**Introducing an Ecolagogical approach to understanding transformative experience: human and non-human living together apart**

**Prequel:**

The genesis of this paper lies within a research project (Consorte-McCrea et al., 2016) investigating attitudes towards biodiversity, with particular focus on the re-introduction of two species of carnivores (lynx and pine marten) native to the British Isles. The research process involved focus group interviews alongside which my role was to collect a small number of more detailed individual narratives. Despite, what may seem like an incongruous area of research, it was the content of and my response to these narratives that maneuvered my thinking towards speculating on the nature of transformative learning experiences. Therefore, the purpose of this paper will be to curate the route from investigating attitudes towards reintroducing wild carnivores, to thinking about transformative learning. I shall do so initially by taking time to explore the narratives provided by two participants, David and Tracey, who both described significant changes in their understanding of the relationship between humans and the natural non-human world. Although it may be presumptuous, I do acknowledge at this early stage the potential complexity inherent within individual narratives and the disparate theoretical frameworks that will be used to inform this piece: but at this juncture ask the reader to be mindful of the advice provided by C. Wright Mills and Peter Berger. In The Sociological Imagination, C. Wright Mills (1970) encourages researchers to consider the meaning that the larger historical scene may have for the inner life. A few years later Berger (1963) referred to the principle of the *sociological perspective* that sought to see the general in the particular, while also looking for the strange within the familiar.

In following Wright Mills’ and Berger’s guidance this paper initially draws on the particularities of David and Tracey’s narratives, specifically examining how these can be used to provide a general understanding of what it means to experience transformational learning. Ultimately a conception of human learning is offered informed by transformational experiences, that conceives pedagogy and the educational structures that surround it from a larger, pre-historical, ecological perspective. This in turn will then lead into a more theoretical discussion of human learning that steers the reader away from the familiarity of more readily accepted pedagogies into the curious world of psychedelic experience, mental health and deep connections with the non-human world. As an adjunct, I provide the neologism ‘*ecolagogy’ -* which aims to represent the nexus between *ecolo*gy and peda*gogy.*

One assumption central to the stories and analysis that follows is that humans are capable of more meaningful relationships with, and as such, a deeper understanding, of the natural non-human world. It will be argued that a disconnection with the nature has, over a significant period of history, given rise to problems such as mental illness s well as the fundamental human ability to act reflexively and to change frames of reference (Mezirow, 2000). The case will be made that modern humans are increasingly separated from their ecological ancestry, prompting a search for meaning, that includes the development of particular niches such as educational settings. An act, which may also represent an unconscious desire to manage the anxiety associated with being separated from complex ancestral ecological relationships. It will also be suggested that the difficult work of ‘learning’, framed within an ecological context, is often defended against and that certain mental health conditions and the clinical use of psychedelic drugs can highlight the impact these can have on transformational learning.

**David and Tracey’s Narratives.**

Participants for the attitudes to wild carnivores project responded to leaflets left in cafes and emails sent to local wildlife interest groups, three whom opted to take part in open ended narrative style interviews (Merrill and West, 2009) - each responded to the stimulus question:

“Can you tell me as little or as much as you wish about yourself and your interest in the re-introduction of wild carnivores, such as the lynx and pine martin and biodiversity.”

The narratives offered by David and Tracey were selected not only due to their dramatic content but that each contained vivid examples of transformative learning. Both could articulate very clearly how they had come to hold their existing frame of reference in relation to their understanding of the connection between the human and non-human world. The analysis involved an immersive reading and re-reading of the transcripts, from which three broad, and to some extent overlapping themes emerged. The first to be discussed relates to how each had an understanding of being *connected* to the natural non-human world and how an appreciation of this can in turn lead to a sense of *wonderment*. The second substantive theme indicates how each experienced their *sense of place* in the non-human world and how this in turn enabled them to challenge their existing assumptions and transform their understanding.

1. **Connection with the non-human world and a sense of wonder.**

Both David and Tracey were able to articulate their deep understanding of what it is like to be connected as well as separated from the natural world. When discussing the issue of re-wilding, Tracey acknowledges that separation between humans and the natural world is one possible cause for contemporary environmental problems, she states:

*“I think part of the problem with, erm … how … how things have become with humans and how we run the planet and that sort of stuff. Is that we have taken ourselves out of the food chain somewhat, and we’re like a colony, sort of …”*

In particular, she considers the position of humans within the food chain as a feature of being able to understand and connect with the natural world. David regards the experience of connectedness with nature as being *‘innate’* and yet despite this, for him, his early experiences, which he describes in a family mountain walk, were negative:

*“I, as a fairly young child, I walked up Ben-Nevis with my family, erm, expecting to find gold, silver and gems at the top, erm … but when I got there, there was this, what everybody else told me … this amazing view of lakes in the … Summits of mountains and I could not appreciate any of that, no aesthetic appreciation of nature at all.”*

At the time of David’s interview, he was in his early fifties and the description above is recalled from over 30 years ago and yet for most of his life since then he has experienced a rich feeling of connection with the natural world. David is quite clear what enabled him to become aware of the wonder and connection with nature that had once alluded him:

