



Flourishing in the forest: looking at Forest School through a self-determination theory lens

Alexia Barrable¹  · Alexios Arvanitis²

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Abstract

Forest School offers opportunities for children and young adults to come into regular contact with nature. Although, in relevant literature, Forest School is seen as highly conducive to participants' motivation to learn, there is no theoretical framework that examines how this motivation can be optimized in relation to Forest School pedagogy. Self-Determination Theory offers a broad perspective for motivational processes and will be used as a guide in this article to advance such a framework. Self-Determination Theory proposes that well-being, which has been identified as an aim of Forest School, is promoted through the support of three basic psychological needs for autonomy, competence and relatedness. In this conceptual article, we make links between Forest School pedagogical practices and Self-Determination Theory, mainly focusing on the support of children's basic psychological needs. Furthermore, we make suggestions for ways in which to enhance practice through explicit links with need-supportive teaching practices, as these are identified in the Self-Determination Theory literature.

Keywords Outdoor learning · Forest School · Self-determination theory · Autonomy · Nature relatedness · Challenge

It is evident even to the casual observer that young children exhibit an inherent propensity to play and explore. How socializing agents, like parents and educators, are able to nurture this valuable intrinsic motivational tendency in ways that will help children *flourish*, that is, develop into thriving, vital, fully-functioning adults, is one of

✉ Alexia Barrable
a.barrable@dundee.ac.uk

Alexios Arvanitis
a.arvanitis@uoc.gr

¹ School of Education and Social Work, University of Dundee, Nethergate, Dundee DD1 4HN, ScotlandUK

² Department of Psychology, Faculty of Social Sciences, University of Crete, Gallos Campus, Rethymnon 74100, Greece

the basic areas of research for Self-Determination Theory (SDT; Deci and Ryan 2017). The main tenet of the theory is that individuals should be supported in ways that facilitate the expression of their intrinsic tendencies rather than be controlled externally through strict rules, rewards or punishments. Within an educational context, institutions and educators often rely on the use of positive reinforcements, such as grades and awards, or external pressure and punishment, in order to motivate children. There are fewer educational settings that attempt to capitalize on children's inherent motivational tendencies to learn, and later on, to achieve their educational goals. An example of the latter type of learner-centered approach is that of Forest School (FS), which nurtures children's curiosity and inherent tendencies to learn and explore the world around them, in a natural setting. We will outline the basic principles of SDT, as they relate to education and nature, and focus on how FS settings are conducive to the creation of an educational, physical and social environment that is in accordance with the principles of SDT. We posit that the proposed theoretical framework could be useful in enhancing practice in a way that keeps close to FS's pedagogical aims, as these are defined in the professional and academic literature.

Self determination theory and education

SDT is a psychological theory that illuminates the conditions and processes through which growth is optimized (Ryan and Deci 2017). These conditions, primarily social, are studied in their role as either facilitating or hindering human flourishing. The theory has a wealth of empirical evidence backing it, and has been used to interpret behaviors and motivational processes in many diverse fields of human endeavour, from education (Liu et al. 2015; Jang et al. 2010) and psychotherapy (Ryan and Deci 2008), to health care (Ng et al. 2012), sport (Hagger and Chatzisarantis 2007), and ethics (Arvanitis 2017). By highlighting motivational processes, the theory succeeds in exploring and explaining personality growth, development and the way humans relate to one another, as well as to their environments.

The starting point of SDT is that humans are active, growth-oriented organisms (Deci and Ryan 2000). As a motivational theory, it is focused on the energy of the organism and the ways in which that energy contributes to growth and integrity. Formally, SDT is a meta-theory that comprises six mini-theories, which have been developed through field and laboratory studies (Ryan and Deci 2017). One of these mini-theories of SDT, Cognitive Evaluation Theory (CET), is especially focused on understanding the energy that propels, for example, young children to be naturally curious, inquisitive and ready to experience the world around them. CET is generally concerned with understanding how and when activities are performed as a natural and authentic expression of individual intrinsic tendencies. Active engagement with an environment through this type of energy and enactment of natural tendencies is defined as *intrinsic motivation*, that is, being engaged in activities for their inherent satisfaction and not in order to attain a separable outcome. Intrinsic motivation is the most desirable type of motivation and is linked with many positive outcomes, including improved learning outcomes (Grolnick and Ryan 1987).

