

Career Chaos Inventory: A Validation Test in China

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Abstract: The purpose of the study was to test the reliability and validity of the Career Chaos Inventory (CCI) in China. The original scale was developed by Tien (2017) in Taiwan. Although the cultures are quite similar to each other, we still want to make sure if the CCI developed in Taiwan can be applied appropriately in China. The CCI, totaling 36 items, was composed of three subscales, complexity awareness, repetition and constant, and chances and action. To test the reliability and validity in China, we invited a total of 725 adults to fill out the CCI. Some inventories were also applied to examine the criterion correlated validity. They were Meaning of Life Questionnaire (MLQ), Satisfaction with Life Scale (SWLS), Job/Learning Satisfaction Scale (J/LSS), Career Adapt-Abilities Scale (CAAS), and Personal Growth Initiative Scale (PGIS). For the item analysis of the CCI, the item total correlation coefficients were between .68 and .88, and all items were retained. We then conducted an exploratory factor analysis, it extracted five components, and explained 63.36% of the total variance. The confirmatory factor analysis showed that the five-factor model fit well ($\chi^2/df = 3.767$, SRMR = .062, RMSEA = .050, 90% CI = [.058, .066], TLI = .910, CFI = .921). The five-factor model with 24 items, rather than the original three-factor model fit the Chinese people better. In addition, the concurrent validity results showed that CCI was positively correlated with MLQ, SWLS, J/LSS, CAAS, and PGIS scores (.13 < r < .42, $p < .01$). The Cronbach's alpha coefficient of CCI was .85, and the coefficients for the five subscales ranged from .75 to .91. Therefore, we concluded that the CCI was a reliable and valid assessment for career chaos perception, and was suitable to be applied for Chinese people.

Chaos theory originally emerged in the fields of mathematics and physics in the 1960s. It is known, together with relativity and quantum mechanics, as one of the three major scientific revolutions of the 20th century. In chaos theory, a nonlinear system exhibits complex, seemingly random behavior, and the future state of the system cannot be determined based on a given initial condition. Chaos does not mean disorder but rather implies order and may occur in an orderly manner. The key to the study of chaos is to discover the internal ordered structure hidden in unpredictable, disorderly phenomena, which allows scholars to further explore phenomena that the current paradigm cannot describe,

explain, or predict (Zhou et al., 2006). James Gleick's publication of "Chaos: Making a New Science" in 1987 led to a new trend of chaos research (Trygestad, 1997).

Pryor and Bright (2003) applied chaos theory to the career field. They proposed that, when we

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try to understand various extremely complex and ever-changing chaotic patterns, we build on our past experiences as these constitute our reality. Disorder and order are both inevitable in life. The process of career development is a complex dynamic system in which unpredictable coincidence is an opportunity rather than a threat. A small change may affect an individual's current or future changes. Sometimes this small change is not even seen or felt, but it may be an important opportunity for personal growth and may even change one's life (Pryor & Bright, 2003). These small, accidental contacts can be explained by the chance factor that Krumboltz (2009) considers, and the Chinese describe it as fate. CTC is a career perspective that adopts postmodern thinking. Unlike traditional trait factor theory, adaptation perspectives, social learning and social cognitive theory, CTC emphasizes the interaction between the individual and the environment (Pryor & Bright, 2011), especially adapting to changes in a complex and changeable environment and finding logical order and responses (Pryor & Bright, 2003). Individuals can have the same profession but entirely unique experiences. This complex picture indicates that careers have diverse components and potential systems of influence that are interconnected and interdependent (Pryor & Bright, 2007).

Whether for a college student, a newcomer to the workplace, or a person with a successful career, in regard to career development, uncertainty, change, and work without boundaries are common themes. Uncertainty, change, and work without boundaries often plunge us into chaos. Studying the chaos phenomenon in career development is of great significance for enhancing this process.

The concept of emerging adulthood was proposed by Arnett, an American psychologist, in 2000. Emerging adulthood refers to the period between the ages of 18 and 25. Young people are different from adolescents and adults in this period, making this period unique (Arnett, 2000).

During emerging adulthood, young people are characterized by instability, optimism, independence, possibility, self-identity exploration, self-attention, and high expectations (Arnett, 2000, 2006; Arnett & Fishel, 2013). As society develops, the duration of education is lengthening and marriage is being delayed. Emerging adults' understanding of marriage, work, and life is at a stage of exploration and uncertainty. In contrast to previous generations in China, which the individual's transition from adolescence to adulthood is rapid, the emerging adulthood nowadays is a meaningful construct. Emerging adults tend to marry later, have their first child later, and stay in school longer. The delay of these life transitions has implications for career planning (Domene et al., 2015). Due to its high degree of instability and uncertainty, this period is described as one of the most stressful periods in life (Kuwabara et al., 2007).

In emerging adulthood, individuals transition from family-dependent adolescents to college students or employees who assume independent tasks at work. In these transitions, young people must actively interact with the environment, meet various challenges, and lay the foundation for their working life so that they can revisit and rebuild different aspects at a later stage of development (Konstam et al., 2015). Marshall & Symonds (2021) examined social, economic, cultural, familial, and personal factors that shape the processes involved in young adults' school-to-work transition. The Chinese emerging adults might have particular transition needs since most of them are from a single child household and bear expectations from the family. The career factors considered might include concerns and expectations from the family in Chinese culture for the emerging adults.

