



Variability in the Emergence Point of Transpersonal Experience in the Life Cycle

EDWARD JAMES DALE
Stockton Hall Psychiatric Hospital,
edwardjamesdale@hotmail.co.uk

ABSTRACT

It is shown in this article that many positions that are usually considered incompatible or antagonistic can be synthesized into a unified framework, creating a model of transpersonal development based around plurality and complexity. The model focuses on evolutionary developmental biology (particularly the process of heterochrony) as well as around psychological theories. A large degree of variability in the nature of transpersonal experience in the life cycle is to be expected, due to differences in both the “timing of onset” of transpersonal characteristics and the “length of developmental period.” Numerous developmental patterns are identified, using the work of some prominent transpersonal theorists

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Evolutionary developmental biology, and in particular Waddingtonian epigenetic theory, has much to offer transpersonal anthropology. A view of spiritual development based around evolutionary developmental biology is very different from the “orthodox” models of invariant, stage-like, spiritual development through the lifetime, and considerably more pluralistic (See Figures 1, 2, and 3). Many transpersonalists, particularly transpersonal psychologists, have claimed that there is only one path to spiritual development (e.g. Wilber 1980; Alexander et al. 1990). Usually these claims have involved a series of transpersonal stages unfolding after cognitive development is complete (that is, in adulthood). Though interesting and influential, it is fair to say that this view has not convinced everyone. In fact, it appears to be the case that transpersonal development in adulthood is a valid possibility—but one that only

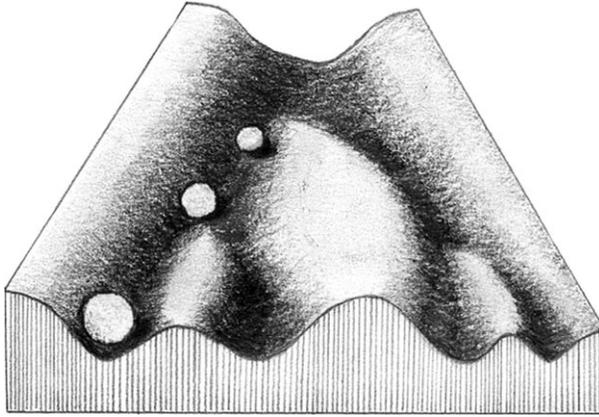


FIGURE 1. CHREODS ACTING AS CHANNELS FOR BALLS IN A DEVELOPMENTAL LANDSCAPE HELD IN PLACE BY GENES. BASED AROUND THE ORIGINAL METAPHOR CONTAINED IN WADDINGTON (1942, 1957), AS CLARIFIED IN RELATION TO GENE EXPRESSION BY WEST-EBERHARD (2003).

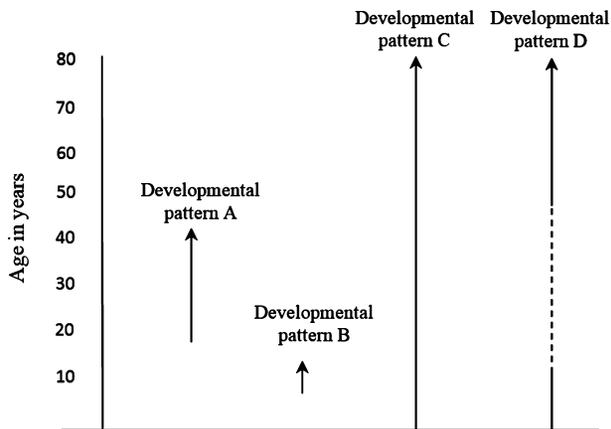


FIGURE 2. FOUR POSSIBLE TRANSPERSONAL CHREODS DETERMINING VARIETIES IN THE TRANSPERSONAL LIFE COURSE, AS SPECIFIED BY HETEROCHRONIES IN TIMING OF ONSET OF TRANSPERSONAL CHARACTERISTICS AND LENGTH OF DEVELOPMENTAL PERIOD.

holds for certain populations. It is only one possible pattern of transpersonal development among a number of others. A view of transpersonal development based around evolutionary developmental biology as well as around more conventional psychological theory and evidence can explain how and why this is possible.

In this article, the focus shall be on broad theoretical themes rather than on the phenomenology of transpersonal experiences themselves. The article will describe a general framework for the emergence of wide-ranging

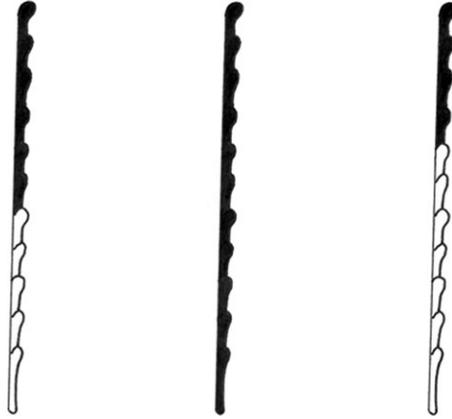


FIGURE 3. HETEROCHRONY IN FOSSILS OF THE FAMILY MONOGRAPTUS OF THE ORDER GRAPTULOIDEA. THE VERTICAL DIMENSION OF COLORING ALTERATIONS IN THE GROWTH OF THE MONOGRAPTIDS OFFERS A STRIKING ANALOGUE TO THE DIFFERENT DEVELOPMENTAL PATTERNS SHOWN IN FIGURE 2.

