children received basic instructions on each of the visually expressive methods, which included how to operate the disposable cameras and what media and tools were available for the drawings. For the sand tray session each child was provided with a 24" by 18" plastic sand tray with white sand and a large assortment of miniature toys, as described earlier. These toys were spread out on blankets in no particular order. Materials, including paper, tape, cardboard, and clay, were also available and children were informed that they could use these to make something that they wanted to include in their picture but that they could not find in the collection supplied. Interviews, which ranged from 10-25 minutes, were conducted away from the other children so as to provide privacy and avoid distractions. The photographs, drawings, and sand trays were then used to elicit semi-structured interviews. Interview questions included:

- Tell me about your experience drawing/taking photographs, etc.?
- What does your picture/photograph /sand tray say about what is important in your experience of nature earlier today?
- What does your picture/photograph/sand tray tell about how you felt during your free time?
- What do you think you will remember the most about your experience in nature earlier today?

The interviews were structured around the emotional, cognitive, and sensory content of the children's visual expressions. Questions included:

- What does your picture/photograph/sand tray tell about what you saw, heard, felt, tasted, and smelled while you were out in nature earlier today?
- What does your picture/photograph/sand tray tell about what you think about your experience in nature earlier today?
- What does your picture/photograph/sand tray tell about what emotions/feelings you experienced during your time in nature earlier today?

The children were invited to make meaning of their own expressions, with the researcher simply being curious and inviting verbalization of meanings for the child rather than attempting to interpret the expression from the researcher's perspective. The children were also invited to comment on their experiences with the research process, including each of the methods used. Each child participated in at least five interviews throughout the week. The four children who were not engaged in an interview participated in a scheduled activity that was organized and supervised by a research assistant. The primary researcher, research assistant, and five child participants were the only individuals present at the camp.

Data Management and Interpretation

Researchers should take care to respect the ownership of children's visual creations. Working collaboratively with the children, the primary researcher discussed their visual representations with them. It is those meanings that were then used as data. We took seriously the concern that visual methods "can make children's thoughts, desires and concerns visible to public and adult scrutiny" (Mitchell, 2006, p. 70). Above all, researchers need to protect children's safety in their expressions. In this study, the children's art and photographs remained the property of the children and were not used directly in the data analysis. Digital photographic records of the children's photographs, drawings, and sand trays were kept by the researcher and used only as a reflective aid in the analysis stage.

The primary researcher transcribed verbatim the digitally recorded interviews. The researcher also took limited notes during the interviews and conducted daily interpretive analyses at the end of each day. Daily interpretive analysis protects important insights and constructions from being lost over time. We concurred with other researchers that "a great deal of understanding comes from the context of the interview, and from a range of cues that are simply not captured on tape" (Lewin, Taylor, & Gibbs, 2005, p. 3).

During analysis, each child represented one case (Patton, 2002). This approach allowed the primary researcher to analyze each case in depth and to make comparisons with the other cases. Boeije (2002) recommends a systematic plan of analysis be developed for complex combinations of case interviews. Cases were compared in the following manner:

- comparison of interviews that were derived from the same visually expressive method (e.g., all sand tray-elicited interviews) (between cases – single method);
- comparison of interviews that were informed by a similar free-play garden environment (e.g., all interviews that took place after an hour of free-play in the garden's wooded area) (between cases – single setting);
- comparison of all interviews conducted with a single child (within case – all methods); and
- comparison of all interviews with each child (between cases – all methods).

Content analysis (Patton, 2002) was conducted for each case to identify major themes and meanings. We looked for themes relating to product (answers to our research questions) and process (examination of methods). The content analysis was comprised of inductive analysis and deductive analysis. In inductive analysis, the categories were identified and named by the participants, in this case the children, and emerged out of the data. It was important that the findings accurately represented the co-constructed meanings developed through the interview process; as a result, a combination of indigenous (child-identified) and sensitizing (researcher-identified) concepts were used. Sensitizing concepts included the four dimensions of experience: cognitive, behavioural, affective, and sensual. The data were coded using these categories and themes. We modeled our analysis on Seidel's (1998) circular process involving noticing, collecting, and thinking about interesting things. We would notice recurrent themes; we would identify and collect them; and then after reflecting upon them, we would think about those themes as we noticed the data again. The entire process of data analysis is best seen as a circular process with continual movement between the data and the analysis and the researcher.

Sand Trays as an Effective Expressive Research Method

As discussed previously, sand trays have been shown to have established advantages in therapeutic contexts and they have received limited use in published research studies. We were interested in the potential for sand trays to elicit understanding of children's multi-dimensional conceptualization of experience. The use of any method, particularly a new method, demands critical reflection on its effectiveness. The remainder of this article outlines our analysis of how effective sand trays were in this study in comparison to photo taking and drawing. Like any research method, sand trays had several benefits and some drawbacks in this study. Children identified the sand trays as being fun and valued the sand tray's capacity to create "real" and malleable depictions of their experiences with nature. From our perspective as researchers, the sand tray pictures and their subsequent interviews elicited more depth and breadth of data on children's multi-dimensional experiences with nature. In particular, sand trays were able to elicit a significant amount of data around the sensory dimension of experience. The primary drawback of this method was the practicality of providing a sand tray and a sufficiently diverse collection of miniature toys.

