Chaos, complexity and COVID-19: The Chaos Theory of Careers in 2022

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Abstract
In acknowledging the contribution of the Australian Journal of Career Development (AJCD’s) continuing work to the career development field, this paper briefly outlines the Chaos Theory of Careers (CTC) and its empirical support. Issues relating to closed and open system validation are canvassed. Two types of COVID-19 case study are analysed: a diary study and the pandemic event itself. COVID-19 confirms the CTC’s claim that we all live on the edge of chaos.

Keywords
Chaos theory, career development theory, COVID-19, pandemic, systems theory

From the second volume of the Australian Journal of Career Development (AJCD), one of the authors of this paper has been privileged to be part of its ongoing contribution to knowledge in this field (Pryor, 1993). Moreover, the first articulation in published form of the Chaos Theory of Careers (CTC) appeared in the AJCD in 2003 (Pryor & Bright, 2003). Subsequently, the current authors have been very appreciative of frequent opportunities to communicate their ongoing theoretical ideas, research findings and counselling insights over the last two decades through this journal. In particular, we were especially grateful to former editor Dr Peter McIlveen who was generous enough to devote a specific issue of the AJCD to the CTC in 2014. In our view, this journal has had a significant impact in providing an avenue for both Australian and international work to become known and utilised by those working in career development throughout the world.

It would have been tempting in such a celebratory issue to outline the development of the CTC, survey its impact on current career development theorising, review the research evidence for its main tenets, demonstrate through follow-up studies the effectiveness of CTC-based interventions, catalogue a range of counselling techniques derived from the theory, delineate a general strategy for chaos-based career assessment, thinking and counselling and finish with what is yet to be done. The authors have resisted this temptation for two reasons: first, because we have in effect done it before in this very journal albeit 8 years ago although there have been developments since that time (Pryor & Bright, 2014); and, second, we have more recently undertaken such an outline elsewhere (Bright & Pryor, 2019) and therefore saw no need to reiterate it here.

The aim of this paper, therefore, is to provide a brief overview of the key tenets of the CTC, the empirical support it enjoys and to highlight how we believe this theory continues to contribute to our understanding of career development behaviour through considerations of case study validation with special reference to recent world events, in particular the COVID-19 pandemic.

Brief outline of the CTC
Chaos theory understands reality in terms of complex dynamical systems. Such systems are embedded in one another and range from subatomic particles to the whole universe. Such systems demonstrate two fundamental capacities: self-organisation and change. Chaotic systems are also sensitive to changes in initial conditions and the changes that occur in such systems are typically non-linear in nature. As a result, these systems interplay between tendencies to stability and chance variation. An example of this is the human body which has numerous complex subsystems (vascular, neurological, endocrine, immune, sensory, cardio, orthopaedic, etc.) which illustrate its embeddedness...
and which in turn, function to assist the body to grow, develop and reject infection (self-organisation) but which can also be subject to impacts such as accident, disease and trauma (chance variation).

In terms of careers, individuals are complex dynamical systems embedded within a vast array of other complex dynamical systems which include family, location, culture, labour market – local, national and international, economic conditions – local, national and international, technological innovation, religion, politics, trade unions, employing organisations, transport, health systems and so on. Of necessity individuals have to act and make decisions that demonstrate patterns of behaviour in response to these other complex dynamic systems in which they are inevitably embedded, called attractors, characterised by feedback mechanisms: negative feedback behaviours precipitate tendencies to stability (self-organisation) and positive feedback behaviours result in creative, novel, unpredicted and random responses (chance variation). For some individuals, career development is easy but for many the challenge can be daunting since the complexity, interconnectedness and changeability of the influences on the decisions to be made, can never be fully known or controlled. Choosing and living with uncertainty can be a fearful prospect but one which is real and which the CTC can help individuals to recognise, to understand, to prepare for, to adapt, to choose despite, to react to and if necessary, to recover from.

Just as the branching of plants, the coastlines of countries or the neurological configurations of the human brain, create patterns over time through the interactive processes of self-organisation and change, so too individuals’ careers can be viewed similarly as fractal patterns of the same processes which can be explored and explicated through thematic techniques such as, inter alia, narrative, structured assessment, journaling, mind maps, collages, card sorts and counselling. More elaborate accounts of the CTC can be found in Pryor and Bright (2011) and Bright and Pryor (2019).

### An empirical basis of support for the CTC

As indicated above given that we have undertaken similar CTC validation surveys of research data previously, it is not our intention to list in detail here the numerous studies that could be cited in support for specific tenets of the CTC. Rather we will adumbrate the range of such tenets covered and discuss the kinds of data gathering techniques used in this work. In addition, we discuss further issues associated with providing empirical support for the CTC.

Table 1 contains in summary form, some of the CTC tenets for which there is an existing body of research support, each with a listing of the types of research methodology used. It can be seen that there is a large body of evidence for the complexity of influences and the impact of chance on career development. There are a series of studies supporting the effectiveness of CTC-based interventions but phase shift, luck readiness and attractors are more limited in validation support due to limited interest, understanding or awareness from researchers. It may also be the case that these concepts along with others from the CTC are not susceptible to an investigation by the methods traditionally used in career development research or willing to be published in academic journals.

