

Evolutionary Developmental Biology, the Human Life Course, and Transpersonal Experience

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This paper explicates secular psychodynamic growth through the life time and meditation as routes to the transpersonal from the perspective of evolutionary developmental biology, based around a multi-line model of growth. A multi-line model raises many significant points for a transpersonal audience. Such models have been pioneered by Hunt. When set on the footing of evolutionary developmental biology and nonlinear dynamics these kind of models become all the more cogent, penetrating and far reaching, validating plurality and diversity in both the process and final form of transpersonal development. The “anecdotal” accounts which Hunt reports, and which this paper adds to, can thus be amalgamated with an established and sophisticated research program (and these “alternative” evidence sources unified with a comprehensive theoretical and research-based paradigm, around which future hypotheses can be formed and tested). Such developments are symptomatic of a general movement in the sciences towards a non-linear paradigm, to which the transpersonal movement might have been slow to respond.

Keywords: transpersonal development, evolutionary developmental biology, nonlinearity

Conceiving transpersonal development as a parallel line to representational development rather than as a higher stage of a single line that includes both representational and transpersonal development can shed light on a number of issues concerning psychology and spirituality. In exploring this further, use is made of Hunt’s (1995a) model of development. These arguments are augmented from a perspective of evolutionary developmental biology. Firstly, a short discussion of “heterochrony” is presented in relation to transpersonal theory, and then an account is offered of both traditional “mystical” techniques like meditation, and the perhaps more usual Western route of life course development towards a spiritual summit as conceived by Maslow (1971), and to some extent by Erikson (Erikson, Erikson, and Rivnick, 1986). Later in the paper, nonlinearity as a

paradigm, and issues concerning its integration with transpersonal research, are considered in broader terms.

Transpersonal Heterochrony in the Human Life Course

Evolutionary developmental biology is the branch of biology that deals with the variable expression of ancestral traits in present-day phenotypes. The subject derived from an amalgamation of the previously disparate fields of evolutionary and developmental biology, in response to the discovery of the regulatory gene, other gene expression mechanisms, and gene expression regulation networks which readily generate rapid variability in the phenotype. The evolutionary developmental process which is most relevant to this discussion of transpersonal themes, and to Hunt's (1995a) paper, is that of *heterochrony*. Heterochrony is the variable timing of onset of developmental characteristics. In biology the development of morphological features and behavioural tendencies often involves different timings of emergence. In many species of finch and manakin for example, a delayed emergence of male plumage patterns will result in reduced attacks by older males on younger males (due to their female appearance) and so serve as an evolutionary advantage (Grant, 1990; McDonald, 1989; see Smith [2003] for a review of the uses of term "heterochrony"). If, as Hunt contends, transpersonal development is best conceived as a line or lines which run in parallel to the line of representational cognition, which can emerge into awareness at any time, then the point at which the transpersonal line does emerge can be considered a heterochrony. Recognising transpersonal development as a parallel line to representational cognition and its emergence as a heterochrony suggests the possibility for a synthesis of many of the dominant transpersonal paradigms.

Specifically, Hunt describes a *representational* line which deals with logical thought and a *presentational* line which deals with "an expanded, spacious sense of isness and a concomitant sense of personal presence" (1995a, p. 121). Hunt also identifies a line of motor development, and argues that Gardner's (1993) multiple intelligences can be accounted for by differences in the weighting of contribution of each of the three lines. Spirituality is both a high level of dominance of the presentational over the other two lines, and is also defined as the highest form of Gardner's intra-personal intelligence.

It is instructive to consider some of the implications of this multi-line view, but before doing so it is necessary to briefly run over some definitions. For writers like Alexander et al. (1990) and Wilber (1981, 2000), transpersonal development happens once representational development is complete or largely complete. Such frameworks can be considered *anagenetic* models, as a largely invariant sequence of stages and a single developmental line is implied. A multi-line model, such as Hunt proposes, can be considered a *cladogenetic* model, as more than one

line of development is involved. The terms anagenesis and cladogenesis were coined to refer to types of evolution in biology: anagenesis describes a stage-like transition in which one species “grows into” or completely displaces another so that a *single line* accounts for the evolution of the genus. Cladogenesis refers to the Darwinian branching of phylogenies in which multiple species (or other taxa) exist *in parallel*. A much greater and lasting emphasis on cladogenesis over anagenesis was one of the major legacies of Darwin. The evolution of the horse, for example, was once thought to progress in anagenetic fashion in which one species replaced another, but it is now known to involve multiple collateral clades, with up to sixteen species having co-existed at once on a single continent (MacFadden, 1999).

My usage of cladogenesis applies this morphological formula to consciousness. A cladogenetic model can accommodate seemingly anagenetic instances of development, and so a cladogenetic model can explain everything that anagenetic or hierarchical models of human development can explain, whilst retaining the flexibility to explain more as well. If the development of representational cognition moves from sensorimotor, to preoperational, to concrete operational, to formal operational levels (and then through as many post-formal stages as one believes exist — see Alexander and Langer [1990] on post-formal stages) and then on to transpersonal stages, then it *appears* as if a single anagenetic line is unfolding, and transpersonal development *appears* to be a continuation of the representational line. But that single anagenetic line can just as easily be conceived as two separate lines, with one emerging into awareness *after* the development of the other is largely complete. It is easy to see why many people think that transpersonal development is anagenetic; but the multi-line or cladogenetic formula *allows* for the earlier emergence of the transpersonal line *as well* as the later emergence.