Sand Trays are Child-Friendly

"It Was Fun"

The children all reported that the sand tray pictures were their preferred visually expressive activity at the camp in comparison with drawing and photography. This may have been due in part to the balance of novelty and familiarity associated with it. Very few children have had experience with sand tray pictures as a visually expressive experience. Most have likely had some experience with sand in general, for example playing in a sandbox or making sandcastles at the beach, and playing with miniature toys. This act of play was likely less regulated and less judged by adults than acts that formed the basis of the other methods that are more "artistic." Punch (2002) described this familiarity as researching within the child's own space. For participant Cloe, "making the sandbox was the most fun part of the day." During the other interviews, she was difficult to engage because she was concerned she was missing out on what the other children were doing while she was being interviewed. She often appeared to rush through her art processes. The sand tray was the exception. Cloe spent a considerably longer amount of time on her sand tray, and her interview was three times as long and contained much more detail than her other interviews despite the fact that the other children were concurrently engaged in a craft that Cloe had expressed interest in earlier in the day. Other participants also reported the sand tray process as "fun." Although the children were unable to clarify in any more verbal detail what was meant by fun, it appears that novel experiences that are enjoyable contribute to the "funness" of a method.

Children's Desire to Produce "Real" Pictures

It is interesting to note that children as young as 7 years old appear to have developed an expectation of art as needing to be "realistic." This need to depict "realness" may be a cultural construct reflected by Western North American culture. Below, Cloe expands on why she enjoyed the sand trays:

> Researcher: What did you like about it [making the sand tray picture]?
> Cloe: I liked how we got to put stuff in it. It's 3-D.
> Researcher: And what do you like about it?
> Cloe: It looks like its real and coming out at me.

Researcher: Is there anything else that you can do with the sand that you can't do when you draw?
Cloe: You can put it on top of stuff. You like just pick it up and then put it on top of stuff [the sand]. I like how it goes through your hands.
Researcher: Do you like touching the sand?
Cloe: Yeah.

Cloe was not alone in valuing the three-dimensional nature of the sand tray pictures:

Angelica: Well, I wanted to bury the roots because I didn't really like them staying on top because that makes me feel like you can still see the roots. It makes me feel weird, like why would you see the roots above the ground. Because it made it taller and easier to see like the real trees. I just want to add things that make it more real [adding sand].
Researcher: What did you like about working in the sandbox?
Angelica: In here you can make like a thousand, like you can put, like you don't have to stick just one huge thing, you can stick little tiny, like lots of things. You can stack it on top, you can stack it here, you can go in there.
Researcher: And what about drawing a picture, how would this be different than drawing a picture?
Angelica: Drawing a picture you can't really make it so 3-D. Then it seems more lifelike. Its easier to talk about, you can say, like, then like, it just pops up and you can see and say "okay here's one thing, here's another thing, here's one, here's the sun on a black stick, here's a pond with a little hole" or stuff like that.

Children's Value of Self-Determination and Flexibility

Another value to the sand trays identified by the children was that they were able to manipulate and change their creations, unlike their drawings that are "unerasable." Being unable to erase mistakes created a feeling of dissatisfaction in the end result of Pearl's drawing:

[Pearl discussing her drawing of the forested area.]

Pearl: I tried to erase it but I couldn't.
Researcher: Oh, I see. You tried to erase it but you couldn't with the charcoal.
Pearl: Mmhmm.
Researcher: Why would you erase that?
Pearl: Because I don't want it. Umm, 'cause, it didn't really look that good.

The researcher observed numerous instances when all five children were creating their sand tray pictures where they moved things, added things, and removed things before completing their creations. While the children did not explicitly refer to this quality of the sand trays, it is possible to deduce that it supported the self-determination of creating the picture they wanted, unconstrained by limitations of art mediums or artistic talent.

Sand Trays are Researcher-Friendly

In this study, we as researchers needed our methods to be child-friendly, but we also needed them to aid us in answering our research questions. This next section evaluates sand trays in comparison to drawings and photographs in their ability to aid us in this goal of producing

valuable data. This evaluation of the three methods—photographs, drawings, and sand trays—is separated into three sections: practicality, employment of method, and elicitation of valuable data.

Practicality

Photography can add a dimension of technical difficulty not inherent with the other methods. In one case, the majority of a child's photographs did not turn out because of poor lighting or camera malfunction. In another case, the flash did not work properly on all the photographs. Overall, photographs did provide detailed data, in particular as it related to memories. Technical considerations affected the practicality of this method in a negative way and more care should be taken to ensure this is not the case in future studies.

Drawings were relatively easy to implement. While the effectiveness may be improved by the variety of materials provided, drawing does not necessarily require any specialized equipment. Some children appreciated the variety of markers and art materials; others simply used a pencil and paper.

Of all the methods used, sand tray pictures were the least practical for the researcher as they required the most materials. A sandbox and sand are required and, in this study, needed to be transported to different areas within the botanic garden. In addition, a diverse enough collection of miniature toys was needed to afford the children the opportunity to create the scenes they wanted. Such a collection of toys can be both expensive and cumbersome to transport. One of the participants also identified a limitation in the lack of diversity of the sand tray toys; however, this limitation was easily managed by providing materials for children to create their own objects if a specific object was not available.

Angelica: Except for one thing.
Researcher: Oh yea, what was that?
Angelica: I couldn't find enough butterflies.
Researcher: Ahh, not enough butterflies.
Angelica: This little guy is cute, he adds up to a whole bunch of butterflies because he's so cute [the wood/feather one].

