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To cite this article: Sus S. Corazon , Theresa S. S. Schilhab & Ulrika K. Stigsdotter (2011) Developing the therapeutic potential of embodied cognition and metaphors in nature-based therapy: lessons from theory to practice, Journal of Adventure Education & Outdoor Learning, 11:2, 161-171, DOI: [10.1080/14729679.2011.633389](https://doi.org/10.1080/14729679.2011.633389)

To link to this article: <https://doi.org/10.1080/14729679.2011.633389>



Published online: 08 Dec 2011.



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Developing the therapeutic potential of embodied cognition and metaphors in nature-based therapy: lessons from theory to practice

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This paper theoretically examines the interplay between cognition and bodily involvement in relation to nature-based therapy and proposes implications for practice. With support from theory within embodied cognition and neuroscientific studies, it is argued that explicit learning is actively supported by bodily involvement with the environment. This argument is placed in the context of 'nature-based therapy', which can be perceived as a generic term for treatments with therapeutic use of activities and experiences in natural environments. The paper proposes that the use of metaphors to conceptualize desired therapeutic understanding in connection with the performance of activities in nature-based therapy can support the learning and change process by semantically relating cognition and bodily involvement.

Keywords: *Embodied cognition; Natural environments; Therapeutic metaphors; Nature-based therapy*

Introduction

Nature-based therapy

Within the past half-century there has been a growing interest in the therapeutic use of natural environments (Cooper Marcus & Barnes, 1999; Sempik, Aldridge, & Becker, 2003; Stigsdotter et al., 2011). Today there is a vast array of therapy programmes based on activities and experiences obtained in natural environments, which overall

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can be termed nature-based therapy [NBT] (Corazon, Stigsdotter, Jensen, & Nilsson, 2010)—from horticultural therapy in specially designed healing gardens (Stigsdotter & Grahn, 2002), to wilderness therapy in large, serene nature areas (Davis-Berman & Berman, 1994; Russell & Farnum, 2004). These treatments commonly focus on the characteristics in the environment and resources within the person that support health and well-being (Grahn, Tenngart, Stigsdotter, & Bengtsson, 2010). This is in line with Antonovsky's (1996) salutogenic perspective, which opposes the pathogenic perspective usually employed in medical treatments, and focuses on the disease/problem (Antonovsky, 1996).

Nature-based therapy differs substantially from the traditional therapy setting—defined as taking place inside a clinic—in that it encourages bodily involvement with the outdoor environment as an integrated part of the therapy, where therapeutic talk often takes place simultaneously with bodily involvement (e.g. talking while walking, Corazon et al., 2010). Because the body is obviously essential for life, human beings are always embodied; defined as a person's physical engagement with the environment through the sensory-motor systems (Schilhab & Gerlach, 2008; Schilhab, 2011). When speaking about bodily involvement our focus is, therefore, on the degree to which the sensory-motor systems of the body are being stimulated. Natural environments can be characterized by their ability to bring about assorted sensory stimulation through sights, smells, sounds and tactile stimulation provided by vegetation, insect and animal life and natural phenomena such as the wind and sun (Corazon et al., 2010). Owing to the topography of outdoor landscapes, navigating in these environments often involves a broad array of movements. Thus, with respect to sensory-motor stimulation and compared to most habitats, outdoor natural environments are enriched and, therefore, promote bodily involvement. It is important to mention that other therapy forms share the same characteristic of emphasizing bodily involvement, such as animal-assisted therapy or dance therapy, but this paper focuses only on the relevance of embodied cognition in nature-based therapies.

Positive effects of natural environments

Why bring therapy into nature and promote bodily involvement with the environment? What are the known benefits? A growing body of interdisciplinary research shows that natural environments, which are experienced as aesthetically pleasing and unthreatening, automatically affect our nervous system, our emotions and our cognition and hereby support general health processes (Nilsson et al., 2011); according to Aesthetic-Affective Theory (Ulrich, 1993), which has an evolutionary approach, positive affects and stress-reducing processes are generated automatically in certain natural environments related to our history of survival. Interaction with natural environments also seems to have an effect on attention by renewing the directed attention resources (Kaplan, 1995; Berman, Jonides, & Kaplan, 2008). Attention Restoration Theory builds on the notion that human beings have two different attention systems: a form of directed attention and an involuntary attention. Directed attention

