# THE CHAOS THEORY OF CAREERS

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Most contemporary theories of career development have difficulty taking into account current realities of career decision-making including complexity, change, constructivism and chance. We sought a conceptual formulation that incorporated the best of contemporary theories in a larger framework, which at the same time incorporated such realities. Under the influence of four intellectual currents—contextualism/ecology; systems theory; realism/constructivism; and chaos theory—an attempt was made to adumbrate a chaos theory of careers emphasising complexity, order, randomness and sensitivity to non-linear change.

Anyone seeking to propose a new career formulation, given the plethora of existing options, must at some point justify to the long-suffering career practitioner the reasons for the endeavour. The contributions and limitations of most major current theoretical frameworks are amply outlined in standard texts (e.g., Brown & Brooks, 1996; Isaacson & Brown, 2000). It is not intended to rehearse most of these here. Instead, it is noted that most extant formulations derive from a positivist view of science, itself derived from natural science models of laboratory-oriented, experimentally manipulated research and hypothetico–deductive reasoning. Such an epistemological paradigm for studying and understanding our world and ourselves has been subjected to widespread and sustained questioning and criticism (e.g., Blaikie, 1991; Cambel, 1993; Hoshman, 1989; Laszlo, 1991; Robson, 2002; Sarantakos, 1998; Waldrop, 1992).

Most current career theories illustrate the legacies and limitations of their positivist nature. Some of these limitations are:

1. A narrow focus on a small range of variables believed to be relevant to career decision-making and development. As a consequence, most theories have tended to be insular. This was the main reason in the 1990s for an attempt to 'converge' these formulations (e.g., Savickas & Lent, 1994), however, it appears that a good number of the contributors to this endeavour did not see this aspiration as even remotely achievable;
2. From our observation of and participation in professional practice in the field of vocational psychology, it is glaringly obvious that very few practitioners believe what they are doing with most of their clients has anything other than the most tenuous links to traditional career development theories. This remains so despite some valiant attempts to link theory and practice (e.g., Peterson & Gonzalez, 2000; Sharf, 2002);

3. Virtually all theories formulated by psychologists have an almost exclusively individualist focus—career decision-making is viewed from the chooser's perspective only. This perspective is too specific to do justice to the complexity of a globalised world in which an individual's career development can be influenced more by a managerial policy formulated thousands of kilometres away from such individuals and their places of employment, than by any particular action by the employee. Furthermore, such a perspective imposes a western individualistic idea of career and the influences upon it. Collectivist cultural perspectives cannot be adequately accounted for in most existing theories;
4. Many existing career development theories still see career decision-making in terms of a fundamentally rational and controlled process of matching the characteristics of individuals with those of occupations and making evaluative decisions on the basis of the best of the available options in terms of congruence of the respective matches. Such assumptions of rationality, accuracy of knowledge and control of outcomes typically owe more to positivism than they do to reality as lived by contemporary decision makers.

The overall impression from surveying career development theories is not that they are of no use, but as they stand founded on positivist epistemology they simply do not appear to be enough. While helpful, the insights that each contain never seem to take us very close to reality as we live it and in which we make our career decisions. In essence, most existing theories leave out or fail to adequately take into account four crucial elements in career development and choice:

- Complexity – of human experience and the range of potential influences on people's careers, in particular the influences of objective and subjective context;
- Change – the dynamic, interactive and adaptive nature of human functioning in the world and in making career decisions and taking career action;
- Constructiveness – the tendency of humans to construe and construct experiences and perceptions into meaningful and often unique interpretive structures for understanding themselves, their experiences and their world; and
- Chance – human experience, and career development in particular, tends to be laced with unplanned and unpredictable events and experiences that are often crucial and sometimes determinative in the narrative of people's careers.

