Order and Chaos: A Twenty-First Century Formulation of Careers

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A chaos theory of career choice and development is outlined. Traditional trait-factor theories of career choice and development overlook too many pertinent influences on career decision-making, such as change and chance events. As a consequence these reductionist approaches fail to adequately capture some of the most salient influences on an individual's career decisions. More recent systems theory approaches better acknowledge the complex array of influences and the recursive nature of many of those influences. These models have been useful in providing taxonomy of influences that have frequently been overlooked. Developing from such models the chaos theory of careers is outlined. The chaos theoretical approach to career decision-making builds upon this identified complex array of influences. It provides a framework for understanding why career trajectories are not exactly repeatable, how relatively minor changes in subtle variables can lead to major changes in career path and how realist and constructivist approaches to career decision-making may be reconciled within a unitary framework. Some of the objections to systems theory approaches are canvassed along with some implications of the chaos theory of careers.

Contemporary career development theories as outlined in standard texts such as Isaacson and Brown (2000), display the evidence of their positivist foundations. They tend to focus on a small range of variables believed to be relevant to career decision-making and development and to emphasise career decision-making as a rational and controlled process of logical deduction. Along with this is an almost exclusive emphasis on the decision maker as though he or she was the only relevant career choice influence. This has resulted typically in oversimplifying decision-making as a static matching of individual characteristics with occupations' demands and rewards.

In noting the above we do so not to decry the insights of previous conceptual formulations of career development and choice. However, they fundamentally fail as sufficient accounts of the realities of the contemporary experience of 21st century students and workers.

In relation to career development theory, most existing theories leave out or fail to take into account adequately four crucial contemporary elements in career development and choice (Pryor & Bright, in press). First, there is a general failure to incorporate the sheer complexity and range of potential influences on people's careers — in particular, the influences of objective and subjective context. Second, because so much contemporary theory deals with a narrow sense of matching the dynamic, interactive and adaptive nature of human functioning in the world and in making career decisions and taking career action is frequently neglected. Third, 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 is acknowledged more often than actually incorporated into most contemporary formulations. Fourth, that human experience and career development in particular, tends to be laced with unplanned and unpredictable events and experiences which are often crucial and sometimes determinative in the narrative of people's careers, while gaining increasing research interest (Betsworth & Hanson, 1996) and practitioner application (Williams et al., 1998) is still largely uncharted territory for most theories or inserted into them in an ad hoc manner (Patton & McMahon, 1999).

In the contemporary career development literature some major attempts have been made to address such issues at a conceptual level. Three in particular appear promising: contextual/ecological approaches, systems theory approaches, and realist and constructivist approaches.

Contextual approaches can be traced back at least to Super, who emphasised the developmental nature of career decision-making through various formulations (Super, 1957, 1980, 1990). He sought to incorporate life stages, personal theatres (of functioning), roles played by the person, into a broad description of how a person's career might develop and change. Vondracek, Lerner and Schulenberg (1986) stressed the reciprocal influence of the person and the context to produce stability and change in an individual's career development. Their focus on multiplicity of influences appears to follow directly in the Super tradition of a broader preview of the idea of career rather than a reductionist focus on specific decision-making (e.g., Holland, 1985; Dawis & Lofquist, 1984). Those in the field of vocational rehabilitation have long realised that traditional career development and choice theorising has inadequately accounted for the experience of their clients (Jacques & Kauppi, 1983). In recent times writers such as Szymanski and Hershenson (1997) have attempted to formulate a more inclusive understanding of career development in ecological terms by incorporating influences identified in various career development and choice theories into a "constructs" and "processes" taxonomy.

Systems theory approaches attempt to integrate the complex array of career development influences. Richmond (2000, p. 3) gives the following outline to characterise systems thinking approaches:

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> We can use the phrase to refer to a set of tools — such as causal loop diagrams, stock and flow diagrams, and simulation models — that help us map and explore dynamic complexity. We can also use it to mean a unique perspective that sharpens our awareness of wholes and of how parts within those wholes interrelate. Finally, systems thinking can refer to a specific vocabulary with which we express our understanding of dynamic complexity.