is employed to solve problems and inhibit undesired information, but unfortunately it is a limited resource vulnerable to exhaustion, whereas involuntary attention does not appear to deplete these same mental resources. The diverse stimuli in natural environments seem to promote the use of involuntary attention, hence creating an opportunity for directed attention to be restored. Further, involvement with therapeutic activities in natural environments seems to have positive psychological benefits by providing an occupation that is perceived as being meaningful, pleasurable and rewarding (Relf, 1999; Gonzalez, Hartig, Patil, & Martinsen, 2011), and to have a positive influence on a person's self-concept (e.g. in relation to feelings of self-esteem and empowerment through the performance of wilderness activities [Russell, 2000]). Research is still too limited to determine whether the above-mentioned effects of involvement with natural environments are shared with other bodily-involving therapies, or are intrinsic to nature-based therapy. Furthermore, the influence of sociocultural factors on the above-mentioned effects is not yet clearly understood.

As described above, much is known about the positive effects of conducting therapy in a natural environment, but it seems that limited attention has been given to examining the relationship between bodily involvement and cognition in relation to explicit learning and psychological change in an outdoor setting. Yet, examining this area could help to improve our understanding of the therapeutic mechanisms involved in nature-based therapy practices. As a relatively new area of research (Glenberg, 2008), understandings of how bodily involvement facilitates the general capacity to corroborate learning are still emerging, yet have relevance to developing therapeutic practice outdoors. Based on contemporary studies and theory in the cognitive sciences, this paper aims to theoretically consider the related knowledge and expand upon how bodily involvement in natural outdoor environments can be linked to learning of therapeutic value—thus encouraging new avenues for future research and practice in this emerging field of understanding.

Learning and embodied cognition

The neuroscientist Anders Gade (1997) defines learning as internal processes which lead to new resources related to knowledge, abilities, feelings and/or behaviour. Learning is viewed as being fundamental to all therapeutic treatments, whether they take place in natural environments or clinical settings. For example, reaching therapeutic goals implies new mental resources related to emotion management, value clarification, empowerment and self-esteem (Sempik, Aldridge, & Becker, 2003; Corazon et al., 2010). Most learning related to sensory-motor stimulation is known as implicit learning, since it occurs at an unconscious or sub-conscious level of which we are unaware, whereas learning we are aware of, or have conscious access to, such as conceptual, symbol-like and discursive learning, is known as explicit learning (Schilhab, 2007a). (Note that implicit learning is a heterogeneous category while this paper only deals with aspects related to sensory-motor stimulation.) The desired learning outcomes in nature-based therapy depend on the goals of the different

therapy programmes, but usually they are related to explicit learning in regard to the clarification of difficult life issues, the setting of goals and personal growth.

Traditionally, explicit learning and cognition in general were seen as being separate and were considered to dictate our embodied acting in the world, which is reflected in the use of computer metaphors about the brain (Anderson, 2003). However, this view is being challenged by an upcoming field called embodied cognition, which claims that thought content and structure are grounded in bodily experiences of the world (Anderson, 2003; Gallese & Lakoff, 2005). This claim is supported by a growing body of evidence within neuroscience which suggests that explicit learning is highly dependent on implicit processes related to our sensory-motor systems (Gallagher, Butterworth, Lew, & Cole, 1998; Taylor, 2001; Barsalou, Simmons, Barbey, & Wilson, 2003; Barsalou, 2008). According to theories of embodied cognition, the transition from bodily experiences to higher cognition takes place through a conceptualization process whereby our direct experiences of space, time, gravity and so forth are re-enacted during linguistic activity and used as a platform to mentally grasp abstract domains such as love, friendship, values and self (Anderson, 2003; Crawford, 2009; Williams, Huang, & Bargh, 2009). An example of this is how we often use spatial metaphors when we talk about friendship such as, 'I feel distant to my partner/we are on the same path/I walk away'. Research supports the existence of a relationship between abstract concepts and experience with physical dimensions. An example is the study by Meier and Robinson (2006), which shows that we react faster when classifying words which describe positive emotions when they are placed at the top of a screen rather than at the bottom and vice versa for words describing negative emotions, which indicates that spatial orientation is related to how we mentally categorize emotions.

