



Dandelion Time Phase Two Review

Executive Summary and Final Report

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Nicola Kemp & Tansy Watts

Faculty of Education

Canterbury Christ Church University

Understanding the therapeutic benefits of engagement with the natural environment within the Dandelion Time Approach: A Review of Literature

Project Description

This second phase of the CCCU/Dandelion Time (DT) evaluation project builds upon the first phase, which identified a range of proximal impacts for the children and families who engage with Dandelion therapeutic services. Specifically, these were:

- Helping parents (and children) interact in a more connected, positive and affectionate ways to each other
- Changes to the child and parent's inner world' and way of seeing themselves, others and relationships
- Helping children (and parents/carers) acquire specific self-calming and self-control skills and different ways of responding to difficult interactions with others.

This stage of the research aims to explore **why** the Dandelion Time approach might be effective by drawing upon published research. It acknowledges the particular experiences of the children and families who are referred to DT (domestic abuse, neglect and other forms of trauma and disadvantage). It aims to establish links between the positive therapeutic outcomes for children and families identified in phase 1 with the principle themes of therapeutic engagement provided by Dandelion Time (systemic multi-family therapy, experiential learning and rhythmic purposeful activities in a natural environment).

Project Rationale

The Dandelion Time approach has been documented in their own Diploma Level Training Course (2014). **A key element of the distinctive approach is the focus upon engagement and sensory development in the natural environment.** This is expressed in the following way:

“The rhythms, seasons and cycles of life in the natural environment are worked with in a way which impacts and resonates with the human senses. The aim of this unit is to develop the learner's understanding of the means and ways by which the natural living environment, both cultivated and its wildlife, can be used as an essential component in working therapeutically with children and families who have experienced traumatic abuse, neglect or attachment difficulties. The unit will require learners to engage in experiential land based activities with families including gardening and animal care. Learners will observe and experience how land based activities can stimulate the sense perceptions. They will be encouraged to consider how such experiences have the potential for life affirming and healing qualities which, when experienced by children,

young people and adults affected by traumatic abuse, neglect or attachment difficulties, can result in a therapeutic experience.”

However, the significance of the natural environment experiences within Dandelion Approach is not fully understood. An initial meeting between CCCU and DT established a desire to move from ‘practice-based evidence’ to ‘evidence-based practice’. A key aim of this second phase of research is to develop a relevant and recent evidence-base that underpins the therapeutic approach employed by Dandelion Time. Specifically, it **aims to deepen understanding of the significance of the natural environment within the practice of Dandelion Time**. The report draws primarily upon recently published research evidence. The review is presented in three parts: The first part provides a conceptual framework for the Dandelion Time approach drawing upon ecoliteracy principles; the second part provides an in-depth analysis of the research literature in relation to the Dandelion Time approach; in the third part we present three exemplar ‘evidence pathways’ that seek to explain the role of the natural environment in supporting the beneficial outcomes for children and families engaging with Dandelion Time.

Executive Summary

There is a large and growing body of literature relating to the benefits of engagement with, or connection to, the natural environment. However, an initial scoping review found that the majority of this literature is focused on adults rather than children and on generalised health and well-being benefits rather than on specifically therapeutic perspectives. No studies were found that matched exactly to the work of Dandelion Time (DT).

In order to maximise the relevance of this review to Dandelion Time, the research team drew upon the principles of ecoliteracy (Capra, 1994) to conceptualise The Dandelion Time approach. This 'language of nature' uses the ecosystem organizational patterns of networks, feedback, self-regulation and self-organization, and can offer a model for successful human systems.

The review focused on addressing three key questions which derive from the DT approach.

What are the effects of childhood trauma?

- Some immediate and short-term impacts on children that have experienced trauma include withdrawal, depression, abnormal fears, regression, learning problems or a decline in school performance
- Traumatic childhood experiences have been found to be associated with a 'toxic stress response' which involves an extreme, frequent or extended activation of the stress response.
- Toxic stress can impact on a child in the short and longer term and is associated with disease arising from chronic stress on bodily systems (physiological disease) and/or by disease caused by psychologically or physically damaging coping mechanisms.
- Physical abuse, sexual abuse and neglect have attracted the most research interest to date, however there has been growing awareness that it is emotional abuse that may in fact be the most pervasive and damaging form.
- There is a co-occurrence of different types of trauma so that exposure to one type of trauma, vastly increases the chances of exposure to further traumatic instances
- The effects of exposure to childhood trauma are complex and cumulative and can be transmitted inter-generationally.
- There are limitations in the evidence base. Longitudinal studies following infants and children into adulthood are needed in order to enhance understanding.

What evidence is there to support therapeutic interventions such as Dandelion Time for children who have experienced trauma?

- Early intervention can serve to prevent the establishment of physiological changes and maladaptive responses in the child. There is strong research support for a systemic approach which encourages a healthy and supportive relationship between the parent and child.
- There has been relatively little research into therapeutic interventions during middle childhood for children that may have experienced trauma. However, the case studies reviewed (Hope Connection; Purvis et al, 2007 & CASA trauma & attachment group; Ashton et al, 2016) suggest they can be effective and should be of particular interest to Dandelion Time.

- There is empirical support for Trauma-Focused Cognitive Behavioural Therapy (TF-CBT) for children who display traumatic stress symptoms. There is also research to support the use of therapeutic approaches that focus on bodily experience. Examples reviewed include Eye Movement Desensitisation Reprocessing (EMDR) (Field & Cotteral, 2011); the Neurosequential Model of Therapeutics (Perry, 2008); Rhythmic-Movement Therapy (Malkina-Pykh, 2014).

What role does the natural environment play in supporting positive therapeutic outcomes for children who have experienced trauma?

- The examples reviewed are not necessarily ‘therapeutic’ in the sense of involving a therapist but often have an identified psycho-social benefit.
- Nature contact studies have identified a variety of stress-reducing psychophysiological responses in the form of decreased arousal and perceived stress levels (see Ulrich (1979) Stress Recovery Theory) although these have not specifically focused on children.
- Nature-based therapeutic interventions aimed at children are uncommon in both practice and research even though there is preliminary evidence to suggest that that nature can support and enhance the therapeutic process
- An overview of studies focusing on children, indicates that nature contact can support the renewal of psychological resources and lead to reported improvements directed attention, mood, cognitive functioning and increase social interaction (drawing upon Attention Restoration Theory, Kaplan & Kaplan, 1989).
- Hordyk *et al*'s (2015) study of immigrant children indicates that nature can represent a safe context for the expression of difficult emotions and conflicts (see also Lahad (1993) Safe Place programme)
- Animal Assisted Therapy (AAT) is the most commonly reported type of nature-based intervention with children and has been demonstrated to improve depression, anxiety and self-efficacy (see particularly Dietz, Davis, & Pennings’ (2012) study of children that have experienced trauma).
- Other forms of ecotherapy with children and young people are less well documented and understood.
- There is some evidence to suggest that the natural environment can support positive family interactions and family functioning with positive psychological outcomes (see Izenstark & Ebata, 2016).

The third part of the report relates the research evidence to the proximal outcomes identified by Dandelion Time in the Phase 1 report. Three ‘evidence pathways’ are presented to illustrate how and why the Dandelion Time approach works. The first focuses on the emotional impacts of childhood trauma; the second on psychological impacts, and the third on social impacts. These are followed by a table of more detailed evidence for the 11 dimensions of change identified in Phase 1. The report concludes by confirming a need for robust empirical research to evaluate DT practice given the identified lack of comparable research evidence.

Understanding the therapeutic benefits of engagement with the natural environment within the Dandelion Time Approach

Final Report

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Part 1 Conceptual Framework

1.1 Ecoliteracy: Drawing upon the Language of Nature

In order to maximise the relevance of the review to Dandelion Time, a first step was to conceptualise the Dandelion Time approach and to do this the research team drew upon principles of ecoliteracy. These principles support a ‘Systems Theory’ (Laszlo, 1972) perspective, described as a “holistic evolutionary paradigm of reality” (DeKay, 1996, p1) in which **the Earth is viewed as a whole, living, self-regulating system, and the material world a network of inseparable patterns of relationships.** It conceives of a symbiosis of nature and culture, in which nature is considered as a continuum of living systems connected through network relationships. This has been described accordingly:

“Living systems are hierarchically organized in seven levels: cells, organs, organisms, groups, organizations, societies, and supranational systems. Each system level is composed of component systems of lower levels and becomes a component system for the level above”. (Miller, 1974, cited by DeKay, 1996, p1)

Living systems have been identified as self-generating: in cells through cellular networks, and in groups through communication networks. Capra (1994) identifies that as ecological and human communities are both living systems, that **a language of nature’s patterns and processes can be used to support the creation of “communities that are compatible with nature’s processes for sustaining life” (Stone, 2012).** Given Dandelion Time’s therapeutic philosophy, which centres on purposive engagement with the natural environment, these organisational patterns will be used to consider its context and processes.

1.2 The Context of Dandelion Time: Nested Systems

Drawing upon ecoliteracy principles, Dandelion Time can be understood as working within the context of a pattern of nested systems

“Nature is made up of systems that are nested within systems. Each individual system is an integrated whole and—at the same time — part of larger systems. Changes within a system can affect the sustainability of the systems that are nested within it as well as the larger systems in which it exists” (Stone, 2012)

The model (Figure 1) identifies a number of ‘systems’ relevant to the Dandelion Time approach starting with the child and moving through the family, the community and the natural environment. This model shares common elements with Bronfenbrenner’s Ecological Theory (1979) and the Person in Environment concept (Norton, 2012) commonly used in social work practice. However, **it goes beyond these theories in recognising the significance of the**

physical environment. Keywords relating to each of the ‘systems’ were derived from the text of the DT Diploma Level Training Course (2014) and these were used as search-terms and are also shown in Figure 1. An initial literature scan confirmed a number of different fields of research that would be of interest although very little, if any, published work that matched the precise focus for this review. The review was therefore based on the concept of ‘bricolage’ where “materials are juxtaposed in open-ended ways designed to provoke readers rather than to convey some closed message.” (Hammersely in Given, 2008).

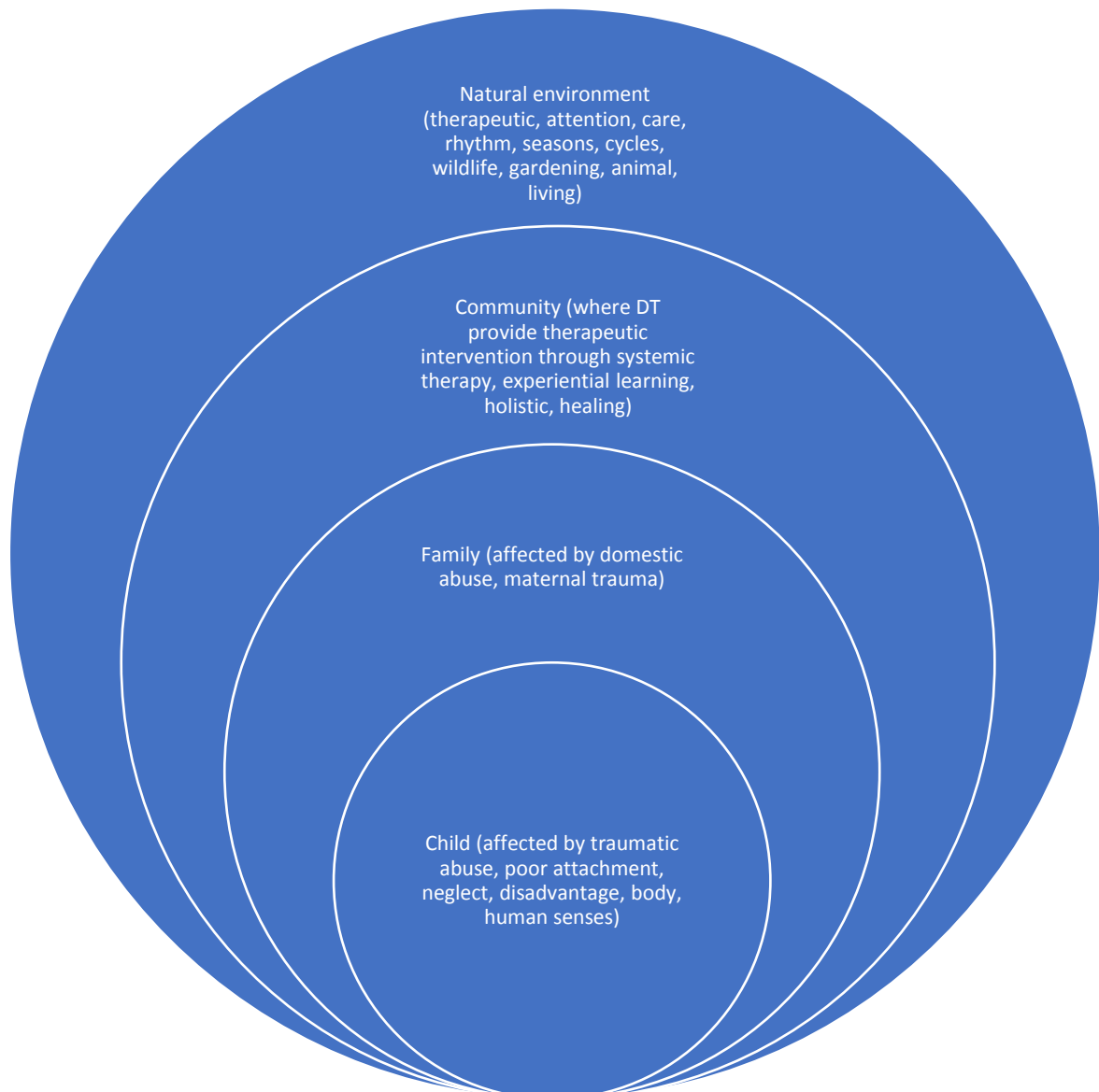


Figure 1: The Dandelion Time Approach: A Nested System

Part 2 Literature Review

The evidence from the literature is both complex and diverse and so for coherence, is presented here as a narrative which starts with the child and moves outwards through the conceptual model. It seeks to answer three key questions that arose during the course of the research and the narrative is built upon the answers to these questions:

1. What are the effects of childhood trauma?
2. What evidence is there to support therapeutic interventions such as Dandelion Time?
3. What role does the natural environment play in supporting positive therapeutic outcomes?