 *“[…] one thing that became … became very clear to me on my first ever LSD experience was the interconnectedness with everything. […] whether we are aware of it or not everything is connected. […] I gather from my experiments with LSD was how beautiful nature was and how wonderous. […] So, the beauty of flowers, the wonder of birds. So, this was a new world which was opening to me…”*

On numerous occasions David makes it clear that in no way does he support the use of psychodelic drugs and acknowledges their inherent danger and their potential cause for periods of his own later mental illness. And yet, despite his own difficult past he sees their use as the event that enabled him to recognize a ‘*new world which was opening up’*. This new world that has ‘*opened up*’ for David is also paradoxically, and old world, a world in which humans were once intimately linked but now as a result of modern industrialization have become separated:

 […] *because I think we’re very reliant and dependent on nature and that mankind’s attachment to nature and mankind’s attempts since the industrial revolution, our ability to overrule nature and the ability to rule us … erm … has separated us more and more from the earth from animals and plants and … it’s lessened our lifestyle it … it’s depleted our spiritual awareness and makes us less hardy, less physically fit …*

The ‘depletion’ recognized by David is focused on the separation of humans from the non-human world and the associated inability to be able to appreciate the significant ‘reality’ of interconnectedness. Interestingly, on numerous occasions the transcriber of David’s interview reported her own sense of sadness when hearing how David articulated both his sense of wonder and tragedy that more people cannot see the world like he does. David acknowledges how difficult his thoughts are to others and states that ‘*obviously we can’t make it all green and pleasant again – that’s very kind of, ‘pie-eyed’ and backward’.* In the context of rewilding he also notes:

 *‘I think that animals have rights and they are wonderful, the ecosystem is the wonderfully designed mechanism that, I think, you know has been evolving for thousands, millions of years and it's perfect. Humans are the odd ones out and I think the wild has a right to be wild in its own right for life. The same time, I have a right and you have a right to live … the earth was not put here just for us to use and abuse according to our needs.’*

Later in the interview David reiterates his views on separation – ‘*it’s … it’s … we’re so at one, part of it and at one with it and the separation from it … erm … is tragic really’.* The tragedy for David is that so many do not see what he sees, feel what he feels or understand the implications of a wider ecology as he does: and how, this in turn, led to a diminished human experience alongside a human promulgated gradual destruction of a ‘*wonderfully designed mechanism’.* David’s connection with the non-human world originated with using psychoactive drugs and this deep connection has for many decades sustained him. So much so that his relationship with nature defines who he is:

*‘So, with the LSD experience I had with flowers and trees and … and nature … erm … I turned on to ecology and … erm, the spirituality of nature. I describe myself as a ‘pantheist’. I see if you like, erm … the physical world and nature as my representation of what life should be … it is a very base level thing.*

The depth of Tracey’s connection with the non-human world is not articulated with the same clarity as in David’s narrative but during a discussion on how attitudes to rewilding may be reliant on ‘education and knowledge’, Tracey recognizes the need to think outside current frames of reference:

Alan: *… and if you had full knowledge then that would help you to make a better decision?*

Tracey*: It helps but … erm … even then for all of us sentient, I don’t think we … erm, because there’s other factors you know, we have got our environment and erm … and our history affecting our thoughts … You know, I am quite aware of what effects our thinking and our habits and … erm, I have been trying to strip mine back a bit so I can look at what makes me operate […] what was it that Jung talked about? The collective conscience …’*

Tracey’s acknowledgement that history and the environment can affect thoughts offers some insight into her understanding that complex decisions regarding environmental issues are not only informed by current knowledge but also an historical relationship with the environment (Wright-Mills, 1970). David regards his connection with the non-human as being so intimate that information can flow between him and the birds and trees. He is aware that his experience(s) can be construed in the light of his previous use of psychedelic drugs and offers a cautious exploration on the same issue that vexed Tracey - how to ‘educate people about the natural world’.

‘*Part of educating humans about wildlife would be to educate humans what it means to be human, amongst the wildlife and about the feelings the … the … feelings and agendas. That feeling you can get from being, contacting tree spirits and being at one with nature. I mean, I had a conversation – don’t lock me up for this. But, I’ve had conversations with trees before […] erm, I’ve had a bird talk to me before […] I was with my sister and this … this magpie, we were at the viewing window and this magpie came down and actually spoke.’*

David continued to describe how he and his sister both heard the magpie while making it quite clear that neither were on drugs or deranged. Their rationale for the experience was that ‘*ancients’* were attuned to animal behaviour and in the reverie of watching the magpie some information passed between them. David’s entreaty to not perceive him as deranged or under the influence of hallucinogens highlights the fear implicit in offering a narrative that steps outside of what would ‘normally’ be expected. At this stage of the paper the experiences of David and Tracey are offered in good faith and their deeper understanding and connection with the non-human world is recognized and acknowledged.