Although this form of motivation seems ideal, people cannot live their lives doing only what is inherently satisfying. In fact, most of life involves activities that are done

in order to attain a separable outcome. To simplify, these activities could be regulated by either external reasons, such as the avoidance of punishment, or more internal reasons, such as the observance of a personal value. According to SDT, there is a natural inclination for humans to transform regulation by external contingencies into self-regulation. The integration of social structures and experience into a unified sense of self is known as *organismic integration*. This is not possible with every external structure though and the process can exhibit a continuum of possibilities. Behavior may remain *externally regulated*, that is, performed for the attainment of a reward or the avoidance of punishment. Sometimes the regulation is swallowed but not digested (Perls 1973); therefore it is only partially internalized. This type of motivation is known as *introjection* or *introjected regulation*. *Regulation through identification* occurs when individuals have accepted the behavior, as they see value in it: this is a highly internalized and self-determined behavior. Finally, when *integrated regulation* occurs, the behavior is fully integrated and self-determined, in a way that is harmoniously assimilated with other values, needs and identities (Deci et al. 1991). Both integration and regulation through identification are considered *autonomous types of motivation*, along with intrinsic motivation.

From the perspective of the teacher, a primary objective is to support the children's natural inquisitiveness, that is, their intrinsic motivation to learn. Whenever this is not possible, motivating students through punishments and rewards or through invoking guilt and shame results in non-autonomous learning (i.e., in learning through external regulation or through introjected regulation, respectively). The purpose of a skillful teacher is, therefore, to facilitate deeper internalization of learning processes, materials or social norms, through organismic integration. For example, within FS, practitioners might want children to learn to respect and look after their environment and all living things. Since this is not something that is always interesting or enjoyable in itself, children may not be intrinsically motivated to learn. In this case, the learning objective is best achieved when motivation for such actions has been fully internalized (i.e., integrated), instead of being imposed through sanctions or rewards. The practitioner can accomplish this by supporting the three basic psychological needs of participants, in ways that will be outlined below.

Hence, from an SDT perspective, learning can be supported in three basic ways (see also Ryan and Deci 2017): 1) support intrinsic motivation and the development of intrinsic tendencies, 2) facilitate the integration of important values and social structures, and 3) support functionally important outcomes that are associated with autonomous behavior, such as vitality and well-being. It is worth noting that, although SDT has been used to empirically examine practice in other types of outdoor education, such as adventure project work (John et al. 2013), outdoor science teaching (Dettweiler et al. 2015) and outdoor adventure courses (Wang et al. 2004), it has not to date been used in relation to FS.

Forest school

FS is a specific form of outdoor learning which can be distinguished from other outdoor learning initiatives. Although FS sits underneath the greater umbrella of outdoor education, it has been described as a “specialised learning approach” (Forest School

Association *n.d.*). Where other outdoor learning programmes can be bound by standardised curriculum goals, FS is predominantly child-led, with curriculum negotiated between adults and children. It is an approach that can be suitable for learners of all ages, but one which is overwhelmingly used with younger children (Knight 2011). It has the express aim of helping people – predominantly younger children – grow as individuals, develop skills and confidence, as well as healthy relationships amongst themselves and with the environments they live in, especially focusing on more natural environments.

FS has been inspired by a Scandinavian approach to early years' education, which has a strong focus on the importance of 'place' for learning. The Danish *udeskole* (Bentsen and Jensen 2012) approach is deeply ingrained in decades of practice within a very established early years' ethos (Williams-Sieghfredsen 2017). In the UK this approach has been named Forest School, with the Forest School Association (FSA) set up in 2011 to support those involved. Since this time the FS name and pedagogy have spread internationally, with the Irish Forest School Association (IFSA) founded in 2016 (Forest School Association *n.d.*; IFSA 2016) and FS settings evolving in countries as diverse as Portugal, South Africa, Brazil, Slovenia, India and Italy (Knight 2013b).