2.1 What are the effects of childhood trauma?

The initial literature search gave rise to forty-two relevant articles and twenty-six of which were prioritised for review for their insight into childhood trauma. Seven offered a meta-analysis of recent relevant research, four were based on reviews of adults using mental health services, four reviewed data from large-scale surveys of general population, eight constituted small-scale interview and questionnaire studies with adults and adolescents (one included children from the age of nine, and some accompanied by specific physiological measures in participants) and three were pilot studies of early intervention programmes with parents and young children. This literature represents studies that have taken place within a wide variety of global contexts.

2.1.1 What is childhood trauma?

Traumatic childhood experiences have been defined as those derived from noxious actions or events inflicted on the child and from the lack of a supporting environment (Carvalho *et al*, 2015). This can be experienced by the child as harm, potential for harm or threat of a harm (Sideli *et al*, 2012). Examples of traumatic events have been identified as including physical, sexual and emotional abuse, neglect and household dysfunction, domestic violence, bullying, injury, illness, parental separation and death of a parent (Misiak *et al*, 2016, Gwynne *et al*, 2009, Fisher, 2000, Felitti *et al*, 1998, Horner, 2015). Additionally, events with broad impact that are traumatic for children include instances such as man-made disasters, war, and terrorism (Little *et al*, 2011).

Recent research has suggested that traumatic childhood experiences are widespread, and that rates of occurrence have been reported as ranging from between a third (Kessler *et al*, 2010) and up to ninety percent (Heinzelmann & Gill, 2013) of the general population. However, it is not only prevalence but the potentially impactful nature of such experiences that has since driven enquiry. Childhood trauma has been identified as a major public health problem with the potential for lifelong mental and physical health consequences (Horner, 2015, Felitti *et al*, 1998, Misiak *et al*, 2016, Heim *et al*, 2016). Felitti *et al*'s (1998) ground breaking study of 9,508 U.S.A medical centre members investigated childhood exposure to Adverse Childhood

Experiences (ACE). In this survey over two-thirds (67.3%) of respondents reported exposure to at least one adverse childhood experience, and 12.6% reported exposure to four or more. Comparisons were then drawn between these exposure rates and measures of health status, disease and risk behaviour to reveal a strong graded relationship between breadth of exposure and “multiple risk factors for several of the leading causes of death in adults” (Felitti *et al*, 1998, p245). The necessity for identifying linking mechanisms between these experience and the consequent health implications, and for identifying effective preventative strategies, became a priority (Felitti *et al*, 1998).

2.1.2 Toxic stress response

Exposure to trauma can result in stress, not all of which has negative effects. However, there is also the potential for traumatic childhood experiences to be associated with a ‘toxic stress response’. This has been defined as,

“The extreme, frequent or extended activation of the stress response that causes distress for the child and may lead to negative psychological or physical health outcomes” (Johnson, Riley, Granger & Riis, 2013 cited by Horner, 2014, p199).

Horner (2014) describes the toxic stress response as arising through the child’s developmental state of dependence, and that feelings of powerlessness and loss of control can generate high degrees of stress with resultant physiological responses in the body.

The human stress response occurs within two primary systems: the hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic nervous system (Bernstein *et al*, 2013). The sympathetic nervous system (‘the fight or flight response’) governs the acute stress response in the body, and the HPA axis the body’s slower responses to stress (Horner, 2015). If children are exposed to toxic stress that does not abate, the HPA axis remains activated and this can result in increased pituitary sensitivity and rises in cortisol levels (Grogan & Murphy, 2011). As the brain is not fully developed until the age of twenty-five (Horner, 2015), and there is a continuous refinement of neural networks in response to its environment during the first years of life, this continuous heightened stress response can be highly developmentally impactful. Specific effects on the maturation of the brain have been identified in terms of auditory, visual, and somatosensory-evoked potentials and a decrease to the volume of the hippocampus important for memory storage and retrieval (Horner, 2014). Changes are implicated in the nucleus accumbens, the pleasure and reward centre of the brain, the prefrontal cortex, necessary for impulse control and executive function and to the amygdala, the brain's fear response centre (Burke-Harris, 2014). There is a potential through the heightened HPA axis response for dysregulation across the immune, metabolic, and nervous systems which can then be subsequently translated into disease (Slopen, McLaughlin, & Shonkoff, 2014). **Felitti (2009) identified two pathways by which toxic stress related disease occurs throughout the life span: that resulting from chronic stress on bodily systems, or disease caused by coping mechanisms that represent psychologically or physically unhealthy choices taken up through the body’s attempt to find homeostasis (Horner, 2014).** Negative health outcomes that have been associated with

childhood trauma exposure and toxic stress response include cardiovascular disease, obstructive pulmonary disease, cancer, asthma, autoimmune disease (Garner *et al.*, 2012).

2.1.3 Psychological Impacts

Some immediate and short-term impacts on children that have experienced trauma include withdrawal, depression, abnormal fears, regression, learning problems or a decline in school performance, truancy, bullying or a tendency to become a victim, difficulty in building or maintaining relationships, impulsiveness, behavioural and emotional problems, denial or obsessive retelling of the incident (Fisher, 2000). There is also the potential for the development of PTSD, experienced as nightmares, flashbacks, and serious emotional and behavioural problems (Kaplan *et al*, 1993). In some cases these responses may be delayed, with a resulting lack of awareness of the connection between trauma exposure and responses, and can appear during adolescence in the form of drug and alcohol abuse or aggressive, antisocial behaviour (Johnson, 1989; Wolfe, Zak, & Wilson, 1986).

Childhood adversity exposure has now been associated with increased risks of potentially long ranging negative social outcomes along the life span, including mental illness, lower educational level and higher criminality (Misiak *et al*, 2016). Due to the prevalence of childhood trauma in the history of patients with psychiatric illness, this link has been well-established and supported by a growing body of research evidence (Catalan *et al*, 2017, Misiak *et al*, 2016, Carvalho *et al*, 2014, Sudbrack *et al*, 2015, Mehdi *et al*, 2016, Rossiter *et al*, 2015, Heim *et al*, 2010). Strong links have been particularly well-established with mood and anxiety disorders, including unipolar depression, bipolar disorder, generalized anxiety disorder, panic disorder, phobias, and posttraumatic stress disorder (Heim *et al*, 2010).

Studies have focused on identifying pathways to psychiatric illness resulting from childhood trauma, and have identified a number of mediating mechanisms in the form of maladaptive personality traits and emotional schemas, which can be impactful in their own right (de Carvalho *et al*, 2015, Sudbrak *et al*, 2015, Hopfinger, 2016). These can take the form of dysfunctional cognitive schemas (Huh *et al*, 2017, Broekhof, 2015), affective dysregulation, lower optimism (Broekhof, 2015), insecure attachment styles and dissociative mechanisms (Misiak *et al*, 2016, Heim *et al*, 2010, de Carvalho *et al*, 2015, Mehdi *et al*, 2016, Hopfinger, 2016). Misiak *et al* (2016) have proposed that evidence exists to support psychosis with a positive history of childhood trauma as a new and specific psychotic phenotype, with distinct associated treatment pathways. It has been identified that in cases of depressive illness with a history of childhood trauma, that there is a greater chronicity to the illness, with higher likelihood of relapse and treatment-resistance, requiring more intensive clinician follow up to achieve sustained improvement (Heim *et al*, 2010).

2.1.4 The specific impactful nature of emotional abuse

Evidence supports a specificity model in relation to the nature of childhood adversities and their consequences (Misiak *et al*, 2016). **Physical abuse, sexual abuse and neglect have attracted the most research interest to date, however there has been growing awareness that it is emotional abuse that may in fact be the most pervasive and damaging form (Riggs, 2010, Carvalho *et al*, 2015, Sudbrack *et al*, 2015).** Drawing on findings from the Brazilian BRAINSTEP study, de Carvalho *et al* (2015) identified strong associations between emotional abuse and neglect with maladaptive temperament and character traits, but this was not upheld in relation to physical abuse. The maladaptive personality traits measured included harm avoidance, negatively associated self-directedness, lack of persistence and reward dependence (de Carvalho *et al*, 2015).

In accordance with Bowlby's (1969) attachment theory, when there is emotional abuse and poor attachment to a caregiver, this can profoundly affect a child's subsequent inner working model of emotions and expectations in relation to others (Riggs, 2010). Not only is there a dysregulation of the body's physical stress response as previously described, but a compounding of this effect through the absence of a secure attachment relationship. The lack of attachment relationship can lead to an inability to develop emotion regulation, and means that children's formative experiences can be dominated by negative rather than positive affect (Riggs, 2010). Broekhof *et al* (2015) draw on van Harmelen *et al*'s NESDA study (2010) in which a strong association between emotional childhood abuse and negative cognitive styles was found, caused by negative self-associations being explicitly handed to the child. Broekhof *et al* (2015) have discerned that negative cognitive schemas may alter emotional self-regulation resulting from alterations in neurobiological development. Dannlowski *et al* (2013) reported that neuroimaging studies have found higher amygdala responsiveness to negative cues in individuals with a history of childhood maltreatment.

O Hagan (2006) suggests that there is the potential for development of children subjected to emotional abuse to be affected such that it leaves an individual at the "outermost limits of emotional functioning", and that this can have far-reaching consequences (O Hagan, 2006 cited by Riggs, 2010, p14). This can include the development of a negative view of self and others, leading to maladaptive coping responses. This can interfere with social functioning, and the capacity to form future attachments, all of which can hold negative potential in relation to future mental health (Riggs, 2010).

2.1.5 The co-occurrence of different types of trauma

The evidence indicates that exposure to one type of trauma, vastly increases the chances of exposure to further traumatic instances (Misiak *et al*, 2016, Horner, 2015, Riggs, 2010, De Carvalho, 2015). Dong *et al* (2004) report that in those revealing one adverse childhood experience, the likelihood of them having another was two to eighteen times higher than those reporting none. There are socio-economic factors that impact on a child's exposure to potentially traumatic experiences (Boyce, 2014 cited by Horner, 2015). Horner (2015) reports that a fifth of

children in the USA will sustain more than half of the medical and psychiatric morbidities within the population. Burke-Harris *et al*'s (2011) study of children in an urban, low income community revealed a significant prevalence of children with exposure to adverse experiences, and that those with exposure to four or more were also associated with a greatly increased risk for learning and behaviour problems and obesity additionally. Misiak *et al* (2015) report that epidemiological studies into the social trajectories leading to the onset of psychosis have addressed interactions between socio-economic status, cannabis use, urbanicity and childhood adversities. Such studies suggest that “social defeat may serve as a mediating variable in the association between childhood trauma and psychosis” (Misiak *et al*, 2015, p394), and that factors such as urbanicity can hold an additive effect.

