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ORIGINAL PAPER

Shaping space and practice to support autonomy: lessons from natural settings in Scotland

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Abstract
In the present paper, I explore some of the concrete manifestation of autonomy support in natural childcare and early childhood education settings, under the organising framework of self-determination theory. More specifically, I present the ways in which early childhood educators shape the space of natural settings and use the affordances of the natural environment to promote autonomy in children aged 3–8 years. The practices presented are a result of direct observation in several Scotland-based outdoor settings, observations and organic conversations with educators in outdoor and forest kindergartens. Hopefully the practices and spaces presented in this paper can be of use by educators and setting managers who aim to support autonomous learning and intrinsic motivation in their pupils in outdoor natural early years' settings.

Keywords Autonomy · Early childhood · Forest school · Practice · Self-determination theory

Introduction

Self-Determination Theory (SDT) identifies autonomy as one of the basic psychological needs for humans to develop optimally and flourish within their environment (Ryan and Deci 2017). Autonomy within SDT retains the literal meaning of the word as rule by the self (Ryan and Deci 2006). Being autonomous is about acting with full volition and self-endorsement but, within SDT, the concept of autonomy is quite distinct from independence (Ryan 1993). Indeed, to define autonomy fully, one needs to take into account the external environment, because being fully autonomous indicates that the individual's actions are coherent with both self and environment (Deci and Vansteenkiste 2004).

In this respect, when we think about autonomy in young children, the environment and socialising agents (e.g. parents, teachers) must be actively supportive of the child's tendency to lead the self. In traditional educational contexts (e.g. classroom), Autonomy Support (AS) and autonomy supportive teachers have been found to correlate with higher academic achievement (Boggiano et al. 1993; Flink et al. 1990). The way in which students

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perceive their own competence in relation to academic tasks is also related to AS teaching practices, with more AS linked to higher perceived competence (Deci et al. 1981; Ryan and Grolnick 1986). In this way, higher AS levels of various social agents, including teachers, parents and school administrators, are related to a heightened sense of competence and autonomy, as well as to better chances of staying in school and avoiding dropout in teenagers (Vallerand et al. 1997).

However, autonomy supportive practices in education differ according to the developmental needs of the child. Early childhood is a time when autonomy starts developing and the young child's need to pursue her own interests starts becoming apparent, while her behaviour can become increasingly volitional (Erikson 1993; Kopp 1982). This tendency towards self-regulation can be supported or thwarted by the actions of socialising agents (education and child-care practitioners and parents) (Sokol et al. 2013). Although early childhood is crucial to this development of self-regulation, through AS practices, very little attention has been focused on this life stage, especially with regards to child care and educational settings.

Autonomy support as a beneficial aspect of parenting practices has been observed in a number of studies, including benefits to executive function (Bernier et al. 2010), mastery related behaviour (Frodi et al. 1985), children's engagement in conversation (Cleveland et al. 2007) and rule internalisation (Laurin and Joussemet 2017). On the other hand controlling parenting practices, such as overprotection and coercion, were found to increase children's anxiety levels (Laurin and Joussemet 2017).

Although the literature supports the idea that AS can benefit children, all cited studies above involved the parent as socialising agent. The child care practitioner, and the manifestations of AS within a childcare/early education setting, have not been studied in any depth. To date, only one study has focused on AS practices within early childhood education settings (Côté-Lecaldare et al. 2016). This small qualitative study gives us a glimpse of the types of practices and behaviours within a childcare setting that support toddlers' autonomy, beyond those that are traditionally conceptualised for older children (Koestner et al. 1984). The children in the settings studied were between 18 and 36 months of age, and the practitioners interviewed for this qualitative study valued AS in their childcare setting. Some such practices included being sensitive and responsive, close observation of the toddler, modelling and scaffolding behaviours and giving responsibilities (Côté-Lecaldare et al. 2016).