## Towards a new approach to career development theory

If positivist approaches to science have been dominant, then historically this can be reasonably traced back to Newtonian physics with its emphasis on cause and effect, immutable and universal laws and a confidence in human rationality and the accuracy of human observation. The model for the universe, and human beings in it, was that of the machine. However, for the twenty-first century it appears much more likely that the paradigm for understanding our world and ourselves will be drawn not from physics but from biology with its emphasis on ecology, organism and pattern.

It follows that if this line of thought is valid, then we might find a different answer to the question: 'What is the nature of things?' Out of these ponderings came a deceptively simple dictum. The simple dictum was: 'If you want to understand the nature of things look to nature itself'. So what is nature like? There are four dominant characteristics of the natural world that may provide some new insights into the shape of a new career development and choice theory.

1. Nature is ordered. From at least the time of the writing of the book of Genesis, humans have observed an order in their physical environment. The significance of this is that if there is order in the universe, then it is possible to explore patterns of correspondence across phenomena so that we can better understand, predict and utilise the natural world for our survival and benefit. As various cosmologists such as Davies (1993) have noted, the reality of order in the universe actually is the justification for scientific endeavour.
2. Nature is complex. There are myriads of life forms on our planet from sub-atomic particles upward. Further, our Earth is only one planet in a solar system that is a tiny part of a galaxy, which is itself only one of countless thousands of others in various states of transformation. Examples could be multiplied in almost any area of human knowledge we care to name. The significance of this is that traditional scientific approaches have usually tried

to simplify the complexity of natural phenomena by experiment and explanation. This is in principle a noble aspiration, however, in the hands of the positivists it often appears to be very myopically focused and directed more by its technologies and traditions than by the nature of the phenomena itself. Positivism has tended to encourage reductionism—the quest to look at ever-finer gradations of phenomena. In the process there is a danger that something very important can be lost. It is perhaps best expressed by the gestalt truism: 'The whole is more than the sum of its parts'. At some point we have to study career development and decision making in its complexity—as a whole rather than the perennially narrow focus of almost all traditional formulations. Typically the positivist approach has meant deciding a priori which variables are most likely to influence career decision-making or work adjustment (e.g., personality, interests, values, beliefs etc.) and then assuming all other variables are randomly distributed and therefore unable to have a systematic influence. This averaging of random effects across samples fails to consider how any number of controlled variables may have significant and systematic effects upon the individual, nor does this approach capture how randomness itself is a key influence. The results of such positivist-reductionist endeavours are conclusions that might describe a population as a whole in respect of a few limited variables, but at the individual level may fail to capture the most important influences for any person. If you calculated the mean average of the career decidedness of a group of students on a 12-point rating scale whose scores were: 2, 2, 5, 10 and 11, the mean would be 6. As a description of the group, it could be considered poor if you looked at it from the point of view of each student. No student had a rating of 6. The average fails to capture anyone's decidedness accurately.

3. Nature is systemic. When we observe order and complexity in our world we see that natural phenomena occur interdependently. Nature is often likened to a tapestry with good reason, in the sense that components are woven together. Everywhere we look this is obvious—just consider the human body as an instance close to home. It is comprised of systems: nervous system, endocrine system, musculature, skeleton, skin, reproductive system, lymphatic system, digestive system and so on.
4. Nature is continually changing. In the natural world some changes are cyclical, such as the seasons, and as such are fairly predictable. Some changes are evolutionary and are usually more obvious after the event as we see patterns of organisms' adaptation to the environment. Some other change events are experienced as chance or at least as unplanned and unforeseen. Many natural catastrophes would fit in this category for the environment and for humans accidents would be an example. Whether chance is part of the nature of things has been an open question at least since Heisenberg formulated his uncertainty principle. While this issue is of metaphysical interest, at this juncture our principal concern is not so much whether chance is intrinsic to the world or not, but rather that change is not infrequently experienced as chance or unplanned in the ongoing lives of humans (Bright et al., 2003).

The next step was to see who else was thinking along these lines. Four intellectual currents were identified which reflected and often amplified the above observations about the nature of things.