**(2) A sense of place and meaning making**

David and Tracey provide some insight into the way the natural world has been modified and the impact this has had on humans and animals as the ‘*wonderfully designed mechanism’* mentioned by David has been disrupted. Tracey begins to questions where she fits when this balance is disrupted:

*So really, when we damage what’s around us … comes back and bites us in the bum eventually. So erm, … so yeah. I guess I have been trying to look at my life, where I fit in, in that sort of biosphere.’*

Tracey also questions the certainty of human actions on the non-human and provides an example of how a ‘good deed’ turned around and ‘bit her in the bum’:

 Alan: *So there’s a bit of attention there between doing nothing and letting the wild take over and the human management of the non-human world?*

 Tracey: *Yeah, well, I had something happen to me in the garden actually which might be sort of relevant to that, erm … I was sitting there … I bought a cheese and tomato sandwich on brown bread and I was feeding this little bird, erm … that was near the veggie garden and I was feeding it bread and I accidently got a bit of cheese in it and the cheese stuck on the birds beak. And it was trying to get the cheese out and trying to get more bread and stuff to dislodge the cheese and I was sitting there absolutely horrified and I thought you know, that’s how you can effect things.’*

Equally, David recognizes some level of disjuncture and inability to act:

*I also think, psychologically, that the way we live has not allowed us to express psychologically the animal instincts that we have. That we are quite confined and contained by a built environment and that has an effect on our consciousness as well.’*

What does emerge from each narrative of disconnection is how David and Tracey’s awareness of a separation between the human and non-human world leads them to seek a reconnection in order to have a positive impact on their own well-being. I shall discuss each transformation separately.

Tracey provides a powerful story of wishing to re-establish this connection in the context of seeking a space to come to terms with a difficult experience. After a period of depression Tracey decided that she needed some space and time to meditate:

*‘And I did something very risky, erm, which normally I wouldn’t have done as I was very aware of the risk. I went for a walk in Rennie Manitoba on my own. I knew the snakes would be hibernating but the bears were about and that sort of stuff and probably wolves and what not, erm … I really decided you know, that if something happened, it happened and if it didn’t I would have an amazing experience. […] you know lynxes can have me for dinner if it wants to […] it’s a similar thing with the bears, erm … There was pristine snow on the bridge and I looked down on the bridge … there were bear tracks across is and I had to make the decision […] I think that’s part of the problem with erm, … how … how things have become with humans and how we run the planet and that sort of stuff … is that we have taken ourselves out of the food chain somewhat.’*

David, this extreme example represents a transformational moment which leads to a lifelong relationship with the natural world. Tracey’s experience was a healing one and helped her come to terms with a difficult episode. I have no doubt from her telling this story that when she walked out into the snowy wilderness, Tracey perceived herself to be palpably connected to the non-human wilderness and ‘*if something happened, it happened’*. The important event for Tracey was to experience what it must be like to be part of the food chain and where she fits in the biosphere. Despite this being many decades ago, Tracey uses this rich experience to give her meaning. Throughout the interview she regularly returns to the notion that humans are *just* part of the food chain and that their actions can and do have many implications. She sees the role of predators to keep things in check:

*[…] if you haven’t got a predator for something then, erm … similar to us, sort of, you know everything gets out of hand if it doesn’t have something to keep it in check … and nature has a good sort of check in service.’*

By taking those steps into the wilderness Tracey had an experience with nature that provided a ‘*good sort of check in service’*.

David had also experienced mental health problems and used his very deep relationship with the non-human world to transform his mindset. It is significant that he feels that what he has gained was worth the angst, he articulates this aspect very clearly after describing how the material world separates people from nature and becomes very insular:

*It becomes a very insular world. The world through a microscope. So, yeah, all the mental ill health I have suffered although it has been very painful it has granted me some aspects of myself that … that I want to keep.’*

He expands on this theme later, making the claim that:

*‘There’s nothing more beautiful to sustain a human than wondering at nature. I have never found anything that matches it.’*

 So much so, that David rents a small piece of woodland that he uses to *‘go back to nature and seek solace’* and in his words to become a wild animal again:

*‘It’s a coppice wood, to use as a retreat and to have as a kind of … erm, … spiritual base a spiritual place to be … to drum, to dance, and if you like that’s become part of me, becoming a wild animal again, it’s part of me returning, being … being part of nature. And that enriches me immensely. It is unbelievably recharging … erm, … so humans are part of the natural world as well.’*

Both David and Tracey have described how their understanding of the close relationship between humans and nature has led them to manage negative and potentially debilitating mental health symptoms. A reframing such as these narratives represents examples of substantial transformative learning experiences. The following section will continue to develop an *ecologogical* model of human learning firmly rooted in the distant ecological past.

**From particularities to generalities: unpacking the nature of Transformative Learning**

The narratives provided by David and Tracey were an unexpected consequence of carrying out open ended narrative style interviews during a research project on attitudes to wild carnivore reintroduction. Although their responses may, to some extent, offer insight into the nature of an extreme and very personal experience, they are by no means particular just to them. It is important to acknowledge that both David and Tracey found that a more meaningful connection with nature helped them manage their mental health. Additionally, the use of psychedelics to enhance meaning making has been shown to have a role in primitive societies (Lawlor, 2013) and has also recently been shown to be very effective as a treatment for depression (Nour, et al., 2016); each of these latter contexts will be discussed in the second part of this section and will provide insight to be used to outline an ecologogical understanding of human learning.