2.1.6 The effects of exposure to childhood trauma

Individual responses to stress are complex: studies have found that there is an interplay between genetic factors and environmental factors in relation to the pathogenesis of or resilience toward stress-related disorders (Gillespie *et al*, 2009). Children inherit both their genotypes and their environments from parents, and it has been identified that

“environmental risks such as exposure to family violence (domestic violence or child maltreatment) are known to co-occur with genetic predispositions to negative health outcomes such as mental health disorders or neuropsychological dysfunctions” (Moffitt & The Klaus-Grawe 2012 Think Tank, 2013 cited by Horner, 2015, p193)”

Fisher has argued that although not a predictor, children who have been victims or have witnessed domestic violence are more likely to be perpetrators than those who have not (Fisher, 1999). Riggs (2010) argues that current theory and research suggests that the profound effects of emotional abuse on the attachment system in early caregiving relationships, can affect the individual at every phase of life, and therefore potentially into the next generation. Moog *et al* (2016) support the notion that **the effects of exposure to childhood trauma may be transmitted intergenerationally**, however that the mechanisms for this require further enquiry. Moog *et al* (2016)'s study explored the effect of maternal childhood trauma during pregnancy via placental-fetal stress physiology, and present findings that support a “biological pathway of intergenerational transmission that may operate as early as during intrauterine life” (Moog *et al*, 2016, p831). McDonnell and Valentino's (2016) study also evaluated pathways between maternal childhood trauma and infant outcomes, and their findings supported an intergenerational influence through maternal depressive symptoms at time of birth, birth weight and infant socioemotional symptoms at 6 months postpartum.

2.1.7 Limitations in the research literature

Although there is an amassing body of research literature to illuminate understanding of the effects of childhood trauma, much of this is from a retrospective approach (Riggs, 2010, de Carvalho *et al*, 2015, Broekhof, 2015, Heim *et al*, 2010). Limitations to retrospective studies

have been identified in their being memory dependent and can relate to a wide range of abuse and neglect which may not be fully identified (Heim *et al*, 2010). A study of childhood trauma reporting in psychiatric records found low disclosure rates, and that this was particularly marked in relation to emotional neglect suggesting a lack of questioning by clinicians, low voluntary disclosure rates or that incidents may have gone unrecognised (Rossiter *et al*, 2015). **It has been identified that retrospective studies are informative, but that longitudinal studies following abused infants and children into adulthood are needed in order to confirm a true causal model (Riggs, 2010, De Carvalho *et al*, 2015).**

2.2 What evidence is there to support therapeutic interventions such as Dandelion Time?

Forty articles were found in relation to the identified research terms, and twenty were prioritised for review. These contributed towards building an understanding of existing therapeutic interventions to address the issue of childhood trauma. Ten articles reported on mixed method research projects, six reviewed existing research and four offered theoretical insights into therapeutic approaches.

2.2.1 Support for a systemic approach

It has been identified that in aiming to enhance resiliency in trauma-exposed children, the first measure should be to encourage a healthy and supportive relationship between the parent and child (Horner, 2015). In order for children to heal from trauma exposure, ongoing sources of potential trauma must be eliminated or greatly reduced, and an inter-agency approach can be deployed in support of this. Horner (2015) argues that research has demonstrated that it is structured parenting programs that have been one of the few clinically proven interventions efficacious in promoting the mental health and well-being of children (Mihalopoulos, Vos, Pirkis, & Carter, 2011).

This approach to addressing childhood trauma has been shaped by the person-in-environment concept that has underpinned social work (Norton, 2012). This approach embodies a dual focus on the individual and their social environment, and the transformational potential of relationships within this context (Norton, 2012). The ecological systems theory of child development (Bronfenbrenner, 1979) has been historically influential on shaping child welfare work, and identifies the potential held by the quality and context of the environment of the child. This environment is conceived of in terms of the networks of human relationships within them, and Bronfenbrenner positioned the child at the centre of an ecology of influential social systems. These are considered according to the micro system, the mesosystem, the exosystem, the macro system, and the chronosystem, and that there is the potential for a complex set of interrelationships within and between them that are influential on the child's life. As such, the family and supportive relationships around this are envisaged as a potentially positive context for healing. Norton (2012) has identified that there has been an ongoing tension within social work,

in where the locus of attention for intervention is placed in relation to the individual and the environment. However, overall there has been evolution towards envisioning,

“the transactional space as ‘a complex environment-behavior-person whole’ comprising continuous, interlocking relationships” (Allen-Meares & Lane, 1987, p. 518).

2.2.2 The importance of Early Intervention

It is the developmental nature of childhood that supports early intervention in response to trauma, as it can serve to prevent the establishment of physiological changes and maladaptive responses in the child (Gwynne *et al*, 2009, Horner, 2015). Fisher (2000) writes from a policing perspective, and draws on research that supports the earliest intervention through critical incident stress management (CISM), which has been identified as dramatically reducing the occurrence of PTSD (Johnson, 1989, Wolfe *et al*, 1986). Critical incident stress management can allow children to process their natural reactions appropriately, and for the caring, compassionate, supportive environment required for the child to rebuild trust to be established quickly (Fisher, 2000). Horner (2015), writes from a paediatric nursing perspective and similarly reiterates that,

“Early identification of trauma exposure coupled with appropriate intervention can assist in the prevention of lifelong consequences for victims.” Horner (2015, p194)

Horner (2015) asserts that the concept of resilience is integral to understanding the impact of childhood trauma, and offers the means by which its effects can be reduced. Sources of resilience can be found within the child, which Horner identifies as personality traits that include cognitive ability, which can help in processing what has happened, high self-esteem, and an internal locus (McElroy and Hevey, 2013 cited by Horner, 2015). However, resilience can also be influenced through the environment, which Horner asserts is important for paediatric nurses’ awareness. Horner (2015) identifies that it is social support, especially from a loving and stable adult, that can protect a child from potentially negative consequences of traumatic experiences. Horner (2015) therefore proposes a role for paediatric nursing in screening children for exposure to trauma, promoting the establishment of positive relationships within the family, and for referral to appropriate agencies to support this essential ongoing, preventative process.

Gwynne *et al* (2009) offers an evaluation of an early intervention programme for children from vulnerable families where there is impact on children’s attention, language, learning and behaviour because of poor attachment and lack of stimulation. A growing body of evidence is indicating that early intervention services “can produce sustained improvements in children's health, education and well-being despite these risk factors” (Gwynne *et al*, 2009, p118). Gwynne *et al* (2009) explored a model which combined three modes of early intervention that have been identified as effective: home visits, parent-child attachment interventions and centre-based early childhood programmes. Outcomes from the study were described as ‘outstanding’ with measurably positive results in relation to parental stress, parent/child interaction, parent's sense of confidence and satisfaction and total family functioning, with potential to maximise outcomes for families via a synergistic, cumulative effect (Gwynne *et al*, 2009). These findings were

identified as offering additional evidence to the value of integrated centre-based interventions receiving international support at present (McCain, 1999, Sylva *et al*, 2004, Douglas, 2001, Shonkoff, 2000, Balbernie, 2005).

2.2.3 The lack of evidence from interventions during the middle years of childhood

Despite insights into the value and impact of early intervention, there has been relatively little research into therapeutic interventions during middle childhood for children that may have experienced trauma (Ashton *et al*, 2016, Juffer and van IJzendoorn, 2005, and Meese, 2005). One example is offered by Purvis *et al* (2007) who evaluate **The Hope Connection**, a therapeutic summer camp for adopted and at-risk children with socio-emotional needs. The camp similarly identified the value of a synergistic approach by addressing attachment, pro-social behaviour and sensory processing together, with the understanding that the underlying neuropsychological processes are connected (Schore, 1994; Siegel, 1999), and that such an approach can work with greater efficacy than using narrowly focused interventions (Purvis *et al*, 2007). It was identified that developmental deficits arising from maternal deprivation, neglect and abuse do not remit easily after adoption, and that there was a scarcity of interventions for adoptive families in crisis. The research aim was therefore clearly identified as addressing a void of data and analysis, and conveying a message that “efficacious interventions for some of the most damaged children *are possible*” (Purvis *et al*, 2007, p40).

The programme identified that attachment-deficient children may have experienced inadequate opportunities for transactional experiences within their social and physical environments (Johnson, 2000; Gunnar, 2001), inhibiting the development of self-regulation, with subsequent behavioural problems and poor peer relations (Purvis *et al*, 2007). The Hope Project therefore prioritised an environment of ‘felt safety’, designed specifically to lessen the chronic anxiety experienced through a heightened HPA axis response, which would then allow for cognitive and emotional processes to develop. Therapeutic input was delivered in the form of ‘attachment rituals’ which were daily ‘scripts’ enacted with the child to instil lessons of trust and authority. The camp was permeated with sensory-rich experiences provided through a wide range of large and small-scale play equipment, and was aimed at activating the three internal tactile, proprioceptive and vestibular senses with the aim of regulating attention, activity levels and emotional states (Kranowitz, 1998; Johnson, 2000). The camp also supported opportunities for children to practice and witness pro-social behaviours. Participants were aged from between three to fourteen years old, and the intervention achieved required improvements for many of the families that were previously in crisis.

Findings from the **CASA Trauma and Attachment Group (Ashton *et al*, 2016)** similarly provide rare evidence of effective intervention with children aged five to twelve years old. The group aims included the stabilizing of attachment relationship between child and primary caregiver, increasing caregiver reflective function skills, and reducing children’s trauma-related behavioural sequelae. The programme used a three-phased approach of creating a clinical and environmental ‘safe place’ for the child, trauma resolution through integration of the experience

within play therapy and a reconnection phase to the wider community. The clinical stabilization of the child is encouraged through group dyad activities that facilitate attuned responses from the primary carer, and caregivers were enabled to increase their reflective functioning through education on the neurological, emotional, and behavioural effects of developmental trauma. A collaborative approach was then taken with caregivers to advocate with community support systems for their child's needs. Evaluative measures used by the programme demonstrated statistically significant gains in relation to attachment, although a less significant reduction of trauma-related symptoms in children

2.2.4 Intervention approaches

Trauma Focused-Cognitive Behavioural Therapy

Symptoms induced by childhood trauma have been met by the development of specialist interventions targeted at building resilience and promoting healing. Trauma-Focused Cognitive Behavioural Therapy (TF-CBT) has been identified as effective in treating children exposed to trauma. It has been described as a complex model that works with both child and parent or caregiver and involves psychoeducation, parenting skills, relaxation skills, affective modulation, cognitive coping, trauma narrative and processing and safety planning for the future, and is deliverable by a clinician trained in the approach (Horner *et al*, 2015, Broekhof, 2015, Hopfinger *et al*, 2016,). **Little & Little (2011) identify TF-CBT as an empirically-supported intervention, and draw on a recent meta-analysis that concluded it was the only significantly effective intervention for children who displayed traumatic stress symptoms (Roberts, Kitchiner, Kenardy, & Bisson, 2009).** Its use has also been indicated with adults with psychosis and a positive history of childhood trauma, within a broad theme of therapies designed to address stress-sensitivity including mindfulness-based interventions and self-relaxation techniques, identified as 'add-on' therapeutic approaches (Misiak *et al*, 2016). While incorporating a biologically and neurologically underpinned view of the toxic stress response, this approach has had a strong emphasis on language-based processing. However, there has been an emerging shift towards therapeutic interventions centred on the experiential and embodied experience. Jude (2015, p230) describes systemic practice as facilitating "a way of thinking about patterns of relationships and relational connections within a wider context" and that systemic family therapists are moving towards including the body in conversation, practice and theory. Jude (2015) draws on Merleau-Ponty (1962) in describing how culturally, our bodily experience has been subsumed by our cognitive processing and states

"we first connect with the world through experience rather than language but that language and dialogue can sometimes get in the way of bodily feelings, their presence doing a disappearing act as soon as speech and words announce themselves". (Jude, 2015, p231)

Jude (2015) identifies a wider cultural shift which is seeing expression within therapeutic approaches which incorporate feelings in the body, and names mindfulness-based interventions and Eye Movement Desensitization and Reprocessing (EMDR) as two leading models, both of

which have received some evidential support in effectively treating childhood trauma related symptoms.