In recent years, due to the emergence of new ways of working and the global economic and financial crisis, considerable changes have taken place in the professional world and the labor market (DeBell, 2006; Kalleberg, 2009). The possibility of unemployment, unsafe work, and

temporary work is also increasing (DeBell, 2006). Many studies have confirmed that unemployment can reduce people's happiness (Milner et al., 2013; Paul & Moser, 2009). Today, career prospects seem far less clear and predictable, and job transitions have become more frequent and difficult. These changes require people to develop skills and abilities for quicker adaptation. For emerging adults who are not yet employed or have just entered the workplace, career development is an unprecedented challenge and is becoming increasingly chaotic.

In recent years, integrating chaos theory into a coherent framework accessible to practitioners is an ongoing process. The concept of chaos has gained traction within some college career practice (Schlesinger & Daley, 2016). However, what exactly is chaos? How can it be measured? Tien et al. (2017) developed a Career Chaos Attitude Scale based on the theory of career chaos that aims to integrate perceived chaos as well as the constancy and order contained in chaos to measure individuals' perceptions of career chaos. This scale can help individuals perceive the uncertain state of their careers, understand the phenomenon of chaos, discover their resilience to chaos, seek their inner calling, and determine how they feel about the meaning of life. More specifically, there are three important concepts in Tien et al.'s study: awareness of complexity, consistency, and chance awareness. The awareness of complexity helps individuals obtain clarity and think less simply. Consistency refers to the appearance of repeated patterns in complex chaos. Chance awareness holds that individuals should be sensitive to the unexpected opportunities in chaos and be able to grasp chaos, be adept at using it, and even leverage it to continuously create opportunities for themselves. This research intends to revise the life chaos perception scale compiled by Tien et al., collect data and test the reliability and validity of the career chaos scale in emerging adults. This research will enrich the tools for measuring

career chaos and provide a reliable and valid measurement tool for subsequent research.

Method

Participants

The participants were randomly selected students aged 18-27 ($M=19.77$, $SD=1.90$) at three universities in Jinan, Shandong Province. A total of 725 valid questionnaires were collected. Of the respondents, 209 were male (28.83%), with a mean age of 20.10 years ($SD = 2.29$), and 516 were female (71.17%), with a mean age of 19.64 years ($SD = 1.70$). Participants were mainly enrolled in bachelor's degree programs, accounting for 93.93%; other students were pursuing an associate's degree, accounting for 1.38%, a master's degree, accounting for 4.41%, and a doctoral degree, accounting for .28% of the total. In addition, 84.28% of the participants had never worked, and the average years worked was 1.39 ($SD = 1.06$).

Measures

Career Chaos Inventory (CCI, Simplified Chinese Version).

The Career Chaos Inventory was developed by Tien et al. (2017) and consists of 24 items and five dimensions: complexity awareness, constant scripts, constant beliefs, chance awareness, and transfer of chances. "Complexity awareness" refers to an individual's degree of understanding of different aspects of life, such as childhood experiences/influence of family of origin, interests and abilities, physical and mental effects (mental and physical illness), conflicts in social values and cultural contexts, and economic issues. "Constant Script" refers to the degree to which individuals perceive constant and repetitive patterns in the chaos of life, such as repeated life scripts (personality, interpersonal modes/response methods), hoping that things develop within the range of one's control, simply escaping when one is dissatisfied or cannot adapt, discovering the

causes of repeated dilemmas and breakthroughs, identifying shortcomings, and engaging in repetitive behavior patterns that ignore one's own feelings to meet the needs of others. "Constant Beliefs" refers to patterns of thoughts and beliefs. "Chance awareness" refers to individuals' perceptions of serendipitous events, their conversion of and insight into serendipitous events, and the degree of cognitive change brought about by serendipitous events. "Transfer of chances" means that the individual can get insight from the chances and turn it to be new opportunities. Reliability for each of the five scales are .77, .84, .86, .79, and .86.

In the process revising the CCI, we first invited an expert in psychology to examine the original scale in traditional Chinese. The expert changed the wording of several sentences to make it more consistent with language use in Mainland China. Then, two graduate students in the psychology department changed the traditional characters to simplified characters. Finally, the members of the research group discussed the logic of the context and wording to produce the final document. Reliability and validity of the inventory will be explained in the results part.

Meaning in Life Questionnaire, MLQ.

The MLQ was developed by Steger and Kashdan (2007). It consists of two five-item subscales measuring the presence of meaning in life and the search for meaning in life. Items are rated on a seven-point scale ranging from one (absolutely untrue) to seven (absolutely true). Higher scores indicate greater perceived meaning in life. The MLQ has good internal consistency reliability (.79 - .93) and retest reliability (the values are .70 for an interval of one month, .63 and .53 for eight weeks, and .50 and .41 for 13 months) for participants of different ages and cultural backgrounds. Additionally, confirmatory factor analysis shows that the scale has a stable two-factor structure (Steger, Frazier, et al., 2008; Steger & Kashdan, 2007; Steger, Kawabata, et al., 2008;

Steger et al., 2009). It was applied as correlation criterion measures to test the validity of the CCI. The ten-item questionnaire could be obtained from the internet. Steger (2010) indicated that readers are welcome to apply the questionnaire. We obtained the Chinese version from the internet.