transpersonal capacities: the details of what those capacities themselves are like is not the present focus. The phenomenology of particular experiences, which is the subject of much anthropological investigation, is certainly important, but a consideration of the phenomenology of experience must inevitably be left out of the current contribution due to limited space. This is a general account of the emergence of transpersonal experience, whatever the specific phenomenology of that experience.

Connections between spiritual development and psychologically derived theories are nothing new, but developing a connection with evolutionary developmental biology as well shows much promise for the future. The field of evolutionary developmental biology has seen some integration into psychology, but this process is considered incomplete in psychology, as many researchers have noted (Johnson 2005; Balaban 2006; Geary 2006). The embrace of science by spiritually orientated subjects was always likely to be problematic. However, certain factions of the transpersonal movement in particular (one of the first academic movements to develop detailed synthetic models of scientific theories and spiritual or mystical experiences) have often jettisoned the relationship with science altogether. Without wishing to devalue transpersonal and psychological contributions to the study of spirituality, it is possible that a more harmonious future will arise from a coalition among evolutionary developmental biology, psychology, and spirituality than from a partnership between psychology and spirituality alone—for reasons that the author hopes to make clear by the end of the article.

Biological concepts have been used more frequently in transpersonal anthropology than transpersonal psychology. There is a long history of the

mapping of the correspondences between neurobiological states and spiritual states of consciousness (Winkelman 2000). One group of scholars who have attempted to integrate biological theory and spiritual development are the biogenetic structuralist authors (e.g. Laughlin and D'Aquili 1974; D'Aquili, Laughlin, and McManus 1979; Laughlin, McManus, and D'Aquili 1990).¹ The fields of neurotheology (Newberg 2011), and neurophenomenology (Laughlin, McManus, and D'Aquili 1990; Varela 1996) are also relevant, along with Charles Laughlin and Jason Throop's (2001, 2006) cultural neurophenomenology. However, heterochronies in transpersonal development, as illustrated in Figure 2, have not previously been described, and neither has the importance of nonlinear effects in atypical developments like transpersonal development; these ideas are the unique contribution of the present article to transpersonal anthropology and transpersonal psychology.

Evolutionary developmental biology is the epigenetic science that investigates phenotypic variability from the perspective of gene expression and complex systems theory. The central concept for discussion—heterochrony—is a core evolutionary development principle. Heterochrony can describe either changes in the timing of onset of a developmental process or changes in the time taken for that developmental process to come to completion (Smith 2003). Evolutionary developmental biology explains variability in phenotypic traits (that is, the traits of individuals) as a consequence of environmental epigenetic influences on gene expression (Jablonka and Lamb 2006), and heterochrony is one result. Differences in the traits of individuals are determined by the developmental environment: the human genome is very similar in all individuals, and indeed it is 98.5% similar to that of the chimpanzee (King and Wilson 1975). The shift in emphasis from the gene to the developmental environment in the explanation of traits in organisms has been the major attitudinal change in biology over the latter half of the 20th century (West-Eberhard 1998, 2005).

In evolutionary developmental biology, development is explained in terms of nonlinear probabilities, meaning that small differences in the developmental environment can be augmented at an exponential rate over time, a characteristic of nonlinear systems known as *sensitivity to initial conditions*. Development can be thought of as involving movement down channels called *chreods* (Figure 1). In typical developments, like ordinary psychological development, chreods are usually well *canalized*, meaning that they are well engrained and stabile, with the result that it is difficult for the developmental trajectory of the individual to break from the norm (Johnson 2005). Transpersonal development on the other hand can be thought of as an *atypical* development (Dale 2011)—powerful and sustained mystical experiences are after all not the norm for members of society at large. Developmental pathways that govern atypical developments are likely to be *less* well canalized than

those of ordinary development, and so a great deal more variability is possible. In terms of the ideas discussed in the present paper: timing of onset and length of developmental period in cases of “spiritual awakening” are likely to be much more diverse between individuals and cultures than differences in the genesis of typical psychological traits between individuals and cultures.²

Waddington (1957), who coined the notions of chreods and canalization, likened the process of ontogeny to balls travelling down grooves in a table. The main groove represents typical ontogeny and is broad and deep, hence it is difficult for balls to leave the groove. Other grooves exit off to each side, which are much shallower. Balls travelling down these grooves are far more likely to skip around and to take different developmental courses. Hence, atypical developments in their many forms show far more variability than typical developments. Usually a large “perturbation,” that is, a disturbance, is needed in order to throw a ball out of the ordinary developmental channel. Such a perturbation might be the practice of disciplined meditation over a period of years or a more powerful (and unpredictable) activity like entheogen consumption. Anything that changes the homeostasis of the system can potentially send development off down an alternative chreod, and hence many different means of altering homeostasis have been used in shamanic and other religious societies (McManus 1979; Taylor 2005). However, these purposeful induction methods are not always necessary; life events and psychodynamic crisis points have been implicated in spiritual development (Jung 1961; Washburn 1995); such events can also serve to throw the ball off down an alternative trajectory.