Patton and McMahon (1999) sought to apply a systems theory approach which they have designated as the systems theory framework to careers. Drawing from the career research and theory literature in much the same way as the contextual/ecological writers have, Patton and McMahon sought to link the content of this literature with the structures of open systems theory. Their systems theory framework (STF) conceptualises systems within systems where the boundaries between such systems are permeable and the influence of systems on one another is recursive. The central focus is on the individual as a system within a larger social system within a larger environmental-societal system. This approach allows the authors to link (although in a rather inexplicit way) influences on the individual's career development such as the global economy and national politics with very particular influences such as interests and sextype appropriateness conceptions. A challenge for the systems theorist is to accommodate personal constructions into the system. In other words, are the systems they describe a reflection of an objective reality, or do they reflect the individual's take on reality?

Realist and constructivist approaches to career development place varying emphasis on what we know and understand and therefore how information in the world influences our career decisions. The realist approach suggests the world is an objective fact that can be discovered and therefore there are certain and definite influences on career decision-making in that world. The constructivist view is that our knowledge of the world comes from our constructions of it. Therefore, it is how we think and feel about the world that influences our career decisions rather than any objective facts.

The combination of the realist 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 & Valach's (1996) "constructivist epistemology" may be the closest approach to relativism in contemporary career development theory. Robson's (2002) realist view of science has features which have influenced our theoretical formulation and thinking — in particular:

- Science invents theories to explain the real world and to test them by rational criteria.
- Explanation focuses on how mechanisms produce events.
- Laws are characteristic patterns of activity or tendency of a mechanism
- The real world is stratified and social reality incorporates individual, group and institutional, and societal levels.
- Events are to be explained even when they cannot be predicted.

Delanty (1997) has suggested 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 the Young and Valach (1996) description of "career" as a process of construction through action, a way to frame, organise and describe behaviour over time is one with which we would agree. 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.

Consider a mirage in a desert, for example. The dehydrated individual may have this experience and it may be real enough to cause that person to head out further into the desert in search of it.

This can be understood as a mistaken observation arising from a survival need of the person. Thus, errors in our construction of reality may still be quite influential in thinking and behaviour while remaining nonetheless false. In fact the effect will be deleterious on the person on occasions, as in this example. In the career context this highlights the need for counselling as a form of reality checking.

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 what aspects of that reality we choose to pattern together and on which we focus our attention. Because reality is so complex it is therefore inevitable that humans will select and construct their vision of it in order to function and adapt to that reality as they experience it. However, though influential such "constructions" may still be incorrect. A major component of some cognitive behaviour therapies is to focus on and challenge misconceptions which have crystallised into faulty personal beliefs.

CHAOS THEORY

From the insights of the three preceding perspectives we sought to conceive career development and choice contextually, ecologically, systemically and from a realist-constructive epistemology.

Chaos theory emphasises complexity and change. It is a systems theory approach in which complexity is acknowledged as contributing to the susceptibility of a system to change. Complexity also influences the effects of change in that the more complex a system, the higher the potential for a small change in the initial conditions of the systems to reverberate through the system causing major changes. For example, to use a physical example, a small infection of virulent virus may be sufficient over time to kill a very large animal or human being.

Chaos theorists contend that small differences can have major impacts on complex systems, and neglecting such differences as "irregularities" risks overlooking key aspects of the phenomenon under scrutiny. One major consequence is a tendency to conceptualise events as more predictable than they are. It then follows that randomness is simply a consequence of inadequate measuring tools and our incapacity to control all the influences on the phenomena. Contrary to this, chaos theory characterises complex dynamical systems as inherently unpredictable. Order will emerge over time due to such systems' capacity to self-organise (Lewin, 1999); however, making precise predictions at any one point is not possible. An obvious and germane example of this is our inability to predict the weather accurately for any long period of time. However, chaos theorists in general maintain that the vast majority of the systems in nature are of this type — chaotic but self-organising (Sanders, 1998).