## Contextual/Ecological Approaches to Career Development

Vondracek, Lerner and Schulenberg (1986) pioneered the importance of context in understanding career development. They stressed the reciprocal influence of the person and the context to produce stability and change. Young and Valach (1996) emphasised the embeddedness of action in context and the purposive nature of such action. Ecological approaches such as Szymanski and Hershenson (1997) attempted to incorporate existing contributions of career development theories into a 'constructs and processes' taxonomy.

## Systems Theory Approaches to Career Development

Various writers have sought to incorporate systems theory approaches into career development (Penick, 2000; Sharf, 2002; Simmons, 1993, quoted in Leong, 1996; Wrenn, 1988). Manicas and Secord (1983) persuasively observed that psychological reality is fundamentally an open system in which structures

and processes are co-determined. Simmons (1993, quoted in Leong, 1996) drew attention to the adaptive nature of complex systems in particular their capacity for self-organising, pattern forming, being emergent and non-linear.

However, Patton and McMahon (1999) have presented the most thoroughgoing and insightful application of systems theory concepts to career development (McMahon & Patton, 1995). They emphasise the need to focus on wholes rather than just on parts; on patterns relating to individuals and contexts; on the importance of understanding structures rather than a reductionistic pursuit of causes; and on the discontinuous nature of change in relation to career paths. Furthermore, these writers have outlined three embedded systems: the individual, the social system and the environmental–societal system. They have sought to give content to each system by reference to existing career development theories and research. This approach appears to be the most convincing extant attempt at the convergence and integration of other career development approaches (McMahon, 2002). However, such an application of systems theory may be unnecessarily prescriptive and may not give sufficient attention to the constructive capacities of individuals to create their own systems.

### Realist and Constructivist Epistemology

While the realist view that we can have direct knowledge of our world (Maze, 1982) has been foundational to our views of psychological theory and research for a long time (e.g., Bright & Burton, 1994, 1998; Pryor, 1979, 1985, 1991), the combination of this epistemological stance with systems theory by Robson (1993, 2002) contextualises realism as a third way between the dogma of positivism and the solipsism of relativism (Sayer, 2000). Young and Valach's (1996) 'constructivist epistemology' may be the closest approach to relativism in contemporary career development theory. Robson's (2002) critique of both positivism and relativism is both cogent and compelling. His realist view of science has features that have influenced our theoretical formulation and thinking—in particular:

- science invents theories to explain the real world and tests them by rational criteria;
- explanation focuses on how mechanisms produce events;
- laws are characteristic patterns of activity or tendencies of a mechanism;
- the real world is stratified and social reality incorporates individual, group and institutional, and societal levels; and
- events are to be explained even when they cannot be predicted.

To such insights, following Delanty (1997), may be added that realism and constructivism can be synthesised in the sense that reality can be viewed from very different perspectives and each one can be real and testable. In this sense, Young and Valach (1996) are correct in describing career as a process of construction through action, a way to frame, organise and describe behaviour over time. Not all constructions of the person, however, are real (in the sense of being accurate) even though they may still be influential in that individual's career development.

A well-established and accepted way of studying the visual perception system is to gain insights from its failures—that is, visual illusions. There are many common examples where contextual effects can influence how we see things: for instance the Muller-Lyer illusion (1889, cited in Gregory, 1997).

