Using Visual Q-methodology to explore Danish children's outdoor play preferences

Abstract

The aim of this study was to gain new understandings about what types of outdoor play experiences children prefer, and the environmental qualities that enable these activities. An application of Visual Q-methodology was developed for children to rank a set of paintings depicting play scenarios. Factor analysis revealed four distinct typologies: Nurturers, Active Children, Creators and Forest Children. Findings suggest that this innovative method is an effective and enjoyable technique for gaining insights about the environmental affordances that foster play in natural and urban settings, from the subjective perspectives of diverse groups of children.

Introduction

Across the globe, children have been withdrawing indoors to the compelling virtual landscapes of computer games and television; concerns are widespread that today's children may not develop the physical skills, resourcefulness, independence and emotional capacities that are associated with outdoor activities. Safety concerns prohibit many parents from allowing children to spend unsupervised time exploring and playing, circumstances that have been labelled a crisis by play researchers (Whitebread, 2015). A second cause for alarm is the loss of suitable play environments, particularly access to natural landscapes. Opportunities for children to have immersive experiences in wild, pristine nature become more limited with each generation. Widespread attention has been given "nature deficit disorder": the societal problems attributed to the decline of play in nature (Louv, 2005).

Active engagement in the outdoor landscape enhances independence and promotes physical and emotional well-being for people of all ages; it is beyond a doubt that frequent access to natural landscapes has a positive effect on children's health and the development of skills and capacities (Chawla, 2015). However, wild landscapes are not the only environments that afford opportunities for children to explore, play and thrive. In future, the majority of children will grow up in cities where opportunities for frequent immersion in pristine nature are limited; urban landscapes must also afford rich play experiences where active engagement can foster physical and emotional development, build social bonds and support natural connectedness.

According to the Convention on the Rights of the Child (CRC), children should have access to environmental resources that allow them to flourish, and the voices of children should be sought in matters that affect them (UN, 1989). New methods are needed that improve children's ability to express their preferences, contribute to environmental shaping and affect decision-making (Bishop and Corkery, 2017, Driskell, 2002), but subjective information is challenging to incorporate. Which scenarios will motivate diverse groups of children to play? What is the relationship between an individual's preferred play activities and the environments that compel them? It is difficult for children to "express their embodied environmental knowledge" (Bjorklid and Nordstrom, 2007, p. 391) but we know that a key aspect of play is that it is experienced as joyful (Zosh et al., 2017). Joy, however, is subjective; why is roughhousing so enjoyable for some yet miserable for others? Is painting a picture fun, or a tedious chore?

Without understanding play preferences from a child's perspective, we will not understand how environments can best motivate an individual. Are there general patterns or typologies that we can respond to when planning for diverse groups of children, in diverse environments? Visual Q-methodology (Visual Q-M) may be an effective way to include children's viewpoints in research, providing qualitative and quantitative results even with a relatively small sample size. The technique is described as "child-friendly" (Ellingsen et al., 2014) but examples of child-environment research using the method are very rare. This paper describes a project employing Visual Q-M to elicit children's subjective views about outdoor play.

Objectives: The first objective of this research is to understand how community environments can better provide a rich spectrum of affordances so that children can be enabled and motivated

to play outside. The second is to test whether Visual Q-M is an effective technique to learn more about play preferences from a child's perspective.

Background

The Importance of play

Play is an essential part of human development; while engaged in play, children are learning to learn while developing important cognitive and emotional capacities (Zosh et al., 2017; Pellegrini, 2009). Different skills and capacities are associated with unique types of play, including physical play, play with objects, symbolic play, pretence play, and games with rules (Whitebread et al., 2017). Physical play is active and supports the development of gross and fine motors skills, develops co-ordination, endurance and builds strength. Play with objects helps children explore, reason, and promotes problem solving skills. Symbolic play activities help children express their ideas, and include activities such as art creation, music, and language activities. Pretence play includes role-playing and fantasy and is associated with social growth and role-modelling. Games with rules assist with social development, sharing, and appreciating the perspectives of others. Play can include both indoor and outdoor experiences, from guided and structured play to unstructured activities where children have agency to explore and discover with few constraints. This study focuses on children's perceptions of unstructured outdoor activities.

Outdoor Play

The places where children play and explore with increasing independence, usually between the ages of 7 and 11, have been called 'primal landscapes'; experiences during this period have a profound formative effect on people's lifelong environmental attachments and perceptions (Gayton, 1996). The attributes of primal landscapes deserve careful scrutiny; places that have a high level of environmental quality are those that support a variety of skill-related behaviors (Chawla, 2015). Kytta uses the concept of affordances to study children's play environments, describing them as "the functionally significant properties of the environment that are perceived through the active detection of information" (2002, p.109). They may include properties from both the environment and the acting individual. For instance, a smooth slope affords coasting or skateboarding, shelter affords hiding and a climbable feature affords climbing. Other spaces provide opportunities for sociality, such as those that support being noisy or 'playing war' (Kytta, 2002).

Benefits of Play in Nature

Natural landscapes are renown for supporting active recreation, learning, and restoration; health benefits include physical dimensions (e.g. access to fresh air, sunlight, and exercise) as well emotional dimensions (e.g. psychological restoration, stress reduction, and spiritual well-being) (Cooper-Marcus and Barnes, 1999; Ward Thompson, 2011; Spirn, 1984). More than fifty years ago, Ian McHarg wrote about damage to both human and ecological health resulting from loss of natural landscapes to urban development (1969); in the decades since, the decreasing role of nature in children's lives has been a central concern of ecologists, geographers and psychologists (Chawla, 2015). Immersion in nature provides opportunities for exploration, learning, creative play and rich sensory experiences that are considered fundamental to the healthy physical,

cognitive and emotional development of young children (Ernst, 2018; Soga and Gaston, 2016); the benefits that arise from contact with nature outdoors "is as important for health and wellbeing as are daily food and sleep for children" (Elliot, 2010, p. 62). Less is known about urban qualities that support active recreation, learning and restoration. It remains unclear how environmental influences, such as access to greenery and nature, or the prevalence of urban amenities, and social factors interact (Bjorklid and Nordstrom, 2007), and how individual preferences influence participation.