When an initial change impacts iteratively through a complex system, the configuration of the elements of the system may change radically. This is called a phase transition. It is an action consequence of such 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.

Chaotic systems eventually (that is, over time) self-organise into patterns. A central component of understanding this process is the notion of attractors. An attractor is typically defined as "the end state toward which a dynamical system moves" (Sanders, 1998, p. 60). Four major categories of attractors have been recognised:

1. Point attractor — the characteristic pattern of which is to be drawn to or repelled from a particular activity or state.

For example, a marble thrown into a bowl will eventually settle motionless at the bottom of the bowl at a single point. Gharajedaghi (1999) identifies such a pattern in human behaviour as people pursuing "natural instincts."

2. Periodic attractor — the characteristic pattern of which is oscillation between two or more activities or states. This is a repeating and self-maintaining process. In the context of work an example of a periodic attractor is the increase in the demand for employment in the Australian snowfields as winter approaches and the decline in this demand as winter recedes.
3. Torus attractor — the characteristic pattern of which is organised complexity repeating itself. It is a typical end state of open systems. Such an attractor is goal seeking, tending to order ("neg – entropic") and achieving a final state by any number of different developmental routes. Seasonal farm labourers in rural Australia exemplify an employment torus attractor. With the changing of climate, weather and the seasons, such farm workers travel the country in set patterns as various crops are ready for harvest and other farm activities are regularly required to be done.
4. Strange attractor — the characteristic pattern of which is unpredictable complexity emerging as a self-organising structure or shape over time. The trajectories or paths toward the attractor are random, self-similar but never repeating. In this sense "unpredictable patterns emerge out of stylistic preferences of purposeful actors" (Gharajedaghi, 1999, p. 60). Strange attractors are characteristic of chaotic systems.

Phase transitions can occur when the system moves from one attractor to another. For instance, grains of sand poured onto a heap of sand can cause the sudden collapse of the pyramid, resulting in a new form. Where at one moment the addition of an extra grain leads to the heap growing larger, at the next moment, a similar addition of a grain results in the collapse of the original structure and the formation a new one. Tsonis (1992) defines attractors as feedback mechanisms. Traditional theories of career have tended to assume feedback models that were fixed. For instance trait-factor models of career (e.g., Holland, 1985) would predict that variables such as personality or interest-type act as point or periodic attractors. The type determines a defined range of ideal career choices or in extreme cases leads to a fixed point or specific career. Other theories such as gender-stereotype approaches (e.g., Gottfredson, 1981) seem to assume a torus attractor model constraining career choice. We wish to argue that the strange attractor (Chaotic) model more accurately captures career decision-making as it is experienced in the 21st century world of work (Watts, 1998).

Thus general chaos theory provides insight into complexity, adaptation, change, chance, creativity and history as systemic characteristics of individuals and the environments in which they operate.

A GENERAL STATEMENT OF THE CHAOS THEORY OF CAREERS

Chaos theory repudiates the idea that we live in a static, linear, cause-effect world in favour of a world of non-linear, dynamical systems, full of motion, change and emerging events. The future is not viewed as some image a long way off — the future is as close as the person's next choice, next thought and next action. While the world in its complexity may appear disorderly there is beneath the disorder a constantly emerging order, a self-organising tendency to pattern and relationship. Such patterns are created by the attraction or active relationship of the elements of the system.

The chaos theory of careers seeks to understand individuals as complex, dynamical, non-linear, unique, emergent, purposeful open systems existing and interacting with an environment comprising systems with similar characteristics. At present our focus is on delineating these characteristics from the career decision maker's perspective; however, we do acknowledge that other perspectives may be equally valid, such as those of labour market economics, employment prospects, sociological, political and so on.