Many of those who experience mental illness are also often reported to hear and see things in the natural world that they previously could not (Cooke, 2014; McCarthy-Jones, 2012). In *Henry’s Demons* (Cockburn and Cockburn, 2012) a book written by a father (Patrick) and his son (Henry) about the experience of schizophrenia, Henry often describes how the non-human world becomes more vivid and ‘real’ and how trees, bushes and birds speak to him. Even after Henry has recovered and no longer has psychotic episodes he carries with him a deeper sense of connection with the natural world and the book ends with Henry reflecting:

It has been a very long road for me, but I think I’m entering the final straight. There is a tree I sit under in the garden in Lewisham which speaks to me and gives me hope. (p.222)

Both David and Henry’s post-schizophrenic descriptions of connecting with the non-human world are of interest as these occur outside of psychosis and therefore involve thought and the reality testing act that ‘I know I am thinking’ (Kreinin, 2013). David is lucid and fearful that others may judge his experience as if he were still deranged and yet in the interview space he is happy to articulate these complex experiences. It is noticeable how the psychotic experience is not recalled as an entirely negative experience, for David, his period of illness has given him a life-long access to a positive and sustaining relationship with the natural world. Cooke (2014) provides an example from a participant who had had psychotic episodes and now, post-ill, regards these as transformational experiences:

… I was kind of struggling, I was blocked. The psychosis allowed me to come out of myself and move on. (p.49)

It is not intended to bypass and negate the profound difficulty associated with mental illness but it would be remiss to ignore that positives do emerge.

Both David and Tracey narrate about how that they now feel a relational connection to the natural world and how this has made them aware of their previous separated experience (the experience that matches all those who have not undergone David and Tracey’s transformational thinking). David conceives his experience in relation to his understanding of how the ‘*the ancients’* lived and it is well documented that in many pre-modern indigenous cultures a very close connection still exists between human and non-human worlds and also between history and mythology (Sinding-Jensen, 2009). For example, within the oral tradition of Australian Aboriginal mythology of Dreamtime stories imbued with ancestral knowledge are linked to precise topographical locations (Whallon, 2016); while New Zealand Maori share legends of the mythical parents, Rangi and Papa cruelly separated from their intimate embrace to become the land and sky, as well as birds being used to communicate between the people and gods (Ihimaera, 1987). Finally, the native Mexican Wixáritari maintain a cultural ‘trinity’ of deer, maize and the psychoactive cactus, peyote, without which their culture would cease to exist. It is through the use of peyote that distinctions between plants, animals and humans are dissolved as all become part of a unified ‘nature’ (Lawlor, 2013). It is easy to disregard these accounts as simply the anomalous result of primitive pre-modern thinking, madness or psychoactive drug use: a more helpful approach is to consider how these ancient and long lasting conceptions provide access to another dimension from which to consider human consciousness. There are two recent developments that support this provocative stance, the clinical use of psychedelic drugs (Carhart-Harris, Bolstridge, and Rucker, et al., 2016) and the efficacy of ecotherapy (Jordan and Hinds, 2016), and draw our thinking back towards the more ‘respectable’ world of empirical research.

Recovery from mental health conditions, such as anxiety and depression, represent a considerable learning transformation that require previous destructive and resistant frames of reference to be replaced by thinking patterns that support human flourishing. Tracey and David alluded to the ecotherapeutic foundation to recovering their mental health: Tracey’s journey into bear territory was part of her healing process as she recovered from depression, while David still visits a piece of woodland to sustain his sense of well-being. What is increasingly becoming known as ‘Ecotherapy’ has over recent years been gathering considerable research evidence on how interacting with the natural non-human world can have significant mental health benefits. Jordan and Hinds’ (2016) edited text provides numerous examples of successful physical and psychological interventions within natural settings and argue that this is an exciting new era for therapeutic work that has its fundamental principles grounded in the notion of disbanding the distinction between the human/non-human. Current research (Carhart-Harris, Kaelen and Bolstridge, et al., 2016) is also providing evidence as to how the clinical application of psychedelic drugs such as LSD can improve well-being and optimism, while (Carhart-Harris, Bolstridge, and Rucker, et al., 2016) conclude that psilocybin use alongside psychological support is very effect at treating resistant depression.

The case made so far is that richer, more intense connections between the human and non-human natural world provides a resource within which considerable transformative learning can take place. Additionally, it is noted that one effect of psychedelic drug use can be to promote and enhance an awareness of the connections between the human and non-human world. As a consequence of this it can be suggested that reconnecting with nature can improve mental health and of course the corollary is that the separation between the human and non-human world can lead to unintended negative consequences. The discussion will now take a short detour to consider a possible cause of this separation and the impact on human functioning, particularly the process of learning.

**Human niche construction – living together apart**

The next line of enquiry to be pursued considers the origin and nature of the assumed dis-connection between the human and non-human world and the impact this has had on human functioning, ultimately, with reference to the process of education. Along with Geary (2010) I will suggest that educational settings represent a very particular and influential type of ecological niche and that the process of human learning and the continuing construction and reconstruction of educational niches are co-determinant. I argue that evolutionary pressures have given rise to human nurturing, both in the home and beyond, that provided the social and cultural mechanisms to enable humans to dominate the planet. Yet, despite millennia of educational niche construction the ‘correct’ conditions for human education settings are constantly in flux and continually debated. Helpfully, Berger and Luckmann’s (1966) seminal text ‘The Social Construction of Reality’ proposes a framework around which the seemingly unquenchable desire and propensity to create multiple and diverse education settings (see p?­) can be thought about.