Environmental affordances and preferences

There is no consistent, all-encompassing theory that explains why people prefer certain landscapes. Rather, there are theories in planning and landscape architecture that address different aspects and mechanisms of environmental perceptions, but they are "quite scarce" and the topic is not approached from the child's perspective (Horelli 2007, p. 268).

People's subjective values, emotions, and cultural orientations affect their cognition of objective physical environmental qualities and features in a 'transactive' way (Zube et al., 1982). For example, viewing an urban skyline might trigger a personal memory that affects whether it is perceived positively or negatively (Relph, 1976). Societal values also play a significant role in how we view 'natural' beauty; preferences for orderly environments (neatly mown lawns and trimmed hedges) or wild environments (tangled gardens, or dramatic mountain vistas) are influenced by cultural learning (Nassauer 1995).

Others argue that innate processes and evolutionary instinct play a more significant role than learned experiences in our responses to environment. For example, people are attracted to landscapes that provide a view or prospect, and enclosed places that provide shelter, because they are conducive to survival; from these environments people could see predators or prey, and find refuge (Appleton, 1975). The concept of environmental affordances was introduced by Gibson, who theorized that people are instinctively attracted to environmental affordances (landscapes that promise sustenance and protection), explaining that preferences are rooted in safe or fertile environments or habitats that can be accessed by actions of the perceiver. An affordance is "what the environment offers the animal, what it provides or furnishes" (Gibson, 1979, p. 127). Wilson hypothesized that people's desire to connect with living plants and animals, 'biophilia', is instinctive (1984). Kaplan and Kaplan (1989) proposed that environmental qualities that are conducive to exploration and gathering of information (legibility, comprehension, mystery and complexity) are preferred to people because of pre-cognitive processes.

Dearden (1989) developed a conceptual framework that incorporates significant aspects of these diverse modes of landscape perception. His framework, described as a 'pyramid of influences' explains that a hierarchy of influences, including biological, cultural, regional and individual values, inform our preferences. Instinctive responses are common to all people, cultural and regional responses are common to societal and regional groups, and unique experiences influence individual preferences.

Learning from children

An assessment of the adequacy of environmental support for individuals must depend on what the person is trying to do, a concept described as person-environment compatibility (Kaplan, 1983). Stress can result from a lack of congruency between what an environment affords and what one wishes to do although few studies exist in which the concept of person-environment compatibility has been applied to young people (Horelli, 2007). A nuanced understanding of child-friendliness would consider the congruity of the environment with the subjective viewpoints of individual children.

Methods

The methods chosen for research are intended to serve a dual purpose: to gain empirical knowledge about children's environmental preferences and motivations for outdoor play, and to explore techniques to enhance children's ability to contribute to that research.

Innovative research work in early explorations of child-environment relationships was conducted by teams led by Kevin Lynch in the 1970s. Researcher-led methods included interviews of children, observations of children's behavior outdoors, surveys, films and photographs, and interviews of parents. Child-led methods include tours of familiar landscapes, photographs of important places, drawings, diaries, maps and models created by the children; overviews of these early studies are described in Chawla (2015). Today, most research exploring children's relationship with the environment uses one or a combination of these pioneering methods. Visual methods, such as photo-voice and photo elicitation, are particularly suitable for studies with children, particularly where there are language barriers (Thomson, 2008). It has been speculated that Q-methodology (Q-M) could be an effective way to include children's viewpoints in research yet the technique is not well-known. Visual applications of Q-M are quite rare in environmental perception research, and thus far unexplored in research exploring child-environment interactions.

Introduction to Q-methodology

Q-M is considered an innovative foundational tool for analyzing the beliefs and values or participants in a scientifically interpretable form, providing the richness and diversity associated with qualitative approaches in addition to statistical insights associated with quantitative analysis. The status of the methodology is described as "somewhat fugitive" (McKeown and Thomas 1988, p. 11) and although increasingly applied in social science research it is still considered an emergent technique. First developed by William Stephenson in 1936 to measure subjectivity, the method was popularized by Stephen Brown in 1983. A detailed explanation of the methodology and instructions for conducting a Q-M study are outlined in Watts and Stenner's comprehensive guidebook (2012); overviews are available in other books and articles (Addams, 2000; McKeown and Thomas, 1988; Brown, 1983).

In most Q-M studies, participants express their subjective beliefs about a topic by ranking a collection of statements in order of preference. The results are analyzed using statistical processes to look for common patterns or archetypes among participants, and places where value systems diverge. It is essentially a data-reduction technique; a key expectation of Q-M research is the belief that there is 'finite diversity' in the subjective belief systems and values of a group

of citizens (Addams, 2000). Researchers follow a standardized set of procedures when developing a Q-M project: Step 1: Discourse about the topic being studied is reviewed, and items that express a particular value or sentiment are collected into a concourse or catalogue. Step 2: a set of statements or 'Q-set' is generated to represent the range of opinions collected in the concourse. Step 3: Participants rank these statements in order of preference on a pyramid-shaped sorting sheet; they also provide some additional qualitative information in the form of brief questionnaires. Step 4: Statistical processes are used to detect patterns or commonalities in participants' value orientations. Step 5: Results are interpreted using a combination of the quantitative results of factor analysis, and qualitative information gained in the questionnaires.

Q-M most commonly uses sets of statements to elicit views from participants, but images can be successfully substituted for statements to explore preferences. As it remains difficult for children to *talk* about their "embodied" environmental knowledge (Bjorklid and Nordstrom, 2007, p. 391), a unique visual adaptation of Q-M was developed for this study.

Development of research instrument
The step-by-step process follows that recommended by Watts and Stenner (2012) using images instead of words. The process is described below.

Step 1: Development of the Concourse

The first step was to create a concourse or catalogue containing a full range of sentiments expressing preferences for diverse outdoor play activities and environments. This review began with the development of a conceptual framework from relevant literature that established initial thematic guidelines. There are three main ways to apply a conceptual structure in a Q-method study, as outlined in Addams (2000). Theory may be used in a highly structured way to test a hypothesis; themes are established from *a priori* knowledge, and this information is used to guide the review of opinion domain. Alternatively, in a naturalized approach, the review is conducted in a completely unstructured way (for instance, statements are taken directly from a set of participant interviews) in the hopes that theoretical insights will emerge *a posteri* from the data. A third approach, chosen for this project, is to apply a conceptual framework in a semi-structured way, to inform the observation process and provide focus for the initial review, while remaining open to new ideas and themes that emerge from observations. Initial themes that were established from the literature were categorized according to play types, skill developments, and environmental affordances.