Underpinning changes in the course of ontogeny are changes in the gene expression regulation mechanisms that determine which genes are expressed as protein products and what modifications occur to those protein products after synthesis. Waddington’s original model did not include gene expression as this mechanism was discovered only later, by Francois Jacob and Jacques Monod (1961), but more recent developmental texts have modified the metaphor (West-Eberhard 2003). Although this need not displace the assumptions of nearly all religions that the “soul” is capable of surviving the death of the brain (discussed later in this article), most mystical experiences have been shown to involve molecular changes, usually in the neuron densities and synaptic connection strengths in the brain (Winkelman 2000), and these neurological changes, like all phenotypic characteristics (that is, all manifestations of gene expression as traits in a particular organism) are underpinned by gene expression mechanisms.

All of this is not to reject the value of psychological contributions to transpersonal theory altogether. A pluralistic view of transpersonal development based around evolutionary developmental biology will include rather than reject previous psychological contributions. Hence, the examples that are

used below are drawn from longitudinal studies of meditators, longitudinal studies of life course development, psychodynamic transpersonal theory, and neo-Piagetian transpersonal theory, as well as from anecdotal sources. All of these psychological sources of evidence retain their value. The author has the advantage of drawing on decades of psychological theory and research conducted by others, and the author's own contribution in this article is small in comparison to the substantial and important theories that the author is attempting to unify. However, a view that unites these disparate psychological positions follows naturally from theory that is already accepted in biology—it is in this respect that the central role that biology can play in the future of transpersonal developmental frameworks should be acknowledged. This trend reflects the growing integration of biological and psychological themes in general, in new fields such as developmental cognitive neuroscience (Johnson 2005).

The article proceeds as follows. Initially, it describes a variable model of transpersonal development through the lifetime. The mechanisms, processes, and causes on which the model rests are explained. Then the article turns to wider issues to which the proposed model is relevant, including the relationship between science and religion, issues of objectivity in development including the much discussed hypothesis of Katz (1978), and the implications for personal spiritual practice.



TRANSPERSONAL LIFE COURSES AND EVOLUTIONARY DEVELOPMENTAL BIOLOGY

If transpersonal experience is viewed as a collaterally existing line to the development of ordinary cognition, which can emerge into awareness at any time in ontogeny due to the nonlinear changes in trajectory that accompany atypical developments, then a very different picture of spiritual development emerges to the orthodox stage-like models. Moreover, if the timing of emergence of the transpersonal line is variable, and therefore is accessed via multiple alternative chreods—that is, if it evidences heterochrony—then many disparate transpersonal theories that make different claims about the emergence point of transpersonal experience can be unified in a single framework. A variety of points of emergence exist for transpersonal experience, determined by differences in the developmental environment of the organism (See Figure 2). Four developmental patterns have been chosen for analysis, although these are by no means the only possible developmental patterns; a further development pattern and fuller integration of a larger range of transpersonal authors work is provided by Edward Dale (2014). Varieties exist *within* each pattern as well.

Developmental pattern A in Figure 2 shows transpersonal development that occurs in adulthood, once the development of ordinary cognition is largely complete. Developmental pattern A is found in the models of Charles Alexander (Alexander et al. 1990) and Ken Wilber (2000).³ This pattern of development is ostensibly supported by the empirical evidence gathered from Transcendental Meditation practitioners at Maharshi International University (now Maharshi Management School), reported in Alexander et al. (1990). Although these data appear to have been capably analyzed and honestly reported, it is wrong to generalize the findings outside of the subject population in question. In a different population and developmental environment, the transpersonal line might have emerged at a different point in ontogeny. There is anecdotal evidence, for example, that powerful meditative experiences can be attained in children as young as ten (Yogananda 1996) in different developmental environments.⁴ While Alexander's sample began meditation at a university age, the children Yogananda describes began much earlier: hence the children Yogananda describes applied the trigger of transpersonal development earlier, and often in such cases an earlier emergence of transpersonal development resulted. In Western samples, where meditation is usually taken up in adulthood (if at all), transpersonal development will appear to be an adult-age adjustment that begins once ordinary cognitive development is complete. A collateral line emerging into awareness during adulthood can easily *appear* to be a higher stage of a single developmental line. Hence, both Alexander and Wilber describe transpersonal development as a continuation of the line of representational cognition investigated by Piaget. However, only a two-line, collateral view of development involving both a line of representational cognition and a line of transpersonal experience can account for child- or adolescent-aged emergence of transpersonal experience.