Central to Berger and Luckmann’s thesis is the concept of ‘open and closed worlds’ where apart from humans, all animals are born adapted to a relatively unchanging ecologically specific ‘closed’ world. Correspondingly, learning within a ‘closed’ environment involves acquiring a relatively fixed repertoire of appropriate behaviours. In contrast, humans are required to construct suitable niches as they are born ‘unfinished’ into an environment that is not species specific and therefore ‘open’ to change. Berger and Luckmann regard this situation as a restless dialectic where humans are both in the world and yet unlike other animals, they must also be involved in the disruptive act of continual niche re-construction. Accordingly, the human experience is to never attain evolutionary ‘fitness’ within their ecologically ‘open’ niche. Human learning must therefore support behaviours that lead to enhancing niche suitability (Geary, 2010) and go beyond simplistic notions of animalistic associative or imitative learning: and additionally, involve the ability to account for an understanding of the needs of the self and others.

Human learning has therefore led to a process of physical and psychological niche construction that has set the species apart from all others and there are many indications that the two are constitutive of and in a dynamic relationship between each other: where niche construction influences human learning and concomitantly human learning influences niche construction. An example could be where the psychological desire to communicate with others has led to the development of increasingly technological systems to achieve this and as a result the use of smart phones, emails and the internet now have a significant influence on human behaviour. The continued and widespread human construction has led to the unparalleled planetary domination of the human species (Odling-Smee et al. 2003; Flynn et al. 2013) and warrants an analysis of the constructed educational places and processes, where the human learning that has brought about this domination. It is within this context that transformative learning can begin to be interrogated, through an ecological lens and how the antecedents of ‘what it is to be human’ requires an understanding of the human initiated separation between the human and natural non-human that has inevitably led to a disjuncture between genetics and culture.

**Cultural-genetic lag/gap**

Although potentially nonsensical, the disjuncture between culture and genetics can best be explored when considering the possibility that the there is no gap between cultural and genetic evolution. Howard-Jones (2014) notes that human brains are unexceptional with more similarities than differences compared to their closest primate relatives. In this putative situation it could be argued that human behaviour should be similar to that of the great apes: therefore, the expectation would be that humans would have very little permanent impact on the wider physical environment or other species and that any rate of change if it were to occur would be equally as slow. It is hypothesized that the significance of the cultural-genetic gap is that it leads to the motivation to engage in unrelenting niche construction highlighted by the development of complex educational settings and processes which support the characteristic requirements for human learning.

It is compelling to consider that human functioning may be effectively marooned within an ecological space between evolutionary determined genetic capacities and the psychological and physical products of socio-cultural niche constructions. Many other ‘gaps’ are represented in literature along with their attendant consequences on human functioning: for example, The Savanah Principle (Kanazawa, 2004), Evolutionary Mis-match Hypothesis (Hagen and Hammerstein, 2006), an evolutionary legacy (Burnham and Johnson, 2005) and the more evocative ‘untenable violation’ (Glendinning, 1995). The contention is that this separation has been caused by the biological organism being in but yet not fitting the environment can be seen as a consequence of the cultural-genetic lag. Berger (1967) compounds the dilemma resulting from the human need to engage in world-making by recognizing that the products of human niche construction acquire their own internal logic that in turn further confounds human functioning (eg?). As a consequence, any attempt to build a ‘closed’ and suitably adaptive niche is condemned by an evolutionary and social created cultural-genetic lag in combination with the confounding internal logic of human made products, to fail. Laland and Brown (2006) propose that the motivation for human niche construction is to offset the impact of ‘adaptive-lag’. The novel suggestion offered here is that educational niches are dependent on and motivated by reducing the anxiety associated within the cultural - genetic gap and the (un)conscious experience of separation. The next section will discuss the role that educational niches and subsequently teaching, plays in reducing this anxiety.

**Why learning is not about adaptation.**

Taking a lead from the narratives of David and Tracey has enabled a model of human learning and, in particular the unique aspect of transformational learning, to be begin to be advanced from the ecological perspective of niche construction. Although not part of this paper, there is an implicit assumption of a pre-historic selective pressure igniting the requirement for early humans to engage in niche construction, the origin of which lies in the acknowledgment that humans were no longer born adapted to their ecological niche. It is postulated that this process of niche construction is what has ultimately and progressively evolved into a separation between the human and non-human world. Modern human thinking has therefore become increasingly divorced from the pre-historic ecological niche these behaviours would have been adapted for. The combination of niche construction alongside Berger’s provocation that human made products possess an internal logic that disrupts human functioning, provides the conditions for the continuation of human world-making and the subsequent increased separation of the human and non-human world.