Table 1-Preliminary themes to structure review

Play types	Capacity Development	Environmental Affordances
Physical play	Emotional skills	Human constructed
Play with objects	Cognitive skills	'Tame' nature
Symbolic play	Physical skills	Wild Nature
Pretend play	Social skills	Biophilia
Games with rules	Creative skills	Habitat
		Mystery/complexity
		Comprehensibility/legibility
		Prospect-refuge

Material reviewed mainly includes illustrated children's books, children's movies and advertising material but also includes field observations. Images that corresponded to thematic types were copied and collected using photography or by downloading images or capturing frames from movies. Each image was inserted and tagged with relevant keywords and source material. As the concourse grew, images with similar keywords and themes were gathered into sub-catalogues with new headings. Many images were tagged with more than one keyword type, and therefore might be placed in more than one sub-catalogue. Representation emerged that did not fit pre-established themes or types, adding new dimensions to the ideas that initially shaped the concourse. Significantly, there were many examples depicting characters engaged in contemplation or meditation, capturing an experience distinct from other play types.

Figure 1. Images of contemplation in children's illustrations: Left: Pumba, Timon and Simba gaze at the stars in wonder (Allers et al., 2003). Middle: Children contemplating distant horizon in Danish picture book Sølvblomst (Eken, 2002). Right: Thoughtfulness and relaxation in the snow in graphic novel Lou! Laser Ninja (Neel, 2009)

The concourse was considered complete, containing 356 images, when it seemed that no new themes were emerging.

Step 2: Creation of the Q-set

A representative set of images of children at play was created from condensing the catalogue into a Q-set. Visual Q-M researchers frequently use selected photographs as stimuli. For this study, the medium of watercolor was chosen to illustrate the play experiences for two reasons. By creating the imagery, the appearance of the characters and the iconic environmental types could be more easily designed, and it was hoped that paintings would be engaging to participants, encouraging a subjective response.

The design process began with an analysis and condensation of the concourse. A full matrix was developed to cover the full range of sentiments revealed in the concourse, based on established themes as well as new themes that emerged from the review.

Table 2. Development of full thematic matrix

Play types	Skill Development	Environmental Affordances
Physical play	Emotional skills	Urban
• High risk (flying)	• Empathy	• City roads/highways
• High speed – vehicles	• Attention	• View over city
• High speed – running	• Bravery	• Bustle/business
• Low speed (hiking/walking)	• Patience	Tame
• climbing	Cognitive skills	• Country roads/paths
• Rough play	• Puzzles/games	• Park-like environments
• Throwing	• Physical games/strategy	Natural
• Swimming	• Reading	• View over nature
• jumping	• Investigation	• Forests (dangerous)
Play with objects	• Exploration (urban)	• Forests (benign)
• Play with weapons	• Exploration (natural)	• seascapes
• Construction tools	• Trading	Sublime
• Trading cards	• Music (listening, playing)	• Urban (night scenes)
• Musical instruments	• Watching people	• Weather/atmosphere
• Art objects	Physical skills	• Wild forests
• Fishing rods	• Balance	• Wild animals
• Play with pets	• strength	• storms
• Flying kits	• Speed	Biophilia
• Play equipment - swings	• Fighting skills	• Love/care of plants
Symbolic play	• Fine motor skills (artwork)	• Immersion in forest/trees
• Drawing/painting	• Musical skills	• Bonds with tame animals
• Music performance	• Stillness	• Bonds with wild animals
• Music (alone)	• Co-ordination	Habitat
• Storytelling	Social skills	• Water
• Drama/dance performance	• Friendship/loyalty	• Food (found in nature)
Pretend play	• Dancing	• Food (urban market)
• domestic tasks (cooking)	• Group building projects	• Shelter from elements
• shopping (market)	• Games with rules	Enclosed (shelter)
• hunting/fishing	• sportsmanship	• Built spaces (forts)
• Nurturing plants/animals		• Natural enclosures
• Friendship/partnering	Creative skills	• Urban rooms
• Fighting/war	• Street art	Open (prospect)
• Detective play	• Music performance	• View from above (flying
Games with rules	• Costumes/drama	• Open meadow
• Physical games (soccer, baseball, basketball)	• Imagination/fantasy	• View from hill/cliff
• Board games	• Tinkering (small scale)	• View of road
• Solo puzzles (rubics cube)	• Building (larger scale)	Wayfinding
• Solo physical games (hopscotch)	• collecting	• Roads and paths (forests)
• Trading games		• City roads
Contemplation	Contemplative skills	Complexity/mystery
• Star gazing	• Alone in nature	• Natural (tangled garden)
• Immersion in nature	• isolation	• Urban complexity
• Groups (campfires)	• wonder with others	• Investigation
• Wonder	• meditation	• fascination
• exploration		Comprehension/Legibility
		• Open field
		• Open roadways
		• paths

The Q-set can be considered as a collection of 'carpet tiles' that represents the range of ideas revealed in the concourse (Watts and Stenner 2012). A preliminary set of illustrations were created to represent this range, with the aim of achieve a balanced representation of the matrix with a limited number of images.

*Figure 2. Left images show images collected into a catalogue or concourse, noted with keywords. Right: illustration summarizing the sentiment depicted in the images*

After evaluation with the research team, 22 final images were selected and painted (Table 3). A package was produced that included a printed book of larger images, a smaller deck of cards for sorting, and a Q-sorting sheet with a preference ranking pyramid.