Outdoor learning environments and the pedagogical practices associated with them have been recognised in the past as conducive to AS (Barrable and Arvanitis 2019; Maynard 2007; Wurdinger and Paxton 2003). The affordances of the natural environment, including a great variety of flexible and open-ended play items, such as naturally occurring loose parts, offer an ideal space for child-led exploration and play (Barrable and Arvanitis 2019), as well as enhanced opportunities for deep adult–child interactions that are child-initiated and responsive to the child's own interests (Waters and Maynard 2010). These child-led interactions, as well as the provision of space and time for child-led play and exploration, can be seen as the manifestation of autonomy supportive practice in early childhood education.

Nature schools and play-based outdoor learning in general have seen a steep growth in many countries around the world. National and regional curricula have introduced outdoor learning expectations in Australia (ACARA n.d.), New Brunswick, Canada (Department of Education 2017) and Ireland (Early Childhood Curriculum Framework 2015). Moreover, different types of forest school practice have developed in countries such as South Africa, Portugal, Brazil, Slovenia, India and Italy (Knight 2013). In

the US, nature-based preschools are a growing trend, with the rate of growth having greatly increased in the last 5 years. A Natural Start Alliance (NSA) national survey concluded that there are over 250 of them operating in 43 states (NSA 2017). In Scotland, the first outdoor nursery opened in 2008 in Fife (Care Inspectorate 2018). By November 2018, 19 early learning and childcare settings across the whole of Scotland had moved into forest locations, with a lot more incorporating some aspect of regular outdoor learning in their programmes (Care Inspectorate 2018). Therefore messages and recommendations of this article are applicable not only to the more established UK forest school practice, but can enhance outdoor learning practices in all nature-based settings around the world.

This growth in the number of settings has been accompanied by an increasing interest in the practice of learning and teaching in such environments. However, literature so far has mainly focused on the activities taking place in natural environments (Doyle and Milchem 2012; Knight 2011a, b), the benefits of the environment in terms of psychological and cognitive measures (O'Brien 2009; Ulset et al. 2017) and the interactions of adult and child within such environments (Waters and Maynard 2010). Moreover, there have been excellent studies that have focused on the person–environment relationship, that have used Ecological Dynamics theory as a framework (Sharma-Brymer et al. 2018), proposed pedagogical frameworks using previous research (Barrable 2019), and investigated a sense of autonomy in space in a home context (Green 2013). The latter paper brought forward 4 key activities that represented the children's autonomous experience of place: playing, exploring, resting and hiding. In this paper, these four activities, along with the ED approach of affordances, informs the interpretation of findings, adding to it a clearer focus on the SDT psychological need of autonomy and autonomy supportive environments.

Learning Environments (LE) research has involved the physical, social and instructional aspects of the LE, their measurement and respective effects on student outcomes (Shavelson and Seidel 2006). Research has identified the LE as a valuable 'alterable' variable that can positively affect cognitive, behavioural and affective student outcomes (Waxman and Huang 1996, 1997; Waxman et al. 1992, 1997). Although most LE research has focused on indoor and traditional classroom environments, some studies have involved aspects of LE in the outdoors. Nedovic and Morrissey (2013) have explored such an environment in an action research project, focusing on changes in an outdoor space and their effect on children's responses to those changes. Other studies have focused on intentionally shaping outdoor LE in the context of field trips (Tal 2001; Zaragoza and Fraser 2017) as well as other outdoor spaces (Dahl et al. 2013; Peacock and Pratt 2011). On the other hand, there have been LE studies of various psychosocial measures that relate to both wellbeing and motivation (Salmi and Thuneberg 2018) and that have combined psychosocial outcomes with physical contextual factors (Liu et al. 2012). These include both quantitative and qualitative studies that utilise SDT as an organising framework (Alfassi 2004; Wijnen et al. 2018). However, to the best of the researcher's knowledge, no work to date has explored the shaping of natural environments (e.g. forests to support students' basic psychological need of autonomy).

The present project primarily was guided by two research aims:

1. To explore how the natural spaces are *shaped* by practice that is committed to supporting autonomy.
2. To explore how natural spaces themselves *shape* autonomy supportive practices.

Methodology

The research approach used in this project is based on an ethnographic methodology, in order to "build[…] theories of cultures—or explanations of how people think, believe, and behave—that are situated in local time and space" (LeCompte and Schensul 2010, p. 12). The researcher felt that context in this instance was key for situating the behaviour and interaction. Ethnography was thought to provide a useful methodology by which decontextualisation is prevented, through direct observation of the interactions of child–environment and child–adult, as well as the careful consideration of the role of 'space' as an important context for learning social norms (Boellstorff et al. 2012).