Eye Movement Desensitisation and Reprocessing (EMDR)

EMDR is a relatively new form of psychotherapy for post-traumatic symptoms, which involves bilateral stimulation in the form of eye movements, hand-tapping and drumming, alongside the client's concentration on emotionally disturbing material in sequential doses (Field and Cottrell, 2011). Negative cognitions are processed and replaced with more positive ones. The EMDR International Association describes the approach as working in a similar way to rapid eye movement sleep and can be "thought of as a physiologically based therapy that helps a person see disturbing material in a new and less distressing way" (The EMDRIA, 2016). Field and Cottrell (2011) systematically reviewed eight recent studies of its use with traumatized children and adolescents, and identified in relation to this analysis that there is a need to find more cost-effective, acceptable treatments for young people with anxiety-based problems. There are claims that this therapy may have a place in this due to its "appealingly simple and structured format" (Tinker, 2002, cited by Field and Cottrell, 2011, p375), that it requires fewer sessions than other treatments and that training would be accessible to an experienced child and adolescent mental health worker (Field and Cottrell, 2011). **Field and Cottrell (2011)'s review of studies indicated that a significant number of children moved from clinical to normal ranges on their measures, although this was more effective for the cognitive re-experiencing than the behavioural avoidance subgroup of symptoms.** Statistically significant differences were not found between the changes produced by CBT and EMDR, although crucially there were significant improvements in both groups following treatment. Field and Cottrell (2011) concluded that there was promising developing evidence for EMDR, and that although they had "not yet demonstrated that EMDR is effective, equally it cannot be said we have proved it is ineffective" (Field and Cottrell, 2011, p386).

Neurosequential Model of Therapeutics

The recent growth in neuroscientific insight has been highly influential on this emerging shift in understanding about the embodied nature of experience. **The Neurosequential Model of Therapeutics (Perry, 2008) is a neurobiologically informed clinical approach to treating trauma-affected children, that has been developed at The Child Trauma Academy (U.S.A) over the past thirty years.** The approach involves an assessment of the developmental and relational history of the child, including key stressors, attachment experiences and their timing, to estimate their potential impact during the brain development process. This is considered alongside current functioning, and a treatment plan is drawn up according to a 'mapping' process which determines "a unique sequence of developmentally appropriate interventions to help the child re-approximate a more normal developmental trajectory" (Perry & Hambrook, 2008, p42).

Perry (2008) outlines the brain as organized in a hierarchical fashion, with symptoms of fear first arising in the brainstem and then moving all the way to the cortex. Therefore, therapeutic intervention may initiate with brainstem regulation, achievable through activities involving patterned, repetitive somatosensory activities, which provide these brain areas with patterned neural activation necessary for re-organization. Such activities may include music, movement, yoga (breathing), drumming or therapeutic massage, which can work to calm an oversensitive, over reactive and dysfunctional fear response, with related self-regulation, attention, arousal, and impulsivity behaviours. Once an improvement in self-regulation is established, the therapeutic work can move to more relational-related problems (associated with the limbic system) using play or arts therapies. Once fundamental dyadic relational skills have improved, therapeutic techniques can be verbal, using cognitive-behavioural or psychodynamic approaches. Perry and Hambrook highlight that the “process of administering repetitive experiences that allow a neglected or traumatized child to regain functioning is not time-limited” (Perry and Hambrook, 2008, p42). Therefore, ideally the therapeutic environment should incorporate a continuity throughout the child’s whole social environment, constituted by “relational stability and multiple positive, healthy adults” (Perry and Hambrook, 2008, p43) thereby supporting the systemic approach as integral to the process.

Rhythmic movement

This therapeutic effect of patterned, repetitive activity is given consideration within the theory of musical rhythmic behaviour (Bisphram, 2006). It is described in terms of a set of human subskills centring on timing abilities, the perception of pulse, and a coupling of action and perception arising through internal oscillatory mechanisms (Bisphram, 2006). Bisphram (2006) has drawn on evidence to suggest that although most animals can move rhythmically, it is humans that have a distinct ability to entrain their movements to an external timekeeper. Bisphram (2006) has postulated that interpersonal entrainment is the key rhythmic feature in human interactions, and that this supports and pervades all human social interaction, from the turn-taking interactions of mother and baby, to a desire to maintain stability through group-coordination. Accumulating research evidence is suggesting that engaging in interpersonal synchrony can lead to important changes in social behaviours (Eravignani *et al.*, 2014). Synchronization of singing, walking and bimanual object manipulation can increase trust and co-operation (Wiltermuth and Heath, 2009), interpersonal affiliation (Hove and Risen, 2009; Miles *et al.*, 2009), and the probability of engaging in helping behaviour (Kirschner and Tomasello, 2010).

Evidence of the use of rhythm for therapeutic effect includes a pilot study with children on the autistic spectrum, who displayed “fight-or-flight avoidance responses resulting from habitual states of fear, possibly induced by sensory processing issues” (Berger, 2011, p1). The study explored the potential for slow sensorimotor rhythm interventions in the form of clapping, drumming, instrument blowing and whole-body movement for the entrainment of more regulated systemic inner rhythms. Measures suggested a demonstration of entrainment through heart-rate tracing that indicated ‘*controlled arousal*’ (Berger, 2011, p6), accompanied by reduced anxiety

behaviours, and an increase in eye contact, attention and motor planning over an eight-week programme of sessions. A further example involved the use of rhythmic-movement therapy with 273 subjects seeking psychological counselling, with effectivity measured using subjective wellbeing questionnaires (Malkina-Pykh, 2014). **Rhythmic-movement therapy is described as a body-oriented psychotherapy (Lowen, 1975), in which there is a ‘theoretical interdependence of movement and emotion’ (Homann, 2010, p. 86 cited by Malkina-Pykh, 2014, p108).** Malkina-Pykh (2014) identifies that rhythm can be used to build new connections (neuropathways) in the brain because it activates both hemispheres simultaneously, and suggests that these pathways can lead to parts of the brain not accessible by other means of therapy (Thaut *et al.*, 1999). A significant improvement in psychological measures of subjective wellbeing were found with participants using rhythmic-movement therapy in comparison to a control group. Malkina-Pykh (2014) identifies that body-orientated psychotherapies are rare, but that the effectiveness of this study is consistent with others e.g. Koch *et al.*, 2014.

Relationality through rhythm and patterns

These studies offer indications of new pathways that have emerged through a reconceptualization of the self, and as such, this implicates our relation to the other. Neuroscientific insights into maladapted responses to trauma have indicated its holistic effects, and insights are starting to broaden to include a lens on the previously unconscious inhabitation of the body. Embodied interventions are indicating a wider consideration of the ways in which the human being can respond to its environment, and this may not be primarily mediated through language-based processing. Insights into the human propensity for entrainment and synchrony, and early indications of a positive therapeutic effect through this, indicate how rhythm may offer a previously unconsidered relational medium.

The evolutionary thinking that has occurred within the ‘person-in-environment’ approach to social work has encouraged an envisioning of the ‘whole’ in relation to the human transactional space. Norton (2012) however proposes a further reconsideration of the whole that includes the natural environment, to form a part of the influential context alongside the social environment. One way of thinking about the natural world includes the rhythms and repetitive patterns which permeate it, as identified within ecoliteracy principles (Stone, 2012). Indications of the human propensity to respond positively through rhythm, and rhythm being a feature of both the self and the ‘whole’ when including the natural environment, suggests that there may be avenues for new thinking about the natural world as a source of calm for the human being. Stevens (2010) draws on ecopsychology in identifying ‘embedment in the environment’ as a new paradigm for wellbeing, one that considers that we are continually interconnected via two-way physical interactions that are electromagnetic, chemical and mechanical, and that “who we are is intimately connected to where we are” (Stevens, 2010, p266).

2.3 What role does the natural environment play in supporting positive therapeutic outcomes?

Thirty-seven articles were found, and twenty-seven were prioritised for review according to their relevance to the Dandelion Time approach. **There is a paucity of research evidence that aligns directly with Dandelion Time’s therapeutic model, but an overview of ecotherapy interventions and theoretical considerations offer insights to draw upon.** Nine studies offer mixed method findings from research projects, nine draw on and review existing research evidence and nine offer theoretical positioning influential to current thinking with regard to this question.

There is an emerging awareness now of the significance of the natural environment in supporting human health, and this has been identified in relation to hedonic and eudemonic well-being. Hedonic well-being has been described as “high levels of positive emotions, low levels of negative emotions, and a sense of satisfaction with one’s life (Diener, 2009; Keyes, 2002)” (Capaldi *et al*, 2015, p3). Capaldi *et al* (2012) provide an overview of evidence indicating the ways in which contact with nature can promote positive emotional states, and includes studies that have examined the association of trait connectedness with nature. These include **a significant relationship between nature connectedness and happiness indicators such as positive affect and life satisfaction (Capaldi, Dopko, & Zelenski, 2014), and psychological resilience identified as key to managing stress and maintaining positive mental health (Ingulli & Lindbloom, 2013).**

Eudemonia derives from the Aristotelian concept of living well and has more recently been defined as the “functioning well component of wellbeing” (Keyes & Annas, 2009 cited in Capaldi *et al*, 2015, p5). **Studies have demonstrated the ways in which nature contact has promoted a sense that one’s life is meaningful for clinical populations (e.g., Berger & McLeod, 2006; Granerud & Eriksson, 2014), the gaining of a sense of freedom to be one’s authentic self (Fredrickson & Anderson, 1999) and a greater sense of vitality (Nisbet & Zelenski, 2011; Ryan *et al.*, 2010).** Despite the evidence that indicates the beneficial effects that nature can have on cognitive, emotional, spiritual, and physical wellbeing, “nature-based interventions are understudied and underutilized as a mental health strategy” (Capaldi *et al*, 2015, p6). Capaldi *et al* (2015) have suggested that this is particularly surprising given that such interventions can be easily accessible and cost-effective, and that “preliminary evidence suggests that repeated contact with nature produces larger increases in wellbeing than other interventions commonly cited in the positive psychology literature (Passmore & Howell, 2014)” (Capaldi *et al*, 2015, p7). Despite their relatively small number to date, there are nevertheless a growing number of research reports that are indicating the ways in which the natural environment may support positive therapeutic outcomes.

2.3.1 Attention Restoration Theory

Contact with natural environments have been found to be particularly successful as a restorative intervention to improve attention and self-regulation (Kaplan & Kaplan, 1989).

Attention Restoration Theory (ART) suggests that executive functioning (a high level cognitive mechanism) and self-regulation are both dependent upon a common resource which is finite – directed attention. Directed (or voluntary) attention depend on frontal and parietal brain regions that are involved in cognitive control and can become fatigued after extended use, and when depleted may lead to negative emotional states. ART is based “on the simple premise that directed attention might be more likely to recover if it is allowed to rest.” (Kaplan & Kaplan, 1989, p.48). One way is to utilise involuntary attention through ‘soft fascination’, and natural environments have been found to be particularly beneficial as they are can capture involuntary attention without monopolising attentional channel capacity (Kaplan & Kaplan, 1989). According to the theory, restorative environments must contain the four components of ‘being away’, extent, fascination, and compatibility with one’s inclinations (Kaplan & Kaplan, 1989). Extent requires that the environment is “rich enough and coherent enough so that it constitutes a whole other world” (Kaplan, 1995, p. 173), and fascination should be that which requires little effort, allowing one’s attention to recover through the opportunity for reflection and the exploration of other thoughts and mental connections (Kaplan, 1995). Izenstark & Ebata (2016) identify a significant body of empirical evidence to how interaction with nature can restore directed attention for individuals across many domains, tasks and participant populations (Faber Taylor & Kuo, 2009, Berman, Jonides, & Kaplan, 2009, Ottosson & Grahn, 2005).

An overview of studies of the restorative benefits associated with children’s nature contact, indicates that nature contact can improve directed attention (Berman, Jonides, & Kaplan, 2008; Berto, 2005; Hartig, Evans, Jamner, Davis, & Gärling, 2003; Van den Berg *et al.*, 2003), mood (Bagot *et al.*, 2015, Roe and Aspinal, 2011), cognitive functioning (Wells, 2000, Martensson *et al.*, 2009, Berman, Jonides, & Kaplan, 2008; Berto, 2005; Tennessen & Cimprich, 1995) and increase social interaction (Faber Taylor *et al.*, 1998). It has also been evidenced that children diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) have a reduction of symptoms after spending time in green areas when compared with non-green areas (Collado & Staats, 2016, Faber *et al.*, 2001-2011, Chawla, 2015). In reviewing studies of nature’s restorative potential for children to date, Collado & Staats (2016) identify that in line with Attention Restoration Theory, there has been a focus on the renewal of psychological resources. However, an interesting question is raised in relation to children, given that their preferences and uses of different environments differ from those of adults (Korpela *et al.*, 2002). It may be that the greater potential for risks and challenges offered by natural environments, could be thought of as restorative to children’s competence, self-esteem and resilience (Collado & Staats, 2016).