FS pedagogy has sometimes been linked with a 'constructivist' pedagogy (Harris 2017; Leather 2018; O'Brien 2009). Constructivism is, at its core, a "meaning making theory" (Richardson 2003, p. 3). As such, within constructivist educational theories, children create meaning via their interactions with others around them, including other children and adults, as well as the local environment. Seeing learners as co-constructors and not as mere receivers of knowledge is central to the FS approach.

FS pedagogy comes with deep roots in other educational theories too (Doyle and Milchem 2012; Waite et al. 2016). These include Froebel's ideas emphasizing freedom and play (Liebschner 2002), Dewey's philosophy of 'real learning' and learning through life situations (Ord and Leather 2011), and Steiner's awareness of the natural environment as a facilitator of experiential learning (Steiner 1996). Through these deep traditions emerges a pedagogy that is child-centered, flexible and allows learners a freedom to control their own learning experiences, largely through play and exploration. All this happens within a local natural environment, preferably a forest.

It should be noted that FS is a vehicle for curriculum and not a curriculum in itself (Maynard 2007). Tensions can exist in some cases when the curricular goals and philosophy do not fully align with the ethos of FS (Waite and Davis 2007), but in this article we focus on an "ideal" FS practice as presented in the literature, rather than the various ways in which it is adapted and enacted. We acknowledge that the reality of FS, especially in the instances where it is used as a vehicle for curricular goals, may be different than the ideal representation. This is something that offers opportunities for research, as we further develop below.

Essentially, what distinguishes FS from other types of outdoor learning is its unique purpose. The purpose of FS, as described by Waite et al. (2016), can be seen as two-fold. On the one hand, FS is a way to increase children's connections with nature, within the cultural and social context of an ever-urbanized and indoor society (Davis and Waite 2005). On the other hand, FS aims to increase young children's motivation to learn (Kenny 2010; Waite et al. 2016), mainly by stimulating their interests. To these two ends we wish to offer an SDT framework within which FS practice can be

examined and enhanced. We note that, while the framework we are advancing is based on an ideal FS practice, drawing mostly upon UK literature, there will inevitably be intersections with other forms of nature-based outdoor learning. Hence there is scope for the framework to be successfully utilized by other outdoor child-centered settings internationally.

Forest school and self determination theory

It is because FS aims to help children develop through self-initiated learning activities that SDT, as a motivational theory, is ideally suited for offering evidence-based guidelines for FS. According to SDT, the required support for children's motivation to learn is possible through the presence of the right environmental conditions, and the absence of social contexts that over-control, over-challenge or exclude (Deci and Ryan 2000). More specifically this is possible when the socializing agents are supportive of three basic psychological needs, namely autonomy, competence and relatedness. *Autonomy* literally means 'regulation by the self' and refers to acting with full volition and self-endorsement. *Competence* refers to the need of individuals to master and be effective within their environment. *Relatedness* is seen as associated with social belonging and building strong interpersonal relationships, as well as feeling accepted and connected to others. When the social environment is supportive of these three basic psychological needs, intrinsic motivation and organismic integration are facilitated. With regard to education, need-supportive teaching practices have been developed and applied in several educational contexts (Aelterman et al. 2013, 2014; Stroet et al. 2013, 2015), showing specific positive functional and educational outcomes.

We propose that these basic psychological needs align with the basic elements of FS pedagogy, as these are described in the academic and practitioner literature (Knight 2011, 2013a; Waite et al. 2016), as well as in practitioner guidelines from the FSA (n.d.). Moreover, we argue that FS pedagogy is well placed to support all three needs, unlike other indoor or outdoor education settings, as outlined below. This is important, as "satisfaction of different basic psychological needs often seems to be synergistic or mutually supportive" (Ryan and Moller 2016, p. 228). This proposal constitutes a new organising framework to support pedagogical practice, addressing what Leather (2018) identifies as the "undertheorised" (p. 5) nature of FS pedagogy.