Employment of Method

Of the three methods, photography carried the most challenges in its employment as a method. The diversity of settings and variation in lighting and subject matter made it difficult for a "one-size-fits-all" camera to be sufficient in all situations. Disposable cameras also limited the number of photographs that could be taken. Four of the five children used up all their photographs within the first 15 minutes of their "free time." The fifth child, the oldest of the group at 10 years old, consciously made a choice to save a few pictures for the "end" of his time. This raises questions about the validity of the photographs taken in representing the most significant or important aspects of the children's time in nature.

In some cases, photography impacted the child's experience by permitting a more complete sensory experience of nature, as illustrated below:

Researcher: So what was it like to have the camera today?
Colton: It was really interesting.
Researcher: What made it interesting?

Colton: That I could take all the pictures of different things that I couldn't touch because like those [pointing at a photo of prickly plants], because they're all prickly. I could see them, but I couldn't touch them.

For others, precautions were taken so that the picture taking didn't interfere with the experience:

Researcher: So what was it like having the camera today? Because I noticed that for some of it you had it and for some of it you gave it to [the research assistant]. Why did you give it to [the research assistant]?
Angelica: Because I didn't want to lose it in the water.
Researcher: Oh ok.
Angelica: Because when I was climbing up I had it tight.
Researcher: Uh huh.
Angelica: So then I knew I was not going to drop it.
Researcher: Ok.
Angelica: 'Cause on the first few seconds, minutes, I had to give it to [the research assistant] just to get used to the slippery.
Researcher: Oh so you had to kind of focus on the rocks.
Angelica: Yeah more than holding on to a camera.

In two instances, imposed limitations in the implementation of the photographs may have affected the data elicited from them. In the case of the photographs, children were asked to select three photographs from the total taken, which was approximately 20, that represented the most important parts of their experience in nature. In one case, the child selected photographs that were the "prettiest":

Researcher: So [Cloe], tell me, you've picked three photographs that are important. Tell me why you picked them, what they are pictures of, and why they're important.
Cloe: I picked this one because I really like roses.
Researcher: Ok.
Cloe: And I like this one because it's pretty.
Researcher: Ok, what's pretty about it?
Cloe: The pink and purple flowers.
Researcher: Oh ok.
Cloe: And I picked this one because it looked, it just looks really pretty.
Researcher: Ok, so you've kind of picked all of them because they're pretty.
Cloe: Yep.

Another child, Angelica, did not select certain pictures that told a story because of the limitation of choosing only three photographs to talk about. She shot a long sequence for photos depicting her story of the garden's waterfall and creek as it flowed under a bridge. She could not choose just three photos from this sequence as that was considered too limiting.

The children appeared to engage more spontaneously in drawing, perhaps because of their familiarity with this medium. Drawing also appeared to be more socially influenced by other children's drawings. On several occasions, the researcher observed a child asking another child what they were drawing or creating, and then deciding to draw something very similar. On the whole, children appeared more distracted from their task of drawing and would, more often than with the sand tray, get up to get a drink of water, change art media, visit with their co-participants, or do other tasks that took their attention away from their drawing.

Sand tray creations involved a more deliberate process of choosing which toys to include and where to place them in the sand tray. The researcher observed much less distractive behaviour than listed in the discussion about drawing. When children were creating their sand tray pictures, they appeared to focus much more of their attention, for longer periods of time, on their sand tray and only their sand tray.

Elicitation of Valuable Data

Polkinghorne (2005) argued that qualitative interviews must be of "sufficient quality to produce worthwhile findings" (p. 142). He identified two qualities of valuable interviews: breadth and depth. These characteristics were applied to evaluate the utility of the three methods used to elicit information about children's experiences with nature. *Breadth* refers to the quantity of categories identifiable in the data. *Depth*, according to Polkinghorne (2005), includes not just "accurate recalls" (p.143) but also reflections on meaning. Polkinghorne (2005) expanded on this by arguing that "to capture the richness of experience in language often requires the use of figurative expressions such as metaphors and narratives" which "can expand the meanings contained in literal language" (p. 139). For example, Angelica used a metaphor of her successful performance in a math test to describe her emotions experienced in the garden.

Breadth.

In all the interviews, drawings and sand trays generated comparably more breadth than photographs in terms of the number of categories identified in the data. Photograph-elicited interviews generally stayed limited in scope to what was depicted in the photographs. In many cases, children chose photographs of a specific flower or specific butterfly, for example. To illustrate the potential for sand trays to elicit interviews with more breadth than drawings, a comparison of Colton's photo and sand tray pictures, and short sections of the accompanying interviews, is provided (see Figure 2 and Figure 3). While aware and committed to the importance of fostering security and safety in creating and expressing, we chose to include in this article two of the children's images (with the child's assent and parent's consent) to address the article's reviewers who strongly urged the authors to include children's visual creations as evidence of data robustness.

Figure 2. Photograph of Colton's sand tray picture.

[Initial section from Colton's sand tray interview.]