Developmental pattern B represents an earlier emergence of the transpersonal line due to heterochrony. In addition to the examples provided in Yogananda, examples of children and adolescents who appear to be deeply spiritually aware are contained in research by Harry Hunt (1995) and Dale (2014). These include cases of adolescent-aged individuals attaining permanent spiritual realizations long before the completion of adult cognitive development: age 15 years in Ram Bahadur Bomjon's case (Adhikary and McDermid 2008) and age 16 years in Ramana Maharshi's case (Venkataramiah 2003). The case of Maharshi is particularly significant as his awakening was so rapid, and the depth of his spiritual awareness is commonly regarded by a variety of critics from different cultures as exceptionally high. Swami Nithyananda (2008) claims powerful spiritual experiences from the age of 12 and profound enlightenment from the age of 22. Master Xuecheng was considered spiritually advanced enough to be ordained as a Han Buddhist Rishi

at the age of 23 (see Ruoqiao 2011), making him the youngest ordained Han Roshi. Krishnamurti was recognized by Charles Leadbeater at age 14, apparently already displaying sage-like characteristics recognizable to those who discovered him (Jayakar 1986). These ages fall significantly short of the age at which the development of representational cognition is complete. Evidence in psychology suggests that cognition goes on developing into the late twenties: well past the age of 16 years, at which Piaget's formal operational stage is usually complete. Postformal stages of development like Kurt Fischer's level nine and level ten abstractions unfold at 19–21 years and 24–26 years, respectively (Fischer, Kenny, and Pipp 1990). Further cognitive complexities develop after this age, including Michael Commons and Francis Richards's (Richards and Commons 1990; Commons and Richards 2002) paradigmatic and cross-paradigmatic stages, though a stable emergence point for these capacities has yet to be pinned down by researchers.

These ages are significantly after the ages of spiritual attainment of the adolescent and early adult-aged individuals mentioned above. These instances should not exist if transpersonal development is a higher stage of representational cognition. The maturation of representational cognition is held in place by the well-ground chreods of ordinary ontogeny and cannot mature significantly early. If transpersonal development is a higher stage of this line, then transpersonal development should not be able to unfold in adolescence. If transpersonal development is viewed as a collateral line that emerges into awareness at variable points in ontogeny due to heterochrony, then these examples of young spiritually realized individuals are naturally accommodated—in fact they are to be expected.

Developmental pattern C describes cases in which the transpersonal line can be active from birth or very early in ontogeny, and so transpersonal experience provides a constant collateral accompaniment through life. Hunt (1995) describes such development and provides examples of such individuals. For Hunt, childhood animism is an earlier form of the realization that “all is self.” The intuition of consciousness in everything that leads to the anthropomorphized world view of children is an early manifestation of the line that culminates in subject permanence (Kegan 1982) or unity consciousness (Alexander et al. 1990). In these cases, there needs be no cultivated uncovering of the transpersonal line through the process of mediation as described in developmental pattern A and no swift or sudden awakening in the manner experienced by Ramana Maharshi, which provides an example of pattern B. There is instead the gradual development of the line across ontogeny, much as affective development might begin in infancy or at birth and show a gradual development through the lifetime.

Developmental pattern D indicates an early presence of the transpersonal line that then fades and might re-emerge later in life. This is synonymous

with the positions of Rudolph Otto (1958) and Carl Jung (1961), and more recently with the work of Michael Washburn (1995). For Washburn, the psychodynamic process of “primal repression” cuts off the awareness of transpersonal energy early in life: the process of spiritual awakening involves the re-emergence of this transpersonal energy, which usually enters awareness again in mid life. This dynamic is illustrated through the broken nature of the line corresponding to developmental pattern D in Figure 2. Washburn associates this form of development more with Western mysticism than with Eastern; such cultural differences between populations are typical of what is found in biology and highly compatible with the evolutionary developmental approach described in this article (though Washburn does not use such explanations himself).

For all developmental patterns, both the length of the developmental period and timing of onset vary, in line with contemporary definitions of heterochrony (Smith 2003). The developmental period in pattern A, the route commonly associated with Western meditators, is taken as 20 years, a figure derived from Alexander et al.’s (1990) longitudinal studies. In these studies, transpersonal development is considered complete once the highest stage of development in the Vedic psychology tradition—the stage of “unity consciousness”—has become a permanent adjustment. The spiritual prodigies of pattern B display a much more rapid development: the author has indicated this as a developmental period of a few years in Figure 2, but in the case of Maharshi in particular, development appears to have been complete in only a few days (Venkataramiah 2003). Pattern C evidences a gradual deepening throughout the life and hence a highly protracted developmental period. It is common in the Jungian tradition for spiritual development to continue well into old age. Jung (1963) himself described his own development in this fashion, and so the developmental period extends throughout the life in pattern D. Often, the developmental pattern will be incomplete at the end of the life, and this can be the case in all the patterns except B. For example, many meditators will practice throughout the life and find that their practice deepens continuously and does not appear to complete (perhaps they are those who practice less hard than those in Alexander et al.’s study, those who begin later in life, those who are less naturally gifted, or even those who exceed the developmental ceiling that the Vedic psychology tradition describes as “unity consciousness”). Similarly in patterns C and D, the end of the life (aged 80) will very often cut off the developmental period short of completion. In Eastern models, this incomplete development could be built on, and completed, in future incarnations.