Without wishing to sound too fatalistic, due to the ‘open world’ that the human species is born into, modern humans are enmeshed within a positive feedback cycle of being motivated to construct niches that can never provide the ideal ‘closed world’ into which evolution has enabled other animal species to fit. The ironic consequence of humans being caught-up within a continual dialectic cycle of world making in an attempt to repair an adaptive lag, is that humans, unlike all other animals can never be adapted to their external world. Therefore, humans have been and continue to be separated from the non-human world and consequently, human learning is not about adaptation but rather the *continual struggle* to be adapted. Once this eco-centric, as opposed to anthro-centric (or as shall be discussed later, ego-centric) view is taken, a more realistic stance on the complexity and problem of modern human learning: in particular the uniquely human ability for learning to be transformative, where frames of reference can be challenged and changed to actualize new knowledge, skills and of course construct new niches.

 The narratives presented by David and Tracey reflect the tension for those whose experience of the separation between the human and non-human has been sensitized by mental illness or psychedelic drug use. What their stories, and those within the empirical research presented earlier (p,?), allude to, is that their experiences of re-connecting with the natural non-human world, has provided suitable conditions for transformational learning. David discovered his appreciation of and deeper connection with the natural world during adolescent experiments with psychedelic drugs that enabled him to become aware of what he called ‘deep ecology’. David’s sense of self was now located within a complex interconnected planetary ecosystem, whereupon the distinction between human and non-human began to degenerate. So much so, that he could use this new and closer relationship to help him modify the immutable and damaging thinking that characterized his psychotic episodes. Likewise, Tracey described how during a period of depression, she deliberately took herself into the wilderness to experience what it is like to be part of the food chain. The outcome was similar to David’s, as she was now able to describe and make meaning of her-self within an *eco-centric* context of an interconnected ecology and leave her depressive thinking behind.

It has also been reported in previous research and exemplified in Henry’s Demon’s that despite psychotic auditory hallucinations, where elements of the natural world ‘speak’ and offer instructions, this too can engender a deeper connection with the natural world that becomes restorative. Many of those who have taken psychedelic drugs in clinical research settings also report similar feelings of closeness with the natural world, alongside an appreciation of the ‘interconnectedness of everything’, and that how these feelings are long lasting and can lead to a significant improvement in a sense of well-being. Indeed, Carhart-Harris, Bolstridge, and Rucker, et al., (2016) have begun to use psilocybin in clinical trials as an effective treatment for resistant depression. The evidence, presented so far, leads to an understanding of the human condition, that due to the activity of niche building, has become separated from the natural non-human world and this in turn has the potential to confound human functioning. Vitally, when this lost connection is re-established it can lead to an increased sense of well-being and an ability to change thinking patterns that have become stuck and debilitating.

The insight gained from these observations into what education and human learning might be is not as simplistic and absurd as suggesting that learning can be improved by either increasing connections with the non-human world or the consumption or psychedelic drugs. But, just as cognitive scientists extrapolate models of human learning from subjects with brain injury and evolutionary psychologist use mathematical modeling to evoke hypothetical situations: the function of the examples provided is to provide an alternative and novel lens with which to interrogate what it means to be human, and why and how human learning is different from that of all other animals. In particular the functionality of a connection with the non-human world will explain why formal education settings and the potential for transformative learning is a uniquely human attribute. For, although humans engage with and are influenced by behaviourist and associative modes of leaning, these offer reductive explanations that fail to account for the human motivation to ‘make-meaning’ that is satisfying on an individual and social level. David, Tracey, Henry and those involved with psychedelic clinical trials have all been able to transform their thinking in juxtaposition with a more personally satisfying relationship with the human and non-human world.

This existential dilemma to construct a life that has meaning, axiomatically results from a pre-historical ecological situation whereby humans now no longer fit the external world and therefore are required to construct niches that satisfy both physical and psychological needs. The dilemma is exacerbated, as human products, psychological and physical, possess their own internal logic that confounds human functioning. Consequently, humans continue to build niches that are increasingly more complex, so much so that the knowledge and skills required to understand and maintain these processes are no longer able to be catered for within a typical family group. It is this predicament that provided the selection pressure for the evolution of more formal education settings that now contains learners and teachers (Geary, 2010). Apart from a very small number of examples no other animal species have examples of direct, more formal, teaching (Tomasello, 2014) that will develop into what Fogarty, Strimling and Laland (2011) refer to as *cumulative culture,* facilitating a rapid evolution of advantageous behavioural traits that account for the disparity within the cultural-genetic lag. Using a neuroeducational lens to consider why human learning is so problematic, Howard-Jones (2014) acknowledges the negative impact of the cultural-genetic lag. The final question therefore that needs to be addressed, focuses on a consideration of education settings having developed as a result of the evolutionary advantage located within niche construction and asks – ‘why it is that connecting with the natural world or using psychedelic drugs can support transformative learning?’

**Conclusion: An Ecolagogy of Human Transformative Learning**

The human constructed educational niche is a response to the ecological and existential threat of being born into an open world that does not immediately support human flourishing. For example, the newborn has substantial learning to engage with (approximately 20 years in the northern hemisphere) before they are able to enter the complex cultural and social world that humans inhabit and subsequently survive independently. It is this struggle to make sense of and develop an individual role and identity with an existing external world that elicits considerable anxiety (Bainbridge and West, 2012; Beista, 2013), leading the discussion towards a consideration of psychoanalytic defence mechanisms and a return to Carhart-Harris, Bolstridge, and Rucker, et al., (2016) experiments with psychedelics. The discussion will then move to review the educational role of parents and teachers and how they may manage the anxiety integral within the process of learning. Finally, it is argued that a shift of focus from an ego-identity to an eco-identity provides a novel and nuanced explanation of transformative learning, that is established in an *ecologogical* framework that acknowledges the repercussions of human ecology.