Complex Systems

The realisation that we must deal with reality in its complexity rather than in reductionist terms has become a field of intellectual endeavour in its own right (Lewin, 1999). In systems theory terms the multiplicity of component influences can be designated as "elements" or "subsystems" of the person and may be both configured and construed in a variety of ways at varying levels of generality. For example, a particular event remembered (such as a personal abuse incident) may be an element at a specific level of generality, thereby resulting in the individual wanting to avoid occupations with the potential for interpersonal conflict. On the other hand, a series of learning experiences as a high school production actor may later constitute a developed exhibitionist trait resulting in the individual seeking teaching and training occupations.

Dynamical Systems

This characteristic of chaotic career development emphasises the interactive and interdependent nature of subsystems, systems and supersystems constituting individuals and their career development context. Dynamical systems in chaos theory are sensitive to change. As a general rule humans seek to respond to change by adaptation often through learning via the process of feedback loops with their environment. This is why some writers (e.g., Gharadejah, 1999) designate these systems "adaptive". The disadvantage of such a term is that it assumes or at least implies that systems will be successful in response to change. There is no guarantee of this. Our experience of dealing with people with disabilities returning to work convinces us that responses in terms of somatisation, abnormal illness behaviour, reactive motivation and the development of a "victim" mentality are very seldom adaptive for either the person or their employer.

Non-linearity

Unlike Patton and McMahon (1999) who use the term non-linear in an apparently directional sense, in chaos theory the term is used to describe the lack of proportionality between an initial perturbation of a system and the final impact as a consequence of iteration through a complex system. In other words, often very small initial changes in complex systems can result in very powerful changes in the system as a whole. For example, your brother-in-law asks you to write a small ad for him about his house being for sale. His real estate agent compliments you on the ad's tone, wording and originality. You go along to an "open inspection" day for the property to see what effect your ad has had. To help out you take a few people through the dwelling and find that you are good at answering their questions. You find it enjoyable so you do it again next week. By this time the real estate agent has asked you to write some captions for their magazine for an attractive fee. They say you have a gift for this type of work and they would like you to "come on board", they will give you some training and if you perform you'll have a new career. All this from doing a favour for your brother-in-law! A more spectacular example is that an event such as someone initially contracting severe acute respiratory syndrome (SARS) in China in early 2003 can by midyear threaten the viability of a number

of international airlines and literally hundreds of thousands of jobs throughout the world.

Uniqueness

One of the big issues in the history of the psychological study of individual differences has been the idiographic-nomothetic issue. That is, the degree to which such differences can be understood and assessed normatively (by comparison with others along common dimensions) versus needing to understand and respect the uniqueness and individuality of each person. While the nomothetic approach has flourished in the career development field through the growth of psychometric assessment in particular (Pryor, 1991), by comparison focussing on the individual qua individual is uncommon (for an exception refer to Tyler, 1978).

In the chaos theory of careers the uniqueness of the individual is understood in terms of the special construction and configuration of each person's subsystems and interactions with supersystems. In the chaos theory of careers through the "strange attractor" all human experience is historically unique. For example, if we take a routine task such as a personal assistant following set procedures before the beginning of a regular meeting. This person arranges the chairs, ensures the agenda is ready, confirms the attendees, informs the chairperson and so on each time with clockwork precision. Even if we assume that the personal assistant does exactly the same tasks exactly the same way from one occasion to another — the person's experience is still unique on each occasion, whether this is realised or not. For example, on the second occasion the same actions are performed but with some knowledge of having done the same actions on a previous occasion. This means that the person is not the same on both occasions. Technically neither are the inanimate objects since they are being affected by time and movement as well although this is usually less obvious. If the personal assistant's actions are repeated again and again and again, even if the individual is not consciously aware of it this knowledge, however construed and stored in the memory, alters the person each time. This may not matter most of the time. However, it may be contributing to a "phase transition", at which point the personal assistant might decide to quit the job because it is too repetitive and boring. The phase transition is the point at which individuals act or react to alter the pattern of their lives.