I will now begin to describe some of the processes and dynamics which are involved in the emergence of transpersonal potentials. Although I discuss these in detail below, I will introduce them here in order to expand the discussion of heterochrony, before returning to look at the processes I use — meditation and spontaneous transpersonal experience from the perspectives of life course development research — later in the paper.

If transpersonal development is triggered by serious engagement with meditation as many have contended — see, for example, Alexander et al. (1990) and Washburn (1995), and also the large amount of anecdotal evidence in the Zen, Vipassana, and other contemplative Buddhist traditions for whom meditative practice is an essential part of monastic life — and if meditation is nearly always engaged with seriously (i.e., as long-term daily practice) from an adult age and not before in Western environments, then it stands to reason that the transpersonal line will emerge only in adulthood (once the line of representational cognition is complete) and so human development will *appear* to be char-

acterised by a single invariant anagenetic continuum of stages. On the other hand, in a non-Western environment, say, an Indian Hindu ashram like those mentioned by Paramahansa Yogananda (1996), meditation is encouraged from a much younger age. Yogananda writes that it is not unusual, in these circumstances, to see children as young as ten years entering deep states of meditation for an hour or more. In such children, I suggest, the trigger of transpersonal development — serious regular meditation — is applied earlier and so the transpersonal line emerges whilst the line of cognitive representation is still developing (at a concrete operational age) and represents a parallel or collateral aspect of development to the progression of representational cognition. The timing of development evidences a heterochrony, and the heterochrony is triggered by the developmental environment — i.e., whether or not meditation is engaged — in classic epigenetic manner.

Of course, meditation is by no means the only trigger of spiritual development. Some individuals appear to encounter similar phenomena to the meditative adept spontaneously, and their development can be explained without recourse to meditation. The triggers of transpersonal development will become clearer with more research, but I suggest that — whether the trigger is meditative training or some spontaneous psychodynamic process — the age that the trigger occurs determines the emergence into awareness of the spiritual line. I consider the spontaneous psychodynamic cases, which might be the more prevalent, later in the paper.

The literature includes many examples of adolescent age individuals attaining permanent spiritual realisations long before the completion of adult representational development, both involving meditation and spontaneous occurrence. Nithyananda (2008) claims to have had powerful spiritual experiences from the age of 12 and experienced full enlightenment from the age of 22, and Master Xuecheng was the youngest ordained Han Rishi at the age of 23 (Ruoqiao, 2011). Ramana Maharshi's awakening took place at age 16 (Maharshi, 2001), Ram Bahadur Bomjon's at age 15 (Adhikary and McDermid, 2008), and Krishnamurti's sage-like qualities at age 14 were noticed by Charles Leadbeater (Jayakar, 1986). The latest research suggests that the development of representational cognition is not complete until well into the twenties. Post-formal stages like Fischer's level 9 and level 10 abstractions unfold at 19–21 years and 24–26 years respectively (Fischer, Kenny, and Pipp, 1990; Richards and Commons, 1990). Commons and Richards (2003) identify two higher stages than the highest stages investigated by Fischer et al. — the usual age of emergence of these stages has not yet been determined. Other researchers, like Pascual-Leone (1990), trace developments in the representational line through the entire life course to old age. Clearly the examples cited show evidence of deep and powerful transpersonal development occurring well before representational development is complete. If representational and transpersonal development unfold as invariant anagenetic stages, then

these powerful permanent experiences at adolescent and young adolescent ages should not be possible; if representational and transpersonal development unfold as collateral lines, then the variable age of transpersonal development is natural.

Something similar emerges when considering phylogeny: if Commons and Richards' further stages did not emerge in the species until recent centuries as they claim, then the adepts of old cannot have been enlightened, as those adepts would not have been able to pass through the requisite representational stages. If representational and transpersonal development are separate lines then a high level in the transpersonal line could have been attained in medieval, axial, Chalcolithic, Neolithic, and Paleolithic ages quite easily, while representational development has not perhaps fully flowered until the modern period. This objection to anagenetic views of stage-like development from phylogeny is not new but has arguably never been satisfactorily answered, and a multi-line cladogenetic model provides a more plausible alternative which avoids these difficulties.

Meditation as Cause

I have suggested that both meditation and secular psychodynamics can serve as the basis for transpersonal experience and, as I fill out these routes to the transpersonal, a fuller evolutionary developmental perspective can be introduced (although the details of such an approach are not completed until later in the paper). Detailed mechanisms — specifically the variable expression of genes through mRNA translation and post-translational protein modification that influences variability in gene products — exist in the evolutionary developmental literature to explicate what has been said. I suggest that transpersonal development can be considered as an alternative developmental chreod. Chreods represent developmental *homologues*, or pathways laid down by phylogenetic ancestors. The classic metaphor that Waddington (1959) used to describe chreods was balls rolling down grooves on a table. Most balls will take the broadest and deepest groove, but a minority (due to some difference in the epigenetic environment) experience a “perturbation,” and then a “bifurcation” or split in trajectory, and head off down an alternative groove. I suggest below that meditation, or some other source of stress, causes the perturbation; the age at which development diverges from the normal trajectory is thus determined by epigenetic factors. In the West, this usually happens in adulthood, but if the stimulus is applied earlier the divergence of trajectory or “bifurcation” will happen earlier. Accordingly, transpersonal theory grounded in biology immediately suggests malleable developmental avenues.