Two research strategies for data collection were implemented: (1) non-participant observation, and (2) informal conversations with practitioners. Non-participant observation (i.e. observation from a distance) was considered appropriate because it influenced the behaviours of those involved in the interactions as little as possible (Gobo 2008). Field notes were taken at the time, while photography was used to capture the space after the observation was complete and with no children present. Finally, informal conversations with practitioners while walking around the grounds were undertaken, and both descriptive and reflective field notes were taken.

Five different forest nursery settings in Scotland were visited. In two of these, the researcher observed children during their time at the nursery with a total of 6 h being observed. The other three settings were explored with the help of a practitioner, with informal conversations taking place about the space, its use and ways of shaping it.

The settings and participants

All five settings were in a forest and ranged from 3 to 21 acres in space. Each forest setting corresponded to one nursery school, and they included different types of forest environments, namely, native pinewoods and broad-leaf forests (upland birchwoods and lowland mixed deciduous). The observations took place across a 3-week period in early spring, although the weather ranged from cold and rainy to sunny and warm—weather conditions are relevant as they affect children's interactions both with the environment and the adults around them. Six female practitioners, one each from the five different settings and with two practitioners coming from the same setting, spent time talking to the researcher. The fact that they were all female is not surprising, because only 4% of early childhood practitioners in Scotland are male (Scottish Government 2018). Of the six, two were qualified teachers who had previous experience of working in indoor settings, but had chosen the alternative forest nurseries as a place of employment. These were both lead practitioners with extensive experience. Of the remaining four, two were qualified early childhood educators, while the other two held other qualifications, such as forest school level three certification. Experience levels varied, but all practitioners had been in position for over a year, although one practitioner was a sessional worker working on an ad hoc basis.

Finally, the children attending the nature pre-schools were aged 3–8 years. All settings were in rural areas of Scotland, with children coming from a variety of backgrounds, because for some settings state funding could be accessed to cover attendance fees. However, lead practitioners in two of the settings noted that there were barriers for children of lower socio-economic status attending because of a lack of transport links and, in one case,

it was mentioned that funding was sought to broaden participation to children from local villages who might not have had the means to attend or access to viable transport options.

Analysis

Analysis of the data focused on an inductive thematic approach, as is common in ethnographic research (Reeves et al. 2008). Data were unstructured at the point of analysis, which involved interpretation of both the meaning and function of the actions and environments observed. Moreover, the researcher's field notes were repeatedly reworked in order to distil some of the key themes that emerged, as well as to give the reader of this article a sense of immersion in the practice and place (Jarzabkowski et al. 2014). The informal conversations that took place allowed the researcher to probe and ask open-ended questions to gain a deeper understanding of motivations, intentions and thinking behind certain action on the part of the practitioner, when shaping the learning environment in the forest setting. To increase reliability, explicit research method triangulation was used through the collection of data additional to the interviews, in the form of field notes from observations and photographs of the natural environment (Flick 2004). Moreover, geographic triangulation was also used to compare findings from different locations (Wilson 2006).

Results

In order to present the findings, collected through observations, interviews and photographs, the researcher decided to try to group some of the observations that were made into themes. Within those themes, a description of some of the observations or discussions that took place are used as illustrations and examples for practice in other similar spaces (Jarzabkowski et al. 2014). Four key headings are defined: Structure, Ownership of space, Affordance and Risk. The reader is asked to reflect upon the ways in which these implicate all three aspects of the LE, namely, the practitioner, child and natural environment. Of these, two have already been identified by LE research, namely, affordance (Nedovic and Morrissey 2013) and structure (Reeve and Halusic 2009), while the other two tie closely with ideas of autonomy and self-direction as explored by Barrable and Arvanitis (2019). All are underlined by the practitioner's willingness to support the autonomy of the child and endorse self-directed activities.