Carhart-Harris has a background in psychoanalysis and began working with psychedelic drugs as a treatment for depression focusing on the role of the ego and its defences (check). He explains the successful treatment of resistant depression in terms of the ability of psychedelics to disrupt ego functioning, in particular to reduce the impact of unconscious defences by engineering ego-dissolution. It is in this less defended state that his participants were able to confront and explore their stuck thinking. There are similarities here with Beista’s (2006) contention that learning is about ‘coming into presence’ and responding to the world, rather than attempting to dominate or control it. Something which both David and Tracey were able to. It is particularly emblematic that their transformative learning experience – the alleviation of depressive symptoms - has resulted from them each experiencing ego-dissolution during a cogent encounter with nature: David as a result of psychedelic drug use and Tracey as a conscious decision to walk into and face the possibility that humans are part of a complex ecology and that their role is not always to dominate and control nature. It is therefore not an unreasonable conjecture to suggest that transformational learning requires a level of ego-dissolution, whereby defences can be sufficiently reduced to allow a true (eco-centric) self to approach and respond to difficult and potentially risky knowledge (Beista, 2013). The predicament that is now left is to consider how the conditions for ego-dissolution, and potentially transformative learning, may arise in more formal learning environments.

Maintaining a psychoanalytic perspective provides an insight into the fundamental nature of human learning and the conditions required to manage the anxiety particularly associated with transformational learning. It is salient that Winnicott (1960/2007) recognized the importance of external ‘holding environments’ where the monitoring of emotions by primary caregivers helps contain anxiety and allow the ego of the novice learner to take the risks necessary in the act of creating new knowledge. The ecopsychoanalyst Joseph Dodds (2011) expands this model by suggesting that the holding environment with its incumbent care-givers, gradually expands from the family setting, to wider ecological niches and ultimately a consideration of a planetary ecology. Although the site of human learning now moves beyond the influence of the family and primary caregivers, what does not change is the essentially intimate nature of transformative learning and how this revolves around close relationships that provide care during the risky act of confronting the ego with difficult knowledge and many potentially new possibilities. It is noticeable that when David and Tracey experienced transformative learning their response was to appreciate their reconnection with the natural non-human world and consequently reflect the pre-historic world of ‘the ancients’. As such, their holding environment now includes the non-human as well as experiences of others passed down from pre-history and raises questions about the role and nature of potential care givers.

A return to Winnicott (1960/2007) provides an opportunity to bring together disparate ideas and locate the origin of a confident self that can engage successfully in difficult, transformative learning. Winnicott argues that an autonomous and independent self is the result of a personal identity that has resulted from an experience of coherence and continuity leading to ‘ego-relatedness’. The stories from the participants in clinical psychedelic drug trails along with the narratives from David, Tracey and Henry all report how an enhanced appreciation of the natural non-human world, in turns leads to an improved sense of self. I suggest that there is a shift from an ego-identity to an eco-identity; a shift that represents a transformative moment where the self is no longer confined to individual solipsism but can now be experienced within an ecological coherence and continuity that more acutely reflects the origin of human education processes and learning. The conclusion is not that transformative learning can only occur when learners re-connect with the complexity of the human/natural non-human interconnectedness, or take psychedelic drugs. Rather, the consequence of the cultural- genetic lag is that culturally located education systems have evolved faster than human biology and often do not support the fundamental aspects of human learning. To achieve this outcome, and encourage transformation, learners need to be more readily open to new ideas, an experience enhanced by ego-dissolution. Consequently, the role of care-givers/teachers is to contain and not remove the anxiety that is aroused when faced with the complexity of interconnectedness. The challenging transformation that is therefore required, for all those involved in life-long human learning will be to think ecologogically and acknowledge that: human learning will be transformed by approaching and responding to difficult knowledge and complexity instead of attempting to dominate and control.

 The non-human world will cannot be tamed and equally, educational niches will never be able to provide solutions that precipitate an external closed world of

Bainbridge, A., & West, L. (2012). *Psychoanalysis and education: minding a gap.* London: Karnac Books.

Beista, G.J.J. (2006). *Beyond Learning: Democratic education for a human future.* Boulder, CO: Paradigm Publishing.

Beista, G. J. J. (2013). *The beautiful risk of education.* Boulder, CO: Paradigm Publishers.

Berger, P., L. (1963). *An invitation to Sociology: a humanistic perspective.* Doubleday Dell Publishing: New York.

Berger, P. L. (1967). *The sacred canopy: Elements of a sociological theory of religion.* New York: Anchor Books.

Berger, P. L., & Luckmann, T. (1966). *The social construction of reality: A treatise in the sociology of knowledge.* London: Penguin.