In this article the author has not been specific about the type of transpersonal experience involved. When spiritual practice, for example, is the cause of transpersonal development, the form of transpersonal development that

ensues (i.e. the Christian *union*, the Zen *satori*, the Buddhist *anatta*) will depend on the technique that is developed. The model of heterochrony is a *general* model that would appear to apply to any specific type of transpersonal end state that the realizer attains. A Westerner beginning spiritual practice at a university age would conform to developmental pattern A, whether they took Hesychasm, Zen, or Vipassana as their technique of choice. In some traditions, once transpersonal development is initiated and progresses beyond a certain critical point, the full realization of the spiritual ultimate of the tradition is considered to be inevitable. At the seventh stage of the Bodhisattva path, for example, it is said to become impossible for the Bodhisattva to fall back: the Bodhisattva becomes an “irreversible Bodhisattva” (Snellgrove 1987). Once a critical point is reached in transpersonal development, it may well be the case that the completion of transpersonal development must eventually be attained. This is typical of the development of many other phenotypic traits in biology: the process of “induction” means that a particular stimulus is initially needed to catalyze the development of a trait, but the catalyst need not be present for the full length of the developmental period in order for the developmental period to complete (West-Eberhard 2003).

Discussion now turns to the physiological basis of transpersonal heterochrony. There are two factors that are consistently associated with transpersonal development: training and psychodynamic maturation. Either can provide the perturbation that tips the course of ontogeny down an alternative trajectory (Dale 2011). On a molecular level both involve neurobiological changes as a result of changes in gene expression regulation networks. Often stress plays a molecular role in heterochronous change in organisms (Jablonka and Lamb 2006). The source of stress is often challenging environmental conditions. Where population densities are high, many species of salamander will display a delayed maturation of reproductive function, triggered on a molecular level by stress hormones that result from low nutrition. Reproductive age, therefore, shows a delayed timing of onset relative to other populations in other environments, ancestral or contemporary. At an extreme, this can result in reproduction at a tadpole age (McKinney and McNamara 1991). The pronounced differences in the age of onset of transpersonal experience are mirrored in other traits in other genera as further examples of heterochrony.

It should come as no surprise that stress is implicated in the production of transpersonal traits. Analyses of the evolutionary function of religious experience have focused on the role that religious experience plays in cementing allegiances between groups in ritualized situations. Brian Hayden (1987, 2003) provides detailed analysis on the use of religious experience to form alliances among Paleolithic and contemporary hunter-gatherer peoples. Religious experiences are known to produce a sense of psychological integration and altruism (Winkelman 2000) and are used to create alliances between

leaders of groups in which promises are made over the sharing of resources in times of hardship. Stress induced through food shortage would aid the generation of religious altered states of consciousness in these situations. Heterochrony in the expression of transpersonal traits is useful, as the need for more easily induced transpersonal traits will vary in accordance with the environmental niche and will not always be needed at the same time in life. Moreover, excess altruism would not always have been advantageous; altruism might have served as a disadvantage in other circumstances (either in more hospitable conditions or in still more extreme conditions), and so variability in the transpersonal response is adaptive for the organism. The adaptive nature of the relationship between stress and heterochrony witnessed in many other genera is shared in *Homo*.

Humans have learned that the induction of stress can be useful in triggering transpersonal development. Feats of endurance of hot and cold temperatures, of minimum food and water requirements, of pain in the “suspensions” of certain North American Indian tribes, the prolonged meditative “lotus” postures of Hindu traditions, or the night-long vigils of kneeling in a prayerful position on the stone floors of churches, as well as the prohibitions in which daily comforts and indulgences are abstained from, are all designed to induce the kind of stress in the organism that produces a perturbation in the phase profiles of the gene regulation networks and a “bifurcation” or split, in which a different phase profile settles over the system and a different developmental trajectory is followed. The entire organism is linked through the blood supply. Stress induced in one area of the body will lead to an increase in cortisol in the blood in general, which will affect the chemical constituents involved in the gene expression regulation networks that serve to switch on or switch off the expression of one kind of gene or another in different areas of the body. The role that stress can play in the growth of new neurons in adults has been described by Palombo (1999) in relation to psychotherapeutic change: it seems likely that neuron growth produced by stress is also the cause of transpersonal experience. Wherever there is sufficient stress in the environment, whether naturally occurring or purposefully induced, transpersonal experience will emerge as a coping strategy. New neurons will integrate old experiences that were previously held in unconscious groups of neurons by linking them to conscious processing systems. Such an emergence of repressed material is common in “spiritual emergency”—the term used for a stressful transition from an ordinary to a transpersonal life phase (Grof and Grof 1990).