Researcher: Ok so how did you decide to make this scene with everything in it?
Colton: Well, I was going to make like trees and stuff and like just all the water place instead of this. And I saw this little house there and I thought that might look like this almost so I put that there then I just started working around that. And like I kind of found this stuff that's kind of over there.
Researcher: Ok.
Colton: I found a little bit of the stuff for there and then I just saw that river and I put that in.
Researcher: Oh. How did you decide to put the trucks and cars and stuff in there?
Colton: Because I heard and saw lots of vehicles going by there and umm its kind of a dirt road so that's what made me really want to do it because you can't really get a paved road on here so a dirt road is really good on here because it's just sand.
Researcher: True.
Colton: Dirt roads usually have lots of sand and stuff.
Researcher: Yeah, you're right.
Colton: To keep the dust from flying up. They usually put sand over top.
Researcher: So I'm curious, why was it important to put the fence and what was behind the fence in? Because like you said we spent most of the day in the river and the water here. So why was that important to put that in there?
Colton: Because if there was no fence, people could just walk back there and get in the way of the vehicles by accident and something.
Researcher: Oh ok.
Colton: And like little kids could just run through there and hurt themselves and stuff.
Researcher: So that's why it's important to have the fence.
Colton: And that's their proper working place or something or whatever they call it.
Researcher: Oh. So I get why that's important to have the fence there but why was it important for you to put it in here, in your picture?
Colton: Because I was trying to do the whole place here. I was just trying to copy this place here and there was a fence there so I decided to put the fence there.
Researcher: Oh ok. It's just very interesting to me.
Colton: It's a different kind of fence but that's the only kind of fence there was.
Researcher: Well for sure. A fence is a fence really right? Ok. So tell me about this part. How does it help you remember about what we did today?
Colton: It helped me remember because umm we played in the water today and umm lots of people got their boots full of water.
Researcher: They did, didn't they?
Colton: But they didn't suction cup on to their feet like my dad's boots do.

Figure 3. Photograph of Colton's drawing.

[Initial section from Colton's drawing interview.]

Researcher: So [Colton], tell me about your picture that you drew here.
Colton: It's uh, different leaves and a pinecone that I saw and I found really different leaves that I never seen before.
Researcher: So how did you decide to draw these leaves and that pinecone?
Colton: Because I wanted to draw nature and that's pretty much all there is out there is leaves and plants and trees.
Researcher: Mmhmm. So what did you think about that? What was this like for you because this was a bit different than where we were the other days?
Colton: Well, it was really neat because um there were leaves and stuff. And it's not usually this packed with grass, with tall grass and stuff.
Researcher: Yep, why was that neat? What was neat about having the grass and the leaves everywhere ?
Colton: Well, it's neat to go through walking through them and all the taller grass, it's neat to be walking through them because you can't see where you're going too well.

[From here the interview goes into a long discussion of novelty and challenge and does not directly relate back to the leaves and pinecone in the drawing.]

Sand trays appeared to excel at enabling the children to portray many nature experience themes. In his drawing-elicited interview, Colton talked primarily about the leaves and pinecones and then later about challenges. In a similar section of his sand tray-elicited interview he talks about trees, a river, a building, a road, the surface of the road, the purpose of the road, fences and boundaries, getting wet boots, the sensation of stepping in mud, his father, and so on. The tangible representation of these elements and experiences using the sand tray miniatures appeared to expand expressive opportunities for the children. The nuanced description of dirt roads, depiction

of bounded spaces and restricted areas, and the attempt to illustrate the wholeness of the garden through the sand tray image are examples of the sand trays' ability to inspire a breadth of subject matter to discuss. In contrast, the challenge of drawing representations of things encountered in the garden appears to have restricted the variety of elements and experiences talked about. Leaves and tree cones, while the main focus of the drawing, were only briefly discussed. Colton appeared to indicate that they were meant to represent "nature" but little else was elicited from their depiction. Instead, the conversation moved to other experiences, limited in length because the initial catalyst for discussion, the drawing, lacked additional detail to inspire conversation.

Depth.

Co-creation/co-interpretation of the visual expression.

Polkinghorne (2005) asserted that qualitative interview data requires the researcher to "dig below the surface to bring up experiential accounts" (p. 141), and he warned that to be valuable interview-produced data should contain more than "only initial reflections of participants without explorations into the depth and breadth of the experience" (p. 142). He further argued that interview-produced data is co-created with the researcher and participant but the participant remains the primary author. A prime example of this co-creative process is Pearl's conversation about the bird in her drawing:

Researcher: [Pearl], tell me about your picture here.
Pearl: It's trees.
Researcher: Trees.
Pearl: Mmhmm. An owl, I don't know why I put an owl.
Researcher: Interesting.
Pearl: And the bush where I ate berries.
Researcher: Ah, the berries.
Pearl: Mmhmm.
Researcher: Okay. And what's this?
Pearl: I tried to erase it but I couldn't.
Researcher: Oh I see – you tried to erase it but you couldn't with the charcoal. So if you had an eraser you would have just erased that?
Pearl: Mmhmm.
Researcher: Why did you want to erase that?
Pearl: Because I don't want it.
Researcher: Oh, so how did you decide you didn't want it there?
Pearl: Umm, 'cause it didn't really look that good.
Researcher: Okay. And then did you draw it again over here?
Pearl: Yeah.
Researcher: Okay. So does that one look better?
Pearl: Mmhmm.
Researcher: So why did you decide to draw it over there?
Pearl: 'Cause I wanted it to fly.
Researcher: Oh you wanted it to fly. So how did you decide to draw the trees, and the bushes where the berries were and an owl?
Pearl: 'Cause I wanted to draw an owl because I don't know how to make a bird.
Researcher: So an owl is a type of bird you know how to draw?
Pearl: Yeah.
Researcher: So it kind of just represents a bird that you see?
Pearl: Yeah.