In this illusion (see Figure 1) people tend to perceive the right vertical line (b) as longer than (a), although both vertical lines are the same length. In the illusion the immediate context of the arrow shapes on the end of the lines systematically influences how we see the lines. We could say that our perceptual

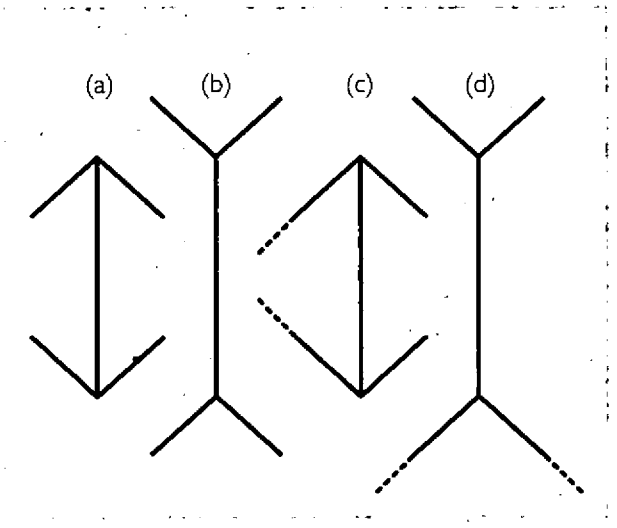



FIGURE 1: THE MULLER-LYER ILLUSION
WHICH VERTICAL LINE IS THE LONGEST?

construction is wrong, and in the absolute sense this is correct. For example, if we think of those lines as representing the height of a far corner of a room (d) and the height of the edge of a distant building (c), then our perceptual system has interpreted line (c) as being smaller than line (d). However, experience tells us that the building is taller, because as the distance between an object and us increases, the object appears to decrease in size (e.g., a finger held in front of our face appears the same size as a distant tree, but we know the tree is bigger). Thus while these constructions are objectively inaccurate, they can still have a significant influence on our thinking and need to be considered and explained rather than dismissed.

Therefore, the position taken here for theory development and research is a 'constructive realist' approach. The natural world is both knowable, but not in any indisputable way, and constructed in terms of which aspects of reality we choose to pattern together and focus our attention. Because reality is so complex it is inevitable that humans will select and construct their vision of it in order to function and adapt to reality as they experience it. However influential such constructions may be, they may still be incorrect. It was Ludwig Wittengenstein, one of the greatest twentieth century philosophers, who frequently noted that the hardest thing in the world is to not deceive yourself.

### Chaos Theory

Chaos theory is a systems theory approach to understanding natural phenomena, which emphasises structure and order. It does not assert that nature is anarchic as the name may imply, but merely that it is not completely deterministic and therefore is not predictable. This is a direct and, many would say, logical consequence of the complexity of most natural phenomena (Cambel, 1993; Cramer, 1993; Kellert, 1993).

Individuals and their environments are viewed as chaotic in the sense that they are complex, open, adaptive systems, which are extremely sensitive to change in initial conditions. As a consequence of both their complexity and this sensitivity, such systems experience non-linear causality—the causes and effects of events that the systems experience are not proportional. As a result, such systems are ordered but not predictable. A commonly cited illustration of human experience of non-linear causality is the political, economic, security, military, social, recreational, travel and personal repercussions of the actions of a dozen al-Qaeda terrorists in September 2001, throughout many parts of the world.

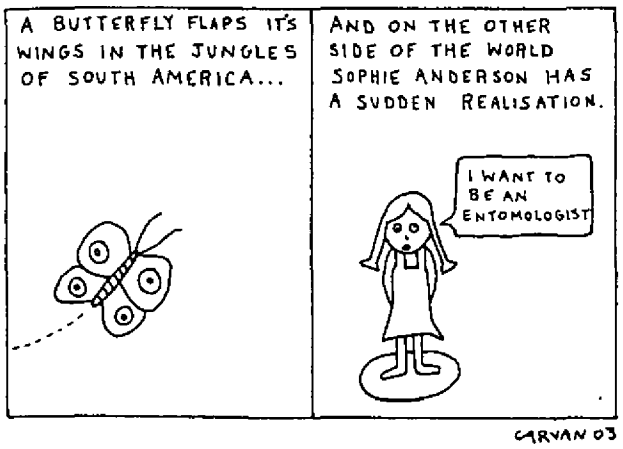
Such systems are adaptive in the sense that they are pattern seekers (Merry, 1995). They interact with their environment and learn from the experience. They experience stress when the fine balance between the internal forces structuring the system and the external forces that make up their environment become unbalanced. This balance between stability and instability is often referred to as 'the edge of chaos'. It is here that systems are at their optimum performance potential, where a system's creativity is evinced and decisions are confronted (Kauffman, 1993).