The chreods down which transpersonal life courses unfold are induced through switching mechanisms. Switches involve threshold levels: once a threshold level of a particular molecule or collection of molecules in a gene expression regulation network is exceeded, a cascade of changes will ensue over many levels of emergence, sometimes rapidly, sometimes over an

extended period of time, like a row of dominos falling. The cascade is the modern explanation that underlies the alternative channels in Waddington's epigenetic landscape. Once the ball is thrown out of the dominant chreod, fully formed alternatives are activated and unfold efficiently, which would otherwise have remained completely inactive (and unknown to the subject as life course possibilities). The events or activities that trigger the transpersonal development trigger pre-existent, inherited pathways that are stored in the DNA, known as homologues. The study of morphological homologues has provided insight into many aspects of evolutionary and developmental biology and explains alternative life histories of multiple traits across many genera (McKinney and McNamara 1991).

In time, self-sustaining processes emerge for the maintenance of neuronal structures involved in transpersonal development. Spiritual masters often claim that they no longer need meditation or other consciousness altering practices in order to maintain spiritual awareness. The *self-sustaining loops* in gene regulation networks involve the production of the molecules needed to sustain the loop internally, rather than production outside the network (Thieffry and Sanchez 2002). Such a process might be involved in the experience of "masters." The creation of certain chemicals in transpersonal experience, for example serotonin or dopamine, will feed back into the gene regulation network and cause the continuing activation of the protein products used in the tissues of neurons in a particular area of the brain. Once a threshold level is exceeded, a closed loop will be created in which the chemicals produced during spiritual experience are enough to sustain future spiritual experience without external input. Initially such chemicals are induced through stress, and at later stages in development, stress is not necessary.

It is unlikely that specific genes exist that code for transpersonal traits. As specific a trait as language does not have its own exclusive coding genes. Instead, genes involved in language are *pleiotropic*, meaning that they are also involved in the production of other phenotypic traits (Geary 2006). Reciprocally, most phenotypic traits are *polygenic*, meaning that multiple genes combine in different ways to produce them (Johnson 2005). The role of the genome itself is limited in determining the final form of the phenotype. The genome is nearly identical in all humans. Moreover, each cell contains identical genetic information (Brooker 2008). The difference between tooth tissue and hair tissue is entirely epigenetic and determined by the constituents of the molecular environment. A young hair can be turned into a tooth by controlling the developmental environment in a laboratory so that a tooth is produced in a hair follicle (Oster and Alberch 1982). This example, in fact, illustrates switching from one chreod to another—and provides a simple analogue of the process of switching from a typical to a transpersonal life-course trajectory from a much lower level of emergence.



SOME WIDER ISSUES

This article finishes with conclusions specific to the article itself as a piece relevant to debate in transpersonal circles and then progresses to wider themes relating to universalism or perennialism and the cultural relativism of Katz (1978), the relationship between science and religion, and the relevancy of the model to personal spiritual development. The forms of heterochrony outlined in the paper are all determined by the epigenetic influence of the environment on the expression of genes. The result is a highly variable view of transpersonal development that contrasts to a large degree with the invariant structuralism that dominated much of 20th century thinking in religious studies and transpersonal psychology. The article has been limited to a discussion of heterochrony, but another aspect of development, allometry, further increases variability in transpersonal outcome. Allometry refers to variability, or “asynchrony,” in different transpersonal capacities within the same individual (discussion can be found in Dale [2012]).

As a great deal of interesting work has been produced that focuses on the adult-aged emergence of spiritual experience, it is pleasing that this pattern of transpersonal development can be maintained as one possibility among others. The emergence of transpersonal experience in adulthood remains the *primary* form of transpersonal development, but a two-line view of development based around gene expression, heterochrony, and nonlinearity can explain everything that the stage-like models derived from mid 20th century psychology can explain, as well as considerably more variety besides. A synthetic unification of models that were previously considered antagonistic emerges from an evolutionary developmental view. Such florid plurality and diversity—including large-scale heterochronies—are not usual in typical human developments. This is one reason why evolutionary developmental perspectives have not yet influenced psychology to the extent they have influenced biology, but plurality and diversity are very usual in atypical human developments, and (at the present time) the permanent emergence of a powerful transpersonal experience is certainly an atypical human development. The assumption that there is one and only one route to transpersonal development—an assumption derived from what is known of typical human psychology—has been the central error in the study of transpersonal phenomena and the human life course.