Satisfaction with Life Scale, SWLS.

The SWLS was developed by Diener et al., (1985). The SWLS consists of five items that are rated on a seven-point scale ranging from one (absolutely untrue) to seven (absolutely true). The SWLS was revised by Tien (2006), and the internal consistency reliability of the scale using data from 725 adults was .89. In terms of validity, the variables are work-family conflict and coping. When exploring the effects of these factors on growth initiative and satisfaction with life, causal relations are supported, indicating good validity.

Job/Learning Satisfaction Scale.

The job/learning satisfaction scale was revised by Tien (2006), and the internal consistency reliability of the scale using data from 725 adults was .90. In terms of validity, the variables are work-family conflict and coping. When exploring the effects of these factors on happiness and pleasure, causal relations are supported. Content validity was also evaluated by three experts. In this study, the internal consistency reliability of the revised scale is .87, indicating good internal consistency.

Career Adapt-Abilities Scale, CAAS.

The CAAS was developed by Savickas and Porfeli (2012) and consists of 24 items and four subscales: concern, control, curiosity, and confidence. Participants respond to each item on a scale from one (not strong) to five (strongest). The CAAS was revised by Tien (2010). The internal consistency reliability of the scale is .96, and the internal consistency reliability of the subscale is .89 - .91, indicating good internal consistency. In terms of validity, confirmatory factor analysis showed that the goodness-of-fit indices exceed the upper-middle fit criteria.

Causal relations were determined from our data, and the content validity was evaluated by experts. In this study, the CAAS was revised based on Tien's version to make it suitable for the mainland population. The reliability estimates show that the internal consistency reliability of the scale is .95 and that the values for the subscales are .85 - .95, indicating good internal consistency.

Personal Growth Initiative Scale, PGIS.

The PGIS (Robitschek, 1998) is a self-report instrument that yields a single scale score for personal growth initiative, which is a person's active and intentional involvement in changing and developing as a person. It includes nine items, such as "I know where my life will lead to." As reported by Robitschek (1998), internal consistency estimates have been found to range from .78 to .88, and test-retest reliability values (with a one-week interval) of .84 have been found in samples of emerging adults. The PGIS was revised by Tien (2008). The scale comprises nine items rated on a six-point Likert scale from one (strongly disagree) to six (strongly agree). The total possible score ranges from 0 to 54, with a higher score indicating higher personal growth initiative. The internal consistency coefficient based on 725 adult workers (231 males, 478 females, 16 unspecified) was .90 (Tien & Wang, 2008), indicating good internal consistency. In this study, the internal consistency reliability of the scale is .91.

Research Procedure

The participants were selected through a convenience sampling approach. Counselors and class teachers arranged for the students to complete the questionnaires online during class or sent questionnaire links to class groups for students to complete after class. A dedicated teacher explained the instructions before students completed the surveys. The questionnaires were edited and published on an online questionnaire platform. It took about three weeks to collect the data.

Data Analysis

The statistical software SPSS 20.0 was used for descriptive statistics, independent-samples *t* tests, correlation analysis, exploratory factor analysis, and reliability analysis. AMOS 21.0 was used for confirmatory factor analysis to test the factor structure of the CCI. Criterion-related validity of the CII was also examined. M-plus 7.0 was used for model fitness index analysis. In addition, we applied the average imputation to deal with the missing data.

Results

Item Analysis

All the reverse-scored items in the CCI were rescored to calculate the total score of the questionnaire. The critical ratio (CR) method was used to test the significant differences between the high and low scores on the CCI. The total scores were arranged from low to high. The lowest 27% of the scores were categorized as low scores, and the highest 27% as high scores. Independent-samples *t*-tests were carried out on the scores for each item in the two groups. The results showed that the differences between the two groups reached significance ($p < .001$).

Item total correlation analysis showed that, for complexity awareness, the Pearson product-moment correlation coefficients between the score of each item and the total subscale score were statistically significant ($p < .001$), and the correlation coefficients were between .68 and .80. The Pearson product-moment correlation coefficients between the scores of each item and the total subscale score for constant scripts were statistically significant ($p < .001$), and the correlation coefficients were between .80 and .86. For constant beliefs, the Pearson product-moment correlation coefficients between the item scores and total subscale score were statistically significant ($p < .001$), and the correlation coefficients were between .70 and .83. For chance awareness, the Pearson product-moment correlation coefficients between the scores of each item and the total subscale score were statistically

significant ($p < .001$), and the correlation coefficients were between .69 and .81. The correlation coefficients between the transfer of chance item scores and the total subscale score were statistically significant ($p < .001$), and the correlation coefficients were between .78 and .88.

Reliability Analysis

The internal consistency reliability of the data was tested, and the results showed that the Cronbach's alpha coefficient of the whole scale was .85. The Cronbach's alpha coefficients of each subscale were between .75 and .91. Specifically, the Cronbach's alpha coefficient of complexity awareness, constant scripts, constant beliefs, chance awareness, and transfer of chance were .79, .85, .81, .75 and .91 respectively. The CCI had good internal consistency. The retest reliability of the whole scale was .67. The test-retest reliabilities of each subscale were between .64 and .81.

Validity Analysis

Content Validity.