Emergent Systems

Chaos theorists such as Holland (1998) characterise open systems as emergent in nature. In doing so they emphasise the importance of considering a system functioning as a whole rather than simply as an aggregation of elements. In fact, the properties of the system cannot be reduced simply to the collective properties of its components. Capabilities and states "emerge" from the elements of the system functioning as a system that are new and not able to be identified with any particular element of the system. This is often referred to in the organisational context in positive terms as synergy or synergistic functioning (Gharadejhi, 1999). Many organisational takeovers are justified in these terms, especially where one company takes over another in that company's supply or distribution network. However, emergence can also function negatively in the career development context. For example, take the case of the truck driver in his early 30s, married, two children, mortgage and having just started his own subcontracting hauling company. After contracting a nervous system disease, he finds he no longer has the coordination to drive large vehicles and eventually to drive at all. This combines with his heavy debt on both his truck and his home causing him to lose both. The previous stresses in his marriage are exacerbated by these financial problems and his frustrations with his limitations causing his wife to take away the children whom the man, in fits of temper, now threatens physically. The emergent state for the person considered in systemic terms is a phase transition into despair, loneliness, grief and loss.

Purposefulness

Particularly when considering human beings as systems, and because chaos theory in general emphasises the development of order in terms of patterns of functioning of a system, the chaos theory of careers views individuals as purposeful. In systemic terms they are goal seeking. Individuals have the capacity to achieve the same end (or state) by a variety of different means. Thus, for example, someone could secure job satisfaction by juggling the mix between rewards from vocational and avocational activities or just change jobs. Purposefulness is not just learning or adapting to internal subsystem configurations or changes, or to external supersystem developments, it is principally about creating responses. Part of the dynamical quality of individuals viewed systemically is their capacity not simply to react but also to behave creatively to alter both themselves and their environment.

It is this capacity for creativity that challenges traditional cause and effect explanations of human (career) behaviour. Traditional matching approaches fail to account for the emergent properties of people including purpose, meaning and emotion. It is significant that in general, the career development literature has either ignored or failed to come to terms with such influences.

Open Systems

Traditional research paradigms based on laboratory models of variable control and manipulation are at best crude approximations to reality. In their attempts to reduce the interactivity of variables they cancel out the reality they are attempting to research. This is the essence of the difference between a closed system approach and an open systems approach which emphasises complexity, interdependent influence, capacity for change, randomness and creativity. The chaos approach provides a way of understanding career-related behaviour. For instance, people who have remained in the same type of job for many years with little satisfaction or achievement, may be each functioning with a periodic or torus attractor that constrains their career choices. The task may be to identify these narrow parameters (perhaps concern about security, unwillingness to travel, institutional dependence, obeying a parent's wishes and so on) and then introduce other factors and by increasing the complexity of the perceived influences to demonstrate to the individual the validity of other career trajectories. Equally this approach allows us to understand radical changes in career direction — "the drunken man's stagger through the world of work" as we have previously described it (Bright & Pryor, 2002). This can be seen in terms of phase shifts leading to new attractors. Using the analogy of the sand pile, the traditional view of career success was to build an ever greater pile of sand with the addition of each grain until you had a heap (such as climbing the corporate ladder with increasing material rewards). In the chaos theory of careers phase shifts may occur at any time leading to the pile reconfiguring (such as leaving the corporate world to start up an antique furniture shop). This reflects the system arranging itself around a new attractor — it produces an alternative structure, not necessarily (in traditional terms) a lesser structure. This approach encourages a greater awareness and acceptance of change and also highlights its unpredictability and far reaching consequences. This then, provides a good platform for introducing notions through career counselling such as the

development of skill portfolios, hedging career options (or keeping several irons in the fire), dealing with the consequences of significant injuries, preparing for happenstance events and so on.

SOME IMPLICATIONS

There are many implications of such a theoretical approach. As Payne (1997) notes an advantage of systems theory approaches is that they do not reject more molecular theories but allow their incorporation within the more molar framework. The chaos theoretical approach enables the development of taxonomies of influences on career development. Such taxonomies may be constructed by the individual in collaboration with a career counsellor. This yields the advantage of directing attention to the multiplicity of potential influences on career development and choice for the researcher, counsellor and client (Szymanski & Hershenson, 1997).