It is a consequence of a phase transition of the system that one solution among many actually occurs. This in turn gives an historical dimension to the system, which will influence the system's further adaptations. Thus, general chaos theory provides insight into complexity, adaptation, change, chance, non-linearity, creativity and history as systemic characteristics of individuals and the environments in which they operate.

## A GENERAL STATEMENT OF THE CHAOS THEORY OF CAREERS

The preceding section sought to highlight the contributions of others to the development of our theoretical formulation. We also debated what to call our approach, which had ecological, contextual, systemic, realist, constructivist and chaotic components. At this stage, we have named our formulation 'the chaos theory of careers' because general chaos theory encapsulates the broadest purview of influences on our conceptual attempts as outlined above.

Each person from a career development perspective can be understood as a complex, unique, non-linear, adaptive, chaotic and open system. As a consequence, they are sensitive to change, which can have the effect of producing disproportionate and unpredictable effects. Part of the uniqueness of a person is their capacity to construct their career through purposive action. However, such action can be maladaptive, inappropriate and inaccurate. For example, the underlying motivation action can be unconscious and then rationalised through defence mechanisms such as those identified by Freud.




People can lack insight into their own knowledge and learning. In an experiment conducted by Bright and Burton (1994), people were shown a series of clock faces and participants were asked to rate the aesthetics of the designs. All the clocks showed a time between 6 and 12 o'clock. After the participants had rated the clocks they were given a surprise test where they were shown two clock faces and asked to identify the one they had seen before. Most participants said they could not recall and guessed an answer. In fact, they had not seen either of the two clocks earlier, but one depicted a time between 6 and 12 o'clock and the other did not. Despite their conviction they had no idea which clock to choose, participants typically chose the clock showing a time between 6 and 12 o'clock. It was concluded that the participants had implicitly been influenced by the context and could display this knowledge even when they thought they were guessing!

Hence on occasions, especially when people's perceptions and beliefs are inaccurate and even detrimental to decision making, there is a need for timely vocational counselling, assessment, information and opportunities for learning. This is part of the reason we believe that 'the chaos theory of careers', has to be viewed as both realistic and constructivist. If there was no reality, then it would be impossible to establish the error or inadequacy of certain individuals' construals of reality.

The adaptive capacities of individuals are principally manifested through ongoing learning, as a consequence of interaction with their environmental systems (usually designated 'super-systems'), through their capacity to reframe their understanding of self, others and the world through their experience, and through purposive action. Purposive action indicates the capacity of the individual to function in ordered yet unpredictable ways. While simple systems settle into regular and set patterns—like a clock pendulum, chaotic systems never settle into repeated patterns—such as human beings. This is partially a function of their sheer complexity as systems and partially because human beings have unique emergent qualities such as the capacity to learn, to remember, to seek meaning and to act purposefully. The functioning of dynamical chaotic systems is inherently unpredictable but over time how the systems function assumes a self-generating order. This is called the systems' fractal pattern, which in the case of dynamical chaotic systems is ordered but never repeats over time. Natural examples of this include the funnel shape of a tornado or the patterns of birds in flight.

Since a person is a chaotic system, change in the system is always imminent, because of their sensitivity to alterations in the initial conditions. However, we have a tendency to deny the reality of and resist the opportunity for change. Human denial of the imminence of change can be found in our desire to cling to linear notions of ourselves, our world and reality as a whole. We expect things to be predictable and generally they are. As a result, we assume we have more control over ourselves, our environment, and indeed our whole lives than we actually have. The gambler's fallacy typically illustrates this. Flip a coin ten times and each time it lands as heads. Most people are inclined to predict that each time heads comes up it makes tails more likely on the next throw—but of course it does not because all the events are discrete and heads or tails is equally likely regardless of any previous outcomes.