Evidence suggests that *both* stress (a great promoter of change in biological systems) *and* relaxation can provide the impetus to change, whether change is driven by purposeful mastery of meditative practices in an Eastern manner or

by a more natural psychological development across the life time in a Western manner. Meditation itself might invite transpersonal experience by *inducing* stress. In terms of complex adaptive systems theory (a core pin in much evolutionary developmental work) it might be said that meditative postures, and a general ascetic code, create *perturbations* which alter developmental trajectory. Readers might expect meditation to produce relaxation, and indeed it often does, but a prolonged period of motionless meditation eventually produces both emotional and physical stress. This stress perturbs the current level of equilibrium and makes possible a new equilibrium, in which the system might sink into a phase profile which incorporates transpersonal experience. Similarly in therapy, progress often only occurs — and greater peace is found — after a period of distress in which the individual vacates her psychological equilibrium and re-calibrates to an alternative equilibrium (see Palombo, 1999 for more on phase transitions in therapy).

Long-term meditation does reduce blood markers of stress (Alexander et al., 1990), perhaps as a result of the increased comfort of transpersonal development, but the early stages of transpersonal development involves negotiating stressful transitions — the “lonely valleys” of Western mysticism. The limitations of the ego become starker when faced with an environment of minimum food and sleep, along with several hours of daily practice in a monastic environment, and numerous prohibitions of the things the ego usually enjoys. These conditions persuade the ego to tire of its present state of equilibrium and to more easily give in to and allow the emergence of transpersonal potentials. Stress is acknowledged as a wide cause of heterochrony in evolutionary developmental biology (Jablonka and Lamb, 2006), and is often implicated in nonlinear phase transitions within organisms: stressful conditions are held to cause the transition from single cellularity to multicellularity in the slime mould *Dictyostelium discoideum*, for example (Höfer, Sherratt, and Maini, 1995).¹

It is worth adding a cautionary note here. Children who penetrate deep levels of meditative awareness might show an above average aptitude for the rapid development of the presentational line from an early age. It would be unfortunate

¹An alternative is that the average “egoic” level of psychological adjustment, and the general phase profile that supports it, is a suboptimal state in which the organismic system has yet to reach a true equilibrium. By the practice of relaxation techniques, the system can first temporarily and then permanently reach an increasingly stable state of equilibrium, which provides the energetic substrate for transpersonal experience. This is a systems view of the arguments of Alexander et al. (1990). [Alexander et al., in fact, present an anagenetic view, but their *framing of relaxation as the key operator* in the production of transpersonal states can be set on the cladogenetic footing that I am expounding as well.] It might be that both relaxation and stress are necessary mechanisms in transpersonal growth, and hence the ability of meditation to produce both responses in students is significant. But as most of the institutions that have historically taken the production of transpersonal phenomena as a primarily goal — monasteries, ashrams, etc. — have also been interested in discipline and austerity, I have focussed on the induction of stress as the primary key that unlocks transpersonal peace in this paper.

if children who lacked this aptitude were pushed into daily meditation (especially longer, stress-inducing practice sessions) from which they drew no obvious benefits. Even if early meditation can induce significant spiritual development in *all* children and not just those with a natural aptitude for the line, the pros and cons of firmly pushing a child into meditation must be considered, much as there are pros and cons in pushing hard the development of any capacity (musical, sporting, etc.) in childhood. It would be particularly unfortunate if one were to pursue this pushing of meditation on children, causing discomfort. While this does not detract from the observation that transpersonal development in children is possible, caution is advisable when considering what the consequences of this should be for children growing up in the modern West. The TM and Vipassana meditation programmes advise meditation sessions of no longer than 20 minutes for children, and for children under ten years old the TM technique is done whilst walking rather than sitting, which is not likely to induce excessive stress, and this approach, in children at least, might be wise.

Secular Psychodynamic Processes as Cause

Spirituality is both the ground of the adept who purposefully activates it through spiritual practices like meditation, and a possibility for the progression of secular human psychology. Stress or dissatisfaction with the conditions of ordinary ego can occur spontaneously without any purposeful induction through ascetic codes and disciplined postural endurance and hence “spontaneous awakenings” are possible — and meditation and asceticism are not always necessary. Washburn (1995) sets the emergence of the transpersonal in the context of existential conflict as well as meditative practice. I have said it is the experience of stress which drives innovation and novelty, in both evolution and ontogeny, by providing the perturbation necessary to drive the movement to alternative system equilibriums; this stress need not be purposefully induced through meditative practice. The stress of the existential conflict that is often said to be at its strongest at the mid-life period can serve just as well. There are many examples of transpersonal awakenings which are anything but relaxing in their early stages. Hunt (2003) acknowledges Erikson’s life stage transitions as presentational shifts. These existential crises can be solved by either an upward movement into another psychological level (upwards through Erikson’s stages), or by the emergence of a previously hidden collateral aspect of existence (the spiritual).

Perhaps the healthiest solution to these life crises would involve both a shift on Erikson’s scale of motivation and outlook, *and* the emergence of the spiritual line as an accompaniment. Indeed, although many people might not claim to be undergoing spiritual awakenings, the general progression of human maturity might involve more of the spiritual than it is typically credited with: Hunt (1995a) suggests that great achievements are often imbued with spiritual presence,

and cites Churchill and Mohammed Ali as examples of those who have embodied such a mode of being through their performances. It also follows from this that the more usual achievements of ordinary adults can also be coloured by the emergence of the collateral spiritual component and illumed like archetypes as the self naturally flowers into “self-actualising” modes. On this reading, you can experience the extraordinary in ordinary life by engaging the transition from what Maslow (1971) terms “deficit values” (interpersonal needs and worldly success) to “being values” (refined presentational or spiritual life appreciation), and I find this in line with both the message of the religious sages and with what life course psychology is revealing as a “secular Western mysticism” which can occur later in life (see Hunt, 2003).