Researcher: Did you see a bird when you were out walking today?
Pearl: Yeah – a chickadee.
Researcher: Oh a chickadee. So what was that like?
Pearl: It was cool.

Interviews based on the photographs elicited the least amount of co-creative conversations in comparison to the other two methods. Photograph-elicited interviews, for all the children, appeared to be more a retelling of events with little construction of meaning. As stated above, depth includes both. In comparison with drawing and sand trays, most of the photograph-elicited interviews themselves were based less on the images in the photographs and more on the children's recollection of their experience. This may have been for reasons discussed above, such as the children were selecting photographs that were not representative of the most significant part of their experience but for aesthetic or other reasons. In all cases, photographs did elicit information on all four dimensions of experience. Overall, the interviewer observed the children to be less engaged with the photograph-elicited interviews and eager to move on to other things after only a few minutes.

The sand tray-elicited interviews appeared to contain more connections to social relationships than the interviews using the other two methods. These social relationships included the children's personal memories of time spent in nature with family members, references to their experiences with their fellow research participants and the researcher and her assistant, and references to third party relationships, such as Cloe's story of the property owners and trespassers discussed below. For all the children, their sand tray-elicited interviews were based more closely on the images in their sand trays than solely in their memory. Also, as reported in the employment of method section of this article, the children were more engaged and less distracted during sand tray interviews. The reasons for this are speculative but may be a consequence of the increased co-creative process involved. It is also possible that the use of sand trays by researchers may be more effective "to attend to establishing a trusting, open relationship with the participant and to focus on the meaning of the participant's life experiences rather than on the accuracy of his or her recall" (Polkinghorne, 2005, p. 142). Sand trays, because of their playful process and perhaps less judgmental associations, may be more apt to establish trust. The children's reports that the sand trays were able to create more "real" pictures suggest they may be less insecure about the accuracy of their recall or their drawing ability. In comparison to the other methods, sand tray-elicited interviews contained many more exchanges that Polkinghorne (2005) would characterize as co-creative. Many decisions go into the creation of a sand tray picture. Each decision creates space for reflection and dialogue between the researcher and the child participant. This was most readily apparent in interviews with the less verbal of the child participants.

The spontaneity inherent in drawing may generate less detailed meaning-making. This is illustrated through a comparison of Cloe's drawing- and sand tray-elicited interviews:

[Section taken from Cloe's drawing-elicited interview.]

Researcher: So how did you decide to draw this?
Cloe: Uhhuh, from the butterfly center.
Researcher: Was this a picture of a butterfly you saw in there?
Cloe: No.
Researcher: So was it … what kind of butterfly is it?
Cloe: I don't know.
Researcher: How did you decide to draw it that way?

Cloe: I just draw them like that.
Researcher: Okay, so how did you decide to draw that butterfly?
Cloe: Mmm.
Researcher: And not a plant or something else you saw today?
Cloe: Because I really like butterflies.
Researcher: Oh do you?
Cloe: And I just wanted to.

[Section taken from Cloe's sand tray-elicited interview.]

Researcher: So how did you decide to put the sword in?
Cloe: Because…. There … uh, there's kind of a grave a person trying to kill them.
Researcher: Oh okay, so tell me about that – what's the grave and why's he trying to kill them?
Cloe: Because it's his property.
Researcher: Oh, okay.
Cloe: And they want to get married here.
Researcher: Oh do they? Interesting. And so why does he want to kill them?
Cloe: Because this sign says "keep out – no trespassing."
Researcher: Oh. And are they trespassing?
Cloe: Yeah.

The sand tray elicited a more co-creative conversation than the drawing. In her drawing-elicited interview, Cloe's butterfly was simply a butterfly she is capable of drawing. By comparison, her sand tray-elicited interview elicited a story about a property owner using a sword to keep an engaged couple off his property. This is a much thicker description of how she decided to include the sword in her picture, and what the sword meant to Cloe.

Multi-sensory data.

Another layer of depth in this research was the multi-dimensional model of experience. Methods needed to generate data on the sensory, emotional, cognitive, and behavioural dimensions of children's experiences in nature. All three methods were able to do this satisfactorily; however, sand trays had an advantage in being able to generate more breadth and depth than photographs, and more consistently with all children than drawings. Of particular significance to this research was the sensory dimension that appeared to figure prominently in children's experiences in nature in this study (Linzmayer, Halpenny, & Walker, 2013). Sand tray-elicited interviews generated significantly more diverse sensory references than either photographs or drawings. Photograph-elicited interviews and drawing-elicited interviews tended to overemphasize visual reports whereas sand tray-elicited interviews more consistently contained references to sound, taste, smell, and touch. Sensory references were coded in each interview and sand tray interviews on average contained over 40% more sensory references than the other methods combined for each child participant. This may have been the result of the sensory nature of the sand tray process. Some of the sensory references included:

Pearl: I water them [the flowers in her grandma's garden]. I look at them. I smell them, a lot things. They're very cool.

Pearl: Well, the rain. It feels a little bit good, especially the rain going splish, splash, splish, splash on your hat.

Angelica: They [the slugs] were slimy.

Cloe: We got to like find flowers and eat wild berries. They tasted good.