Neuroscientific research supporting embodied cognition

Neuroscientific studies have also demonstrated the close relationship between sensory-motor stimulation and explicit knowledge. Such studies show that when we retrieve verbal knowledge, traditionally conceived of as being purely conceptual, concurrent activation of cortical areas pertaining to the relevant senses also occurs (Pulvermüller, 2005). For instance, imaging studies show the simulation of perceptual experiences when people make lexical decisions about sentences (Glenberg & Kaschak, 2002; Barsalou, Simmons, Barbey, & Wilson, 2003; Holt & Beilock, 2006), and the activation of 'perceptual symbols' of referents in the form of objects when we comprehend sentences such as, 'the ranger saw the eagle in the sky' or 'the ranger saw the eagle in its nest' (Zwaan, Stanfield, & Yaxley, 2002). The mere reading of words recruits neural areas that are normally correlated to the actual bodily experience. A study by González et al. (2006) shows that primary olfactory cortices normally involved in perceptual processing are recruited when people read words with strong olfactory associations (i.e. cinnamon or garlic). Simulation in these senses is a 'reactivation' of the neural circuits that were employed during the original experience (Zwaan et al., 2002). The first step in comprehension of a notion, say an

apple, may occur simultaneously with the first taste and tactile experiences of the fruit (Glenberg, 2008). Subsequently, knowledge about and the memory of apples seem to be sustained by the reactivation of the neural correlate, which maintains the perception and linguistic processing. In regard to learning, this means that linguistic processing and understanding, that is conceptual, explicit knowledge, is highly corroborated by previous sensory-motor experiences. These findings strongly suggest that sensory and motor experiences established by bodily involvement could be actively exploited to sustain explicit learning. Apparently, we automatically use our well-established linguistic competences to grasp new concepts by actually building on top of existing representations. According to studies on metaphor use, the first time one comes across a novel figurative expression, the implied actions and nouns are likely to be understood in a literal sense (Aziz-Zadeh, Wilson, Rizzolatti, & Iacoboni, 2006; Mashal, Faust, Hendler, & Jung-Beeman, 2008). For instance, the first encounter with the expression ‘to kick the bucket’ activates the neural correlate of the literal understanding of a bucket, which might also encode action-related understanding (Raposo, Moss, Stamatakis, & Tyler, 2009). To summarize, implicit sensory-motor processes are intricately involved in conceptual understanding, such as learning the notion of apple, by simple co-activation of bodily experiences during the acquisition of explicit knowledge.

Applicability of embodied cognition to nature-based therapy

Obviously, findings on the linguistic retrieval of the notion ‘apples’ seem somewhat distant from understanding the relation between bodily involvement and cognition in therapy when it comes to complex therapeutic life lessons. Nevertheless, such neuropsychological findings accentuate the fact that directed and orchestrated exposure to stimuli, as in a therapeutically natural environment, and thus the excitation of the sensory organs, is likely to influence explicit learning processes. If nature-based treatments actively seek concordance between therapeutic narratives and bodily experienced phenomena, then synergistic effects are clearly within reach. Among other things, owing to the scattering of the neural areas that sustain knowledge, these effects will presumably improve memory of explicit learning. The challenge is to tie the bodily involvement and the explicit learning together and also to transcend the learning beyond the context since nature-based therapy is not just about learning and remembering how to grow vegetables or survive in the wilderness, but also about personal growth and learning strategies to deal with future difficult times.

Therapeutic metaphors and narratives

Therapeutic metaphors and narratives are often used in therapy to provide new conceptual understanding since they can communicate often difficult abstract life concepts (e.g. acceptance and self-insight) in a more tangible way (Hayes, Strosahl, & Wilson, 2003). A metaphor is a figure of speech whereby a physical phenomenon or

object is used to describe something less concrete, thus transferring the qualities and characteristics of the former to the latter. According to Ortony (1975) metaphors have several qualities in communication: they express abstract ideas that would be hard to communicate otherwise; they provide complex information in a compact manner; and they convey the information in a rich and vivid way. In most traditional indoor therapy settings, metaphors are usually only explored through language and not connected with activities involving the body. Based on the above-described relationship between explicit knowledge and sensory-motoric stimulation, we suggest introducing metaphors together with activities in nature-based therapy as a way of strengthening the therapeutic outcome.

As demonstrated by the linguistic studies, perceptual experiences seem to play a role in both the learning and retrieval of metaphors and the modelling of new conceptual and abstract understanding. When we intentionally connect activities with metaphors, we build on this existing relationship and possibly strengthen the consolidation of the explicit learning entailed in the metaphor. One example can be working with the transplantation of young seedlings while talking about how to 'grow strong roots' in personal life. Further, we find that natural living environments are enriched when it comes to metaphors about existential issues such as change, growth, interdependency and meaning. Field studies also indicate that people already use natural environments metaphorically for psychological support in relation to dealing with existential issues and experiencing traumatic life events (Linden & Grut, 2002). It should be mentioned that many other environments and places are enriched when it comes to metaphorical meanings (for example, a cemetery or a theatre), which is presumably also very dependent on the sociocultural context.