On this view the individual, rather than withdrawing like the ascetic, finds her daily activity imbued with a sense of unity as her life unfolds simultaneously into further levels of psychological adjustment and further intensities of spiritual groundedness. As Hunt (1995a) suggests, a business person who comes into contact with powerful presentational states might also enjoy a synthesis of a wider range of life’s experiences, and perhaps progress more smoothly through Erikson’s stages of the life cycle. If, as Hunt (2003, p. 3) suggests, there exists “a spontaneous spirituality in mid- and late-life self actualisation,” then one can come to the conclusion that spirituality can be achieved without the need of exotic Eastern practices like meditation, and that to live spiritually is to simply live ordinary life as well as you can.

Relatedly, the self contracts and dilates in many daily activities as focus shifts from the representational to the presentational line, though this dilation might be largely unnoticed to those who are not familiar with transpersonal or spiritual frameworks. Hunt (1995a) suggests that the development of the spiritual or presentational line can begin with an appreciation of the arts and the open expansive mode of consciousness that intense appreciation (of music for example) can engender. Presented in this manner, as a part of both natural life span progression and daily routine, transpersonal development issues become as relevant to personality psychology, and therefore to healthcare, education, and even politics, as they are to the concerns of the monk and nun.

Hunt, Gervais, Shearing–Johns, and Travis (1992) identify two different continuums which are predictive of transpersonal development, the first characterised by “the relative absence of major indicators of childhood and adult conflict, and the other inseparable from high levels of early and continuing dread and panic states” (Hunt, 1995a, p. 128). It appears that routes exist which lead through both pleasant and dark territories, and this is why both an appreciation of the arts (a pleasant route) and ascetic endurances (a stressful route) can trigger transpersonal experience. I would suggest that the second route might produce more profound transpersonal experience and do so more quickly, which is why roshis advised their monks and nuns to engage discipline rather than artistic

“indulgence.” That said, the beautiful stained glass windows, mandala compositions (a form of Indo-Tibetan art) and chanting, appear to admit a recognition of the first route among ascetics as well: these reclusive communities do not seem to have formed their local subcultures totally without their own forms of aesthetic expression. It might be, however, that the *first* route becomes the *primary* mode of transpersonal development in the modern West, where formal spiritual exercises like meditation are less prevalent, and therefore the more relevant to a majority of Westerners and to the study of transpersonal development in modern settings more generally. This plurality of developmental routes sits quite comfortably with the variable developmental chreods described, and is compatible with the general bridges being built with evolutionary developmental biology.

Evolutionary Developmental Biology

The evolutionary developmental view outlined above needs expansion, which I will do here, by running over some of the relevancies to transpersonal phenomena. Development unfolds down constrained developmental pathways, or chreods. The physical substrate to chreods are gene expression regulation networks; these networks are composed of elements in the internal and external environment which serve to turn genes on or off via a complex network of feedback loops between genes, gene products, and a host of other physiological and psychophysiological factors. They are outstanding examples of the interrelationship between mind, behaviour, and their physical correlates. Gene expression regulation networks are large enough to evidence complexity dynamics and often nonlinearity.

Sudden, subtle changes in developmental programmes due to sensitivity to initial conditions fall into stable patterns: this is the essence of contemporary biology which has arisen over recent decades as a result of the nonlinear revolution, and complex systems theory (Gould, 2002). Harold (1990, p. 415) describes the role of sensitivity to initial conditions in the generation of novelty: “small initial differences (sometimes random or nonspecific, environmental cues) are progressively amplified, generating spatial fields of one kind or another; the nature of these fields may vary from one case to the next. These fields direct the localisation of molecules and forces that actually shape the visible structure, and therefore serve as obligatory intermediates in all developmental pathways.” Although Harold is referring to the chreods that govern body plan morphology, the process he describes also applies to brain structure morphology, altering the neuronal density of cortical and sub-cortical regions by small but significant amounts, in order to alter the arising phenomena of human consciousness, in both personal and transpersonal forms. Whether the brain changes that produce mysticism are entirely epigenetic, or whether they trace ancestral chreods and are therefore evolutionary as well as developmental, remains to be seen.

Nonlinearity produces exponential rates of growth: through sensitivity to initial conditions, small differences in starting trajectories are magnified at an exponential rate over time. In linear dynamics, small differences stay small as time passes. Through cascades of gene/environment interactions evidencing nonlinear behaviour small differences in the transpersonal developmental environment are magnified and result in very large differences in the eventual outcome (see Kauffman, 1993 for a definitive work on nonlinear effects in evolution and development; see Palombo, 1999 for an application of nonlinearity to neural networks and consciousness). To link this to the previous theory: a child who meditates regularly will create the conditions which will cause changes in awareness from an early age; across history most realised adepts have become realised from an adult age; the *normal* time of activation for the transpersonal developmental chreod might be adulthood, whether it is activated through meditation or through the natural progression of life course psychodynamics — but, I have suggested, large divergences from this norm are possible.