The structure, dimension, and expression of the scale were examined several times by the research team. On this basis, the CCI in Simplified Chinese edition was finalized. We emphasized that the dimensions of the scale are reasonable, the operational definition is clear, the content of the items in each dimension conform to the characteristics of the dimension, and the items are expressed clearly and are easy to understand, ensuring the high content validity of the scale.

Structural Validity: Exploratory Factor Analysis.

The data were tested by Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) test. The results of Bartlett's test of sphericity were $\chi^2 = 8606.23$ ($df = 276$), $p < .001$, and the KMO value was .91. These results indicate that the data are suitable for factor analysis. Principal component analysis and the promax skew rotation method were used to analyze the factors. Five factors with more than one characteristic

root were selected, and the cumulative variance contribution rate was 63.36%. Factor loadings for the items are shown in Table 1.

After consulting the relevant literature and holding discussions with experts, factor 1 was named "complexity awareness." Complexity awareness refers to the awareness of complex phenomena in the process of career development, such as the awareness of the impact of the family of origin, interests and abilities, the impact of one's physical and mental status, conflict between social values and the cultural context, and economic problems. Factor 2 was named "constant scripts," which refers to the awareness of constancy and the degree of the perception of recurring patterns in the chaos of life, such as the awareness of one's own unchanging personality, fixed interpersonal patterns, or consistent coping style. Factor 3 is named "constant beliefs," referring to the desire that things develop within the range of one's control and the tendency to run away upon failure or failure to adapt. This pattern coincides with a belief that one can always start from scratch and find the reason for repeated difficulties and breakthroughs. Factor 4 is named "chance awareness," which refers to the ability to identify opportunities in the process of career development. Factor 5 is named "transfer of chance," which refers to the cognitive changes/insight brought about by opportunities.

Confirmatory Factor Analysis.

The five factors of the CCI were verified to examine the structural validity of the scale. The results show that the indicators of the structural equation model are $\chi^2 / df = 3.77$, SRMR = .06, RMSEA = .05, 90% CI = [.06, .07], TLI = .91, and CFI = .92. These results were all adequate and verified the structural validity of the CCI.

To further test the validity of the CCI, correlation tests between the dimensions of the scale and the total score were performed. The results are shown in Table 2. According to psychometric theory, each dimension of the test has a high correlation with the total scale, and there should be a moderate degree of correlation

between the dimensions. Table 2 indicates that the correlations between the item scores and total scores in each dimension are between .47 and .73, and the correlations are high, indicating that the scale dimensions and the overall scale assess the same concepts. The correlation coefficients between the dimensions of the scale are relatively low, between - .08 and .71, indicating that each dimension measures different aspects of the perception of career chaos. In short, the dimensions of the scale are both related and independently measure distinct concepts and have good structural validity.

Criterion-related Validity.

In this study, the correlations of the MLQ, SWLS, job satisfaction scale, CAAS and PGIS with the total score and each dimension score of the CCI are calculated. The results are shown in Table 3. The CCI is significantly correlated with the MLQ, SWLS, job satisfaction scale, CAAS and PGIS, which shows that the scale has good validity.

Background Differential Analysis

Gender Differences.

T tests were applied to test for gender differences in career chaos perception. Tests of homogeneity of variance for complexity awareness, constant scripts, constant beliefs, chance awareness, and transfer of chance show, $F(1, 723) = .18, .25, .05, .14, 3.23$ respectively, $p = .674, .621, .818, .712, .073$ respectively, which indicates that there are no significant differences in complexity awareness, constant scripts, constant beliefs, chance awareness, or transfer of chance. Independent-samples *t*-tests, $t(723) = -2.05, p = .041, d = .17$, indicate that transfer of chance is significantly different between male students ($M = 4.48, SD = .92$) and female students ($M = 4.63, SD = .85$). Specifically, female students have higher transfer of chance scores than male students.

Grade Differences.

Homogeneity of variance tests were used to test for grade differences in career chaos perception in emerging adults. Tests of

homogeneity of variance for complexity awareness, constant scripts, constant beliefs, chance awareness, and transfer of chance show $p > .05$ for each, with no significant difference in total variance. The results of one-way analysis of variance [ANOVA] show no significant differences for complexity awareness ($F(10, 714) = 1.52, p = .129$), constant scripts ($F(10, 714) = 1.17, p = .308$), constant beliefs ($F(10, 714) = 1.04, p = .410$), chance awareness ($F(10, 714) = 1.00, p = .442$), and transfer of chance ($F(10, 714) = 1.78, p = .061$). Therefore, there is no significant difference in the perception of chaos in life across students in different grades.

Differences by Work Experiences.

Homogeneity of variance tests were used to test for differences in career chaos perception in emerging adults based on the number of years worked. Tests of homogeneity of variance for complexity awareness, constant scripts, constant beliefs, chance awareness, and transfer of chance show $p > .05$ for each, with no significant difference in total variance. The results of one-way ANOVA show no significant differences for complexity awareness ($F(5, 719) = 3.14, p = .008$), constant scripts ($F(5, 719) = 2.65, p = .022$), constant beliefs ($F(5, 719) = 1.62, p = .154$), chance awareness ($F(5, 719) = 1.28, p = .270$), or transfer of chance ($F(5, 719) = .93, p = .459$). Posteriori tests also showed that participants with 0-1 years of work experience ($M = 3.05, SD = 1.10$) had lower complexity awareness scores than those with 2-3 years of experience ($M = 4.04, SD = .83$); participants who had never worked ($M = 3.65, SD = 1.07$) had a higher constant script score than those with 0-1 years of experience ($M = 3.21, SD = 1.06$); and participants with 2-3 years ($M = 3.97, SD = .92$) and 3-4 years of experience ($M = 3.80, SD = 1.00$) had a higher constant script score than those with 0-1 years ($M = 3.21, SD = 1.06$) and 1-2 years of work experience ($M = 3.08, SD = 1.10$).