Table 3. The Final Q-set. Original illustrations by author.
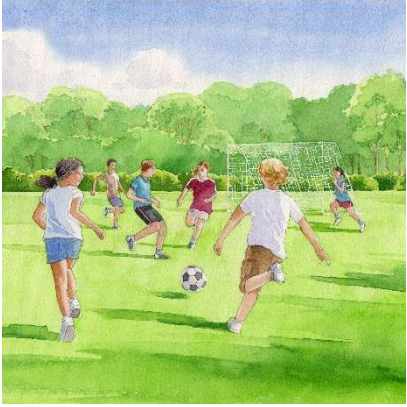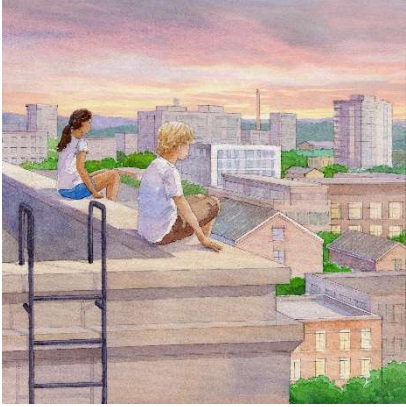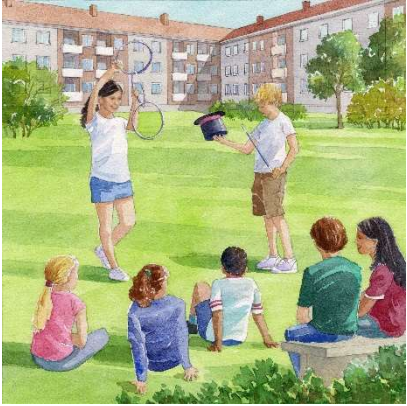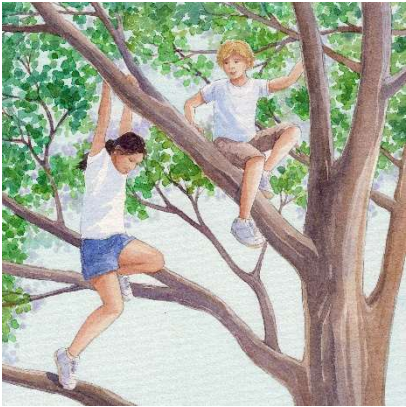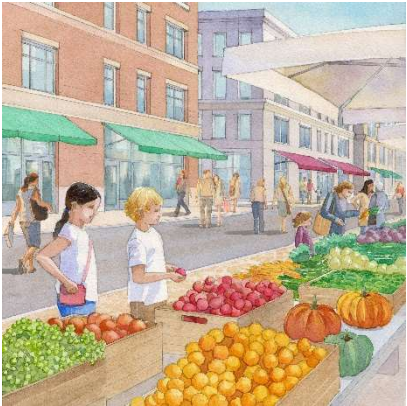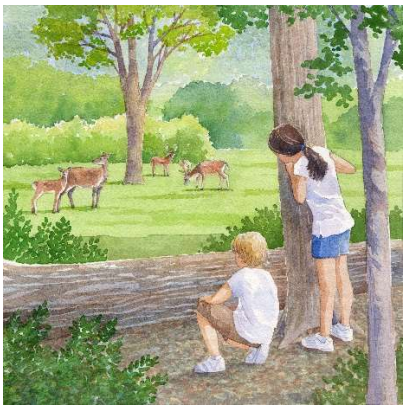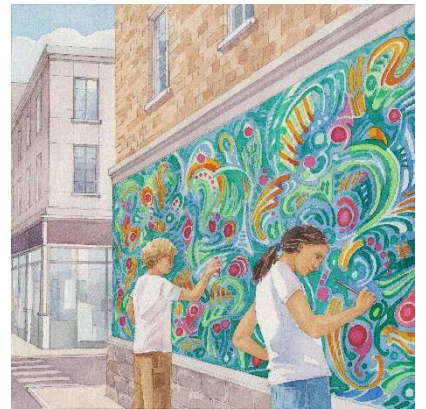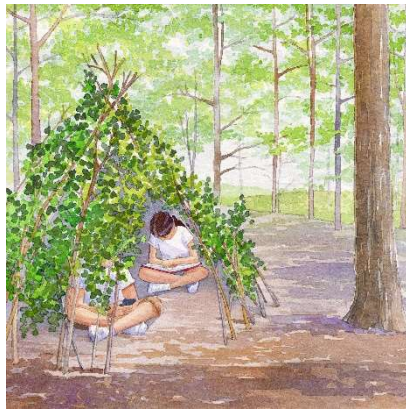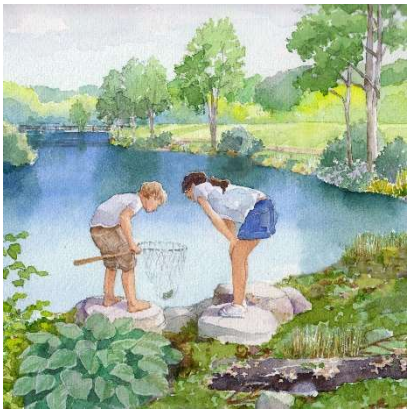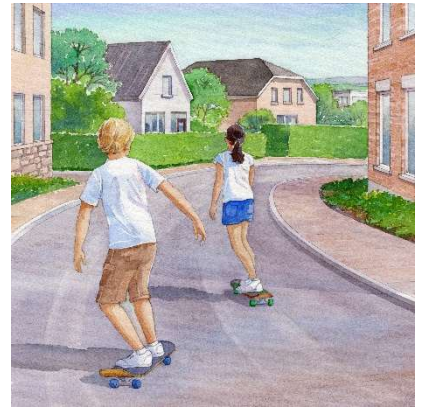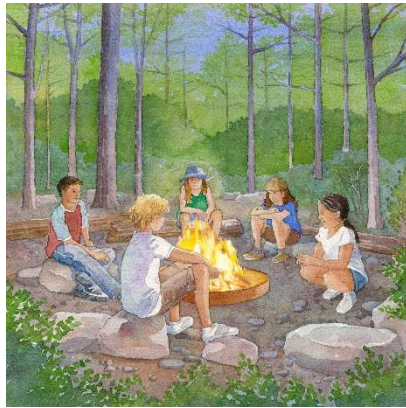
Step 3: Data Collection

A sample of 49 children participated in this study: 24 boys and 25 girls. Most were between 6 and 11 years old. All children reside in the case study region, but we sought participants with varied cultural backgrounds. Thirteen participants have non-Danish parents and moved to the area from other countries. An additional 10 were born in Denmark but have at least one non-Danish parent. Information was collected in several locations, and children were recruited from several sources including schools, the public library, at social gatherings for international residents, at local shops, and those referred by other participants.