Structure

For the purpose of analysis and to ground the analysis into an SDT-informed framework, the concept of structure initially was used to categorise some of the practices in question. Structure within SDT is seen as complementary to and works with autonomy support to improve engagement in activities (Hospel and Galand 2016). Moreover, the SDT literature suggests that a clear structure framework is related to a lot of positive outcomes, including self-regulated learning, higher motivation to learn, and less problem behaviour in children (Vansteenkiste et al. 2012). However, structure in the classroom is very much manifested as good organisation, clear objectives, constructive and informative feedback and a clear action plan on the part of the teacher—in an environment such as the forest, structure has different manifestations.

The manifestations of structure as noted through the observations and discussions with participants clearly centre around two aspects of practice that are considered below: the structure of time; and the structure of place.

Structure of time

It is often lamented that children don't spend much time in unstructured pursuits mainly because of a very structured school day, the allure of technology and risk-averse parenting (Gray and Martin 2012; Malone 2007). In fact, forest school and play-based outdoor learning are often seen as an alternative to the overly structured day, an opportunity for children to have time to just 'be' and explore their own interests, while creating an attachment to the natural world (Lloyd and Gray 2010). On the other hand, a daily structure in activities, a routine for eating, sleeping and play is seen as a constructive ritual that not only positively shape children's early development, but also "provide the cultural backdrop for important processes of social reproduction" (Buchbinder et al. 2006, p. 58). This tension was observed between offering unstructured time in a natural settings, and setting up structure and rituals through the day in some of the practitioners' conversations. On the one hand, the majority of practitioners freely acknowledged the importance of children's autonomy and self-determination yet, on the other hand, they also recognised that certain routines had to be in place.

Compared with conventional/indoor settings, these were often very minimal, for example, routines around getting to and from the main setting, safety, hygiene and eating. Even with these routines, autonomy was valued, with children being given the opportunity to act in a self-initiated way. A good example was the transition-in-time processes, such as moving onto snack or lunch in several of the settings. They relied on song to move from one activity to the other, seeing it as a more gentle way than telling children. In that way, the signal for transition was given, it was clear, and the children would move on when ready.

Outside meal times, the structure of the day was very loose, with the majority of sessions being reserved for child-initiated play and exploration. In fact, one would describe the day as having more of a fluid rhythm, rather than a schedule, with flexibility to encompass children's needs, wants and fascinations. The way in which the physical space was structured is a key element of autonomy support within these settings that is described below.

Structure of Space

Another interesting manifestation of structure within an autonomy supporting environment was the transition-in-space. Several settings had a 10–20 min walk from drop-off place to the main camp area. Within this walk, children were allowed to run ahead. All along the route, there were set waiting places, a log, a gate, a prominent tree. Even the youngest of children could recognise these and referred to them as the 'waiting log', etc. These spots along the way served as check-in points. While children were allowed to run on in between them, they had to stop and wait at each waiting spot. The practice allowed autonomy within structure, while also keeping everyone safe and together on the journey into and out of the forest.

Ownership of place and place names

Key to acknowledging the children's autonomy was a sense of allowing them ownership of the place. The way in which the children spoke about 'their forest' denoted a clear sense that they belonged in that space, and that the space belonged to them. Their ease of movement across the wild spaces and the way in which they interacted and talked to each other about them was indicative of place attachment.

At most settings observed, and through discussion with practitioners, it was noted that each area of the forest had different and often very descriptive names. Two of the settings, however, described the interesting practice of letting children pick the names of the areas of the forest. Children had picked imaginative, descriptive and sometimes rather strange names for some of the areas, such as the 'Lion's Den' or 'Crane's Nest'. This practice of naming can be seen as an indicator of attachment to place (Taylor et al. 1984), and also as denoting a sense of ownership and familiarity by the children.

Hiding places and resting places

In a qualitative study of children's spaces and autonomy, Green (2013) picks out the following four activities that represent children's experience of space: playing and exploring, and hiding and resting. These two latter points are examined in this section, informed by the child–environment and child–adult interactions undertaken in this study.