The purpose of transpersonal development is to break out of the chreods of ordinary development, and this is done through some kind of stressor or perturbation — whether purposefully cultivated through ascetic practice or naturally occurring at a psychodynamic life course crisis point — that throws individual phase profiles out of their conventional repertoire, and leaves open the possibility of the emergence of a new order that incorporates transpersonal awareness as those phase profiles regain regularity.² Nonlinearity certainly functions in many of the phase transitions of human physiology and perception, but the overall progression of the major features of typical or normal human ontogeny displays “robustness,” and is therefore insensitive to small changes (see Solé and Goodwin, 2000 for a general overview). Typical developments unfold within frozen, orderly portions of ontogenetic phase space (this is why large-scale developmental heterochronies do not exist in representational cognition, and four-year-old formal operational reasoners are not seen). But when development is atypical, nonlinearity comes into play and so large-scale heterochronies in the chreod or chreods that govern the emergence of the transpersonal line of development are possible.

Evolutionary developmental concepts have been slow to influence psychology, although that process is now underway; the evolutionary developmental movement in biology’s closest equivalent in psychology is the emerging field of developmental cognitive neuroscience. (For evolutionary developmental effects in psychology see Balaban, 2006; Geary, 2006; Geary and Bjorklund, 2000; Johnson,

²Those familiar with the cybernetic models of Langton (1992), Lewin (1992), and particularly Kauffman (1993), will note that transpersonal development appears to arise in the region of change in complex systems which falls between orderly and chaotic components, described as a *rugged fitness landscape*, as this is the area that often yields atypical patterns, rapid change, and nonlinear effects.

2005; Pennington, Snyder, and Roberts, 2007; but I stress that it is atypical psychological developments to which the field is most relevant.) *Behaviour* as opposed to just *morphology* is also widely acknowledged to evidence large scale heterochronies in animal species (see West–Eberhard, 2003), and a general expansion of evolutionary developmental concepts into the arena of consciousness can be expected in coming decades. After all, gene expression is likely to have produced nearly all of the differences between the chimpanzee and the human, including differences in consciousness and cognition as well as morphology (following from King and Wilson’s 1975 discovery that there is only a 1.5% difference between nucleotide sites in human and chimp DNA).

The chreods of transpersonal development appear to have been laid down in the Paleolithic era, in line with the thinking of evolutionary psychologists as to the origins of modern human cognition. Transpersonal experience might have been more common in the Paleolithic period, as it was cultivated as a part of communal religious experience. If this is so, then relatively well engrained chreods already exist as ancestral channels and await *triggering* — much as the capacity to acquire language is argued to have come pre-wired, and needs only to be triggered through exposure to language (Hauser, Chomsky, and Fitch, 2002). But a *highly specific* epigenetic environment — one which involves exposure to tasks that instill transpersonal growth like meditation — is necessary to trigger transpersonal chreods while *nearly all* human developmental environments involve exposure to language, and this is why most people can use language but don’t experience significant transpersonal development. Whether or not an alternative chreod is taken, and which alternative chreod is taken, is determined by individual differences in the environment. This switching between ancestral characteristics as a result of environment-triggered differences in gene expression is textbook evolutionary developmental biology (see West–Eberhard, 2003). The cross-modal synaesthesias which Hunt (1995b) described can be thought of as pre-programmed responses which await triggering as alternative chreods, and which are specified on the level of gene regulation networks which partially self-organise in spontaneous manner and are partially shaped by the epigenetic environment. Modern mystical experience relies on adaptive responses which were initially honed around the shamanic rituals of Paleolithic religion.

Novelty is initially created in the phenotypes of the first generation whether it is created genetically or epigenetically, and so development always leads evolution when new traits are created. How much current transpersonal realisers reactivate ancestral pathways, and how much they break completely new ground and therefore genuinely represent a “cutting edge” as Wilber (1982) claims, remains to be seen. In my own view, because of the remarkable claims of the mystics — developing within a few years to apparently gain ultimate insight into the deepest existential and metaphysical questions — it seems likely that mystics

traverse pathways which have been refined for millennia and tens of millennia, and the mystics of today walk in the footsteps of the tradition of shamans, saints, rishis, etc., that have gone before them. If, however, the mystics of today really are breaking new ground and only accessing ancestral traits minimally if at all — that is, they are not merely retracing the footsteps of the ancients but standing on their shoulders and seeing farther — then this does not move the ball back to evolutionary genetics alone. The complexity of gene expression regulation explains variety of all kinds including dramatic first generational variety when it arises. Developmental plasticity need not rely on ancestral switching and ordinary epigenetics might suffice; I just think it is *likely* that ancestral switching is involved in the transpersonal domain.

Research Considerations

The hypotheses set out in this paper are derived from applying to transpersonal psychology a paradigm shift which has already set in, in the wider sciences. This deserves some comment, which I provide here, as well as summarising some of the specific hypotheses that can be identified.

The Context of the Theory

A large amount of debate in transpersonal psychology has concerned to what degree individual development will depart from normative, structuralist, invariant, developmental maps (see Ferrer, 2002; Wilber, 2000, 2007). There has been an increasing admission of a larger degree of departure. For example, Wilber (2007) writes, “to repeat, because these are *state*-stages, not structure stages, there can be much fluidity, temporary skipping around, peak experiencing of higher states (not structures), and so on. But the general progression of states as they are mastered (from spontaneous peak to plateau) was indeed gross to subtle to causal” (p. 82, his italics).³ My own view is that *any* model which attempts to map individual differences around a statistical model will fall short as transpersonal development is governed by nonlinear developmental trajectory changes, and not by statistical linear processes. As well as Hunt, the