Figure 3 – Left: A 6-year old participant considers the Q-set. Right: A 12-year old child performs a Q-sort. Photos by author.

After reviewing a printed book displaying the set of images (printed in random order), participants were asked which images looked like fun; a key aspect of the play experience is that it is joyful. They were given a deck of smaller images to sort in order of preference. The interviewers suggested that the children sort the images into 3 piles at first, (favorite, medium, and least favored) and then arrange individual images from these piles from +4 (most preferred) to -4 (least preferred) using a Q-sorting sheet. Children were asked to explain their most preferred and least preferred images, whether there were any images they felt were missing, and if there were any other comments about the project that they would like the researchers to know.

The process was engaging for the researchers *and* participants. Two researchers administered the Q-sorts (one Danish speaking and one English speaking), and both reported similar positive reactions from the children, parents and teachers who facilitated the data-collection process. Children expressed interest in the subject, understood the objectives of the study, and grasped the ranking process quickly. They seemed to have little difficulty making decisions about their play preferences, and usually completed the sorts in less than 15 minutes, with an additional 5-10 minutes for the questionnaire. Two children did not speak English or Danish but were able to understand and complete the Q-sorts without verbal instruction; additional information was added to the questionnaire with the help of a parent translator.

Step 4: Data Analysis

The data was analyzed using PQ-method software (Schmolk, 2012), initially producing 8 factors. The most significant factors were selected from these using Humphrey's rule and choosing highest eigenvalues. A centroid analysis was performed on 4 factors, and the factors rotated

using Varimax. The factor matrix is displayed in a text file (see table 4) with defining sorts automatically highlighted with an X. Instructions for data input and analysis is embedded within the free software and is quite uncomplicated; detailed guidance explaining general considerations for factor selection is provided in Watts & Stenner (2012).

Table 3 - Data analysis output by PQ Method software

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                Loadings

QSORT              1         2         3         4

 1 01M9J         0.0363    0.1653    0.2550    0.7956X
 2 02F11A       -0.1797   -0.0896    0.6648X   0.2499
 3 03M11S        0.2085   -0.0495   -0.2258    0.8807X
 4 04F6A        -0.2321    0.6170X  -0.0565    0.3872
 5 05M8D         0.0416    0.4860X  -0.1406   -0.3791
 6 06F12I        0.2989    0.3580    0.0508    0.2446
 7 07M13S       -0.2395    0.2866   -0.4890X   0.0618
 8 08F10S        0.6073X   0.1634   -0.2693    0.3373
 9 09F9E         0.4288X  -0.0115    0.2315   -0.0013
10 10M6M        -0.0701   -0.1129   -0.1180    0.4474X
11 11F5E        -0.1512    0.5339X   0.2527    0.2013
12 12M7J        -0.0294    0.1097    0.4377X  -0.0963
13 13M9B         0.1849    0.1796   -0.1511    0.5695X
14 14M7L         0.3843   -0.0913    0.0362    0.2574
15 15F6J         0.5117   -0.4251    0.0405    0.6778X
16 16M9M         0.0553   -0.3019   -0.0395    0.1481
17 17F9C         0.5665X   0.1422    0.1669    0.2822
18 18F9E         0.8212X   0.0381    0.2637    0.1927
19 19M9A         0.4441   -0.1880   -0.0558    0.4585
20 20M8I        -0.0806    0.3982   -0.0061   -0.0696
21 21F9K         0.3707   -0.0238   -0.1770    0.3974
22 22M8S7       -0.0025    0.0137   -0.5297X  -0.0006
23 23F7C         0.5390X  -0.1861   -0.2829    0.0117
24 24F9C         0.3069    0.1907   -0.1887    0.1099
25 25F6R         0.6493X  -0.1716    0.1945   -0.3388
26 26F7L         0.4714    0.3047    0.1491    0.4393
27 27M10A       -0.1685    0.7593X  -0.0442   -0.4400
28 28F6S         0.4003   -0.0166    0.4883X   0.2518
29 29F10S        0.2220    0.6027X  -0.0928    0.1583
30 30M7N        -0.2662    0.2884   -0.0112    0.3144
31 31M6R        -0.2724    0.1315   -0.1665    0.6610X
32 32M7N         0.0026    0.4537   -0.3921    0.2845
33 33M6V        -0.5777X   0.0104    0.2282    0.1732
34 34M12M        0.1863    0.1006    0.6834X   0.4695
35 35F7A         0.1278   -0.4680X   0.2702    0.0617
36 36F11A        0.7049X   0.1717    0.0115    0.0219
37 37M8M         0.3277   -0.1031    0.3816    0.0728
38 38M9S         0.1744    0.0522    0.2748    0.4302X
39 39F8M         0.1758   -0.0344   -0.1969    0.2659
40 40F8E         0.5662X  -0.2272    0.1521   -0.1760
41 419Mt         0.1513    0.3188    0.2073    0.0770
42 42F9C         0.1077    0.0003   -0.4154    0.1607
43 43M6V         0.2236    0.6848X  -0.0726    0.2086
44 44F9E         0.1804    0.4069    0.2313    0.7194X
45 45M11W       -0.1505    0.5360X   0.2061    0.3031
46 46F10A        0.1145   -0.0115   -0.6971X   0.3390
47 47F9L         0.5488X  -0.0520   -0.2940    0.0319
48 48M10S        0.0565    0.3062    0.3229   -0.1212
49 49F11J        0.6857X  -0.0836    0.0143    0.1937

% expl.Var.       13         9         8        13
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Step 5: Interpretation of results

Each factor represents an idealized Q-sort that bears a 'family resemblance' to the sorts of a group of participants, or an archetypical viewpoint. The preferences held by each group will be discussed in the section below; the interpretation of the viewpoint was supported by comments made by the children interviewed during the administration of the Q-sort.