Autonomy

Within FS practice the participant is "entitled to choose, and to initiate and drive their own learning and development" (FSA n.d.). This strong sense of self-authorship within FS practice aligns well with SDT's construct of autonomy. Exploring the idea that learners are able to choose activities that they find interesting and engaging is the embodiment of autonomous, self-authored behavior. Autonomy for SDT retains its primary etymological significance as "rule by the self" and is distinguished from independence (Ryan and Deci 2006). It is not simply conceptualized as negative freedom, that is freedom from external interference, but especially as positive freedom, that is actively making meaningful choices (Arvanitis and Kalliris 2017). The focus is

on the functional and experiential properties of choice, which lie along the autonomy continuum of intrinsic, integrated, identified, introjected and external regulation that have been presented above.

Offering choice The opportunity to explore one's own surroundings and to make sense of them is given priority in the FS setting (Doyle and Milchem 2012; Harris 2017). This exploration is facilitated by FS leaders, whose work could rest upon the principles of autonomy-supportive teaching, such as providing meaningful options (Mouratidis et al. 2011), providing a rationale behind each activity and relating it to personal interests or learning goals (Assor et al. 2002).

Freely choosing an activity has an impact on whether children feel they are playing or working (McInnes et al. 2009, McInnes et al. 2011). Namely, when children have choice in an activity, they perceive it as play, regardless of setting (King and Howard 2014). It should be noted that in a FS context, this choice could be of the activity itself, or choice *within* an activity that has been set by the practitioner. Importantly, freedom to choose is not a binary concept. King and Howard (2016) present the idea of a choice continuum based on SDT, in relation to children's play. They note that complete freedom is often not possible, due to environmental, societal and other restrictions and therefore, adaptable choice is presented as a more appropriate model for use by practitioners. Adaptable choice balances the practical need for some control by the adult (time, space, resources) and the need for choice by the child. Moreover, elements of communication, discussed below, are important in the perception of an activity as play by children (Swann and Pittman 1977).

Communication Adult-child communication can be autonomy supportive or thwarting. Language that is inquisitive, and not directive, and that acknowledges children's interests can support autonomy in the forest (Stefanou et al. 2004). This type of discourse is evident in some of the FS literature and centers around elicitation and open-ended questioning to further interest and deepen understanding (Doyle and Milchem 2012). At the same time, there is specific research within SDT on the properties of meaningful, autonomy-supportive dialogue, which can be incorporated harmoniously within FS practice. More specifically, for dialogue to be meaningful it needs to tap into the child's interests, take an empathic view, provide choice and minimise control (Kaplan and Assor 2012). Reeve and Jang (2006) found that several instructional behaviors correlated positively with feelings of autonomy for the students, including listening, encouraging effort, and acknowledging the students' perspective. Moreover, offering hints, rather than solutions, as well as giving time for independent thinking to take place, can further support autonomy.

In order to facilitate effective communication, especially with young children whose verbal communication skills are still developing, effective practitioners can engage in the simple act of observation. They can focus on getting to know the child, through close observation on a daily basis (Côté-Lecaldare et al. 2016). The aim of such observational practices links with the aforementioned facilitation of dialogue, in that the adult needs to be able to acknowledge the child's internal frame of reference, in order to be empathic and able to take the child's perspective (Grolnick et al. 1997; Kaplan and Assor 2012; Reeve and Jang 2006).

Affordance of nature Although research on autonomy supportive behaviors, so far, has been specific to indoor classroom environments and other traditional educational settings, there are some characteristic behaviors that are transferable and can enrich outdoor learning, and promote autonomy amongst participants. Reeve (2006) emphasises the element of affordances as one that promotes autonomy. Affordance, as a concept within education, refers to the properties of an environment, which in relation to the child's abilities can enhance learning potential. Essentially, affordance refers to the functional utility of an object/environment to a specific person/animal. It is the way that the environment complements the competences and abilities of an organism (Gibson 1979), in this instance, the child.