³Wilber might argue that the number of levels and lines in his latest models can cover all forms of spiritual experience and all points of emergence in the life time. If so, then Wilber's model might benefit from being set on an evolutionary developmental footing; there is no evidence in Wilber (2007) that these mechanisms are given any explicit importance in his thinking. Likewise, the phraseology in Wilber suggests that the primary dynamic is still one of linear statistical averaging rather than nonlinear sensitivity to initial conditions. At the same time, the amount of levels and lines in Wilber's model might make it very difficult to test in practice, while a model based around two primary lines — representational and presentational — might offer a more parsimonious working hypothesis and despite its grounding in self-organisation and non-linearity might actually be easier to test, and thereby easier to qualify as a “scientific theory.”

models of Ferrer (2002) and Rawlinson (1997) show potential for integration with a nonlinear paradigm, as they admit to large scale pluralities, though Ferrer and Rawlinson do not speak of their models in nonlinear terms. The same movement from the statistical approach of physics (nineteenth century thermodynamics) and in biology (twentieth century population biology) to views of both subjects based around chaos and complexity has unfolded in the history of science (Hacking, 1990; Popper, 1990). The study of transpersonal phenomena might lag behind this level of explanation, as most of it has focussed on attempts to fashion universal models, to which all subjects who undergo transpersonal development are expected to conform to one degree or another.

Nonlinearity presents a puzzle for statisticians and therefore a puzzle for psychology. Due to "sensitivity to initial conditions" predictive ability vanishes at an exponential rate as time passes. Standard psychological statistics remove outliers and compare population means and variances for statistically significant but small differences. Individuals who develop in highly atypical fashion are likely to be excluded from results. Exactly the same problem — the routine eradication of outliers and anomalies from data samples — beset Mandelbrot (1982) as he developed his fractal geometry which became an icon in the study of chaos and complexity; anomaly is the essential artefact of nonlinearity in data and observation. Abnormal phenomena in transpersonal development are likely to slip through the broad net of statistical averaging through which psychology generally operates. It is telling that it is these non-quantitative or anecdotal observances in timing of onset of transpersonal development reported in Hunt that have drawn attention to the faults with the hierarchical, anagenetic transpersonal framework, and to the emerging problems with the statistical view of transpersonal theory that dominated the subject in its outset. (See the work of Alexander [e.g., Alexander et al., 1990; Orme-Johnson, 2000] for examples of the application of standard psychological assessment techniques to transpersonal experience; a nonlinear perspective does not make this work invalid, it remains a valuable contribution, it just does not tell the *whole* story.) The potential for psychology to predict human behaviour and development is increasingly limited when nonlinear trajectories are involved; predictive power declines at an exponential rate as time increases from the data gathering point. Predictive power also decreases exponentially as precision of initial data decreases, in line with Heisenberg's (1952) uncertainty principle. In standard psychology this rarely matters much, as sensitivity to initial conditions is not a factor; in atypical psychology it is highly important, and the more atypical the development — the more it pushes the current boundaries of evolution and development in a unique way — the more strongly sensitivity to initial conditions applies. This does not bode well for those who seek a "one size fits all" solution to the question "How does transpersonal development happen?"

Some Specific Hypotheses

It is possible to identify differences in *both* the timing of onset of transpersonal experience *and* the character of the experience itself regardless of its point of origin in ontogeny. To begin with, I'll summarise the differences in timing. The work of Hunt suggests very large differences in transpersonal developmental trajectories. To re-iterate, Hunt speaks of a difference in the emergence point of transpersonal development between individuals, so that in some individuals transpersonal development can begin in childhood while in others it does not occur until adulthood (if at all), depending on the time in ontogeny in which they move into (and thereby become intensely aware of) presentational (or spiritual) modes of being. This is not a straightforward alternative to hierarchical models in which transpersonal development can only happen in adulthood once representational development is complete, the hierarchical models which posit transpersonal development as a higher stage of development can be accommodated as well. If the transpersonal line emerges in adulthood, once representational development is complete or largely complete it will *appear* to be a higher stage of the representational line. A two-line view can account for both modular and stage-like views of development, and these are some of the points brought out above.

Hunt (1995b) also speaks of more than one line of transpersonal development which can show different degrees of emergence in different individuals, and this accounts for the differences in the character of transpersonal experience itself. There have been many attempts to provide cartographies of religious and mystical experience. In all likelihood the number of lines of transpersonal development is very large. Hunt himself identifies a white light module which accounts for some of the experiences of light reported in the mystical literature. Likewise there are also many reports of experiences of blank or voidic absorption which represent a different phenomenal complex. Presentational (spiritual) experience appears to flow outwards from *introverted* or absorptive modes experienced in meditation (or the boundary between sleep and waking, or in the intense introspective moods of existential crisis points) to immerse *extroverted* experience in presentational or spiritual tones (Agrawal, 2001; see Stace, 1961 on the introverted/extroverted distinction). Introverted or inner mystical experience can have an *integrative* effect on character; the extroverted flavour of transpersonal experience might result in a *fairly uniform* increase in presentational experience across traditions, but the introverted absorptions that can trigger this presentational experience certainly take *more than one form*. This adds another significant set of individual differences alongside timing of onset. In summary: both the timing of onset and the character of experience of transpersonal phenomena differ between individuals in the ways I have specified, and such a hypothesis can form a basis for testing the evolutionary developmental ideas discussed.