Implications for practice

Based on the above-described research and theoretical arguments, we propose that using metaphors together with bodily-involving activities can strengthen the consolidation and richness of the explicit learning related to the metaphor. We further suggest that due to the conceptual and abstract aspects of the metaphor, it can transcend learning beyond the context. For example, a talk between a therapist and a client about a client's current life situation and how the client wants to live can be performed simultaneously with walking/hiking, where the notions of 'walking your path', 'losing orientation' and 'finding strength' can be used metaphorically in the conversation by the therapist and later be remembered and used by the client in another context to gain support. Another example of connecting reflection and insight with bodily involvement is to ask clients to seek out objects in the environment which correspond with their wishes for the future and encourage them to physically experience the objects while contemplating about the link to their own situation and wishes for the future. Based on the theoretical principles discussed our hypothesis is that when the client later reflects on the same questions, the simultaneous bodily involvement will have strengthened the memory of the talk, thereby prolonging and endorsing

the therapeutic effect. This hypothesis needs empirical testing, which could be performed, for example, through neuroscientific studies examining what brain areas are involved in the retrieval of the metaphors and also through qualitative enquiry of the patients' memory of the context, the talk, its effect and usefulness in later situations.

It is important to mention that learning is not a single process, but a conglomerate of which bodily involvement plays a part. Another very important mechanism in learning is the role played by our emotions, which are on the threshold of bodily involvement and cognition, representing immediate evaluative reactions to stimuli. Emotions are, therefore, a vital component in learning and the consolidation of knowledge (LeDoux, 1998; Damasio, 2000). Thus, the ability of natural environments to elicit positive emotions may be a vital element in explaining the therapeutic mechanisms in these environments, and one which needs to be studied more fully. However, the study of the emotions is a complex research area which is clearly beyond the scope of this paper, which has therefore been focused on bodily involvement.

In considering applied implications for practice, the detail of how a client's therapeutic work with personal growth and emotional values could be integrated with sensory-motor stimulation will be briefly unfolded. The example uses horticulture as the therapeutic tool. The following text, which can be adapted according to the goals of a particular session, draws on the metaphorical meaning of planting seeds and is used to initiate reflection:

Your mind is like a piece of land planted with many different kinds of seeds: seeds of joy, peace, understanding, and love; seeds of craving, anger, fear, hate and forgetfulness. These wholesome and unwholesome seeds are always there, sleeping in the soil of your mind. The quality of your life depends on which seeds you water. If you plant tomato seeds in your garden, tomatoes will grow. Just so, if you water a seed of peace in your mind, peace will grow. When the seeds of happiness in you are watered, you will become happy. When the seed of anger in you is watered, you will become angry. The seeds that are watered frequently are those that will grow strong (Anh-Huong & Hanh, 2006, p. 22).

Before listening to the text, the clients have prepared plant beds for seeds and have chosen some seeds to hold in their hands while listening to the text. After listening to the text, they are encouraged to metaphorically regard the seeds in their hands as their mental seeds—seeds they would like to give more attention to. They are further encouraged to reflect upon how these seeds can thrive in their life and what the obstacles are. This is then kept in mind while the clients actually plant the seeds. The process is illustrated in Figure 1.

It is important to stress that the activity (in this case planting seeds) is a therapeutic tool and not a goal in itself. The same therapeutic goal can be reached through many different activities. The above-described goal could also be implemented in the activity of making a fire, for instance, where the branches symbolize values one does not want to hold any longer and where one can discard the unwanted values by throwing the branches into the fire and letting them burn (inspiration for using nature-related metaphors and stories in therapy can be found in the literature, e.g. Kornfield & Feldman [1997] or in communications with gardeners and wilderness leaders).