Colton: But they [the rubber boots] didn't suction cup on to their feet like my dad's boots do.

Matthew: 'cause I remember my feet got wet.

The sand provided a very kinesthetic experience that was noted by all the participants. Two interview examples included:

Pearl: It was cool to make a white sand, all the white sand is so soft. Umm, I liked the colors of all of it, and this is what I liked, the shiny sand [running hand through sand].
Researcher: What do you like – you like to touch it, you like to look at it.
Pearl: I like to touch it, I like going like this [running through fingers].

Researcher: And what about how you've been sprinkling the sand, how, or is that important?
Angelica: I just wanted to do that because it made it look more lifelike to me.

Overall, while all three methods performed satisfactorily in this research, photographs were the least effective and presented the most challenges. Although cumbersome to set up, sand trays appeared to have an advantage in supporting co-creative conversations that elicited conversations with high levels of breadth and depth—namely many different sensory references, a greater breadth of subject matter, and a richer description of experiential accounts.

Perhaps the most significant strength of sand trays in this study was its apparent ability to uncover more information about children's sensory experiences. As indicated above, sand trays elicited information relating to all five sensory experiences whereas photographs and drawings were biased towards visual reports. Bingley (2003) observed similar results, and he asserted that the kinesthetic nature of the sand does not privilege visual experiences the way other methods do: "Thus, emphasizing different senses, with the tactile as the fulcrum, appeared to hone people's awareness, bringing out insights and reflections about their sense of place from a number of different sensory and psychic perspectives" (p. 336). Like the evidence in this study, Bingley (2003) found that "the language used in feedback was markedly rich and sensual" (p. 337) with the sand tray and brought "to consciousness awareness of multiple dimensions of experience of landscape" (p. 337). Bingley and Milligan's (2007) work explored youth and adult recollections and found that sand tray work was "engaging and facilitated access to embodied memories and ideas" (p. 295). If sensory experiences play more prominently in one's memories, as Cachelin, Paisley, and Blanchard (2009) and Sebba (1991) suggested, then the sensory experiences uncovered through sand tray pictures in this study are potentially very significant and valuable. Although this study involved a small, homogeneous sample and the results are not generalizable to larger populations, it does strongly suggest that sand trays as a visually expressive method warrants further investigation, especially with respect to its application in studying sensory dimensions of subjective experiences.

Creative and visual methods are not inherently ideal for researching children's experiences. The value of visually expressive methods lies, in part, in how and when these methods are used to co-construct data. Research cited earlier in this article suggests that visually expressive methods are

engaging for children, and the engagement of one's research participants is an important consideration in doing research. This study lends support to this claim. Sand trays were identified as fun and engaging for the children. It proved to be familiar yet interesting. The children in this study identified sand trays as their favourite visually expressive activity, which mirrors findings found by other researchers using this method (Bingley & Milligan, 2007; Ramirez & Matthews, 2008). Ramirez and Matthews (2008) found that sand trays generated more meaningful and deep data and invited sharing of information, overcoming cultural barriers inherent in the other methods they used. The children in this study also identified as valuable the potential for the sand trays to create real, three-dimensional pictures. From a researcher's perspective, this multi-dimensionality contributed positively to the depth and breadth of data elicited in the interviews. Sand trays appeared to facilitate a great number of rich, co-created conversations (Polkinghorne, 2005), which are valuable in co-constructing meaning.

Conclusion

Polkinghorne (2005) reminds us that qualitative studies, such as this one, aim to "deepen the understanding of the experience" and are "not for the purpose of making claims about the distribution of the experience in a population" (p. 140). In this study, we were intending to deepen our understanding of children's experiences with nature and also their experiences with sand trays as a research method. Findings demonstrated that sand trays are effective as a visually expressive method for researching with children and generated understanding about children's subjective experiencing of nature, including the four dimensions of behaviour, emotion, cognition, and sensation. Sand tray pictures were particularly effective in meeting children's developmental capabilities and balancing the power inherent in the relationship between the child participants and adult researchers.

Future Directions and Implications

Children's emergence as social and cultural actors in their interactions with nature has been reflected in the growing body of research being conducted from a child-centered perspective. More diverse methods are being used and, to a lesser extent, being evaluated as to their effectiveness and value in researching with children. However, just as an earlier fallacy had researchers equating adults' experiences with those of children and assuming that methods effective with adults will share the same efficacy when used with children, researchers must now be careful not to assume that children's experiences in the research process are universal and homogenous. Innovative methods must be developed or discovered that can meet the diverse needs of a variety of children. Therapy is one arena upon which researchers can draw for inspiration. Like drawings, sand trays have been accepted as valid and effective ways for facilitating expression and communication with children in therapy and assessment, and therefore sand trays as a research method warrants investigation.

Findings from this study demonstrate that sand trays have potential value as a child-friendly research method. Additional larger scale studies evaluating their effectiveness as a research tool would be valuable. Using this method with diverse populations of children would help demonstrate whether this method is more or less effective among specific populations according to age, culture, gender, and socio-economic status, for example. Since no method to date has proven totally effective with all populations, it would also be valuable to evaluate how sand tray pictures complement other methods, both qualitative and quantitative. Given the kinesthetic nature of sand tray pictures, it would be important to determine how they complement both visually-expressive methods, such as drawing and photography, as well as non-visual creative methods, such as song, music, and poetry. A further benefit of the kinesthetic nature of sand tray

pictures may lie in its potential for geography-based studies where an individual's connection to the land is important. Finally, the value of sand tray pictures for research with other marginalized populations may also be worthy of study. This article has documented our experience with sand tray pictures as a research method, and while it is an exploratory study, we hope that this introduction of sand tray pictures to the broader research community will be a fruitful one.