Group 1 – The Nurturers

Preferences for this group of children include settings and activities that are contemplative, creative, tactile and gentle. They value sentimentality, friendship and caring; they enjoy playing the role of a nurturing adult and display empathy for others. Significantly, and unlike other factors, all Nurturers in this study are girls. Out of a total of 10, 3 were born in Europe, outside of Denmark. The age range is 6-11, average age of 8.9.

The Nurturer loves animals, watching or studying them, actively playing with them, or most of all, touching them: "I have cats at home and I love to pet them". However, the image of the children playing in the creek was not preferred. As one explained, "I feel sorry for the animals that they come into a net". Activities such as picking berries, growing plants and growing food, and shopping at a market are more highly valued than for other groups, as is the meadow scene that includes two younger children. Two described making jam from berries with a parent or grandparent, and several expressed that they loved to paint and wished for more places in the city to paint, like the one in the picture. Where it was more preferred, the rooftop scene was selected because of the depiction of friendship: "man hygger", or because the participants appreciated the beauty of the sky.

The playfighting image was least preferred, along with the soccer game and playing with drones. It has been noted by other researchers that rough-housing and rough-and-tumble games is considered a positive play activity for boys, but not girls (Zosh et al., 2017) and these results also show that for most of the girls in this study, playfighting is one of the least preferred activities. Some fear is expressed for activities that appear competitive or harmful, and although some

Nurturers liked the campfire scene, most did not because it looked dangerous: "I am afraid of fire". The football scene was disliked because of its potential for harm: "I am not into football. I don't like balls – they hit me in my head". Bicycling, however, is not perceived by the participants as competitive, and they enjoyed climbing in trees.

Affordances for Nurturers
It is important that suitable spaces be provided so that caring relationships can be developed with people (peers, friends and relatives) and also to support bonding with pets, wild animals, and plants. Nurturers value connectedness with nature, but urban environments provide many affordances for social bonding and biophilia. The concept of 'caringscapes' is often used in research on child-friendly environments to describe the qualities of spaces in which adults care for children; it is easy to forget that children develop their own caring practices (Bowlby, 2017). Nurturers are more likely to be motivated to play by looking after neighbor's dog or chatting with a friend in a treehouse than being enrolled in a soccer league.

Group 2 – The Active Children

The Active Children like to move; preferences are strongly associated with activities and sports; participants enjoy physical play and they are 'do-ers'. Activities such as climbing, cycling, skateboarding, playing with drones, playing with animals, playing guitar, and play fighting were most preferred. Nine participants in this study factor as Active Children, 3 girls and 6 boys. Five are Danish children and four are immigrants, with all children reporting travel experience in southern Europe. Notably, all three boys who spent more than 5 years in the Middle East (two from Iran and one from Syria) who participated in this study have aligned with this factor. Ages ranges from 5-11, with an average age of 8.25.

Individual responses sometimes varied depending on whether the participant had direct experience with the activity, especially the guitar-playing image: "I like playing music – also my brother plays guitar very good". Activities that are perceived as dull are least preferred: "It's boring to shop…I don't like flowers" and "plants are a bit boring". Another child stated that "It's boring to plant and water things". The image of children playing by the creek, perceived as fishing, was described as dull: "It takes too long to fish" and "I have tried (fishing) twice and it is really boring and you just waste your time". The image of playing music, though more sedentary than other activities, was ranked highly by children who desire to play (some inspired by an older sibling) or could already play: "I'm pretty good at guitar".

One Active Child enjoyed the soccer image not only because of the activity but because of the bond with teammates: "I go to football myself. It's fun to use all your forces and fight about the ball and you get a lot of great friends".

A young participant (not quite 6 years old) had no experience with many of the play activities she selected as most preferred, such as playing guitar and playing with drones, but stated that they "looked fun"; similarly, other young participants enjoyed the skateboarding image although they had not tried it. However, older children tended to rank activities they consider themselves incompetent at very low. A ten-year old Active Child ranked skateboarding at +3 because he has one and enjoys it, but the soccer image -2 because he stated that he is "not very good at playing football". Although this pattern of emerged in other groups, low rankings due to perceived incompetence (and vice versa) is very strong for Active Children.

Affordances for Active Children
Active Children generally ranked images based on the activity depicted rather than the place depicted. The forest scenes were ranked more negatively than any other group, although the reasons for this are unclear. It may be related to cultural influences rather than environmental affordances. Active Children who immigrated to Denmark and had previously spent less time in a wooded landscape preferred urban activity, while those who had grown up in the forested trails enjoyed activities in the forest. Open landscapes are preferred generally, and confinement, and restrictions on activities and range will thwart the motivations of Active Children. This group are motivated by activities where they can display competences and will undoubtedly benefit from agency, the freedom to explore, and a large physical range for independent mobility.

Group 3 – The Creators

These children are imaginative, creative, and enjoy fantasy play. They are visual and enjoy activities that foster artistic expression. The most distinctive preference of this group is their perception of creative art as a play experience. Four children in the study align with this factor, 2 boys and 2 girls. Three are Danish children and one immigrated from Poland. The age ranges from 6 to 12, with an average age of 9.

Generally, Creators dislike competitive activities and sports, or running and biking scenes if they were perceived as racing: "I really hate football". Curiously, the playfighting scene was highly preferred, and interpretation of this ranking was aided by referring to comments made during interviews. Participants viewed the scene as role-playing or fantasy: "it's fun to imagine you are in a costume, like a warrior with weapons". The image of children playing with the drones was ranked highly because they imagined what could be seen from the high view: "It's fun to see the world from the sky", and similarly, climbing a tree was enjoyed because of the associations with pretense games: "I like to pretend I am a monkey".

Affordances for Creators

The Creators did not express preferences for distinct environmental typologies in this group's preference; the children enjoyed both open and sheltered landscapes, urban and natural. Environments that foster their desire to be creative are key: "I like to draw things and I wish there were more places to paint like this". Landscapes should provide opportunities for children to invent their own games and adventures. While creators enjoy wooded settings where there are branches and sticks to construct a fort, a vacant urban junkyard with an enticing collection of refuse might be equally compelling.