Individuals often resist change because it may further disrupt the fractal pattern of their lives and thereby expose the limitations of their levels of control. The big message from the great self-development sages, from Dr Johnson to Dr Covey, in the ultimate analysis, is that the only thing we can control is ourselves. That is part of the reason why suddenly being made redundant is usually such a shock for most people. We realise the world is not as predictable as we usually thought and we are not as powerful as we typically imagined. In chaos theory terms, career decision-making typically involves a phase transition, that is, the sudden movement of a system from one

state (or pattern) to another. A phase transition has the potential to become transformational, radically altering the patterns of the person's life. For example, the quiet, shy, strugglingly-studious seventeen year old from the country who finishes school, leaves home to study at a large city university, and suddenly transforms into an extroverted, boisterous, carefree, hedonist revelling in the platitudes of post modernism. The decision making process involves the exploration of the current fractal pattern of the person's life and the transformation of that pattern as a result of acting on one career option or another. In this sense, the future is not somewhere a long way off, the future is emerging with each action we take and each response we make to changes in the complex dynamical systems of which we are a part or which intrude into the fractal pattern of our lives.

At this stage of our formulation we are not as concerned with the precise content of each level or even the precise number of levels. Other writers in the field from related perspectives have attempted this (e.g., Szymanski & Hershenson, 1997; Patton & McMahon, 1999). At this stage 'the chaos theory of careers' is more concerned with developing structures for the theoretical framework that integrate theory, research and practice in the way that other writers have frequently called for (Peterson & Gonzalez, 2000; Spokane, 1991; Toman, 2000). Moreover, it is not clear at this stage whether specifying content precisely is desirable or not. For example, the excellent taxonomy provided by Patton and McMahon (1999) is likely to be very useful in vocational counselling, as illustrated in Patton and McMahon (1997). However, within such designated sub-systems it may be desirable to leave at least some undesignated sub-systems as a concession to Kluckhohn's (1953) eminently sensible observation that individuals are like all people in some things; like some people in some things; and like no-one else in some things. Further, Hans Eysenck, the famous personality theorist, was frequently heard to observe that all of us have a tendency to both acknowledge individual differences and at the same time believe that people are more or less like ourselves, and in thinking so almost all of us underestimate individual differences between people.

## AFTERWORD

No scientific theory of career development comes out of thin air: 'the chaos theory of careers' owes much to other thinkers and writers. Nevertheless, at this incipient stage the tentativeness and incompleteness of the current formulation is painfully obvious. It is hoped to improve it as a theory, a basis for research and a foundation for counseling. We are not iconoclasts whose pent up rage has caused us to smash away mindlessly at extant career development theories and research. However, we feel what has been done so far is not enough, and that the gap between theory, research and practice tells us something about their inadequacies. We do not presume to know all the answers. We have endeavoured to point to the complexity of career development, the limitations of positivist empirical approaches and the essentially atheoretical nature of counselling practice. In reaching to develop 'the chaos theory of careers' we continue to grapple with what often seem like mysteries.

In the future we hope that some of the implications of 'the chaos theory of careers' will be developed. However, even at this early stage one implication especially relevant to the readership of this journal can be adumbrated. If it is the case that individuals can be construed as open chaotic systems, then the potential importance of appropriate career development assessment and counselling becomes apparent. The sensitivity of individuals to changes combined with the complexity of sub-systems—resulting in disproportionate (non-linear) change—means receiving appropriate assistance early in an individual's career has the potential to enrich the whole spectrum of dimensions in their lives for decades ahead. If as a consequence 'the chaos theory of careers' inspires career counsellors with a renewed sense of the seminal contribution we can make to individuals, communities and our nation, then we would consider that to be a substantial beginning.

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