Job or Learning Field Differences.

Homogeneity of variance tests were used to test for job or learning field differences in career chaos perception in emerging adults. Tests of homogeneity of variance for complexity awareness, constant scripts, constant beliefs, chance awareness, and transfer of chance show $p > .05$ for each, with no significant difference in total variance. The results of one-way ANOVA show no significant differences for complexity awareness ($F(5, 719) = 3.74, p = .002$), constant scripts ($F(5, 719) = 0.99, p = .422$), constant beliefs ($F(5, 719) = 1.79, p = .112$), chance awareness ($F(5, 719) = .50, p = .779$), and transfer of chance ($F(5, 719) = 1.85, p = .100$). Posteriori tests further showed that the participants in the research and analysis categories ($M = 3.90, SD = 1.07$) had higher constant script scores than those in the management and political ($M = 3.19, SD = 1.20$) and transaction ($M = 3.42, SD = 1.12$) categories.

Discussion

Revision of the Career Chaos Inventory

Referring to the research results on career chaos perception in mainland China and internationally and combined with the related theoretical knowledge on career chaos perception, this study uses a questionnaire survey to revise the CCI developed by Tien et al. (2017). The results of this study show that career chaos perception consists of five factors: complexity awareness, constant scripts, constant beliefs, chance awareness, and transfer of chance. Compared with the three-factor structure of complexity awareness, repetition and constant awareness, and chance awareness and insight proposed by Tien et al., this study further divides repetition and constant awareness into constant scripts and constant beliefs, and chance awareness and insight into chance awareness and transfer of chance.

Repetition and constant awareness are further subdivided into constant scripts and constant beliefs, which may be because constant scripts better reflect the behavior and habits of

individuals in their careers. Pryor and Bright (2003) proposed the importance of being aware of the complexity and logical order in the changeable environment. Our findings agreed with this proposition. Complexity awareness and constant awareness are both included in CCI subscales. In addition, constant beliefs better reflect individuals' views and opinions on their careers. The two represent different levels of an individual's perception of career chaos and distinguish them to more accurately reveal such perceptions. Similarly, chance awareness refers to the chance events that individuals perceive during their career development, and transfer of chance refers to the cognitive changes brought about by chance events. Therefore, it is more reasonable to further subdivide opportunity awareness and insight into chance awareness and transfer of chance. These findings are consistent with Krumboltz's (2009) idea of happenstance theory. The emerging adults should be aware of chances and grasp the opportunities to create future development.

This study verifies that the chaos theory of career development has cross-cultural adaptability. There are three key conceptual elements of chaos theory (You, 1993). The first key conceptual element is sensitive dependence on initial conditions. A chaotic system is highly sensitive to initial conditions. Small changes may cause unexpected consequences, requiring individuals to improve their awareness of the complexity of their career environment as much as possible. The second key conceptual element is fractal. This concept reflects that individuals exhibit cross-contextual repetition in various situations and that a seemingly disordered pattern can produce a fixed and orderly pattern; thus, individuals can consciously explore and summarize their own consistency. The third key conceptual element is strange attractors. An incident/chance event that has an important impact on the career process changes the individual's cognition of her career and opens new possibilities. For example, what the individual inadvertently reads may greatly

stimulate his or her achievement motivation, thereby changing his or her development direction.

The results of the gender difference analysis showed that female students have a significantly higher score on the transfer of chance scale than male students. The essence of transfer of chance is that individuals believe a turning point in life can bring opportunities and that emergencies are not crises, but opportunities. The results show that female students are more inclined to regard turning points as opportunities than male students, which is not consistent with previous study results (Xu, 2018). This may be related to the selection of the participants. In the previous study, the participants were 20 to 75 years old, while in this study, the participants were emerging adults aged 18 to 27.

Regarding work experience, the participants who had worked for 2-3 years had significantly higher complexity awareness than those who had worked for 0-1 years. This may be because, compared with the participants who had worked 0-1 years, the participants who had worked 2-3 years experienced more events related to parents' expectations, physical and mental status, and conflict between social and cultural values and their own ideals, and had accumulated more work experience. Thus, they were more sensitive to the impact of the complex external environment on their own career development. In addition, the participants who had never worked had significantly higher constant script scores than those with 0-1 years of work experience, while the participants who had worked for 2-3 years and 3-4 years had significantly higher constant script scores than those with 0-1 years and 1-2 years of experience. Thus, with the increase in the length of employment, the constant script score showed a trend of decreasing first and then increasing. A constant script refers to the way in which an individual perceives that he or she has a fixed approach for handling problems. Individuals who have never worked or have worked more than two years can accurately understand and

grasp the environment and have formed a series of fixed behavioral patterns to interact with the surrounding environment. An individual who has worked 0-2 years has had experience with the need to continuously adjust the relationship between himself or herself and the professional environment to achieve a relatively balanced and adaptive state, which requires breaking with the original coping style and exploring new behavioral patterns.