In the work of Fjørtoft (2001) the term is explored in relation to outdoor play environments for children. Fjørtoft writes of the landscape as a dynamic and open-ended resource for children to engage with in a variety of ways. Affordance as a central part of FS has been explored by other researchers, who make the link between pedagogy and a host of open-ended opportunities to engage with nature in the forest (Sharma-Brymer et al. 2018). This idea of open-endedness is extremely inviting for children and can be used by the expert practitioner to underpin autonomy support in young learners. The forest is essentially a resource of rich, individualized opportunities for children to act in accordance with their innate capabilities and tendencies.

Competence

Competence, a basic psychological need, and motivation are closely linked within SDT. It is rather telling of the interrelation of the two needs, that theoretical work prior to a fully articulated SDT considered autonomy and competence a single need (Deci 1975). The two are mutually supportive and in certain ways reciprocal (Ryan and Moller 2016). A salient point within the idea of experiencing competence, is that satisfaction derived from it is not necessarily at a level of absolute achievement, but rather more central to the person's feelings of "increased mastery and effectance" (Adams et al. 2017, p. 47). The FSA in the UK sees the participant as "competent to explore and discover" and "entitled to experience appropriate risk and challenge" (Forest School Association n.d.). Challenge is also an inherent part of the Scandinavian FS approach (Williams-Siegfredsen 2017). By placing an emphasis on challenge, FS aims to nurture children's awareness of risk, at the same time as helping them develop the skills to tackle appropriate challenges.

Optimal challenge In a study of risk and challenge in outdoor learning environments, Gill (2010) proposes a spectral model of risk and adventure. One end is play, as activity that is well within a participant's capacity; the other end is misadventure, where the participant's capacity and skill are overstretched, possibly leading to the occurrence of serious accidents, often with grave consequences. Between is an optimal challenge level where participant skill and challenge are well matched. The idea of 'optimal challenge' as the nexus of participant skill and activity level is also echoed in SDT. The importance of activities that are optimally challenging, and that allow students to both test and extend their skills is recognized both in education in general (Guay et al. 2008) and in the more specific context of physical education (Teixeira et al. 2012).

FS pedagogy sees the taking of appropriate risks as conducive to the process of healthy physical and emotional development (O'Brien 2009). Emotional resilience and social skills are both functional outcomes of children being able to undertake activities that are appropriately challenging (Waite et al. 2016). Additionally, many of these activities support enhancement of motor skills (Ord and Leather 2011). Risk taking in this setting is linked to gradually increasing levels of skill, with scaffolding, aimed at the development of both fine motor skills, in the case of tool use, and gross motor skills, in the case of climbing and balancing (Leather 2018). One of the ways that practitioners mitigate excessive risk is that inherently risky activities, such as tool use for fire lighting, are supported by appropriate adult involvement, inclusive of an adoption of different levels of progression for participants, according to their skills (Swarbrick et al. 2004; Leather 2018). The gradual and safe progression of skill use is supported through regular visits to the same task. Swarbrick et al. (2004) explore the idea of the “challenge of the unfamiliar” and how reiteration of a skill, or even repeat visits to the same environment, can facilitate this progression. Looking at this through an SDT lens, feelings of competence, vital to the building of intrinsic motivation and well-being, are nurtured by the frequent visits to the same natural setting, and the building of skills relevant to that setting.

Feedback Within SDT, positive feedback is seen as an informational event that has functional significance for motivational processes. Providing positive feedback, relative to negative feedback, can facilitate intrinsic motivation (Vallerand and Reid 1984). However, practitioners should be aware that positive feedback in the form of praise can actually undermine autonomously motivated behaviours. It is informational feedback that is the most useful type of feedback for intrinsic motivation, in that it can signify competence or can be useful in becoming more competent (Deci et al. 1982, 1999). Wording is also important. Feedback using the word ‘should’ has been found to diminish motivation, as it can be perceived as controlling (Ryan 1982). Practitioners can use alternative phraseology for informational feedback, that highlights one’s ability to do something (e.g. ‘you can also try with the saw’) and highlights free choice.