The sense of spatial autonomy is never more pronounced than when children claim spaces through the building of dens. Sobel (1990) talks of the den as a special place where the 'birth of self' takes place (p. 9). Moreover, Barrable and Barrable (2017) describe the den as a place where children 'grow themselves' (p. 61). Whether pre-existing or built by children in a corner of the forest, the den becomes a place where the child is king, a place of perfect ownership.

The den might be seen by the child as a social place for children, or a hiding place (Kylin 2003), a place to escape from the adult world and be truly autonomous. That sense of control is key to the experience. Green (2015) writes:

> Through hiding, children gained control and constructed their own rules in their home environments. Hiding places also offered children a sense of comfort and security and provided a space for play and creativity. Early childhood educators need to consider the significance of children's hiding places and activities as they construct their own sense of place and identity (p. 329).

Although the adult in this child–environment interaction is largely absent, and her role is one of facilitation or even observation rather than planning, it was evident from the data collection in this project that there were steps that the adults could take to encourage and support this autonomy beyond simply allowing it to happen. One of the ways observed was to provide a 'communication' space, a piece of slate for writing on to communicate whether the space/den was open to adults or not. This presented children with a unique exercise in control of their own space and rule-setting.

Several settings provided pop-up tents for the children to rest in. Older children could find these and set them up themselves, then settle in with some blankets to rest, read or play. Younger children could ask to be provided with this space, which seemed particularly popular post-lunch and on colder/wetter days.

Affordances

The term affordance refers to the functional utility of an environment to the individual (person or animal). It closely relates to the how the competencies of the individual match up with the provision in the natural environment (Gibson 1979). The affordance of nature has been seen as a key positive characteristic of nature schools (Fjørtoft 2001), as well as a particular avenue to autonomy in forest schools (Barrable and Arvanitis 2019).

In this study, one of the key observations in relation to the affordance was unsurprisingly related to the type of natural environments where the nature settings were based. In this way, the diversity of the natural environment is a central positive feature that can meet the needs of children for exploration and imaginative play; the more complex the environment, the greater the opportunities for children (Ridgers et al. 2012). Through our observations and discussions with practitioners, it was clear that different types of woodland offered diverse opportunities, through two points of divergence: biodiversity and loose parts. Broad-leaf forests, such as birch and oak, as well as mixed or diversified forests, offered greater opportunity for play in loose parts and great biodiversity on the forest floor. Monocultures of conifers, such as the Scots pine, provided year-round shelter. Because most of these were managed plantations, there was the opportunity to leave felled trees in situ and use them to support practice. Felled trees were often used as bridges, or balance beams, and their roots offered a rich environment for play and exploration. Oaks can provide ideal trees for climbing, with the branching starting around a metre off the ground, and a sound branch structure for excellent and safe climbing.

In several settings, practitioners had taken advantage of certain features of the terrain to create opportunities for the children to engage with the natural environment in different ways. Natural springs and dry river beds were used as slides or to provide for water in a mud kitchen, while slopes and rocks presented opportunities for climbing, often facilitated by the use of ropes. The engaged practitioner responded to the children's needs by providing such aids, as well as verbal feedback.

Role of weather

The weather played a central role which is difficult to untangle from the forest environment itself. Prevailing winds or inclement conditions often dictated which spaces could or could not be used. Older and more-experienced children were empowered to make their own decisions in response to weather conditions and the practitioners worked with them to assess risk and weather. Children were able to choose their own spots, as long as they communicated clearly with practitioners when moving on. Finally, it seemed that the more inclement the weather the less likely it was for children to spread widely, and the closer they stayed to the practitioner throughout the day. From discussions with practitioners, on days with rainy weather, children became much more reliant on adult guidance for activities.

Assessing and managing risk

Taking managed risks is central to the forest school approach and is often seen as one of the desirable skills that children learn as they engage with the forest environment (O'Brien and Murray 2007). Mastering age- and competence level-appropriate challenges can become a valuable exercise in judgement and decision making for children as young as

3 years of age (Sandseter and Kennair 2011). While there are many types of risky play, several of them are particularly appropriate to a forest environment, such as climbing to great heights, working with sharp tools and possibility getting lost (Sandseter 2007). Therefore, it is important for both adults and children to learn how to assess risk, and set structures and rules to avoid fatal or other serious accidents.