Another implication of the chaos theoretical approach is a research agenda that is less constrained by tight definitions of cause and effect and traditional laboratory format research (Robson, 2002). The research focus is more on patterns of influence not defined by a single traditional theory but as inclusive as a total systems framework taxonomy (Patton & McMahon, 1999). For example, the notion of influence does not presume a directionality of causation. Thus, a parent who is a police officer may influence one son who sees his father as a hero to become a police officer while another son, viewing his father as an exploited "mug", may be driven away for considering any occupations in law enforcement.

Further, the chaotic theory of careers draws no necessary distinction between realist and constructivist approaches. We see no essential reason why variables cannot be both constructed and real — the construction is in terms of what system is chosen as the perspective from which to undertake either research or counselling.

An additional implication is that by broadening both counsellor and client perspectives through a focus on the whole range of career development influences the chaos theoretical approach can demonstrate what may be able to be changed and what may not for any one individual and counsellor. In this way a more realistic perspective can be achieved with respect to the rationality of career decision-making. For example, the role of happenstance is appropriately included in the taxonomy of influences which makes such a theoretical framework much more relevant to the vocational development of those with disabilities, than most traditional theories.

SOME CRITICISMS OF SYSTEMS THEORY APPROACHES

In outlining the chaos theory of careers we are conscious that not all workers in the field have been impressed with systems theory conceptualisations. Given that chaos theory is a systems theory it is important to attempt to provide some responses to several of the most frequently cited problems for such approaches. In this section some of the most common objections and limitations of such approaches are addressed.

Such Approaches Are More Expository than Explanatory

The point here is that while such approaches outline connections and configurations of influences, no account is given of how things happen or why particular connections exist.

One response to this is to say that until all the influences and their connections are appropriately outlined, the demand for explanation is premature. In other words, taxonomy and description precede explanation in scientific endeavour. Another response could be in terms of questioning the meaning and form of explanation being required. This becomes especially relevant when dealing with complex and holistic phenomena. Immediate and linear cause-effect conjunction may not be the most appropriate or the most useful form that explanation could take. For intance, as Casti (1994, p. 84) points out, Darwin's theory of evolution is essentially more descriptive than predictive. It does not provide "precise quantative predictions". If the mathematics are correct then the demand for precise predictability as the criterion for explanation, appears quite literally impossible to attain simply because it would require an infinite number of absolutely correct observations as a prerequisite. The general point to be made is that unpredictability is not a function of our current limitations of measurement and mathematics, rather it is intrinsic to the nature of natural phenomena. It cannot and will not in some precise future state of psychology or any other science, be measured or analysed away (Sanders, 1998).

Stewart (1995, pp. 58–59) observed that a non-linear systems perspective will change our conceptions of what we should be trying to do in science.

> [T]his approach again changed the meaning of 'solve'. First that word meant 'find a formula'. Then its meaning changed to 'find approximate numbers'. Finally it has in effect become 'tell me what the solutions look like' ... [T]his move toward an explicitly qualitative theory is not a retreat but a major advance. For the first time, we are starting to understand nature's patterns in their own terms.

Such Approaches Are Over-inclusive

Too many variables are cast into the melting pot of a system on the assumption that they should be in there and often regardless of whether they are relevant or not.

One response to this could simply be that this is a consequence of attempting to deal with complexity. Of course we would like to be able to restrict the range of relevant variables to a small number that could be intensively investigated. But this is to wish for convenience not reality. As for deciding what influences what and how, these are empirical questions derived from the chaos theory which we are at present continuing to investigate (e.g., Bright, Pryor, Wilkenfield, & Earl, 2003). As for practical relevance, our view is that it is better to start off being over-inclusive and then attempt to rule out some influences on the basis of empirical data and in the case of an individual counselling client exclude on the basis of personal history (e.g., Pryor & Bright, in press).