Burnham, T. C., & Johnson, D. D. P. (2005). The biological and evolutionary logic of human cooperation. *Analyse & Kritik,* 27, 113-135.

Carhart-Harris, R., L., Leech, R., Williams, T., M. et al. (2012). Implications for psychedelic-assisted psychotherapy: functional magnetic resonance imaging study with psilocybin. *The British Journal of Psychiatry*,  200 (3) 238-244; DOI: 10.1192/bjp.bp.111.103309

Carhart-Harris, R., L., Bolstridge, and M., Rucker, J., et al., (2016). Psilocybin with psychological support for treatment-resistant depression: an open-label feasibility study. *Lancet Psychiatry,* May 17, 2016 [http://dx.doi.org/10.1016/S2215-0366(16)30065-7](http://dx.doi.org/10.1016/S2215-0366%2816%2930065-7)

Carhart-Harris, R., L., Kaelen, M. and Bolstridge M., et al. (2016). The paradoxical psychological effects of lysergic acid diethylamide (LSD). *Psychol Med*; 46, p.1379–90.

Cockburn, P. and Cockburn, H. (2012). *Henry’s Demons: A father and son’s journey out of madness.* London: Simon and Schuster.

Cooke, A. (2014). *Understanding Psychosis and Schizophrenia: Why people sometimes hear voices, believe things that other people find strange, or appear out of touch with reality, and what can help. Leicester:* The British Psychological Society.

Dodds, J. (2011) *Psychoanalysis and ecology at the edge of chaos: complexity theory, Deleuze and psychoanalysis for a climate in crisis.* East Sussex: Routledge

Fogarty, L., Strimling, P., & Laland, K. N. (2011). The evolution of teaching. *Evolution,* 65(10), 2760-2770

Flynn, E. G., Laland, K. N., Kendal, R. L., & Kendal, J. R. (2013). Developmental niche construction. *Developmental Science,* 16(2), 269-313.

Geary, D., C. (2010). Evolution and Education. *Psicothema,* 22(1), 35-40).

Glendinning, C. (1995). Technology, trauma and the wild, in Roszak, T., Gomes, M.E. and Kanner, A.D. (eds.) *Ecopsychology: restoring the earth, healing the mind.* San Francisco: Sierra Club Books, pp. 41-54.

Hagen, E. H., & Hammerstein, P. (2006). Game theory and human evolution: A critique of some recent interpretations of experimental games. *Theoretical Population Biology,* 69, 33-348

Howard-Jones, P. A. (2014). Evolutionary perspectives on mind, brain and education. *Mind, Brain and Education.* 8(1), 21-33.

Ihimaera, W. (1987). *The Whale Rider.* Auckland: Harcourt Books.

Jordan, M. and Hinds, J. (Eds) (2016). *Ecotherapy: Theory, research and practice.* London: Palgrave Macmillan.

Kanazawa, S. (2004). The Savanna Principle. *Managerial and Decision Economics,* 25, 41-54.

Kreinin, A. (2013). “Hearing Voices” in schizophrenia: who’s voices are they? *Med Hypotheses,* 80(4), 352-6. doi: 10.1016/j.mehy.2012.12.022.

Laland, K. N., & Brown, G. R. (2006). Niche construction, human behaviour, and the Adaptive-Lag Hypothesis. *Evolutionary Anthropology,* 15, 95-104.

Lawlor, D. (2013). Returning to the Wixáritari: The Huichol and their sense of place.  *European Journal of Ecopsychology,* 4, 19-31.

McCarthy-Jones, S. (2102). *Hearing Voices: The histories, causes and measuring of auditory verbal hallucinations.* Cambridge: Cambridge University Press.

Mezirow, J. (2000). Learning to Think Like an Adult – Core Concepts of Transformation Theory. In J. Mezirow and Associates: *Learningas Transformation: Critical Perspectives on a Theory in Progress.* San Francisco: Jossey-Bass.

Merrill, B. and West, L. (2009). *Using Biographical Methods in Social Research.* London: Sage.

Nour, M., M., Evans, L., Nutt, D. and Carhart-Harris, R., L. (2016). [Ego-Dissolution and Psychedelics: Validation of the Ego-Dissolution Inventory (EDI)](http://dx.doi.org/10.3389/fnhum.2016.00269). F*rontiers in Human Neuroscience*, Vol: 10, ISSN: 1662-5161

Odling-Smee, F. J., Laland, K. N., & Feldman M. W. (2003). *Niche construction: The neglected process in evolution.* Princeton, NJ: Princeton University Press.

Sinding-Jensen, J. (ed) (2009). *Myths and Mythologies: A reader.* London: Routledge.

Tomasello, M. (2014). *A natural history of human thinking.* London: Harvard University Press.

Whallon, R. (2016). Marked Sacred Places of Hunter-Gatherer Bands. In Williams, L. and Whallon, R. (Eds). *Marking the Land: Hunter-Gatherer creation of meaning in their environments,* 263-275. London: Routledge.

Winnicott, D.W. (1960/2007) The Theory of the Parent-Infant relationship, in *The Maturational Processes and The Facilitating Environment.* London: Karnac.

Wright-Mills, C. (1970). *The Sociological Imagination* (3rd Edition). Penguin: Harmondsworth.