During this project, we found that structure, as discussed above, was particularly useful when it came to managing risk. Structures around risk and dangerous activities were discussed and agreed in a collaborative manner. Because informed voice was used, risks were fully explained to the children and ways to manage them were arrived at through interaction and discussion. Thus, there was a distinct ownership of the rules by the children. While some discussions were prompted by the practitioner, others were prompted and led by the children, who then set the boundaries for themselves.

Within the group, there was a distinct sense of the group discussing and managing risk. Children found it easy to discuss potential dangers and even mitigate them amongst themselves. For example, when climbing onto a fallen log that was used as a bridge/balance beam, one child noted that it was wet and therefore slippery, and another suggested sitting on it rather than standing. In this way, children remained autonomous and safe, while the small ratio of practitioners to children allowed discussions to take place and ultimately oversight of all activities. A potential factor that could have an effect on some of the attitudes towards risky play and risk taking that were observed could be that all practitioners interviewed were female. Past research suggests that female practitioners tend to be significantly less likely to allow risk taking behaviour and to have a more liberal attitude towards risky play (Sandseter 2014).

A few rules seemed to apply to all settings, especially when it came to tree climbing. The children were given the knowledge to make safe decisions regarding how to identify trees that were healthy, strong and therefore safe for climbing. This allowed the children the autonomy to make their own decisions regarding choosing suitable trees. Moreover, all settings had the rule that children were not to be helped to get on any trees: they would do so when they were developmentally ready. This explicit match of competence on the part of the child and level of skill on the part of the activity is linked to what is discussed in Barrable and Arvanitis (2019) as optimal challenge. By finding that balance, children are kept safe from 'misadventure', which is the term used to describe a mismatch between skill and competence (Gill 2010).

The issue of boundaries was addressed in a variety of ways in different settings, allowing for different levels of autonomy. Some settings, by the nature of their location, had natural boundaries (streams, roads, fields or other fenced-off areas). These were the clearest ways to set boundaries. Other settings denoted boundaries by putting ribbons or tape on trees—in that way, giving children a clear indication of where the perimeter of an area was. However, upon discussion, a practitioner explained that these visible markings were only 'soft' boundaries and were used flexibly: children were aware of them but they were allowed to go past them upon informing an adult. This allowed children control of where they were at any one point, within a safe environment and with adequate supervision. Some settings had no set boundaries at all. Upon discussion with the practitioner, it became clear that children tended to stay close, while they would inform each other on what was deemed safe. Introducing new children to the setting gradually, possibly only one at a time, meant that the children themselves were able to regulate their activities safely. The support and promotion of autonomy with respect to risk and risky activities were believed to lead to greater self-regulation and a safer environment by practitioners.

Discussion

This particular project was primarily guided by the following research aims: to explore how the natural spaces are shaped by practice that is committed to supporting autonomy; and to explore how natural spaces themselves shape AS practices.

In order to explore how natural spaces are shaped by practice, it was important to understand the role of the practitioner within the natural setting as one of curator and facilitator. For that reason, an ethnographic research design was used as described in the methodology section above.

It emerged from the data collected that the expert practitioner's main role within the natural setting can often be that of an observer, and that the process of *curation* relies on the iterative process of observation, change to the environment and back to observation of the children and how they engage with the environment. This highly iterative process, which relies on clear communication between practitioner and child and skilled observation on the part of the practitioner, can inform a constant curation of the affordances present in the learning environment and is described by the cyclical shape of Fig. 1.

The simple act of skilled observation is crucial for listening to the child's needs and being responsive to them, especially for young, pre-verbal children. The effective practitioner gets to know the child and can acknowledge her internal frame of reference (Côté-Lecaldare et al. 2016). In this way, the adult can be empathic, take the child's perspective and support her need for autonomy (Grolnick et al. 1997; Kaplan and Assor 2012). Extending previous SDT research that focuses on observation as an autonomy supportive factor (Côté-Lecaldare et al. 2016), the current findings suggest that the practitioner can manipulate the physical environment, both as a response to the needs of the child and in order to provide sustained and meaningful engagement with the environment. In turn, this changes the child's self-directed response, further informing the practitioner's curation. This can be seen as a novel finding from this research.