References

Alerby, E. (2000). A way of visualizing children's and young people's thoughts about the environment: A study of drawings. *Environmental Education Research, 6*(3), 205–222.

Barker, J., & Weller, S. (2003). Is it fun? Developing children centered research methods. *International Journal of Sociology and Social Policy, 23*(1), 33–58.

Barraza, L. (1999). Children's drawings about the environment. *Environmental Education Research, 5*(1), 49–67.

Barraza, L., & Robottom, I. (2008). Gaining representation of children's and adults' constructions of sustainability issues. *International Journal of Environmental and Science Education, 3*(4), 179–191.

Barry, D. (1996). Artful inquiry: A symbolic constructivist approach to social science research. *Qualitative Inquiry, 2*, 411–438.

Bingley, A. (2003). In here and out there: Sensations between self and landscape. *Social and Cultural Geography, 4*(3), 329–345.

Bingley, A., & Milligan, C. (2007). Sandplay, clay and sticks: Multi-sensory research methods to explore the long-term mental health effects of childhood play experience. *Children's Geographies, 5*(3), 283–296.

Boeije, H. (2002). A purposeful approach to the constant comparative method in the analysis of qualitative interviews. *Quality and Quantity, 36*, 391–409.

Bradway, K., & McCoard, B. (1997). *Sandplay – Silent workshop of the psyche.* New York, NY: Routledge.

Braun, B. G. (1988). The BASK model of dissociation. *Dissociation, 1*(1), 4–23.

Cachelin, A., Paisley, K., & Blanchard, A. (2009). Using the significant life experience framework to inform program evaluation: The Nature Conservancy's Wings & Water Wetlands Education Program. *Journal of Environmental Education, 40*(2), 2–14.

Chawla, L. (1998). Significant life experiences, revisited: A review of the research. *Journal of Environmental Education, 29*(3), 11–22.

Christensen, P., & James, A. (2000). Research children and childhood: Cultures of communication. In P. Christensen & A. James (Eds.), *Research with children* (pp. 1–8). New York, NY: Falmer Press.

Clark, C. (1999). The autodriven interview: A photographic viewfinder into children's experience. *Visual Sociology, 14*, 39–50.

Clark-Ibáñez, M. (2004). Framing the social world with photo-elicitation interviews. *American Behavioral Scientist, 47*(12), 1507–1527.

Clark-Ibáñez, M. (2007). Inner-city children in sharper focus: Sociology of childhood and photo elicitation interviews. In G. C. Stanczak (Ed.), *Visual research methods: Image, society and representation* (pp. 1–22). Thousand Oaks, CA: Sage.

Coad, J., Plumridge, G., & Metcalfe, A. (2009). Involving children and young people in the development of art-based research tools. *Nurse Researcher, 16*(4), 56–64.

Dale, M. A., & Lyddon, W. J. (2000). Sandplay: An investigation into a child's meaning system via the self-confrontation method for children. *Journal of Constructivist Psychology, 13*, 135–154.

Einarsdottir, J. (2005). Playschool in pictures: Children's photographs as a research method. *Early Child Development and Care, 175*(6), 523–541.

Epstein, I., Stevens, B., McKeever, P., & Baruchel, S. (2006). Photo elicitation interviews (PEI): Using photos to elicit children's perspectives. *International Journal of Qualitative Methods, 5*(3), 1–11.

Fasoli, L. (2003). Reading photographs of young children: Looking at practices. *Contemporary Issues in Early Childhood, 4*(1), 32–46.

Gabhainn, S. N., & Sixsmith, J. (2006). Children photographing well-being: Facilitating participation in research. *Children and Society, 20*, 249–259.

Gharahbeiglu, M. (2007). Children's interaction with urban play spaces in Tabriz, Iran. *Visual Studies, 22*(1), 48–52.

Greene, S., & Hill, M. (2005). Researching children's experience: Methods and methodological issues. In S. Greene & D. Hogan (Eds.), *Researching children's experience: Approaches and methods* (pp. 1–21). London, United Kingdom: Sage.

Gurevitz, R. (2000). Affective approaches to environmental education: Going beyond the imagined worlds of childhood? *Ethics, Place and Environment, 3*(3), 253–268.

Hart, R. (1979). *Children's experience of place*. New York, NY: Irvington.

Holloway, S., & Valentine, G. (Eds.). (2000). *Children's geographies*. London, United Kingdom: Routledge.

Homeyer, L., & Sweeney, D. (1998). *Sand tray: A practical manual*. Canyon Lake, TX: Lindan Press.

Keenan, T. (2002). *An introduction to child development*. Thousand Oaks, CA: Sage.

Kendrick, M., & McKay, R. (2004). Drawings as an alternative way of understanding young children's constructions of literacy. *Journal of Early Childhood Literacy, 4*(1), 109–128.

Lewin, A., Taylor, C., & Gibbs, G. R. (2005).What is Qualitative Data Analysis (QDA)? Retrieved from http://onlineqda.hud.ac.uk/Intro_QDA/what_is_qda.php

Linzmayer, C. D., Halpenny, E. A., Walker, G. J. (2013). A multidimensional investigation into children's optimal experiences with nature. *Landscape Research, 38*, 1–21.