While it has become almost a commonplace to find in any career development textbook a listing of the shortcomings of theoretical approaches based on positivist assumptions in the attendant literature, there often still appears to be the prevailing view that research undertaken in laboratory-type conditions, with controlled variables, having before and after intervention evaluations, deductively developed hypotheses, using validated assessment measures, yielding objective mathematical data and analysed by accepted statistical methods, remains the preferred way to provide empirical support for a particular theoretical formulation. The problem here is that such research is usually most applicable to theories that share positivist and reductionist assumptions and tenets.

| CTC tenet                                                                 | Evidence summary source                      | Methods of data collection                      |
|--------------------------------------------------------------------------|----------------------------------------------|------------------------------------------------|
| Complexity – multiple interconnecting influences on career development    | Vondracek et al., 1986; Pryor & Bright, 2011 | Survey                                         |
| Chance – impact on career development                                     | Kim, 2022                                    | Real-world observation                          |
| Effectiveness of interventions based on the CTC                          | Pryor & Bright, 2011; Bright & Pryor, 2015   | Literature review                               |
| Strange attractor and fractal as descriptors of the patterns of individuals’ career experience | Javensivu, 2020                              | Case study                                     |
| Luck readiness dimensions                                                 | Kim et al., 2014                              | Psychometric assessment                         |
| Phase shift                                                              | Seibert et al., 2013                          | Factor analysis                                 |

Table 1. Brief summary of empirical support for key tenets of the Chaos Theory of Careers (CTC).
Post-modernist approaches to career development theory such as the CTC are open systems formulations. They seek to explain reality in terms of the complex interaction between the multiple, embedded, codetermining, emergent and non-linear structures and systems that constitute the real world as we experience it not the rarefied atmosphere of the laboratory. The real world, for example, is not circumscribed in terms of potential influences on individuals, those influences are not often easily separable or discernible, they can be unpredictable or unforeseen, they may be unable to be controlled, restrained or resisted, they may be iterative and recursive in impact. A closed system research approach based on positivism by itself is insufficient to capture the richness of this reality and its relevance for the validation of an open systems theory.

“In open systems we can be in a position to explain some event after it has occurred even though we were not able to predict it. In closed systems, explanation and prediction are symmetrical; if we can explain, we can predict, and vice versa. But in open systems, the actual configurations of structures and processes are constantly changing, making definite prediction impossible. This means that while the future cannot be predicted, the past can be explained by establishing the particular configuration which was in existence.” (Robson, 2002, p. 41)

The explanatory power of the CTC as an open systems theory may be appreciated more clearly through the use of case studies. Case studies can be understood as explorations of individuals’ career fractals. The strength of case studies is that they permit a consideration of the context in which behaviour is expressed and provide examples that are less abstract in nature typically featuring expressed behaviour. However, this does not mean that scientific principles can be ignored or should be abandoned (Snowden, 2017). As Snowden (2020) points out ‘there is a massive difference between understanding that everything is entangled, small things can catalyse significant change and unintended consequences on the one hand and deluding yourself that you can or should see the system as a whole.’ One of the implications of this warning is that context is crucial. It is crucial both in being able to understand the behaviour of a system, but it is also a limiting factor for any attempt at making generalisations about other systems no matter how similar. In other words, just because a system appears to operate in a particular manner in a particular context, is no guarantee that a similar system will operate in the same way in a different context. The attempt to draw general principles from case studies for application in other contexts is an attempt to impose positivist and reductionist thinking on complex dynamical systems. The result, as is shown in the management literature, and to some extent in the psychological literature, is a crisis of replication (Diener & Biswas-Diener, 2022).

However, while this remains true for case studies focused on individuals or very specific events, with the attendant limitations of subjectivity of observation, editing of reporting, imposing of narrative and interpreting of outcome, if the case study is of a nature that vast numbers observed, experienced, discussed and interpreted it, then many of the shortcomings of case studies for research purposes might be if not eliminated, at least significantly attenuated. COVID-19 overcomes many of the typical limitations of case studies such as subjectivity of selection of material, observation of processes and outcomes as well as of interventions given. There are many observations that are open and many outcomes observable. The COVID-19 pandemic represents a global chance event, or work-life shock, which we argue can be described better in the CTC than traditional or alternative career theories.

In the following, first, we will analyse a recent COVID-19-based diary study as an example of a multiple case study exploring responses to uncertainty and then consider the pandemic event itself as a global case study illustrating and validating fundamental concepts in the CTC.

**An empirical study of COVID-19 interpreted in CTC concepts**

A diary study was conducted with fourteen men and women, all working parents living in France during COVID-19 confinement (Hennekam et al., 2021). Their study commenced in March 2020 when a compulsory lockdown was imposed in France, and ended on the 4 May 2020. The men and women were asked to write every evening of their experiences.