Systems Approaches Are so Generalised that they do not Apply to any one Situation (Everything is Open to Personal Interpretation)

A number of things that can be said in response to such an objection. First, it is just plain false that systems theory approaches cannot be applied to specific situations. For example, Patton and McMahon (1997) demonstrate through case study how their systems theory framework could be applied to a specific individual to provide insight and direction. Second, this criticism is better directed at constructivists who do not appear very interested in the real world. Our approach seeks to take into account clients' perceptions of themselves and the world as part of the counselling process. However, the chaos theory of careers is realist in the sense that the counsellor would seek to test these perceptions against his or her direct knowledge and experience of the world, expert impressions and objective data about the client. The difference in chaos career counselling is that the client is being understood as a system comprised of interacting subsystems and as a subsystem in a larger system with which he or she interacts. The challenge of counselling in this conception is to understand which are the relevant subsystems, systems and

supersystems for the client's career development and decision-making. In such a counselling process, issues of complexity, change, recursive influence, adaptability, uncertainty and chance are likely to figure prominently. Like some writers, such as Gelatt, (1989) we do not always see decisiveness as the best outcome from career counselling — sometimes indecisiveness can be the most appropriate and the most adaptable response in a complex, changing and unpredictable world.

ON STABILITY AND INSTABILITY

The previous section's comments ventured into the field of interventions as conceived in chaos theory. It is important to consider how the need for intervention in careers can be conceptualised in the chaos theory of careers. Systems theorists often distinguish between stable and unstable systems. Stable systems are those which are robust in their resistance to changes in their internal subsystems and the external environment. An authentic Rolex watch could be considered an example of a stable system. It is well engineered and so does not wear out easily. It is robust in that if dropped from the hand to the ground will usually keep ticking away.

On the other hand chaotic systems are typically unstable since they are by nature sensitive to change. In such systems equilibrium is the exception rather than the rule. This is so because the more complex a system is the more numerous are the possible disturbances, fluctuations and perturbations that may threaten its stability. Therefore, the instability of a system is a function of the type and magnitude of the disturbance on the one hand and the susceptibility to perturbation of the system on the other. Thus the instability experienced by a system may have its origins either internally or externally or both at the same time. A systems approach dealing with complexity may provide greater insight than more circumscribed approaches. For example, Super's (1957) developmental theory of careers identified stages which he ascribed to psychological mechanisms. However, a wider view of the phenomena would have noted that Super's stages in adolescence for example closely coincided with the United States education system transitions at which points students have to make career relevant decisions. Super's narrow perspective lead him to internalise such developmental changes when they are much more convincingly explained by reference to the constraints of the external environment.

The use of personality scales in counselling for career decision-making can be understood in these terms. For example, assessing the Big Five's Neuroticism (which we would prefer to call "Emotional Orientation" — see Pryor & Taylor, 2000) can be seen as providing an indication of how susceptible the person is to the pressure and the challenges of change in circumstances and some of the ways the person responds emotionally to such disturbances. Thus, for example highly anxious individuals who are informed of being outplaced from their organisation may react with fear, worry, physical symptoms and various ineffectual forms of behavioural reaction. The elements of their psychological system are so configured as to make individuals less stable than others with a more phlegmatic disposition. With respect to such an occurrences the anxious individuals may be more cognitively complex and vigilant with respect to threat as elements of their constructed perceptions of reality.

SOME FUTURE DIRECTIONS

There are a variety of ways in which the worth of any theory can be evaluated. Good theories are those which expand our understanding and frame future action. At this incipient stage of development we would not presume to claim such advantages.

However, we believe that the chaos theory of careers has sufficient promise for the following reasons.

Integrative Worth

Along with other systems approaches we believe that the chaos theory of careers has the potential to incorporate many of the extant career development theoretical formulations. Our belief that it is possible to be both constructivist and realist implies that there may be equally valid, useful and existent perspectives for perceiving and organising phenomena and experience. In so far as there is evidence for other career development theories, they are all endeavours to describe and explain supersystems, systems and subsystems.