2.3.2 Psychophysiological Stress Recovery Theory

Nature contact studies have also identified a variety of stress-reducing psychophysiological responses in the form of decreased arousal and perceived stress levels (Ulrich, 1979, 1981; Ulrich *et al.*, 1991). Several decades of evidence suggest that contact with nature can **lower pulse rates, reduce cortisol levels,** and improve immune functioning (Tsunetsugu, Park, & Miyazaki, 2010; cf. Bowler, Buyung-Ali, Knight, & Pullin, 2010). Ulrich (1991) measured arousal states using a combination of subjective assessments, and physiological measures of

alpha wave amplitude and heart rate, in response to images of urban natural landscapes. The research revealed a “clear cut pattern” (Ulrich, 1991, p548), that images of natural environments, especially those containing water, had more beneficial influences on psychological states, inducing feelings of attentiveness and positive affect, which were matched by measures of wellbeing in the alpha results. A meta-analysis of studies (McMahon & Estes, 2015) that has examined the effect of contact with natural environments on positive and negative affect, has indicated how even brief contact is associated with a number of positive effects. These include decreased stress (Cole & Hall, 2010; Hartig, Evans, Jamner, Davis, & Gärling, 2003) and decreased blood pressure (Lee, Park, Tsunetsugu, Kagawa, & Miyazaki, 2009; Ulrich *et al.*, 1991) alongside assessments indicating greater emotional well-being (Mayer, Frantz, Bruehlman-Senecal, & Dolliver, 2009; Nisbet & Zelenski, 2011).

2.3.3 Nature as a safe transitional space

The field of ecopsychology provides further theoretical and practical understanding of the role nature plays within the therapeutic process. More than fifty years ago the psychologist Searles recognised that “the non-human environment...constitutes one of the most basically important ingredients of human psychological existence” (Searles, 1959, p27). More recently ecopsychology and ecotherapy have emerged and represent “a new modality of psychotherapy that enlarges the traditional scope of treatment to include the human-nature relationship” (Hinds & Jordan, 2016, p1)

Drawing upon Winnicott’s (1958) idea of holding and Bion’s notion of containment (1970), Jordan (2016), argues that nature can act as a ‘third space’ which can support and enhance the therapeutic process. Similarly, **Hordyk *et al*’s (2015:581)** study of 18 immigrant children suggested that the natural world can temporarily sustain children whose human attachments are tenuous. **“What made the nature camps unique as a container for children’s emotions as opposed to an indoor setting was that the natural world became a non-reactive physical recipient for children’s emotion.” Nature is a safe context for the expression of difficult emotions and conflicts.**

Berger (2006) refers to nature as co-therapist whose role may move back and forth between being active and passive during the therapeutic process. He argues for the importance of the ‘triangular relationship’ between the client, therapist and nature based on direct contact with nature. Nature in this context reflect continuity and change, “its independent dynamic and the element of uncertainty and unpredictability...occurring alongside the cycles present in nature, can help people develop their flexibility and coping abilities while normalizing” (Berger, 2016, p179)

2.3.4 Sensory awakening: Embodied and embedded experience in nature

Another dimension to nature's therapeutic value relates to the multi-sensory connections it can stimulate and the associated invitation to live in the moment rather than the past or future. This has been illustrated in research featuring military veterans diagnosed with stress and PTSD (Westlund, 2014, Pithouse, 2016). Westlund's (2014) narrative study of four veterans identifies how nature has provided a source of support, relief and healing alongside clinical treatment and medication, that is little acknowledged but deserving of attention. The research found that the rich sensory experiences of the natural world facilitate an orientation to the present, with a slowing down and gaining perspective which can counteract PTSD symptoms, whereby flashbacks and panic attacks have the effect of drawing sufferers back to their past. The veterans were able to articulate this insight against the backdrop of their experiences:

“Each veteran described how his embodied experiences in the natural world turned his attention back toward the ways that nature is regulated by cycles and seasons, by birth and death, by relations between animals and plants” (Westlund, 2014, p166)

Pithouse (2016) similarly supports this therapeutic approach for veterans, and draws on two recent nature-based projects for veterans, Wild Things and Surf Action. These projects have been characterised by looking beyond the symptoms of the individual, and rebuilding life through the development of therapeutic connections with family and friends, and the natural world.

2.3.5 Ecotherapy in practice

Ecotherapy as a term was first used by Clinebell (1996) and so is of relatively recent origin and includes “a range of therapeutic and reconnective practices such as horticultural therapy, ‘green’ exercise, animal assisted therapy, wilderness therapy” (Hinds & Jordan, 2016, p1). Those which offer some relevant insights for Dandelion Time are considered below.

Animal Assisted Therapy

Ecotherapy is concerned with relationships with the non-human and Animal Assisted Therapy (AAT) is a broad term which includes Pet Therapy, Equine Assisted Therapy and a range of other animal assisted interventions (Hinds & Ranger, 2016). **AAT is particularly significant in the context of children and young people as it is the most commonly reported type of nature-based intervention. Such therapies have been demonstrated to improve depression, anxiety and self-efficacy.** Wilson *et al's* (2017) qualitative study examined eight Equine-Assisted Psychotherapy (EAP) facilitators' perspectives on the biopsychosocial benefits and therapeutic outcomes for adolescents experiencing depression and/or anxiety. One benefit identified was the non-reliance on language as a medium for change. Hinds & Ranger refer to animals as a ‘clinical bridge’ for those who are beyond talking therapies. EAP has been used effectively to address autistic spectrum symptoms (O’Haire, 2013; Redefer & Goodman, 1989), compromised mental functioning (Kanamori *et al.*, 2001), emotional difficulties (Barker & Dawson, 1998), undesirable behaviours (Nagengast, Baun, Megel, & Leibowitz, 1997) and with **children that have experienced trauma (Dietz, Davis, & Pennings, 2012)**. The horse is identified as having a

well-developed ‘fight or flight’ instinct, and is therefore more sensitive to the body language and emotions unconsciously projected by a client (Gustavson-Dufour, 2011, Lentini and Knox, 2009 cited by Wilson *et al*, 2017).

Animals can offer both emotional and physical comfort, facilitating a development of trust and confidence, and can be likened in this way to therapies using attachment theory. The approach offers the creation of a safe environment or secure base. From a psychodynamic perspective animals can be viewed as transitional objects. Katcher (2002) found that in the presence of animals, highly aggressive children behaved more cooperatively, become less antagonistic and displayed greater social competence. He draws upon Winnicott and the idea of the animal as a transitional or split object arguing that “most children who found their way into treatment had been injured by human beings, had control issues with people, and had been assaulted and controlled with words. The absence of speech and obvious controlling strategies in animals permitted them to serve as appropriate vehicles for the projection of positive feelings” (Katcher, 2002, p195). Elements from these findings are reiterated in Schreuder’s (2014) qualitative study with eleven young people who had spent six months on youth care farms in the Netherlands. The young people valued working with animals who were identified as ‘relaxed’ and non-judgemental. Rossiter (2006) evaluated ‘Forget me not farm’ in California which works with child victims of trauma and abuse through engagement with animals and agriculture (www.forgetmenotfarm.org).

Horticultural Therapy with children

Other forms of ecotherapy with children and young people are less well documented and understood. Swank & Shin (2015) evaluated a school-based garden counselling group (USA) which focused on children with social and emotional behavioural problems.

Findings from their measures indicated higher overall self-concept scores, and that the children felt happier following the intervention, in line with previous research (Block *et al.*, 2012; Feral, 1998). It was also found that **children scored higher on a behavioural adjustment subscale indicating more positive feelings about their behaviour following the intervention**, which expands on previous findings of children having greater self-understanding following an academic garden program (Robinson & Zajicek, 2005). These identified and well-supported aspects of nature’s therapeutic value, connect particularly well with the observed impact that Dandelion Time has demonstrated in helping children, as well as parents and carers, to acquire specific self-calming and self-control skills, and different ways of responding to difficult situations.

Nature Therapy

The ‘Safe Place’ programme was developed in Northern Israel following the second Lebanese war to support the thousands of children exposed to the war. Based on the principles of Nature

Therapy, it is underpinned by the Basic PH resiliency model in which six modalities constitute resiliency: belief; affect; social function; imagination; cognition and physiology (Lahad, 1993). **The kindergarten was identified as an environment which had the potential to promote all of these aspects, through a holistic consideration of the child within a natural environment as a dynamic therapeutic context.** More than 12,000 children have engaged with the programme and it has won prizes for its contribution to helping traumatized children.

Nature-based family interventions

The specific impact and benefits of the natural environment for the family unit have been under-researched (Flett *et al*, 2010), although a review of studies from the past fifty years on outdoor family recreation revealed its consistent association with family cohesiveness (Izenstark & Ebata, 2016). **Izenstark & Ebata (2016) propose a new model for framing an examination of the value of nature-based family activity which incorporates both Attention Restoration Theory (Kaplan & Kaplan, 1989) and Routines and Rituals (Fiese *et al*, 2002).** ART brings attention to the importance of setting, and the process by which nature can affect individual family member's psychological well-being and hence their ability to interact positively. Izenstark & Ebata (2016) argue that rituals and routines may further reinforce family identity by creating shared meanings and feelings of belonging (Fiese, 1992; Wolin & Bennett, 1984). Rituals have been defined as "a symbolic form of communication that, owing to the satisfaction that family members experience through its repetition, is acted out in a systematic fashion over time" (Wolin & Bennett, 1984, p1). It is suggested that family-based nature activity may facilitate specific symbolic communication as it is 'away' from daily environments, and can engage family members together within the spontaneity of the natural world (Stone, 1965 in Izenstark & Ebata, 2016). **This framework allows for consideration of the potential for an attentionally restorative natural environment being facilitative of positive family interactions and family functioning with positive psychological outcomes.**

The significance of rituals is also evident in Berger & McLeod's (2006) work. They suggest that a framework for using nature to support therapeutic practice should involve the intentional creation of rituals. This relates historically to times when people lived in communities in nature and is

“embedded in a strong sense of collectivity: the individual was part of a family, which was part of the tribe, which was part of nature, which was part of the universe.”

(Berger & McLeod, 2006, p10).

A strong role is identified for rituals in providing a sense of order and security, fostering a feeling of togetherness and providing a sense of control over the uncertainties of life, and in supporting individuals move from one social stage to another (Eliade, 1959; Evans, 1997; Hazan, 1992; Jennings, 1995; Meged, 1998; Turner, 1986).

McManus (2012) reviewed a family-based nature intervention with seven single-parent families from a deprived UK community, including seventeen children who were identified as having

emotional wellbeing needs. The intervention involved a week's residential at an outdoor centre, ongoing support from mental health professionals and a follow up residential weekend at the centre. The activities at the outdoor centre aimed to provide the opportunity for families to learn new skills, manage risk, and give family members an opportunity to see each other in a different, more positive light and to support community building. The centre was identified as offering a stable base, physical and emotional time and space away from the stresses of everyday life freeing up energy to be directed into learning new skills. Mixed methods of surveys, observations, school feedback and interviews prior to and after the programme indicated more positive attitudes from the children towards school and home after the intervention. Teachers observed reductions in anxiety, less disruptive behaviour, and higher levels of pro-social behaviours. Reports from parents indicated positive changes to family life, and some parents showing greater engagement with personal development opportunities.

2.3.5 Limitations of the research evidence

In all of the literature reviewed in relation to the therapeutic benefits of the natural environment there were no examples in research or practice which contained all elements of the Dandelion Time approach. Furthermore, the review revealed that the term 'therapeutic' is understood in a variety of ways within the context of the existing body of literature. Psychotherapeutic approaches may incorporate nature but tend to involve a three-way triangle between the client, therapist and nature; the family is not included in the therapeutic process. Equally, systemic family therapeutic approaches may go beyond talking (recognising sensory experiences and embodiment) but no examples could be found that explicitly include nature. **Nature-based interventions are not necessarily 'therapeutic' in the sense of involving a therapist but often have an identified psycho-social benefit.** Finally, interventions with trauma-affected children have identified an importance of the synergistic effect, and that positive effect on one aspect of development can influence others. The review has also revealed significant differences in how 'nature' is understood and positioned within the context of the literature. Contact with nature is not always direct and some research, including that by Ulrich and Kaplan, is based on vicarious exposure (e.g. slides of nature shown to participants) rather than actual experiences. **Dandelion Time's purposeful engagement of the natural environment for therapeutic effect therefore marks a departure from established research and practice although connections can be made (Figure 2)**

Part 3 Evidencing Practice

3.1 Dandelion Time's Therapeutic Process: Feedback Loop Pattern

Dandelion Time's therapeutic effect can be considered according to the ecoliteracy patterns of feedback, self-regulation and self-organisation (Capra, 1994). These have been defined in the following ways:

Feedback: Some messages travel in cycles to return to their origin, thus influencing future system behaviour.