It is worth explicating in a little more detail what has been said about introverted lines of transpersonal experience: two common forms of introverted mystical experience are those of “mystical light” and “mystical darkness,” which perhaps represent the two most basic representations of an intuition of “reality” free from cultural and contextual framing. If multiple lines of introverted experience exist and can be accessed through meditation and other forms of inner Yoga, and if meditation progresses through stages in the manner suggested by many Eastern contemplative schools like the framework in Patanjali’s *Yoga Sutras* (Agrawal, 2001), then the possibility arises that spiritual development might offer an equivalent structural form to the lines of representational cognition. Specifically, just as lines of representational cognition (numerical, emotional, musical, etc.) progress, in neo-Piagetian theory, through Piaget’s stages of sensorimotor, preoperational, concrete operational, and formal operational representational logic (or another domain general scale of representational development, like Case’s [1992]) at *independent rates*; so lines of introverted meditative experience (mystical light, mystical darkness) might progress through Patanjali’s stages of dharana, dhyana, and samadhi levels of unity with an object of contemplation (or another cartography of meditative stages like the Theravada or Vajrayana Buddhist stages) again at *independent rates*. Similarly, if the physical world, as well as outer experience more generally, drives the development of the Piagetian lines by providing a constant for testing towards which lines can equilibrate, then meditative absorption might provide an equivalent phenomenological “constant” that drives the development of presentational experience, such that presentational experience is drawn forward by the unitive experiences of interior absorption into further levels of psychodynamic integration. Representation *equilibrates* to the outer or manifest world; presentation *equilibrates* to the inner or unmanifest world. (Some read the *Yoga Sutras* as a stage-like progression from mystical light towards mystical darkness, but the interpretation that I have given of mystical light and darkness as lines that progress through stages of dharana, dhyana, and samadhi holds as well — see Hewitt, 1983 on the various interpretations of the *Yoga Sutras*, and Washburn, 1995 on Patanjali’s stages of meditative development.)

These variables in developmental course and outcome do not lend themselves well to statistical averaging approaches, but they follow very naturally from a complexity and nonlinearity based view. The movement to a nonlinear footing is necessary as a reflection of the development of our understanding of change in general. But transpersonalists need to be more aware of nonlinearity than ordinary psychologists, as transpersonalists deal with the rugged fitness landscapes of atypical developments on which new ground is broken. Transpersonalists can expect a move in the future to a nonlinear transpersonal paradigm, and that models like Hunt’s which allow a lot of variability will replace the more rigid hierarchical models that have dominated in recent decades (and previously).

A future nonlinear paradigm in which variability proliferates in all aspects of transpersonal development is likely.

Conclusion

Pluralistic and variable accounts of transpersonal development need a powerful basis to account for *mechanisms* which substantiate higher-level observations, and evolutionary developmental biology can provide that. The best models would *accommodate* hierarchical models based around linear statistics, but would consider them to be just *one* example of how transpersonal development can happen. The move to complexity has not been spectacular in psychology, as most of psychology studies normal or typical developments, which unfold in orderly manner, as strongly canalised and stable developmental pathways. As transpersonal developments are atypical developments they unfold on precisely the rugged developmental terrain where nonlinear dynamics are most likely to apply, and which are absent in the domain of typical psychology. Nonlinearity is therefore highly relevant to transpersonal discussion, though less relevant to discussion of typical human psychological ontogeny, and it can be expected that an increase in pluralistic and variable models of transpersonal development will be seen in the future. What has been described in this paper is of course just one form that a nonlinear transpersonal theory might take.

References

- Adhikary, D., and McDermid, C. (2008). *A Buddhist messiah in Maoist Nepal?* Retrieved from Asia Times Online: http://www.atimes.com/atimes/South_Asia/JK15Df04.html.
- Agrawal, M. (2001). *Six systems of Indian philosophy: The sutras of six systems of Indian philosophy with English translations*. Delhi: Chaukhamba Sanskrit Pratishtan.
- Alexander, C., Davies, J., Dixon, C., Dillbeck, S., Druker, S., Oetzel, R., et al. (1990). Growth of higher states of human consciousness: Maharshi's Vedic psychology of human development. In C. Alexander and E. Langer (Eds.), *Higher stages of human development* (pp. 286–332). Oxford: Oxford University Press.
- Alexander, C., and Langer, E. (Eds.). (1990). *Higher stages of human development*. Oxford: Oxford University Press.
- Balaban, E. (2006). Cognitive developmental biology. *Cognition*, 101, 298–332.
- Case, R. (1992). *The mind's staircase*. Hillsdale, New Jersey: Erlbaum.
- Commons, M., and Richards, F. (2003). Four postformal stages. In J. Demick and C. Andreoletti (Eds.), *Handbook of adult development* (pp. 199–219). New York: Kluwer Academic.
- Erikson, E., Erikson, J., and Rivnick, H. (1986). *Vital involvement in old age*. New York: Norton.
- Ferrer, J. (2002). *Revisioning transpersonal theory*. Albany, New York: SUNY Press.
- Fischer, K., Kenny, S., and Pipp, S. (1990). How cognitive and environmental conditions organise discontinuities in the development of abstractions. In C. Alexander and E. Langer (Eds.), *Higher stages of human development* (pp. 162–187). Oxford: Oxford University Press.
- Gardner, H. (1993). *Frames of mind*. London: HarperCollins. (originally published 1983)
- Geary, D. (2006). Evolutionary developmental psychology. *Developmental Review*, 26, 113–119.
- Geary, D., and Bjorklund, D. (2000). Evolutionary developmental psychology. *Child Development*, 71, 57–65.
- Gould, S. (2002). *The structure of evolutionary theory*. Cambridge, Massachusetts: Belknap Press.