Regarding the job or learning field, the participants in the research and analysis field had significantly higher constant script scores than those in the management, political, and traditional fields. Most of the participants in the research and analysis field were doctors, R&D engineers, scientific researchers, etc. For these participants, their work content is focused on scientific research, technology, etc. Their work environment and interpersonal relationships are simpler, and they always have a series of relatively fixed ways to handle work problems. Most of the participants in the management, politics, and traditional fields were managers, lawyers, and insurance brokers. Their work requires contact with different social groups and the ability to resolve various problems effectively. Their work environment and interpersonal relationships are more complex, which requires them to analyze specific problems and use different ways to flexibly address them.

The confirmatory factor analysis of this study revealed that the five-factor model of career chaos perception obtained by exploratory factor analysis had a good fit, the correlation among the factors in the questionnaire was good, and each factor had a high correlation with the total questionnaire, indicating good structural validity. The questionnaire and the factors were significantly correlated with the MLQ, SWLS, job satisfaction scale, CAAS, and PGIS. The reliability test results showed that the questionnaire had good internal consistency reliability. However, the significance might be related to the large sample size. In addition, the

correlations between two dimensions “complex awareness,” “constant scripts” correlated negatively with other measures. It seems that the more emerging adults that are aware of the complexity and constant script, the less they feel satisfied with life, work, and meaning in life. This finding is inconsistent with Pryor and Bright’s (2011) idea of complexity and constancy. It seems that the idea of career chaos should be further examined in different populations. For young adults, it seems that the more they feel complexity, the more they feel unsatisfied and meaningless with life.

In summary, the factor structure of the CCI in this study was clear, and the reliability and validity were good. Thus, the scale is suitable for assessing the career chaos perception of emerging adults. However, the cultural factors should be taken into consideration when it applied with emerging adults.

The Significance of the Career Chaos Inventory

With the advent of globalization, change has become the theme of contemporary society. Emerging adults face more choice options, uncertainty, and chaos than others. The career process seems to be linear and forward-moving only, but it is actually nonlinear and irregular. However, there must be a vortex in the disorder, and small changes may bring about large changes. Facing the chaos of a career, adjustment and adaptation become inevitable. These processes are worth studying deeply to help individuals make order from the chaos of their careers, realize the unpredictability of their careers, and begin to adapt and adjust.

Awareness can bring independent action and is the first step to change. Self-awareness can help individuals understand the variability in their career and then act, help individuals cope with change and chaos, and help them face the world's variability with an open attitude.

The CCI can not only help individuals explore their degree of awareness of career chaos to gain a preliminary understanding but can also help individuals increase their

awareness of career chaos. Therefore, it is significant for individual career development to study the dimensions of an individual career chaos scale and to help individuals cope with the uncertainty of their careers and change their coping strategies.

Limitations and Future Research Directions

This study has several limitations. First, we made some contributions in this study. We developed a CCI suitable for emerging adults and conducted a preliminary application in mainland China. However, an in-depth understanding of the characteristics of emerging adults’ career chaos perception is lacking because no in-depth and detailed case study on emerging adults has been conducted. In future studies, we should further obtain important case study data to reveal the characteristics of emerging adults’ perceptions of chaos, which would highlight the function and shortcomings of this scale.

Second, although the scales selected to establish the criterion validity of the questionnaire in this study belonged to the career field, they were mainly related to career satisfaction and adaptability. In future studies, we should select additional effective calibration measures to reflect the criterion validity of career chaos perception based on the three key concepts of the chaos theory of career development. We used only concurrent validity and did not use empirical validity, predictive validity or other methods to test the validity of the scale. In future studies, we should test the validity of the scale from multiple perspectives.

Finally, there was a large difference in size between the male and female groups in this study, which may have affected the results. In future studies, it is necessary to balance the gender ratio to reduce errors. In addition, the participants in this study were mainly undergraduates. The total proportion of students who were not undergraduates was 6.07%. Whether the sample can effectively represent the general emerging adult population remains to be evaluated. Therefore, we should expand

the scope of the test and select more diverse participants of different ages and education levels in future studies. Generally speaking, we suggest the application of the CCI with a variety of population in China. Validity with different population can also be examined in the future.