Katz (1978) has claimed that all mystical experience is entirely culturally constructed. Katz’s critique can be viewed as a response to the invariant structuralist paradigms that date at least to Evelyn Underhill (1911) and that were presented in more scientific manner by Wilber (1980), Roberto Assagioli (1988), and Alexander et al. (1990). The evolutionary developmental perspec-

tive finds a middle way. Mystical experience is not entirely culturally constructed, for it unfolds down inherited chreods, stored in the human genome, and the human genome shows very high homogeneity not just in modern *Homo sapiens* but across the entire genus *Homo* (Hawley and Mori 1999). The transpersonal life course trajectory unfolds as a triggered mechanism that has evolved as an adaptation in the Paleolithic. Once triggered, spiritual development progresses efficiently because usually inactive cascades of responses at the gene expression level and at higher levels of emergence are switched on and carry development down an alternative ontogenetic trajectory. Evolutionary developmental biology strongly suggests that no spiritual experience can lack an involvement of gene expression and the expression and recombination of protein products because no other biological trait lacks involvement of these components. The time in ontogeny when transpersonal experience emerges is determined to a large degree by the cultural environment; human development is not *completely* culturally constructed because it is at least partially determined by inherited biogenetic structures—and neither is it *completely* determined by universal biogenetic structures, for biology has shown in recent decades that those structures are highly malleable and open to environmental modification, including modification from the cultural environment.

The spaciousness and clarity of spiritual consciousness may be a universal human response, in a manner reminiscent of the perennial philosophy, but transpersonal chreods are triggered at different times in ontogeny due to differences in the cultural, epigenetic environment. The trigger of the timing of onset of transpersonal development is environmental, whether the trigger is associated with purposefully controlled factors like age at which spiritual practice is undertaken or whether it is the life events that cue spontaneous psychodynamic maturation and spiritual awakening in a manner more reminiscent of James Fowler (1981). The universalism of invariant stage-like transpersonal orthodoxy is not supported by evidence from evolutionary developmental biology. Cultural differences produce large-scale diversities in the transpersonal life course, but limits to the nature of transpersonal experience are set by the genotype. These issues, relating to subjectivity and objectivity in mystical experience, are clarified through consideration of evolutionary developmental mechanisms that govern all other phenotypic traits in all known genera.

Science has been rejected by certain factions within the transpersonal community (see Braud and Anderson [1998] for discussion). One of the reasons for this is that the standard psychological frameworks produced invariant models of stage-like spiritual development that not only were often contradicted by examples in the literature (Ferrer 2002) but also led to accusations of marginalization of minorities due to the assumption of a hierarchy of spiritual cultures and the imposition of Euro-American-centric views onto

non-Western or indigenous spiritualities (Winkelman 1993). However, the most relevant science is not 20th-century psychology rooted in broad averages and universal developmental blueprints but evolutionary developmental biology rooted in nonlinear complex systems theory in which dramatic departures from population averages are to be fully expected. Such a basis is more naturally accommodative of pluralism and of the religious and spiritual paths that constitute minorities. The many varieties of spiritual diversity could not hope to be included in models based around broad averaging approaches. A synthesis of psychological and biological models holds hope for the future.

Hierarchy has returned in biology over the last several decades (Gould 2002). Progress in science lies in the opposite direction of rapid developments that have unfolded as a result of the complex systems revolution (Depew and Weber 1997). It is much harder for philosophers to deny a spiritual aspect to the universe on the basis of biological reductionism than it once was, for emergence, rather than reductionism, has been shown to be central to so many aspects of biology that have arisen since the molecular revolution of the 1970s (McConkey 1993). The hierarchical complexification of the lower levels leads to an increasing sense of spiritual presence in the conscious experiences of higher emergent levels, which eventually develop into the spaciousness and clarity of subject permanence, as consciousness, space, time, and objects become increasingly alike in the perception of the subject.

This emerging view of spirituality is not a replacement of the traditional view; it is a complement to it. The mind—body problem remains perhaps the most intractable of all scientific problems. In ancient societies spiritual practices were believed to prepare the body for the entry of the spirit (Lancaster 2011). Researchers now know a lot more about exactly how spiritual practice changes the body than they used to—researchers can now, for example, talk about these changes on a molecular level involving phase profile transitions in gene expression regulation networks—but the same principle of a transcendent spirit entering “from above” is just as likely to apply now that spiritual development is understood in terms of gene regulation networks and neurons, as it was when changes in the body were understood purely on the macroscale (through Yogic, meditative, and shamanic postures). The unification of science and religion that aspects of modern religious studies is tackling is not an alternative to traditional religion; it can be viewed as an expansion of exactly the traditional notions of the relationship between an infinite consciousness (or “God”) and the finite units of consciousness (ourselves), which in some way that we do not fully understand, can draw closer to and even apparently merge with that infinite consciousness, both in this life and the next.⁵