Group 4 -The Forest Children

This group of children is highly influenced by their environment: they enjoy woodlands, natural landscapes, and play experiences with animals. Of the 8 children in this group, most are Danish; two of the children had one Norwegian parent (but were not related to each other). The ages ranged from 6 to 11, with an average age of 8.12. Half of the participants in this group attend a local school that has a strong component of forest activity in the programming.

Forest children enjoy sedentary and physical activity in woodland settings: sitting around campfires, climbing trees, biking or running through the forest. They enjoy building and hiding in 'hules' or woodland huts made of branches and brought up fond memories of both hiding in them, and building them. The love animals: "I love the cat which is so soft – I am the best friend with all of the cats here" and a particular affinity for trees: "It is really awful that somebody here has cut down the trees where I live". The open landscapes of fields, meadows and raspberry patches are not as compelling as the forest canopy. Interestingly, danger is perceived in the image of skateboarding, or sitting on a rooftop, "you can fall down and hurt yourself a lot", but biking downhill through a forest trail or climbing in a tree is familiar and not seen as dangerous.

Affordances for Forest Children
Forest Children flourish in woodland environments. There is a strong love for living plants and animals, or *biophilia* (Wilson, 1983) expressed by the participants, and a disinclination to urban and human-constructed settings. But they ranked the activity of petting a cat highly despite the uncompromising hardscape and lack of greenery. For those living in cities, access to wooded and well-treed areas will be highly beneficial, as well as contact with urban pets and wildlife. Many cities have strong campaigns to plant more trees, but an immersive, tactile and sensory connection is important for Forest Children, they need to touch the bark of trees and climb in the branches.

Conclusions

Insights on Methodology

Visual Q-M is highly suited to research that seeks to understand children's preferences. Although intended for participants age 7-11, younger children easily grasped the sorting process easily, understood the activities represented in the imagery, and expressed their views eloquently. Older children were equally interested in the subject, considered the topic very relevant, and were happy to offer their time and opinions. Some participants did not speak either English or Danish but completed Q-sorts; they grasped the topic and the ranking process after being instructed with non-verbal gestures. The process is efficient; Q-sorts and brief interviews with a short questionnaire took about 20 minutes. Factors arising from the analysis of Q-sorts of a small number of participants can provide substantial insights into the topic, meaning that a robust study can be conducted with limited resources.

A 6ᵗʰ category of play-type

As Hart observed in 1979, "Children spend a lot of time alone quietly resting, watching or dabbling in sand or water…such activities have been given little recognition in those reports of children's play prepared for environmental planners" (p. 335, cited in Chawla, 2015). Kaplan suggested that activities classed as reflection or contemplation may be considered less significant than other types of activities, but "reflective moments that permit one to organize thoughts and feelings" play a substantially important role in cognitive clarity, restoration and human motivation (1983, p. 317). The five key types of play identified by Whitebread et al. (2017), physical play, play with objects, symbolic play, pretend play, and games with rules, do not account for contemplative play as a foundational experience. Results of this project suggest that reflection, meditation and contemplation, particularly for Nurturers and Creators, is a significant play experience.

Urban environmental affordances

In order to encourage children to play outdoors, it is important to understand the diverse motivations of different groups of children. Natural landscapes provide motivating play environments for all groups identified in this study, but it would be false to conclude that cities cannot provide spaces for all children to flourish. Carefully designed urban environments can provide landscapes that foster connectedness to nature, complemented by amenities that afford adventure, and support full range of skill and capacity development for each of the groups identified.

Most children love animals, but the naturalness of the setting seemed less important than close, tactile connection; the image of petting the cat was highly ranked across all categories, despite the unflinchingly urban background; children preferred it to the activity of watching deer in a natural landscape. Where children preferred the pastoral scene of playing frisbee with a dog, none spoke specifically about the aesthetics of the park-like scene; they only commented about how much they love dogs. Even children who have grown up without access to animals desire a connection: "my mom and dad don't like animals in our house which is very sad because I *love* to have a dog".

Similarly, the image of tree climbing was one of the most highly ranked. Deep biophilic responses (such as enjoyment felt by touching the bark, or being among the green leaves) were reported by some, others liked the sense of refuge and seclusion offered by the tree, while others were drawn to the action of climbing, imagining tree forts, or attaining the view afforded by height. Some participants described their fond memories of a memorable and familiar tree – perhaps one in their grandmother's garden. But fostering biophilic connections may not require vast stretches of pristine nature. Urban forest patches or even a single large specimen in the courtyard of an urban housing project can enable tactile connectedness for Forest Children, the enjoyment of nestling in greenery can be provided for Nurturers with ivy-covered walls, adventure playgrounds or abandoned lots can provide settings for Creators to build forts, and Active Children might climb and achieve a view on numerous urban structures.

But urban affordances that are motivating will be ineffective if children lack access. The negative impact of adult-imposed restrictions on children's desire to play may be more substantial than the lack of access to pristine natural environments for them to play in. Children mentioned their desire for numerous play activities but lacked permission: they aren't *allowed* to playfight at school, painting on walls isn't legal, pets are prohibited in their apartments, parents would get them in trouble if caught climbing trees or visiting rooftops.

Future research
This pilot study suggests some fertile areas for future research. The Nurturers in this study were all female, and the majority of Active Children are boys, but this study did not provide insights into whether gender-related preferences are innate, or learned, or whether these results can be generalizable. More research with very young children (age 3-6) using Visual Q-M may provide insights into gender differences and play motivations. Results also suggest that cultural differences play a role in forming preferences. Across the globe, cities are increasing in population due to immigration from other regions and from other countries, and Visual Q-M may provide new insights that assist community builders in understanding how environmental needs and perceptions of newcomers differs from locals.

When asked if there were any other comments about the research, one Active Child stated that "The adults should themselves be outside a little bit more and participate in the game. They should try it and see how fun it is to play!". Some differences between young children and older children arose from this study, particularly in the way that an activity can be strongly disliked due to perceived incompetence once we become a little older. Older children and adults perceive dangers more readily as well. Visual Q-M might provide knowledge about age-related aspects of play preferences and how learned experiences alter our ability to enjoy play. Play researchers also suggests that adults play more, to become more socially and physically active, creative and happy. When asked if there were any other comments about the research, one Active Child stated that "The adults should themselves be outside a little bit more and participate in the game. They should try it and see how fun it is to play!"