References

- Arnett, J. J. (2000). High hopes in a grim world: Emerging adults' views of their futures and "Generation X." *Youth & Society*, 31(3), 267-286. <https://doi.org/10.1177/0044118X.00031003001>
- Arnett, J. J. (2006). Emerging adulthood: Understanding the new way of coming of age. In J. J. Arnett & J. L. Tanner (Eds.), *Emerging adults in America: Coming of age in the 21st century* (pp. 3-19). Washington, DC: American Psychological Association.
- Arnett, J. J., & Fishel, E. (2013). *When will my grown-up kid grow up?: Loving and understanding your emerging adult*. Workman Publishing.
- DeBell, C. (2006). What all applied psychologists should know about work. *Professional psychology: Research and practice*, 37(4), 325-333. <https://doi.org/10.1037/0735-7028.37.4.325>
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49(1), 71-75. https://doi.org/10.1207/s15327752jpa4901_13
- Domene, J. F., Landine, J., & Stewart, J. (2015). Emerging adult career transitions. In P. J. Hartung, M. L. Savickas, & W. B. Walsh (Eds.), *APA handbook of career intervention* (Vol. 2, pp. 479-494). American Psychological Association. <https://doi.org/10.1037/14439-000>
- Kalleberg, A. L. (2009). Precarious work, insecure workers: Employment relations in transition. *American sociological review*, 74(1), 1-22. <https://doi.org/10.1177/000312240907400101>
- Konstam, V., Celen-Demirtas, S., Tomek, S., & Sweeney, K. (2015). Career adaptability and subjective well-being in unemployed emerging adults: A promising and cautionary tale. *Journal of Career Development*, 42(6), 463-477. <https://doi.org/10.1177/0894845315575151>
- Krumboltz, J. D. (2009). The happenstance learning theory. *Journal of Career Assessment*, 17(2), 135-154. <https://doi.org/10.1177/1069072708328861>
- Kuwabara, S. A., Van Voorhees, B. W., Gollan, J. K., & Alexander, G. C. (2007). A qualitative exploration of depression in emerging adulthood: Disorder, development, and social context. *General hospital psychiatry*, 29(4), 317-324. <https://doi.org/10.1016/j.genhosppsych.2007.04.001>
- Marshall, E. A., & Symonds, J. E. (Eds.) (2021). *Young adult development at the school-to-work transition: International pathways and processes* (pp. 107-124). Oxford University Press. <https://doi.org/10.1093/oso/9780190941512.003.0005>
- Milner, A., Page, A., & LaMontagne, A. D. (2013). Long-term unemployment and suicide: A systematic review and meta-analysis. *PloS one*, 8(1), e51333. <https://doi.org/10.1371/journal.pone.0051333>
- Paul, K. I., & Moser, K. (2009). Unemployment impairs mental health: Meta-analyses. *Journal of Vocational behavior*, 74(3), 264-282. <https://doi.org/10.1016/j.jvb.2009.01.001>
- Pryor, R. G. L., & Bright, J. E. H. (2003). Order and chaos: A twenty-first century formulation of careers. *Australian Journal of Psychology*, 55(2), 121-128. <https://doi.org/10.1080/00049530412331312984>
- Pryor, R. G. L., & Bright, J. E. H. (2007). The current state and future direction of counseling psychology in Australia. *Applied Psychology*, 56(1), 7-19. <https://doi.org/10.1111/j.1464-0597.2007.00272.x>
- Pryor, R. G. L., & Bright, J. E. H. (2011). *The chaos theory of careers: A new perspective on working in the twenty-first century*. Routledge.
- Robitschek, C. (1998). Personal growth initiative: The construct and its measure. *Measurement and Evaluation in Counseling and Development*, 30(4), 183-198. <https://doi.org/10.1080/07481756.1998.12068941>
- Savickas, M. L., & Porfeli, E. J. (2012). Career Adapt-Abilities Scale: Construction, reliability, and measurement equivalence across 13 countries. *Journal of Vocational Behavior*, 80(3), 661-673. <https://doi.org/10.1016/j.jvb.2012.01.011>
- Schlesinger, J., & Daley, L. P. (2016). Applying the chaos theory of careers as a framework for college career centers. *Journal of Employment Counseling*, 53(2), 86-96.
- Steger, M. F. (2010). The Meaning in Life Questionnaire. Obtained from <http://www.michaelfsteger.com/wp-content/uploads/2013/12/MLQ-description-scoring-and-feedback-packet.pdf> and <http://www.michaelfsteger.com/wp-content/uploads/2013/03/MLQ-Chinese-traditional.pdf>
- Steger, M. F., Frazier, P., & Zacchanini, J. L. (2008). Terrorism in two cultures: Stress and growth following September 11 and the Madrid Train Bombings. *Journal of Trauma and Loss*, 13(6), 511-527. <https://doi.org/10.1080/15325020802173660>
- Steger, M. F., & Kashdan, T. B. (2007). Stability and specificity of meaning in life and life satisfaction over one year. *Journal of Happiness Studies*, 8(2), 161-179. <https://doi.org/10.1007/s10902-006-9011-8>
- Steger, M. F., Kawabata, Y., Shimai, S., & Otake, K. (2008). The meaningful life in Japan and the United