Scaffolding learning and giving appropriate feedback is an element of a competence supportive teaching practice (Aelterman et al. 2014; Jang et al. 2010; Sierens et al. 2009), but especially so within an early years context (Côté-Lecaldare et al. 2016). In relation to FS, an experienced leader scaffolds effectively, assesses the level of mastery of participants, provides personalised incremental informational feedback and allows them to experience a high degree of autonomy in their attempts at acquiring new skills.

Structure SDT frames the idea of competence and intrinsic motivation, within the broader context of structure. Structure, in this instance, refers to the extent to which a socializing agent, in our case the practitioner, provides consistent guidelines for behavior (Edmunds et al. 2008; Reeve et al. 2004). This is especially pertinent when working with young children (Grolnick and Pomerantz 2009). Creating structure in this manner, allows participants to be able to take risks, and stretch themselves into that optimal challenge zone, without overstretching into misadventure (Gill 2010). Limit-setting does not have to be controlling in nature, but can and should be informational, acknowledging the child’s possibly conflicting feelings, yet clearly stating what the limits are (Koestner et al. 1984).

In an effective outdoor learning environment structure is central to experiencing acceptable risk and appropriate challenge (Ord and Leather 2011). Facilitating this process is provision of feedback that gives children a clear idea of the progress they are making within the expected standards (Koka and Hein 2005). This can be contrasted with chaotic settings, where structure is lacking and children may feel they are operating in a void. Skill building and feelings of competence are undermined in such instances (Skinner et al. 2005).

In order to create regulations that fully meet the participants' needs, skilled educators balance keeping them safe with allowing for reasonable risks to be taken and competencies to be developed. It should be noted here that, within SDT, competence is intricately linked with autonomy – therefore, the satisfaction of both needs is crucial to intrinsic motivational processes (Ryan and Moller 2016). The forest is an ideal environment for enabling autonomy and competence to be experienced and supported; always subject to a robust, yet flexible structure, through the consistent use of routines and rules.

We reiterate that our argument is founded on an idealised version of FS practice, and that the discrepancies between rhetoric and actual practice are acknowledged in the FS literature (Waite and Davis 2007). This is not a challenge unique to FS, but inherent in many educational settings. We suggest that the outlined structure has the above characteristics – i.e., informational, consistent, non-controlling and with the provision of adequate feedback – in order to be need-supportive.

Relatedness

The need of relatedness is satisfied when a person has a positive sense of connectedness with others, including the element of caring for others and being cared for (Deci et al. 2013). Within educational settings, relatedness is associated with a student feeling liked, valued, and accepted by the teacher. The academic literature on FS supports the view that building of interpersonal skills and positive relations constitute a desired outcome of participation (Borradaile 2006; Davis and Waite 2005; O'Brien 2009). Further, two of the seven ways in which FS characterizes participants, as viewed by the FSA, are linked to relationships. One states that the participant is “entitled to develop positive relationships with themselves and other people” (Forest School Association n.d.). The other is that the participant is “entitled to develop a strong, positive relationship with the natural world” (Forest School Association n.d.). This suggests that there are grounds for applying the concept of relatedness, as a need conceptualized within SDT, in a FS setting.

Social relatedness Personal relationships are at the core of education, and especially early years' education (Pianta and Stuhlman 2004). Relationship building is also at the heart of FS pedagogy (Harris 2017) and is one of the intended outcomes of FS (Waite et al. 2016). These relationships are key to the learning process and involve multiple layers of interaction. On a first level, there is the interaction of the practitioner with the learners. Here, communication is important for the support of autonomy and competence; guidance has been given above as to how to successfully foster these two basic psychological needs. To support relatedness, discourse has to show genuine interest for

what the learners have to say, valuing and respecting their interests and listening in a way that facilitates the building of authentic connection and involvement (Deci et al. 1994; Skinner and Belmont 1993). This process of involvement, whereby an educator conveys warmth towards the students, facilitates the satisfaction of the need for relatedness and is associated with optimal motivation (Skinner and Belmont 1993).