Also emerging from the findings is the idea that a forest school setting is not a set space, but rather a continuously evolving entity. There are many influences on that entity, including both human (children and practitioner) non-human (wildlife, fauna and flora, weather). These interactions are entrenched in the pedagogy within the space and lend themselves to an autonomy supportive environment for the children that relies on child-led decisions for action, play and risk management. Moreover, children are able to have control of their environment in ways that are not often possible within an indoor setting, including

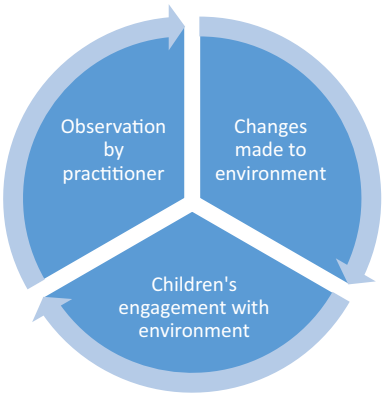

Fig. 1 Iterative process of effectively shaping the outdoor environment for autonomy

the flexibility of boundaries and the creation of private spaces, such as dens (Kylin 2003). The effect of the natural outdoor environment on engagement in early childhood has been observed before in LE research (Nedovic and Morrissey 2013) but previously has never been explored through an SDT lens. This was undertaken in this study, with autonomy being the key factor. In this sense, this research suggests that the opportunities afforded to the child for growth and self-direction are only limited by the three-way interaction, and are facilitated by the expert practitioner in the ways described above. This finding generally concurs with previous LE research that has used SDT and has focused on student outcomes, including motivation and competence, in other contexts (e.g. Alfassi 2004), but it extends past research to the less-studied forest environment and to an early-childhood focus.

Several limitations have to be acknowledged, relating to the research design and the limited sample of observations. Ethnography in itself is deeply 'personalistic' and this can in itself affect reliability of results (LeCompte and Goetz 1982, p. 36). Therefore, the researcher attempted to mitigate this by explicitly explaining both the data collection, the organising frameworks for analysis and the process of it. In terms of reliability, the conclusions of this particular research are qualified by the researcher herself and by her role within the research sites (LeCompte and Goetz 1982). As such, they might not be applicable or generalisable on a large scale and to every forest site. Validity of findings, however, can be seen as a strength of ethnographic, especially when compared with other qualitative methodologies (Denzin 1978; LeCompte and Goetz 1982). This is mostly because of the triangulation practices, which also were undertaken in this work.

These above limitations do not preclude generalisation of these findings and the reflective practitioner is invited to critically use the recommendations below to enhance their practice. Moreover, the author hopes that the study can inform future research, which can then address some of these limitations by using supplementary methods of exploration of the concept of AS in forest settings, including the use of quantitative methodologies or experimental designs, to expand upon the findings presented in this article.

Conclusion

Creating an effective outdoor space that is need-supportive for the young child is inevitably a complex and iterative process. It relies on the practitioner having a variety of skills and it is also highly dependent on the natural affordances of the space available. This small qualitative study of settings in Scotland aimed to use SDT to describe ways in which AS is facilitated by the interaction of adult, child and environment. The following key implications for practice are suggested, as outlined in the themes emerging from this ethnographic study. Firstly, a structure, both in time and space, within which children can feel safe to enact self-directed behaviours should be created. Secondly, children should be allowed to rest and hide within the place as they wish. The right type of environment and stimuli to allow this behaviour to freely emerge need to be provided. Thirdly, ownership of space should be promoted; this could be accomplished through encouraging children to give names to places, for example. Finally, children should manage of their own risk and share information feedback on the best ways to do so, but refrain from controlling behaviours in managing potential risks.

As a more general overarching principle, this research suggests a model for shaping the environment to support autonomy. The participant's willingness to engage with the child

and with the natural environment at different levels is central, and includes closely observing and consulting with the child on a regular basis, as well facilitating opportunities in accordance with the child's competence and interests. This is a cyclical process that brings together the interaction of child, practitioner and environment and promotes an autonomy supportive environment, both in the physical and psychosocial aspects of the term.

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