Louv, R. (2005). *Last child in the woods: Saving our children from nature-deficit disorder*. Chapel Hill, NC: Algonquin Books.

Malchiodi, C. A. (2005). The impact of culture on art therapy with children. In E. Gil & A. A. Drewes (Eds.), *Cultural issues in play therapy* (pp. 26–71). New York, NY: The Guilford Press.

Matthews, H., & Limb, M. (1999). Defining *an* agenda for the geography of children: Review and prospect. *Progress in Human Geography, 23*(1), 61–90.

Mauthner, M. (1997). Methodological aspects of collecting data from children: Lessons from three research projects. *Children and Society, 11*, 16–28.

Mayall, B. (2000). Conversations with children: Working with generational issues. In P. Christensen & A. James (Eds.), *Research with children: Perspectives and practices* (pp. 120–135). London, United Kingdom: Falmer Press.

Meo, A. I. (2010). Picturing students' habitus: The advantages and limitations of photo-elicitation interviewing in a qualitative study in the city of Buenos Aires. *International Journal of Qualitative Methods, 9*(2), 149–171.

Mitchell, L. M. (2006). Child centered? Thinking critically about children's drawings as a visual research method. *Visual Anthropology Review, 22*(1), 60–73.

Mizen, P. (2005). A little "light work"? Children's images of their labor. *Visual Studies, 20*(2), 124–139.

Morrow, V., & Richards, M. (1996). The ethics of social research with children: An overview. *Children and Society, 10*, 90–105.

Myers, O. E., Saunders, C. D., & Garrett, E. (2003). What do children think animals need? Aesthetic and psychosocial conceptions. *Environmental Education Research, 9*(3), 305–325.

Nelson, K. (2007). *Young minds in social worlds: Experience, meaning and memory*. Cambridge, MA: Harvard University Press.

O'Shea, K. (2011, December). *When there are no words, processing early trauma and neglect*. Proceedings from workshop, Calgary, Alberta. Retrieved from http://emdrtraining.com/AT_Calgary_ReprocessingEarlyTrauma.pdf

Patton, M. Q. (2002). *Qualitative research and evaluation methods.* Thousand Oaks, CA: Sage.

Phenice, L. A., & Griffore, R. J. (2003). Young children and the natural world. *Contemporary Issues in Early Childhood, 4*(2), 167–171.

Polkinghorne, D. E. (2005). Language and meaning: Data collection in quantitative research. *Journal of Counseling Psychology, 52*(2), 137–145.

Punch, S. (2002). Research with children: The same or different from research with adults? *Childhood, 9*(3), 321–341.

Ramirez, M., & Matthews, J. (2008). Living in the NOW: Young people from refugee backgrounds pursuing respect, risk and fun. *Journal of Youth Studies, 11*(1), 83–98.

Rasmussen, K. (2004). Places for children – children's places. *Childhood, 11*(2), 155–173.

Russo, M. F., Vernam, J., & Wolbert, A. (2006). Sandplay and storytelling: Social constructivism and cognitive development in child counseling. *The Arts in Psychotherapy, 33*, 229–237.

Sebba, R. (1991). The landscapes of childhood: The reflection of childhood's environment in adult memories and in children's attitudes. *Environment and Behavior, 23*(4), 395–422.

Seidel, J. (1998). *Appendix E: Qualitative data analysis*. Retrieved from http://www.qualisresearch.com/qda_paper.htm

Solberg, A. (1996). The challenge in child research: From "being" to "doing." In M. Brannen & M. O'Brien (Eds.), *Children in families: Research and policy* (pp. 53–65). London, United Kingdom: Falmer Press.

Steele, W. (2003). Using drawing in short-term trauma resolution. In C. A. Malchiodi (Ed.), *Handbook of art therapy* (pp. 139–150). New York, NY. The Guilford Press.

Sullivan, G. (2005). *Art practice as research: Inquiry in the visual arts*. Thousand Oaks, CA: Sage.

Turner, B. (2005). *The handbook of sandplay therapy*. Cloverdale, CA: Temenos Press.

Veale, A. (2005). Creative methodologies in participatory research with children. In S. Greene & D. Hogan (Eds.), *Researching children's experience: Approaches and methods* (pp. 1–21). London, United Kingdom: Sage.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes.* Cambridge, MA: Harvard University Press.

Weinrib, E. (1983). *Images of the self: The sandplay therapy process*. Cloverdale, CA: Temenos Press.

Wilson, K., & Ryan, V. (2005). *Play therapy: A non-directive approach for children and adolescents*. Toronto, ON: Elsevier.

Wright, S. (2007). Young children's meaning-making through drawing and "telling": Analogies to filmic textual features. *Australian Journal of Early Childhood, 32*(4), 37–49.

Yamashita, S. (2002). Perception and evaluation of water in landscape: Use of photo-projective method to compare child and adult residents' perceptions of a Japanese river environment. *Landscape and Urban Planning, 62*, 3–17.

Young, L., & Barrett, H. (2001). Adapting visual methods: Action research with Kampala street children. *Area, 33*(2), 141–152.

Yuen, F. C. (2004). "It was fun … I like drawing my thoughts": Using drawings as part of the focus group process with children. *Journal of Leisure Research, 36*(4), 461–482.