The relevance of this model is not just to broad debates between science and religion or to narrower debates in the transpersonal community. The

relevance is to all people: for all people are engaged in the human life cycle, and all people can potentially access a transpersonal chreod. Although the mystical experiences of religion and spirituality can be spoken of in the terminology of scientific framework, those experiences themselves (that stand as perhaps the only possible confirmations of the existence of spiritual reality) remain in essence first-person subjective events. Processes of psychodynamic maturation derived from the life events that occur to us remain largely beyond our control, but the second cause of transpersonal experience—the route induced through meditation or mystical prayer—remains something that we can influence. The essence of spiritual practice is simply quiet. When the mind becomes still the spirit can enter; this has always been the basis of the meditative schools of the East and the West's tradition of mystical prayer. Circles of purposefully arranged stalagmites have been found in remote European caves, accessed only through treacherous passages, dating to 50,000 ya; human beings have long sought out these conditions of quiet and long known their value. According to the model presented here, the sooner the spiritual life is engaged with in an effortful fashion on a daily basis—through mediation, mystical prayer, or simply through time spent alone and in silence each day—the sooner the timing of onset of spiritual experience will occur. Heterochrony guarantees that the variability of such an emergence point in the life cycle can be very great.⁶



NOTES

1. Waddingtonian concepts of development are used in Laughlin, McManus, and D'Aquili (1979), Laughlin and D'Aquili (1979), and McManus (1979). Discussion of transpersonal experience is contained in Laughlin, McManus, and D'Aquili (1990). The essays in Laughlin, McManus, and D'Aquili (1979) also make clear that the "hardwired" view of structure no longer washes given advances in neurophysiology and that the strict dichotomy between nature and nurture is outdated. Almendro and Weber (2012) provide a recent example of nonlinear theories beginning to enter transpersonal psychology.
2. The implications of nonlinearity have generally been underestimated or ignored in transpersonal psychology and religious studies, leading to models of spiritual development that posit an invariant series of stages. Prominent examples include Wilber (1980) and Alexander et al. (1990). Wilber (2000, 2007) and Alexander et al. (1990) explicitly described a statistical or probabilistic base for their theories that admits to *some* plurality—the charts at the back of Wilber (2000) are artifacts of a classic statistical averaging approach in which the same overarching model is held to apply, more or less, to all individuals. Such models are examples of the application of 20th-century psychology to the transpersonal vista. Wilber (2000) falls short of a nonlinear footing that would predict dramatic departures from even

the flowing and overlapping “waves” that he describes. These models predict *some* variability around an average—they expect *linear* variability—but they do not expect the large scale, exponential variability that follows from the *nonlinear* view described here. See Dale (2011) for further discussion of the relationship between probabilistic statistical psychology and nonlinear frameworks.

3. Wilber (2000, 2007) holds that transpersonal development cannot happen as a *structure* before cognitive development is complete as a *structure*, meaning that he denies that spiritual development can emerge as a permanent trait before cognitive development is complete. Alexander et al.’s (1990) model does include horizontal elements, which they call “rows,” but the overall character of this model is also sequential, and follows a single line, because the modules interact to produce an invariant sequence of hierarchical emergence.
4. Some might object that anecdotal evidence, including the examples of children cited in Yogananda, should not be considered relevant to scientific investigation, but there is no obvious reason to disbelieve these reports, and for that matter the reliability of the data emerging from MIU studies have also been questioned (Andresen 2002; Williamson 2010). In this article, both sources of evidence are accepted at face value and both can be accommodated by the model proposed.
5. Interesting and sober perspectives investigating the survival of the soul from a scientific viewpoint and finding cautious evidence in favor of such a claim can be found in Stevenson (1987) and Braude (2003). The emergence of a unitive form of consciousness in the lifetime has been demonstrated in long-term meditators (Alexander et al. 1990).
6. A reviewer has invited me to comment on my personal experiences. My own attempts at organized spiritual development began at the age of around 13–15. They involved theistic prayer techniques. Experimentation led to what I have since recognized as mystical prayer—which borders on the inner silence of meditative awareness. The practice resulted in a change in both the appearance of the world and the quality of the body and mind. The world took on a kind of translucency that I later recognized as a diluted version of the Hindu “Self,” or the clear light by Tibetan Buddhism. Also, aspects of the personality harmonized such that—in the time following the performance of the exercises at least—I would always know exactly what to do and say: what might be described as a higher guiding force took over, which polarized the usually disparate strands of the mind. In Buddhism, this finds an analogue in the *jnanasattva* (higher being) that is channeled into the mind of the adept through engagement with the spirit guide (Yid-dam), in Christianity it appears to resemble a forerunner to the state of “union” (the individual will with the will of God). These experiences are not a sign of any special ability in myself. They are the normative result of daily spiritual practice, and the reason spiritual practice is often considered essential for spiritual development to unfold efficiently in both Eastern and Western monasteries. Although in my own case these experiences did not stabilize into a *permanent* transpersonal equilibria at this age, it is easy to see that they may have done so in a different

cultural environment or in a more spiritually gifted individual than myself. The cases of Ram Bahadur Bomjon, Xuecheng, Ramana Maharshi, and Krishnamurti, which were described earlier, provide examples in which this certainly did happen at a young age. The theory of the article is not derived from personal experience in any case but from examples such as these, which show that there is more to mysticism that can be accommodated by invariant universalist spiritual frameworks.

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