The parents experienced threats to their family identity and also their work-related identity. This led to a reflection on who they were as people, and finally to the development of refined identities, driven by internal beliefs more than societal norms. For some of the group, their work came to a halt, causing threats to their work identities. For others, work demands increased as did their childcare responsibilities. The interconnectedness of different domains of the participants’ lives is clear to see, and supports contextualist approaches to career development theory and practice.

The transformational journeys reported by the participants that resulted from a chance event (COVID-19) are not surprising from a CTC perspective. These included a rejection of notions of being the perfect worker or parent, and accepting imperfection; a feeling of being lost followed by a realisation that one must take action; and becoming stronger and more resilient as a result was reported by one participant. For another there was a trajectory from frustration at the blurred boundaries of work and parent, to a realisation that this frustration cannot continue, to an accommodation and determination to focus on positives and experience gratitude.

Common themes included initially experiencing a sense of loss, frustration or feeling lost, which several weeks later frequently led to insights into their own attitudes about work and homelife causing them to reappraise and adjust their outlook. Most reported an increase in
flexibility in how they integrated their work and home identities.

The accounts of the parents illustrated just how quickly their identities began to transform; their sense of being lost (not sure what to do), worthless (feeling surplus to requirements at home with children unaccustomed to their presence) or disoriented (for instance about the time or day of the week). More positively, new patterns emerged, or older patterns re-emerged – for instance one participant resumed a hobby of running, whereas another began to throw off the shackles of social conformity – embracing imperfection and caring less about outward appearances. The study illustrates how the sudden loss of work identity is connected to a sense of self. It illustrates the complex dynamical interconnectedness of not only home and work roles, but also the deeper psychological processes that sustain identity and performance of life roles.

Hennekam et al.’s (2021) study provides valuable longitudinal insights into how individuals react to chance events, and how they reason about them and how this in turn causes shifts in their identity. In CTC terms, we argue this study illustrates the role of chance (COVID-19), interconnectedness and complexity (the multi-domain impact on identity), transitioning from point, pendulum and torus (closed system attractors) to operating on the edge of chaos in the strange (open/chaotic) attractor. It also illustrates the key idea of self-organising systems, emergence, phase shift and fractals.

More generally COVID-19 can be seen to illustrate many of the basic concepts of the CTC including:

1. The rapidity and extensiveness in the rise in unemployment in the worldwide travel, tourism and hospitality industries illustrates the non-linear (iterative) and recursive (reciprocal) nature of change in complex dynamical systems;
2. The changing nature of specific occupations, for example, frontline health workers (including high workloads, hazardous work environments, inadequate resources, concerns for one’s own and one’s families health, uncomfortable and cumbersome work gear, excessive work demands and ambiguous infection control instructions and policies) illustrates system phase shift, self-organisation in response to change and emergence of new patterns of working;
3. The unpreparedness and ongoing nature of lockdowns, isolations, family disruptions and employment insecurity illustrate the importance and stress that CTC places on chance and uncertainty in our personal and work lives.

It would be possible to proceed to multiply examples of how the manifestations and effects of COVID-19 illustrate the CTC conceptualisation. Additional areas derived from Rudolph et al., (2021) could include Occupational health and safety; Work and family; Telecommuting; Virtual teamwork; Job insecurity; Precarious work; Leadership; Human resources policy; The ageing workforce; and Career development.

Ultimately, however, the point is not how many notches one theory or another can put into a research validation belt, but rather the degree to which research and theory integrate to contribute to our understanding of career development. What is still so often lacking in the current research literature, and the Hennekam et al. (2021) study itself is a regrettable example at this point, is an ongoing effort to link and interpret findings specifically in terms of major career development theories such as the CTC.

Conclusion

In one sense what COVID-19 has done is heighten many people’s sense of what the CTC has repeatedly claimed: that all of us, all of the time and live on the edge of chaos. The pandemic has done so by exposing the limitations of and knowledge and control over, our world, our lives and our careers. It is striking that many of the diary excerpts quoted by Hennekam et al. (2021) resemble the accounts given by the thousands of injured clients that both the current authors have heard recounted in the course of their medico-legal practice. Indeed it was bearing witness to these unplanned impactful events on individuals’ lives and careers that in part motivated our original dissatisfaction with traditional career development theories. It started us on a search that led us to the development of the CTC. Those experiencing workplace injury and trauma, frequently report fatigue, stress, feelings of inadequacy, blurred boundaries, a sense of being lost, grief over losing work, awareness of a large amount of space that work took up in their lives, and a resistance to accept their current circumstances.

Living with uncertainty for some is an anxiety-provoking reality and for others it may simply be disturbing. Nevertheless what events like COVID-19 undeniably reveal is that uncertainty is a reality for all of us that no amount of wealth, technology, knowledge or power can ultimately protect us from confronting. It is our hope that within the career development context at least, the CTC will assist individuals to recognise and to embrace this reality since each person has the choice to become either uncertainty’s victim or its beneficiary. Again we wish to thank all those involved in the production of the AJCD over the last three decades, especially all the editors, not only for the opportunities that we have had to share our work but for the journal’s continuing contribution to the career development field.

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