Heurist Worth

We believe that the theory has the taxonomic virtue of inclusiveness. The value of this is that it makes theorists, researchers and counsellors broaden their preview of what is going on in a person's career development. Attention is drawn to neglected areas such as chance, the media, emotion, spirituality, the nature of family influence and "the geography of career choice". These latter two areas are directions in which our own current research efforts are being directed.

Explanatory Worth

As we have earlier observed we do not see the value of explanation exclusively in terms of cause and effect relations confirmed from predictions and tightly controlled empirical studies. While it may be possible to frame aspects of the chaos theory of careers in these terms, we also want to account for explanations such as individual differences in the efficacy of counselling interventions for career choice. Why is it that some clients frame their experience in broad developmental terms, while others' focus is more on career as a societal role, while others see it as a problem solving task and so on? The fact that their clients vary in such ways frequently makes responsive career counsellors become notoriously eclectic in choice of theoretical basis for their work. The constructivist and realist perspective of the chaos theory of careers with an emphasis on individualism of perspective on the one hand and generality of influences on the other, we believe offers the possibility of not only theoretically justifying existing practice but also providing new integrative possibilities for broadening individual counsellors' interventions with clients.

Provocative Worth

Theoretical approaches such as the chaos theory of careers intend to challenge the pervading theoretical and empirical zeitgeist. We want to emphasis "influence" rather than "cause" since we believe that effects may be contradictory — as earlier observed in career decision-making someone may be drawn to or repelled by an occupation as a result of the fact that a parent worked in that particular occupation. This of course was an observation in the clinical context made by Sigmund Freud with defence mechanism formulations such as "reaction formation" This itself suggests that career development research might need to return to Freud-like methods of intensive case studies for new insights into the complex, dynamic and multilayered process of career development and choice. The importance of counsellor experience and qualitative research as sources of data for theoretical as well as empirical understanding, demands reassessment (McMahon, 2002).

Practical Worth

One goal of the chaos theory of careers is that it will foster the establishment of a nexus between theoretical conceptualisation, research endeavour and face-to-face career counselling practice. This triumvirate must be made to integrate otherwise our theory will lack application, our research will lack relevance

and our counselling will lack validity. The chaos theory of careers aims to facilitate what we believe to be this noble aim. For example, our theoretical ideas grow out of our experience dealing with clients; our research endeavours attempt to deal with reality as people experience it rather than in some rarefied research design and the outcome of our findings we are trying to translate into specific techniques for use with individuals facing career choices (Bright & Pryor, 2003).

A FINAL COMMENT

Attempts to converge major extant career development formulations (e.g., Savickas & Lent, 1994) were not wholly successful because many of the theories were highly reductionist in nature and focused on different and narrow phenomena. Recent formulations, in particular systems theory, have embraced the notion of complexity of influence in career choice. This is a significant breakthrough, and applications of this theoretical approach have been adumbrated. In one sense our chaos theory of careers approach can be classified as a special form of systems theory. The major benefits we see of our approach are that chaos theory provides a more powerful framework for understanding discontinuous change and unpredictable career decisions. At this stage our model relies on analogy to chaotic systems. However, we also believe that it will become increasingly obvious that reality comprises more open than closed systems, dynamical rather than stable systems, non-linear than linear relationships and adaptive rather than static structures. We agree with Sanders (1998) that "...the fundamental structure of the universe is dynamic behaviour expressed as a whole, through its interconnections and relationships" (p. 62).

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. At this point we are very much in agreement with the insights of writers such as Leong (1996, p. 341)

> Our theories fail to take into account ... emergent and self-organising properties in complex adaptive systems. All too often our practice and the theories that guide them are based on simple models that are linear, univariate, single equilibrium and static ...Vocational psychologists and career counsellors need to integrate the science of complexity into their theory and practice — not because it is the latest scientific fad or quick fix but because it more accurately reflects the nature of the phenomena with which they deal.

After all it was no lesser figure than Albert Einstein, himself no stranger to complexity, who once said, "Things should always be kept as simple as possible ... but not simpler". In attempting to develop the chaos theory of careers we continue to grapple with what often seem like mysteries.

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