Self-regulation: Using feedback, systems can keep themselves in dynamic balance.

Self-organization: Because life is a network, it can organize itself, including its own direction, purpose, and creative self-transcendence.

The research evidence presented in Part 1 reveals a situation where adverse childhood experiences such as trauma and abuse can impact on the developing child in the short and longer term in a range of ways that are complex and cumulative. **From a systemic viewpoint, they can be understood as influential on living systems within a network of relationships: from the cellular, organ and organism level of the individual, to the group, organization and societal systems that surround them.** These are damaging experiences, however from a systems theory perspective can be considered as “negative feedback loops” within “a whole and purposeful system” that is “evolving towards greater complexity” Miller, 1978 cited by DeKay, 1996, p3).

Thinking within these terms, Dandelion Time's unique approach can be considered as offering an evolutionary intervention. One that contributes to an emerging insight into the benefits of ecosystem principles for more successful human systems.

- Feedback: As an **early intervention** it creates **positive messages that can influence future behaviour** in the life of the child and the family (with ongoing influences within wider group, organizational and societal systems). These messages will be illustrated as addressing a number of living systems in the child and the family.
- Self-regulation: By working to re-establish strong networks of relationships within and between human groups and the natural world, Dandelion Time's intervention re-orientates families towards an overall influential pattern of **dynamic balance**.
- Self-organization: Dandelion Time's intervention aims to facilitate families towards **self-organization**, and as a unique therapeutic model in itself, indicates the potential for human systems to find creative transcendence and the means to **self-organize**.

3.2 Support for the Dandelion Time Approach

The aim of this section is to relate the available evidence base to Dandelion Time's practice to support the development of evidence-based practice. To do this we return to the outcomes

identified in the Phase 1 report (Figure 3) and present three ‘evidence pathways’ that can be identified and connect these reported outcomes with supportive research evidence.

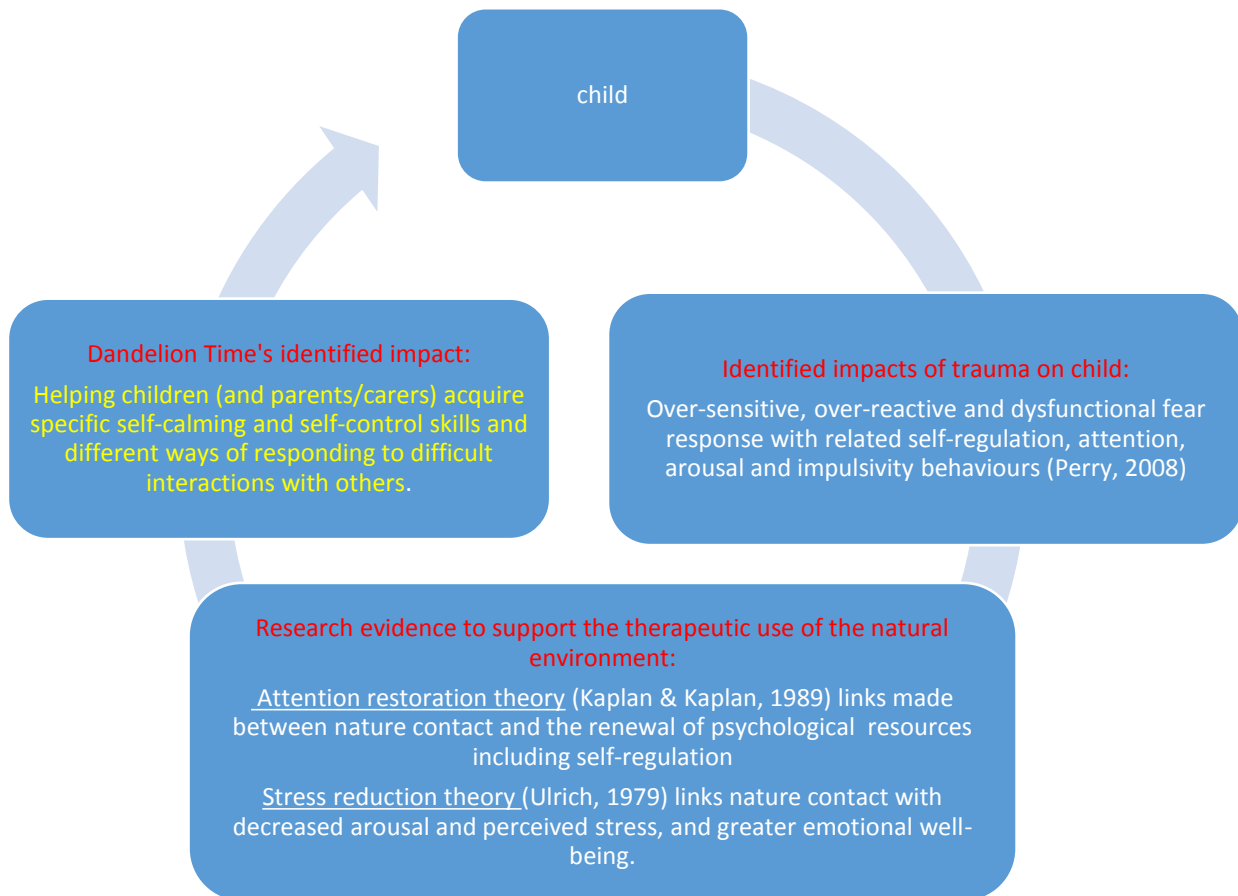
Figure 3 Dandelion Time Outcomes

Dandelion Time Outcomes
Helping parents (and children) interact in a more connected, positive and affectionate ways to each other
Changes to the child and parent’s inner world’ and way of seeing themselves, others and relationships
Helping children (and parents/carers) acquire specific self-calming and self-control skills and different ways of responding to difficult interactions with others.

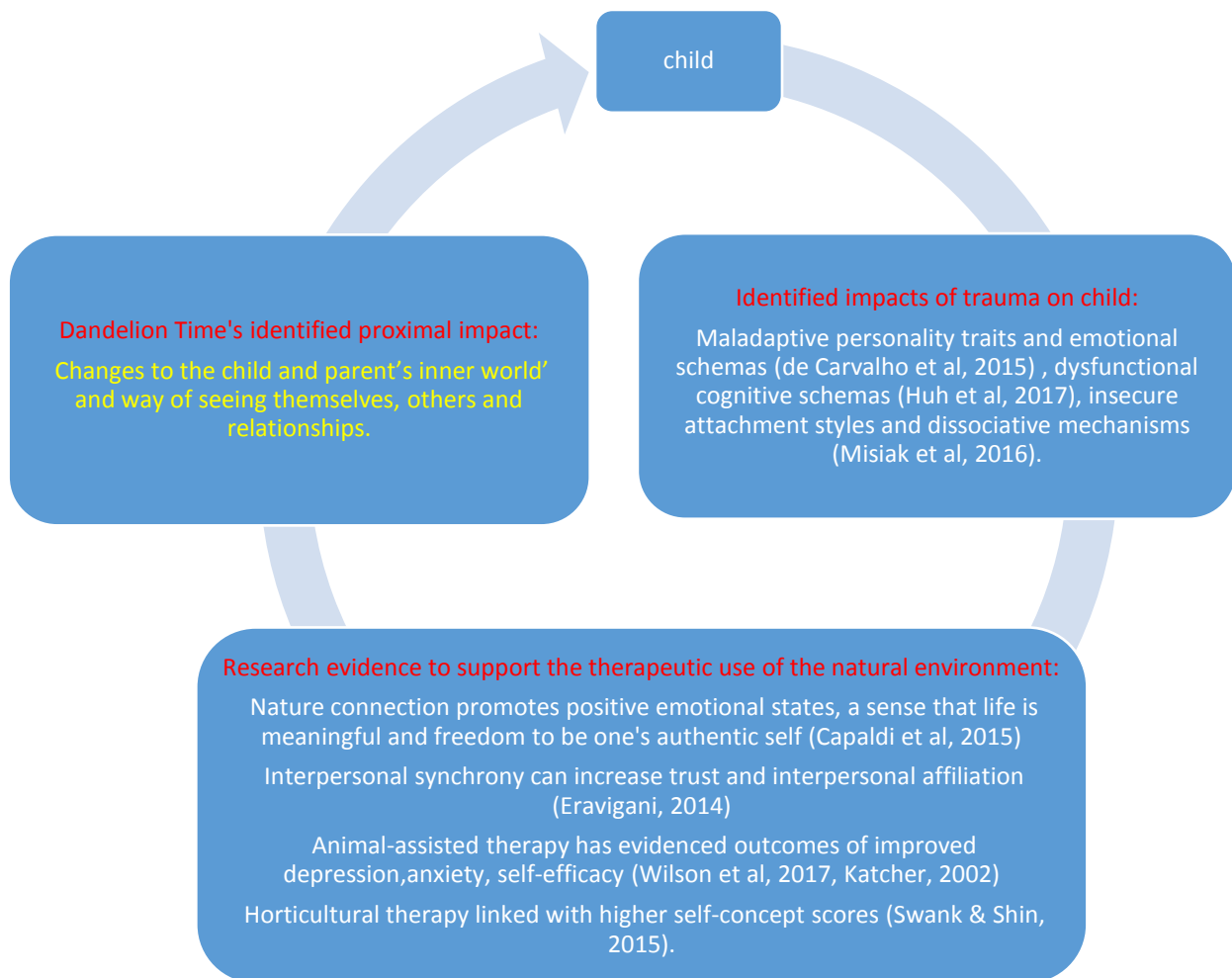
3.3 Evidence Pathways

The three evidence pathways are included to illustrate how and why the Dandelion Time approach ‘works’ in terms of producing the proximal outcomes identified in the phase 1 report. In each case, the pathway starts with the child and moves on to explore the identified impact of trauma within a particular domain. It then presents the research evidence to support the therapeutic use of the natural environment as intervention, and connects it with the identified outcome of the DT approach. It should be noted that these pathways are a visual simplification and isolation of what is a complex and inter-connected subject. They have been selected because they are the most ‘complete’ pathways evident within the literature but should be understood as illustrative rather than definitive.