On a second level, there is the interaction amongst participants. Participant relationships are a facilitator of the social and emotional development of each person involved. Social skills are developed through teamwork, turn taking, mutual respect and cooperation (Harris 2017). The desired effect of this socialization process is the feeling of relatedness towards one another, that is, on an interpersonal level but also in the sense of belonging to a social group (Osterman 2000).

Nature relatedness While interpersonal relatedness is at the core of all educational settings (Ryan and Powelson 1991), both indoors and outdoors, there is a special aspect of outdoor education that cannot easily be replicated in the classroom. Outdoor learning in natural environments, such as FS, can support the building of a relationship between the individual and nature, in ways that are not as accessible in traditional educational settings. This development of Nature Relatedness (NR) is a positive and desired outcome for all. Not only is it linked with general psychological well-being, as well as subjective well-being (Nisbet et al. 2011; Zelenski and Nisbet 2014), but it also relates to environmental concern and pro-environmental behaviors (Nisbet et al. 2009). NR is also associated with a greater sense of belonging within a social context, creating a virtuous cycle between social connections and nature connections (Weinstein et al. 2009, 2015).

Pathways to NR have been studied in adults. Lumber et al. (2017) found that it is not mere knowing of nature that facilitates connectedness. Pathways to improve NR involve sustained contact, emotion and compassion towards nature, as well as appreciation of beauty. The same authors argue that these are rather different to the traditional routes used in education, which usually involve identification of plant and animal species and a knowledge-based curriculum. Such aesthetic and affective experiences, it has been argued by Quay (2013), can shape our understanding of ourselves within nature, and encompass not only activities, but a distinct way of being in relation to nature. Once more, FS facilitates such ways to nurture a meaningful relationship with the natural world, as an integral part of its practice is reflection on the emotional journey that has been undertaken (Knight 2011).

An interesting reinforcing mechanism could further be developed by the skilful practitioner, using the SDT idea of integration. In the context of outdoor learning, when learners feel fulfilment of the need for relatedness towards the practitioner and the group, they are more likely to integrate the values of that group, which are pointing strongly towards environmentally-friendly and sustainable behaviors in nature. Both close contact with nature and nature connectedness facilitate the development of such attitudes towards the environment (Cosgriff 2011; Lugg 2007).

This idea of promoting NR, through effective need-supportive learning experiences can be a goal of all outdoor learning pedagogies. The potential impact on personal well-being, social relationships and pro-environmental attitudes and behaviors is one way to affect positive change with regard to environmental outcomes. The aim of FS (n.d.) to

support development of a relationship between the learner and the natural world could be instrumental in creating more sensitized and pro-environmental citizens.

Optimal internalization

Creating a learning context where the three basic psychological needs are met – for autonomy, competence and relatedness – will help children flourish. On the one hand, such a learning context supports intrinsic motivation. On the other hand, it supports the full development of the process of internalization, leading to integrated regulation with regard not only to learning objectives, but also to important values and norms within this social context, and to positive functional outcomes. FS can both nurture intrinsic tendencies through fun child-led activities and also help in the optimal internalization of values and norms that may not offer enjoyment in themselves. This is an important desired outcome of FS participation (Waite et al. 2016).

Deci et al. (1994) describe three contextual events that promote the process of integration: 1) providing a meaningful rationale, 2) acknowledging the student's perspective, and 3) providing choice. A host of empirical evidence further extends how giving value to a behavior through communicating a strong sense of empathic understanding and providing meaningful reasoning both facilitate internalization (Vansteenkiste et al. 2018). Linking reasoning to something of personal relevance to each participant also supports integrated regulation (Jang 2008). Finally, integration can be achieved through low levels of controlling behavior and providing choice or, more practically, through the use of inviting, rather than controlling language (Vansteenkiste et al. 2004). All of the above can be used by practitioners in a FS setting to promote integration of goals such as the advancement of positive social interactions, respect for the environment, as well as awareness of the natural world and sustainability.