- Grant, B. (1990). The significance of subadult plumage in Darwin's finches, *Geopiza fortis*. *International Society for Behavioural Ecology*, 1, 161–170.
- Hacking, I. (1990). *The taming of chance*. Cambridge: Cambridge University Press.
- Harold, F. (1990). To shape a cell: An inquiry into the causes of morphology in microorganisms. *Microbiology Reviews*, 54, 381–431.
- Hauser, J., Chomsky, N., and Fitch, W. (2002). The faculty of language: What is it and how did it evolve? *Science*, 298, 1569–1579.
- Heisenberg, W. (1952). *Die Physik der Atomkerne*. London: Taylor and Francis.
- Hewitt, J. (1983). *The complete book of yoga: The yoga of breathing posture and meditation*. London: Rider.
- Höfer, T., Sherratt, J., and Maini, P. (1995). *Dictyostelium discoideum*: Cellular self-organisation in an excitable biological medium. *Proceedings of the Royal Society B*, 259, 249–257.
- Hunt, H. (1995a). Some developmental issues in transpersonal psychology. *The Journal of Mind and Behavior*, 16, 115–134.
- Hunt, H. (1995b). *On the nature of consciousness*. London: Yale University Press.
- Hunt, H. (2003). *Lives in spirit*. Albany, New York: SUNY Press.
- Hunt, H., Gervais, A., Shearing-Johns, S., and Travis, F. (1992). Transpersonal experiences in childhood: An exploratory empirical study of selected adult groups. *Perceptual and Motor Skills*, 75, 1135–1153.
- Jablonka, E., and Lamb, M. (2006). *Evolution in four dimensions*. London: MIT Press.
- Jayakar, P. (1986). *Krishnamurti: A biography*. San Francisco: Harper and Row.
- Johnson, M. (2005). *Developmental cognitive neuroscience*. Padstow, United Kingdom: Blackwell.
- Kauffman, S. (1993). *The origins of order*. Oxford: Oxford University Press.
- King, M., and Wilson, A. (1975). Evolution at two levels: Molecular similarities and biological differences between humans and chimpanzees. *Science*, 188, 107–116.
- Langton, C. (1992). Life at the edge of chaos. In C. Langton, J. Taylor, J. Farmer, and R. Rasmussen (Eds.), *Artificial life II* (pp. 41–91). Reading, Massachusetts: Addison-Wesley.
- Lewin, R. (1992). *Complexity: Life at the edge of chaos*. New York: MacMillan.
- MacFadden, B. (1999). *Fossil horses: Systematics, paleobiology, and the evolution of the family Equidae*. Cambridge: Cambridge University Press.
- Maharshi, R. (2001). *Talks with Ramana Maharshi*. Carlsbad, California: Inner Directions.
- Mandelbrot, B. (1982). *The fractal geometry of nature*. New York: Freeman.
- Maslow, A. (1971). *The further reaches of human nature*. New York: Viking.
- McDonald, D. (1989). Cooperation and sexual selection: Age graded changes in the Lekking bird. *American Naturalist*, 134, 709–730.
- Nithyananda, P. (2008). *Living enlightenment*. Delhi: Lifebliss Foundation.
- Orme-Johnson, D. (2000). An overview of Charles Alexander's contribution to psychology: Developing higher states of consciousness in the individual and the society. *Journal of Adult Development*, 7, 199–215.
- Palombo, S. (1999). *The emergent ego: Complexity and coevolution in the psychodynamic process*. Madison, Indiana: Indiana University Press.
- Pascual-Leone, J. (1990). Reflections on life span intelligence, consciousness, and ego development. In C. Alexander and E. Langer (Eds.), *Higher stages of human development* (pp. 258–285). Oxford: Oxford University Press.
- Popper, K. (1990). *A world of propensities*. Bristol: Thoemmes.
- Pennington, B., Snyder, K., and Roberts, R. (2007). Developmental cognitive neuroscience: Origins, issues, and prospects. *Developmental Review*, 27, 428–441.
- Rawlinson, A. (1997). *The book of enlightened masters*. La Salle, Illinois: Open Court.
- Richards, F., and Commons, M. (1990). Postformal cognitive development theory and research. In C. Alexander and E. Langer (Eds.), *Higher stages of human development* (pp. 139–161). Oxford: Oxford University Press.
- Ruoqiao, L. (2011). *Media report about Master Xuecheng*. Retrieved from <http://longquanzs.org/eng/articlecontent.php?id=457>
- Smith, K. (2003). Heterochrony and the evolution of development. *International Journal of Developmental Biology*, 47, 613–621.
- Solé, R., and Goodwin, B. (2000). *Signs of life: How complexity pervades biology*. New York: Basic Books.

- Stace, W. (1961). *Mysticism and philosophy*. London: MacMillan.
- Waddington, C. (1959). Canalisation of development and genetic assimilation of acquired characteristics. *Nature*, 183, 1654–1655.
- Washburn, M. (1995). *The ego and the dynamic ground*. Albany, New York: SUNY Press.
- West–Eberhard, M. (2003). *Developmental plasticity and evolution*. New York: Oxford University Press.
- Wilber, K. (1981). *The Atman project*. Wheaton, Illinois: Quest.
- Wilber, K. (1982). *Up from Eden*. London: Routledge and Kegan Paul.
- Wilber, K. (2000). *Integral psychology*. Boston: Shambhala.
- Wilber, K. (2007). *Integral spirituality*. Boston: Integral Books.
- Yogananda, P. (1996). *Autobiography of a yogi*. London: Rider.