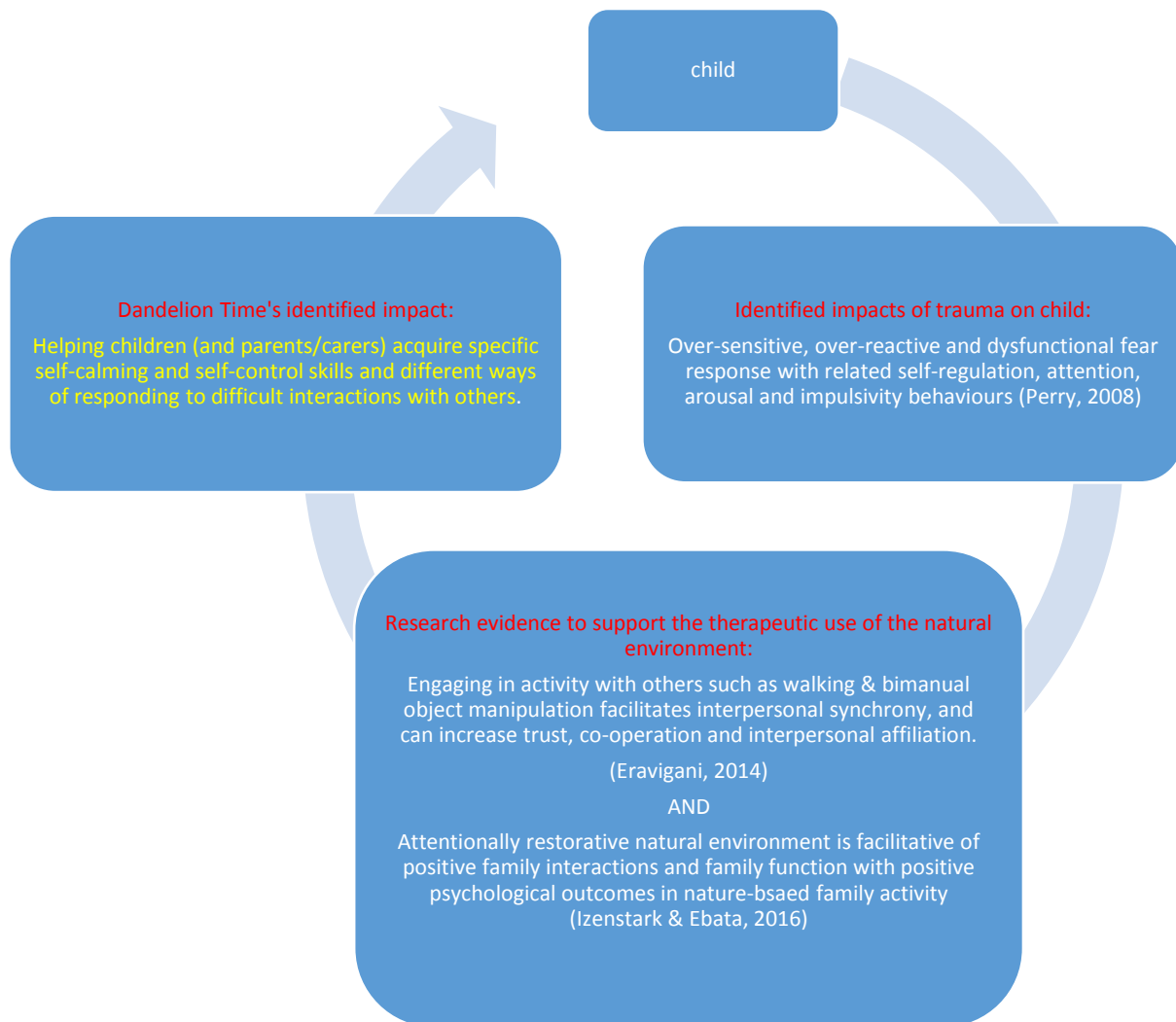
3.3.1 Addressing the Emotional Impacts of Childhood Trauma



3.3.2 Addressing the Psychological Impacts of Childhood Trauma



3.3.3 Addressing the Social Impacts of Childhood Trauma



3.4 Evidencing the DT ‘dimensions of change’

The following section aims to provide further detail about these evidence pathways and to signpost other possible pathways by moving the focus from the three high-level outcomes to the 11 ‘dimensions of change’ identified in the Phase 1 report. This analysis is presented in Figure 4.

Figure 4: Evidencing the dimensions of change

Dimension of Change	Evidence from literature to support DT practice
Parental warmth, connection and affection	<p>Izenstark & Ebata, 2016 provide a framework for thinking about how a restorative natural environment can influence family relationships.</p> <p>Family-based nature activity may facilitate specific symbolic communication as it is ‘away’ from daily environments, and can engage family members together within the spontaneity of the natural world (Stone, 1965 in Izenstark &Ebata, 2016). McManus (2012) highlights the importance of ‘time and space away’ from daily stresses</p> <p>Flett <i>et al</i> (2010). 50 years of family leisure studies, consistent association with family cohesiveness.</p>
Regard for child’s capabilities, skills & qualities	
Agency	
Sense of safety and trust	<p>Using nature to support therapeutic process can include group (e.g. families) rituals - can provide a sense of order and security, fostering a feeling of togetherness and providing a sense of control over the uncertainties of life, and in supporting individuals move from one social stage to another (Eliade, 1959; Evans, 1997; Hazan, 1992; Jennings, 1995; Meged, 1998; Turner, 1986) cited by Berger & McLeod (2006).</p> <p>Eravigani (2014) Synchronous activity together (e.g. walking, bimanual object manipulation) can increase trust and co-operation (Wiltermuth and Heath, 2009), interpersonal affiliation (Hove and Risen, 2009; Miles <i>et al.</i>, 2009), and the probability of engaging in helping behaviour (Kirschner and Tomasello, 2010).</p> <p>Katcher (2002:195) on animals as transitional objects ““most children who found their way into treatment had been injured by human beings, had control issues with people, and had been assaulted and controlled with words. The absence of speech and obvious controlling strategies in animals permitted them to serve as appropriate vehicles for the projection of positive feelings” (195)</p>

	<p>Westlund (2014) and Fisher (2006) found that for PTSD veterans contact with the natural environment was significant in supporting an embodied experience of safety</p>
<p>Hopefulness</p>	<p>Studies of clinical populations have found that nature contact has promoted the sense that one's life is meaningful – concept of eudemonia. e.g. Berger & McLeod (2006); Granerud & Eriksson (2014)</p> <p>Berger and Mooli (2010) refer to the imaginative affordances contact with the natural environment offers</p>
<p>Shared time, space and activities</p>	<p>Izenstark & Ebata, 2016 emphasise the importance of ritual and routine to improve family relationships</p> <p>Eravigani (2014) focuses on significance of synchronous activity together</p>
<p>Improved relationship</p>	<p>Restorative benefits of nature for children e.g. Faber Taylor <i>et al</i> (1998) who found it increased social interaction.</p> <p>Smith-Osborne & Selby (2010) found improvements in socialisation skills associated with equine assisted therapy</p> <p>Swank & Shin (2015) horticultural therapy evidence as promoting empathy.</p> <p>Ecotherapeutic projects (e.g. Wild Things and Surf Action) emphasis shifted from the individual to rebuilding lives through therapeutic connections with family, friends and natural world.</p> <p>Wilson <i>et al</i> (2017) draw on Gustavson-Dufour (2011) in identifying that clients using equine-assisted therapy can gain transferrable skills such as non-verbal communication, creative thinking, assertiveness, problem-solving, teamwork and confidence from their interactions with the horse, and apply these to other situations and human relationships. Katcher (2002) supports this in his study of animals in therapeutic education.</p>
<p>Self-calming and coping</p>	<p>Attention Restoration Theory (ART) - Izenstark & Ebata (2016) identify a significant body of empirical evidence to how interaction with nature can restore directed attention for individuals and improve</p>

	<p>self-regulation (Faber Taylor & Kuo, 2009, Berman, Jonides, & Kaplan, 2009, Ottosson & Grahn, 2005).</p> <p>Stress Reduction (through sensory processing) can contribute to this (The Hope Connection use this approach but with ‘play’ equipment – see Purvis <i>et al</i>, 2007). This allows cognitive and emotional processes to develop (regulating attention, activity levels and emotional states).</p> <p>Swank & Shin (2015) found children scored higher on a behavioural adjustment subscale indicating more positive feelings about their behaviour after contact with nature.</p> <p>Berger (2006) nature as co-therapist – independent and dynamic natural world can support the development of flexibility and coping responses.</p>
Resilience	<p>Capaldi <i>et al</i> (2015): association between nature contact and hedonic wellbeing including a significant relationship between nature connectedness and happiness indicators such as positive affect and life satisfaction (Capaldi, Dopko, & Zelenski, 2014)</p> <p>Ingulli & Lindbloom, 2013 identify psychological resilience as key to managing stress and maintaining positive mental health.</p> <p>Horticultural therapy: achievement of tangible successes which can promote self-esteem (Harter, 2006) higher overall self-concept scores following garden counselling group (Swank & Shin, 2015)</p> <p>Collado & Staats (2016) Nature’s potential for offering risks and challenges – promotes children’s self-confidence, competence and resilience</p> <p>Berger & Mooli (2010) – Safe Place resiliency model.</p>
Attachment	<p>Animal-assisted therapy can offer emotional and physical comfort, non-verbal communication (Bachi, 2013). Smith-Osborne & Selby (2010) equine assisted psychotherapy illustrated reduced attachment issues.</p> <p>Hordyk <i>et al</i> (2015) - natural world can temporarily sustain children whose human attachments are tenuous.</p>
Behavioural and emotional responses to trauma	<p>Attention Restoration Theory (ART) supports the development of skills (e.g. cognitive functioning) that help with the processing of trauma.</p>

	Repetitive somatosensory activities (Perry, 2008) found to calm over-reactive fear response, and consequently addresses self-regulation, attention, arousal & impulsivity e.g. Dandelion Time's use of hand crafts with natural resources.
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Part 4 Conclusions

4.1 Summary of Report

This review set out to enhance understanding of the therapeutic benefits of engagement with the natural environment within the Dandelion Time Approach. **Whilst, there is large, and growing body of literature relating to engagement or connection with the natural environment, the majority of this is focused on adults rather than children and on generalised health and well-being benefits rather than from a specifically therapeutic perspective.** For the purposes of the review then, the first step was to conceptualise the DT approach and to use this to assemble the research evidence. In the second part of the report we present an analysis of the research literature relevant to the DT approach. In the third part we connect identified DT outcomes with the reviewed literature and present exemplar evidence pathways. In this final section we briefly explore some of the research implications of the review for Dandelion Time.

4.2 Research Implications

Within the review, there is evidence of a steady change in therapeutic practice from the individual towards an understanding of what has been termed the ‘ecological self’ (Bragg, 1996).

“a vision of a self that is permeable, interconnected not only with other human selves but also with all living beings and processes. Such a theory must take into consideration that the infant is born into not only a social but an ecological context.” (Barrows, 1995, p103)

Such an understanding seems to fit well with the Dandelion Time approach. Eco-centric approaches currently occupy a marginal position in practice and research (Haubenhofner (2010); Hinds & Jordan (2016) and, as this report has identified, there is an evident gap in the research literature. Although, a case can be built to support the DT approach, the research literature could be considered to exemplify the issue highlighted in Phase 1 in relation to data on services for children and families which is described as ‘FUPS’ (CORC, 2016). In the case of the research literature it is **Flawed** because the research is often one-off rather than longitudinal and so cannot capture change; **Uncertain** because research focusing on traumatic experiences in childhood is mainly retrospective and nature-based interventions tend to focus on adult well-being; **Proximate** because researchers are inconsistent in their use of terminology and nature contact may be vicarious rather than direct; and **Sparse** because there are very few studies focusing on therapeutic interventions aimed at children in middle childhood. One implication of this research gap is that there is a clear need for robust empirical research that can properly evidence the DT approach. Such research could make an important contribution to the newly emerging discipline of ‘ecotherapy.’ A second implication is that, given the demonstrated ecological ‘turn’ within therapeutic practice, it is likely that stronger and better research evidence will start to emerge that more closely supports Dandelion Time.

References

- Ahmed, K., Windsor, L. & Scott, S. (2015). In their own words: abused children's perceptions of care provided by their birth parents and foster carers. *Adoption & fostering*, 39(1), pp. 21-37.
- Ashton, C., O'Brien-Langer, A. & Silverstone, P. (2016). The casa trauma and attachment group (tag) program for children who have attachment issues following early developmental trauma. *Journal of the Canadian academy of child and adolescent psychiatry = journal de l'académie canadienne de psychiatrie de l'enfant et de l'adolescent*, 25(1), pp. 35.
- Berger, D (2002.) *Music therapy, sensory integration and the autistic child*. London: Jessica Kingsley.
- Bernstein D, Ahluvalia, T., Pogge, D. & Handelsman L. (1997) Validity of the childhood trauma questionnaire in an adolescent psychiatric population. *Journal of the American academy of child & adolescent psychiatry*. Vol 36 pp340–348.
- Bispham, J (2006). Rhythm in music: what is it? Who has it? And why? *Music perception*, 24(2), pp. 125-134.
- Broekhof, R., Rius-Ottenheim, N., Spinhoven, P., Van, D., Penninx, B., Zitman, F. & Giltay, E. (2015). Long- lasting effects of affective disorders and childhood trauma on dispositional optimism. *Journal of affective disorders*, 175, pp. 351-358.
- Bronfenbrenner, U. (1977) Toward an experimental ecology of human development. *American psychologist*, vol.32(7), pp.513-531.
- Burke, N, Hellman, J., Scott, B., Weems C, & Carrion, V. (2011). The impact of adverse childhood experiences on an urban paediatric population. Vol 35(6) pp 408-13. (accessed at <https://www.ncbi.nlm.nih.gov/pubmed/21652073> on 29.6.17).
- Capaldi, C., Passmore, H., Nisbet, E., Zelenski J. & Dopko (2015). Flourishing in nature: a review of the benefits of connecting with nature and its application as a wellbeing intervention. *International journal of wellbeing* 5, no 4. (accessed at <https://internationaljournalofwellbeing.org/index.php/ijow/issue/view/19> on 29.6.17)
- Capra, F., & Luisi, P. (2014). *The Systems View of Life: A Unifying Vision*. Cambridge: Cambridge University Press.
- Carpenter, L., Carvalho, J., Tyrka, A., Wier, L., Mello, A., Mello, M., Anderson, G., Wilkinson, C. & Price, L. (2007). Decreased adrenocorticotropic hormone and cortisol responses to stress in healthy adults reporting significant childhood maltreatment. *Biological psychiatry*, 62(10), pp. 1080-1087.
- Carpenter, L., Shattuck, T., Tyrka, A., Geraciotti, T. & Price, L. (2011). Effect of childhood physical abuse on cortisol stress response. *Psychopharmacology*, 214(1), pp. 367.
- Carr, A (2016). How and why do family and systemic therapies work? *Australian and New Zealand journal of family therapy*, 37(1), pp. 37-55.