Opportunities for future empirical research

The connections made in this article are all based on the application of SDT in the context of an ideal FS, as this is presented in the literature. As stated previously, we recognise that there may be some distance between ideal vs real practice, and suggest that one way of testing our argument would be through focused empirical research, especially since SDT is an empirically-based theory. As such, no assumptions should be made that cannot be tested through empirical means. Future empirical research should investigate need-supportive teaching practices within FS and other outdoor learning settings. This could be achieved with a combination of qualitative and quantitative methodologies to fully explore the depth and breadth of practitioner and learner interactions and how these can support student autonomy, competence and relatedness. Appropriate instruments have been developed to be used in such research, such as the Basic Psychological Need Satisfaction and Frustration Scales (Chen et al. 2015) and the Problems in Schools (PIS) questionnaire (Deci et al. 1981). Similar studies have been undertaken in different contexts, for example traditional and constructivist classroom environments (Stroet et al. 2015), in physical education lessons (Aelterman et al. 2014)

and in early childhood care settings (Côté-Lecaldare et al. 2016). The qualitative study conducted by Côté-Lecaldare et al. used interviews and content analysis to explore early childhood educators' conceptualizations of autonomy supportive practices within their particular settings. The Stroet et al. study cited above employed a narrative analysis of student-teacher interactions to establish positive and negative manifestations of need-supportive teaching in two different classroom environments. There is certainly scope for similar methodologies to be used within the non-traditional settings of FS programmes.

Research on risk and safety, in particular, when examined through an SDT perspective, could help create an empirical basis for the development of further understanding of the relations between safety, structure, risk and competence. Viewing risk and challenge as elements of a positive, growth inspiring process that fuels feelings of competence (when embraced within a stable and safe pedagogical structure), would be beneficial to FS practitioners. Further research could be more focused on the relationship between optimal challenge and perceived competence within a FS setting, as well as exploring the tensions between autonomy and structure, and ideal and enacted practice, as these are identified in previous FS literature (Waite and Davis 2007).

Finally, looking more closely at the idea of NR and how this is promoted in outdoor learning settings would support further understanding of pedagogical practices that aim to improve outdoor and environmental education. Given the links between NR and concern for the environment (Nisbet et al. 2009), promoting NR within outdoor settings could give children a head start in developing appropriate pro-environmental attitudes and practices. There are instruments that have been validated for use with children aged between 8 and 12 (Bragg et al. 2013). Development of further methods appropriate for use with younger children, who make up the largest demographic of FS participants (Knight 2016), would be of benefit, facilitating further research endeavours.

Conclusion

In this article we argued for the application of SDT to further understand and enhance pedagogical practices within FS settings. We made explicit links between SDT and current FS practices, building a framework that holds the possibility of facilitating the growth of effective practices; practices that promote intrinsic motivation and positive functional outcomes for all learners. We believe that some of these recommendations will be appropriate for use by practitioners in outdoor settings other than FS, as there is overlap between pedagogies, locations and opportunities in other forms of outdoor learning. However, FS is particularly aligned, as it is predominantly child-led and can support not just one or two of the basic psychological needs but, as demonstrated above, all three. It is need satisfaction as a whole, and not in a piecemeal way, that is necessary for enhanced well-being, healthy development and motivation (Ryan and Deci 2000). We therefore hope that the bringing together of SDT and FS in such a framework can be of use to both researchers and practitioners in examining what effective outdoor learning looks like, and what it seeks to accomplish.

Compliance with ethical standards

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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Alexia Barrable is a Lecturer in Education, at the School of Education and Social Work, University of Dundee. Her research interests include early years education, learning in natural environments and nature connection.

Dr. Alexios Arvanitis is an Assistant Professor at the Department of Psychology, University of Crete. His research includes the application of Self-Determination Theory in social, political and moral psychology.