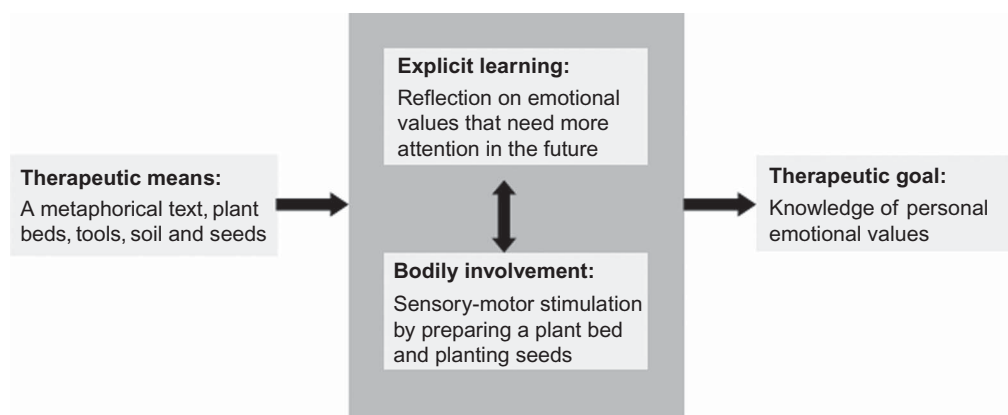


Figure 1. Integrating bodily involvement and explicit learning.

Limitations

The limitations of the paper should be mentioned briefly. First of all, neuroscience is a new area of research and the evidence weakens when one tries to draw implications from laboratory tests to complex real-life learning contexts. Further, there is a circularity problem within the argumentation for embodied cognition (EC) since it mainly relies on language analysis as evidence for the very development of language and cognition through embodiment. The importance of socio-cultural factors has been explored (Kitayama & Park, 2010), but they are as yet not very well integrated into the theories of EC, neither is the importance of emotions. The area of embodied cognition and the relationship between sensory-motor stimulation and cognition have been further blurred by the discovery of mirror neurons, where our sensory-motor areas in the brain are activated simply by looking at another person performing an activity (Schilhab, 2007b). The conclusions and suggestions for practice are derived, therefore, from a new research field with limitations. However, it also provides us with promising leads to begin to understand our embodied nature and the therapeutic mechanisms involved in therapies which engage the sensing and moving body, such as nature-based therapies. It is in this light that this paper should be read.

Conclusions and future research

Based on embodied cognition and neuroscientific research, it is argued that in nature-based therapy, profound bodily involvement can support cognitive processes related to explicit knowledge acquisition and retrieval. Therefore, to ensure optimal learning conditions, it seems to be of vital importance that bodily experiences and explicit learning are semantically related. Such connections can be established through the use of nature-related stories and metaphors that explicitly integrate sensory-motor stimulation, thus deliberately linking embodiment with insight. However, as noted above, these conclusions require empirical testing through neuroscientific research of brain

areas involved in the retrieval of therapeutic metaphors and by qualitative inquiry of specific therapy sessions and their impact. There should preferably be control groups in both cases, which should consist of people who have not participated in nature-based therapy, but who have been introduced to the same therapeutic metaphors in a traditional indoor clinical setting. The proposed qualitative studies will be conducted as part of a large research project regarding the effect of nature based-therapy at the Danish Healing Forest Garden, Nacadia, which will open in the autumn of 2011 and which will offer treatment for people with stress-related illnesses (Corazon et al., 2010). It is hoped that in examining the bodily-related processes and associated impacts of nature-based therapy its therapeutic potential can be understood more fully and its benefits to clients expanded more widely.

Author biographies

Sus S. Corazon holds a Master in Educational Psychology and is currently a PhD student at Forest & Landscape Denmark, University of Copenhagen. Her research focuses on the development of nature-based therapy for people with stress-related illness and she is part of the university-based initiative to construct the healing forest garden Nacadia in Hoersholm, Denmark.

Theresa S. S. Schilhab is a neurobiologist and holds a PhD in the philosophy of the biological sciences from Niels Bohr Institute, University of Copenhagen. Now, she is an associate professor at the GNOSIS Research Centre, University of Aarhus. She is the author and co-editor of numerous books including the anthology *Learning Bodies* (2008) and *The Symbolic Species Evolved* (2011) as well as scientific papers in cognitive ethology, implicit knowledge, embodied cognition and evolutionary neuroscience emphasising the impact of bodily experience on human learning.

Ulrika K. Stigsdotter is a landscape architect and an associate professor at Forest & Landscape Denmark, University of Copenhagen. Her research focuses on the connection between humans' health/well-being and the outdoor environment, which involves both the green structure in the city as well as small gardens at hospitals and workplaces. Stigsdotter is one of the landscape architects involved in the Rehabilitation Garden at SLU Alnarp and the project leader of the Healing Forest Garden Nacadia.

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