- Catalan, A., Angosto, V., Díaz, A., Valverde, C., de Artaza, M., Sesma, E., Maruottolo, C., Galletero, I., Bustamante, S., Bilbao, A., Van J. & Gonzalez-Torres, M., (2017). Relation between psychotic symptoms, parental care and childhood trauma in severe mental disorders. *Psychiatry research*, 251, pp. 78-84.
- Cohodes, E., Hagan, M., Narayan, A. & Lieberman, A., (2015). Matched trauma: the role of parents' and children's shared history of childhood domestic violence exposure in parents' report of children's trauma-related symptomatology. *Journal of trauma & dissociation* pp. 1-16.
- Combs, K., Hoag, M. & Javorski, S. (2016). Adolescent self-assessment of an outdoor behavioral health program: longitudinal outcomes and trajectories of change, *Journal of child and family studies* vol 25:3322. Doi:10.1007/s10826-016-0497-3
- Cottrell, D. & Boston, P., (2002). Practitioner review: the effectiveness of systemic family therapy for children and adolescents. *Journal of child psychology and psychiatry*, 43(5), pp. 573-586.
- D'Andrea-Merrins, W., Pole, N. & Kulkarni, M., (2006). Childhood trauma: moderating effects on the relationship between emotion regulation, affect and physiological reactivity. *Psychophysiology*, 43, pp. S33-s33.
- De Carvalho, H, Pereira, R., Frozi, J., Bisol, L., Ottoni, G. & Lara, D. (2015). Childhood trauma is associated with maladaptive personality traits. *Child abuse & neglect*, 44, pp. 18-25.
- DeKay, M. (1996). "Systems Thinking as the Basis for an Ecological Design Education" *Proceedings of the 21st National Passive Solar Conference, American Solar Energy Society, April.* (pp. 13-18). Available at: http://works.bepress.com/mark_dekay/11/
- Ding, H., Han, J., Zhang, M., Wang, K., Gong, J. & Yang, S. (2017). Moderating and mediating effects of resilience between childhood trauma and depressive symptoms in Chinese children. *Journal of affective disorders*, 211, pp. 130-135.
- Eravignani, A., Ebowling, D. (2014). Chorusing, synchrony and the evolutionary functions of rhythm. *Frontiers in psychology*, 5.
- Fanning, J., Lee, R., Gozal, D., Coussons-Read, M. & Coccaro, E. (2015). Childhood trauma and parental style: relationship with markers of inflammation, oxidative stress, and aggression in healthy and personality disordered subjects. *Biological psychology*, 112, pp. 56-65.
- Felitti V, Andarf, Nordenberg D., Williamson, D., Spitz, A., Edwards, V., Koss, M. & Marks, J. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The adverse childhood experiences (ace) study, *American journal of preventative medicine* vol 14(4) pp245-58.
- Field, A & Cottrell, D. (2011). Eye movement desensitization and reprocessing as a therapeutic intervention for traumatized children and adolescents: a systematic review of the evidence for family therapists. *Journal of family therapy*, 33(4), pp. 374-388.

Fisher, D., 2000. Preventing childhood trauma resulting from exposure to domestic violence. *Preventing school failure: alternative education for children and youth*, 44(1), pp. 25-27.

Flores, K., Van Niekerk, C. & Le Roux, L. (2015). Drumming as a medium to promote emotional and social functioning of children in middle childhood in residential care. *Music education research*, pp. 1-15.

Given, I. M. (2008). *The sage encyclopedia of qualitative research methods* thousand oaks, ca: sage publications ltd doi: 10.4135/9781412963909

Goldstroom, Y., Korman, D., Goldstroom, I. & Bendavid, J. (2011). The effect of rhythmic exercises on cognition and behaviour of maltreated children: a pilot study. *Journal of bodywork & movement therapies*, 15(3), pp. 326-334.

Graham, R., (2007). Music as socio- emotional confluence: a comment on bispham. *Music perception: an interdisciplinary journal*, 25(2), pp. 167-168.

Grey, N., 1970-, 2009. *A casebook of cognitive therapy for traumatic stress reactions*. London: Routledge.

Gwynne, K., Blick, B & Duffy, G., (2009). Pilot evaluation of an early intervention programme for children at risk. *Journal of paediatrics and child health*, 45(3), pp. 118-124.

Heim, C., Shugart, M., Craighead, W. & Nemeroff, C. (2010). Neurobiological and psychiatric consequences of child abuse and neglect. *Developmental psychobiology*, 52(7), pp. 671-690.

Heinzelmann, M. & Gill, J. (2013). Epigenetic mechanisms shape the biological response to trauma and risk for PTSD: a critical review. *Nursing research and practice*, 2013,

Hopfinger, L., Berking, M., Bockting, C & Ebert, D. (2016). Emotion regulation mediates the effect of childhood trauma on depression. *Journal of affective disorders*, 198, pp. 189-197.

Honor, G., 2015. Childhood trauma exposure and toxic stress: what the PNP needs to know. *Journal of pediatric health care*, 29(2), pp. 191-198.

Howells, F., Stein, D. & Russell, V. (2012). Childhood trauma is associated with altered cortical arousal: insights from an EEG study. *Frontiers in integrative neuroscience*, 6, pp. 120.

Huh, H., Kim, K., Lee, H. & Chae, J. (2017). The relationship between childhood trauma and the severity of adulthood depression and anxiety symptoms in a clinical sample: the mediating role of cognitive emotion regulation strategies. *Journal of affective disorders*, 213, pp. 44-50.

Izenstark, D. & Ebata, A., (2016). Theorizing family- based nature activities and family functioning: the integration of attention restoration theory with a family routines and rituals perspective. *Journal of family theory & review*, 8(2), pp. 137-153.

Jude, J., (2015). Engaging feelings in the body in systemic family therapy. *Australian and New Zealand journal of family therapy*, 36(2), pp. 230-244.

- Kaplan, R, Kaplan, S. (1989). *The experience of nature: a psychological perspective*. Cambridge, New York: Cambridge University Press
- Kaplan, S. & Peterson, C. (1993). Health and environment: a psychological analysis, *landscape and urban planning*, vol 26, pp17-23.
- Kessler, R., Duncan, G., Gennetian, L., Katz, L., Kling, J., Sampson, N., Sanbonmatsu, L., Zaslavsky, A. & Ludwig, J. (2016) Associations of housing mobility interventions for children in high-poverty neighborhoods with subsequent mental disorders during adolescence. *Jama*, **316**(2), pp. 227.
- Kirschner, S. & Tomasello, M. (2009). Joint drumming: social context facilitates synchronization in preschool children. *Journal of experimental child psychology*, 102(3), pp. 299-314.
- Koopman, C., Carrion, V., Butler, L., Sudhakar, S., Palmer, L. & Steiner, H. (2004). Relationships of dissociation and childhood abuse and neglect with heart rate in delinquent adolescents. *Journal of traumatic stress*, 17(1), pp. 47.
- Little, S. & Akin-Little, A. (2011). Responses to childhood trauma: an international perspective. *School psychology international*, 32(5), pp. 441-447.
- Long, M., (2009). Disorganized attachment relationships in infants of adolescent mothers and factors that may augment positive outcomes. *Adolescence*, 44(175), pp. 621.
- Malkina-Pykh, I. (2014). Effectiveness of rhythmic movement therapy: case study of subjective well-being. *Body, movement and dance in psychotherapy*, pp. 1-15.
- Mcdonnell, C. & Valentino, K. (2016). Intergenerational effects of childhood trauma. *Child maltreatment*, **21**(4), pp. 317-326.
- Mcnamee, c.m., 2006. Experiences with bilateral art: a retrospective study. *Art therapy: journal of the American art therapy association*, 23(1), pp. 7-13.
- Mcmanus, J, (2012). The Thurston family project: working with families through outdoor activities and resiliency training. *The psychology of education review*, 36(2), pp 40 - 45.
- Misiak, B., Krefft, M., Bielawski, T., Moustafa, A., Sasiadek, M. & Frydecka, D. (2017). Toward a unified theory of childhood trauma and psychosis: a comprehensive review of epidemiological, clinical, neuropsychological and biological findings. *Neuroscience and biobehavioral reviews*, 75, pp. 393-406.
- Moog, N., Buss, C., Entringer, S., Shahbaba, B., Gillen, D., Hobel, C. & Wadhwa, P. (2016). Maternal exposure to childhood trauma is associated during pregnancy with placental- fetal stress physiology. *Biological psychiatry*, 79(10), pp. 831-839.
- Perry, B. & Hambrick, E. (2008) Reclaiming children and youth; *bloomington17.3* pp38-43.
- Purvis, K., Cross, D., Federici, R., Johnson, D. & McKenzie, L. (2007). The hope connection: a therapeutic summer day camp for adopted and at-risk children with special socio-emotional needs. *Adoption & fostering*, 31(4), pp. 38-48.

- Rezaei, M., Ghazanfari, F. & Rezaee, F. (2016). The role of childhood trauma, early maladaptive schemas, emotional schemas and experimental avoidance on depression: a structural equation modeling. *Psychiatry research*, 246, pp. 407-414.
- Riggs, S. (2010). Childhood emotional abuse and the attachment system across the life cycle: what theory and research tell us. *Journal of aggression, maltreatment & trauma*, 19(1), pp. 5-51.
- Rossiter, A., Byrne, F., Wota, A., Nisar, Z., Ofuafor, T., Murray, I., Byrne, C. & Hallahan, B., (2015). Childhood trauma levels in individuals attending adult mental health services: an evaluation of clinical records and structured measurement of childhood trauma. *Child abuse & neglect*, 44, pp. 36-45.
- Sideli, L. (2012). Effect of childhood abuse on cognitive function in first-episode psychosis patients and community controls. *Schizophrenia research*, 136 (1), pp.s24-s24.
- Stevens, P. (2010). Embedment in the environment: a new paradigm for well-being? *Perspectives in public health*. 130(6) p265-9.
- Stone. 2012. Applying ecological principles (accessed at <https://www.ecoliteracy.org/article/applying-ecological-principles> on 29.6.17).
- Sudbrack, R., Manfro, P., Kuhn, I., de Carvalho, H. & Lara, D. (2015). What doesn't kill you makes you stronger and weaker: how childhood trauma relates to temperament traits. *Journal of psychiatric research*, 62, pp. 123-129.
- Truong, S., Gray, T., & Ward, K. (2016). 'sowing and growing' life skills through garden-based learning to re-engage disengaged youth. *Proceedings of the 19th national outdoor education conference, 29 march - 1 april 2016, university of sunshine coast, Queensland*. Retrieved from <http://outdooreducationaustralia.org.au/noec-2016/noec-2016-proceedings/#toggle-id-33>
- Van Cleave, T., Freed, S., Depierro, J., Minshew, R., Doukas, A., Mcgreevy, C. & D'Andrea, W. (2013). Matters of the heart: physiological correlates of heart rate and childhood trauma. *Psychophysiology*, 50, pp. S34-s34.
- Weinstein, S., Meehan, K., Cain, N., Ripoll, L., Boussi, A., Papouchis, N., Siever, L. & New, A. (2015). Mental state identification, borderline pathology, and the neglected role of childhood trauma. *Personality disorders: theory, research, and treatment*
- Weltz, S., Armeli, S., Ford, J. and Tennen, H. (2016). A daily process examination of the relationship between childhood trauma and stress- reactivity. *Child abuse & neglect*, 60, pp. 1-9.
- Wotton, L. (2013). Between the notes: a musical understanding of change in group analysis. *Group analysis*, 46(1), pp. 48-60.
- Zilberstein, K. (2014). Neurocognitive considerations in the treatment of attachment and complex trauma in children. *Clinical child psychology and psychiatry*, 19(3), pp. 336-354.