References

Addams, H. (2000). Q-Methodology. In: Addams, H. and Proops, J. (Eds). (2000) *Social Discourse and Environmental Policy: An Application of Q Methodology*. Elward Elgar Publishing, UK.

Allers, R., Minkoff, R. Hahn, D. Mecchi, I. and Roberts, J. (2003). *The Lion King.* DVD video. Walt Disney Home Entertainment.

Appleton, J. (1975)*. The Experience of Landscape*. New York: Wiley & Sons Ltd.

Bjorklid, P. and Nordstrom, M. (2007). Environmental Child-Friendliness: Collaboration and Future Research. *Children, Youth and Environments* 17 (4)

Bowlby, S. (2017) Children, young people and 'caringscapes', pp. 244-248. In: Horton, J. and Pyer, M. (Eds): *Children, Young People and Care.* New York: Routledge.

Bishop, K. and Corkery, L. (2017) *Designing cities with children and young people: Beyond playgrounds and skate parks*. New York: Routledge

Brown, S. 1993. A primer on Q Methodology. *Operant Subjectivity*, 16(3/4), 91-138.

Chawla, L. (2015). Benefits of Nature Contact for Children. *Journal of Planning Literature,* 3 (4) pp 433-452. https://doi.org/10.1177%2F0885412215595441

Cooper Marcus, C., and Barnes, M. (1999) *Healing Gardens: therapeutic Benefits and design recommendations*. NY: John Wiley & Sons

Dearden, P. (1989) Societal Landscape Preferences: A pyramid of influences. In: Dearden, P. and Sadler, B. (1989) Landscape Evaluation: Approaches and Applications. Victoria, BC: University of Victoria.

Driskell, D. (2002). *Creating Better Cities with Children and Youth: A Manual for Participation.* Unesco Publishing, London: Earthscan.

Ellingsen, I., Thorsen, A., and Storksen, I. (2014). Revealing Children's Experiences and Emotions through Q Methodology. *Child Development Research.* (2014). http://dx.doi.org/10.1155/2014/910529

Elliott, S. (2010) Children in the natural world. In Davis, J. (Ed.), *Young children and environment: Early education for sustainability* (pp. 43-75). Melbourne: Cambridge University Press.

Eken, C. (2002). *Sølvblomst.* Gyldendal: Denmark

Ernst, J. (2018). Exploring Young Children's and Parents' Preferences for Outdoor plat settings and affinity toward nature. *International Journal of Early Childhood Environmental Education* (5) 2, p. 30. https://naturalstart.org/sites/default/files/journal/ijecee_52_spring_2018_1.pdf

Gayton, D. (1996) Primal. *Landscapes of the Interior: Re-explorations of nature and the human spirit.* Gabriola Island, Canada: New Society Publishers

Gibson, J. (1979) *The ecological approach to visual perception.* London: Houghton Mifflin

Hart, J. (1979). *Children's Experience of Place.* New York: Irvington.

Horelli, L. (2007). Constructing a theoretical framework for environmental child-friendliness. *Children, Youth and Environments* 17 (4).

Kaplan, S. (1983). A model of Person-Environment Compatibility. *Environment and Behavior*, 15 (3).

Kaplan, R. & Kaplan, S. (1989) *The Experience of Nature: a psychological perspective.* Cambridge University Press, Cambridge, UK.

Kytta, M. The extent of children's independent mobility and the number of actualized affordances as criteria for child-friendly environments. *Journal of Environmental Psychology* 24 (2004), 179-198

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

McHarg, I.(1969) *Design with Nature.* New York: Natural History Press

McKeown, B. and Thomas, D. (1988). *Q Methodology.* Sage University Paper, Beverly Hills.

Nassauer, J. (1995) Messy ecosystems, orderly frames. *Landscape Journal* 14(2):161-169.

Neel, J. (2011) *Lou! Laser Ninja.* Graphic Novel. Usharp Comics, an Imprint of Highland Books

Pellegrini, A. (2009) *The Role of Play in Human Development.* USA: Oxford University Press.

Relph, E. (1976) *Place and Placelessness.* London: Pion Limited.

Spirn, A. (1984) *The Granite Garden: Urban Nature and Human Design.* New York: Basic Books.

Thomson, P. (2008). Children and young people: Voices in visual research. In P. Thomson (Ed.), *Doing visual research with children and young people* (pp. 1– 19). New York: Routledge.

UN (1989) United Nations Human Rights. *Conventions on the Rights of the Child.* Office of the high commissioner. Article 12.1. http://www.ohchr.org/EN/ProfessionalInterest/Pages/CRC.aspx

Ward Thompson, C. (2011) Linking landscape and health: the recurring theme. *Landscape and Urban Planning* 99 (3-4) pp. 187-195

Watts, S. and Stenner, P. (2012) *Doing Q Methodological Research: Theory, Method and Interpretation.* Thousand Oaks, California: Sage Publications.

Whitebread, D., Neale, D., Jensen, H., Liu, C., Solis, S. L., Hopkins, E., Hirsh-Pasek, K., Zosh, J. M. (2017). *The role of play in children's development: a review of the evidence* (research summary). The LEGO Foundation, DK. ISBN: 978-87-999589-3-1. https://www.legofoundation.com/media/1065/play-types-_-development-review_web.pdf

Whitebread, D. (2015). *Crisis in childhood: the loss of play*. Cambridge Primary Review Trust. http://cprtrust.org.uk/cprt-blog/crisis-in-childhood/#comment-7049

Wilson, E.O. (1984) *Biophilia – the Human Bond with Other Species*. Cambridge: Harvard University Press

Zosh, J. M., Hopkins, E., Jensen, H., Liu, C., Neale, D., Hirsh-Pasek, K., Solis, S. L., and Whitebread, D. (2017). *Learning through play: a review of the evidence* (white paper). The LEGO Foundation, DK.

Zube, E., Sell, J. and Taylor, J. (1982). Landscape Perception: Research, Applications and Theory. Landscape Planning 9, pp. 1-33