- States: Levels and correlates of meaning in life. *Journal of Research in Personality*, 42(3), 660-678. <https://doi.org/10.1016/j.jrp.2007.09.003>
- Steger, M. F., Oishi, S., & Kashdan, T. B. (2009). Meaning in life across the life span: Levels and correlates of meaning in life from emerging adulthood to older adulthood. *The Journal of Positive Psychology*, 4(1), 43-52. <https://doi.org/10.1080/17439760802303127>
- Tien, H. S. (2006). *Dual career couple's career and family conflict and life satisfaction*. (Project No.: NSC95-2413-h-003-028-sss) [Grant]. Ministry of Science and Technology of the Executive Yuan, Taiwan. <https://www.most.gov.tw/?l=en>
- Tien, H. S. (Principal Investigator). (2008). *Career adaptability of adults in Taiwan: Related variables and counseling program development*. (Report No. NSC 97-2410-H-003-081-SS2)(Grant). National Science Council.
- Tien, H. S. (2010). *Career adaptability of adults in Taiwan: Related variables and counseling program development*. (Project No.: NSC97-2410-h-003-081-ss2) [Grant]. Ministry of Science and Technology of the Executive Yuan, Taiwan.
- Tien, H. S. (Principal Investigator). (2015). *Calling in chaos: Career chaos theory embedded in raise-up model of career counseling* (Report No. MOST104-2410-H003-013-MY3) (Grant). Ministry of Science and Technology.
- Tien, H. S., Li, X. F., Lin, X. Y., Huang, S. H., & Lin, J. H. (2017). *Call in chaos: chaos theory orientation of career meaning shaping model construction and verification*. Research report of subsidy project of Ministry of science and Technology (No.: MOST 104-2410-h-003-013-MY3)
- Tien, H. S., & Wang, Y. (2008, August 14-17). *The effectiveness of narrative counseling on school teachers' psychological well-being* [Paper presentation]. American Psychological Association 117th Annual Convention, Boston, MA.
- Trygestad, J. (1997, March 24-28). *Chaos in the classroom: An application of chaos theory* [Paper presentation]. American Educational Research Association 81th Annual Meeting, Chicago, IL.
- Xu, Z. (2018). *The relationship between chaotic attitude of adult life and psychological well-being -- Taking intolerable uncertainty as the moderating variable*. Master's thesis. National Taiwan Normal University.
- You, Y. (1993). What can we learn from chaos theory? An alternative approach to instructional systems design. *Educational technology research and development*, 41(3), 17-32. <https://doi.org/10.1007/BF02297355>
- Zhou, M., Zhang J., & Zeng, W. (2006). The chaos theory of career development. *Advances in Psychological Science*, 14(5), 737-742. <https://doi.org/10.3969/j.issn.1671-3710.2006.05.014>

Appendix

Table 1

Results of Exploratory Factor Analysis (After Rotation, n = 725)

Item Content	F 1	F 2	F 3	F 4	F 5
Complexity Awareness					
My family of origin profoundly influenced my decisions.	.71				
I must decide between conforming to my family and being myself.	.81				
I worried about whether my performance met my parents' expectations.	.77				
The unstable environment makes my family interfere with my career choice.	.67				
I hesitate between meeting social expectations and being myself.	.49				
Constant Scripts					
Every time I encounter a dilemma in life, I choose a similar approach.		.84			
I realize that I'm facing career bottlenecks in the same way.		.85			
I find that some approaches to handling things recur in my life.		.79			
The same problems keep bothering me.		.72			
Constant Beliefs					
I believe my positive qualities can help me face changes in the future.			.62		
No matter what happens, I can always start again.			.72		
I will stop to organize my past and find the strength to move forward.			.68		
I believe I have a way to break through the situation.			.59		
I often listen to my true desires and find the future I want.			.48		
Awareness of Chances					
Something in my life has had a major impact on me.				.47	
Noble people have helped me in my life.				.58	
Something that happened by chance changed how I see life now.				.81	
Some important events have changed my outlook on life.				.81	
Transfer of Chances					
I believe that emergencies in life are not crises but new possibilities.					.70
I think that twists of fate can bring opportunities.					.80
Item Content	F 1	F 2	F 3	F 4	F 5
Some things are not as expected, but there are always other ways to go.					.86
Sometimes unexpected setbacks bring me growth and opportunities.					.86

Unexpected events in my past helped me rethink and organize myself.	.73
I will always adjust myself to unexpected events in my life.	.63

Table 2
Correlation Analysis of Subscale of the Career Chaos Inventory

	1	2	3	4	5
1. Complexity Awareness	1				
2. Constant Scripts	.54**	1			
3. Constant Beliefs	-.06	-.08*	1		
4. Chance Awareness	.05	.02	.50**	1	
5. Transfer of chances	-.02	-.06	.71**	.61**	1
Total scale	.53**	.47**	.66**	.67**	.73**

Note. * $p < .05$, ** $p < .01$

Table 3
Correlation Coefficients of Career Chaos Perception with Life Meaning, Satisfaction with Life, Job Satisfaction, Career Adapt-Abilities and Personal Growth Initiative

	LMF	PM	MLQ	SWLS	JSS	C1	C2	C3	C4	CAAS	PGI
1. Complexity Awareness	-.23**	-.02	-.15**	-.13**	-.27**	-.15**	-.29**	-.21**	-.20**	-.25**	-.20**
2. Constant Scripts	-.26**	-.01	-.16**	-.14**	-.31**	-.19**	-.26**	-.26**	-.26**	-.28**	-.26**
3. Constant Beliefs	.53**	.42**	.55**	.43**	.41**	.40**	.48**	.46**	.46**	.52**	.60**
4. Chance Awareness	.38**	.42**	.47**	.26**	.28**	.33**	.28**	.33**	.31**	.37**	.45**
5. Transfer of Chances	.47**	.50**	.57**	.37**	.33**	.39**	.45**	.43**	.43**	.50**	.55**
Total scale	.28**	.42**	.40**	.25**	.13**	.24**	.20**	.23**	.23**	.26**	.35**

Note. * $p < .05$, ** $p < .01$; MF: Life is Meaningful; PM: Pursuing Meaning; MLQ: Meaning of Life Questionnaire; SWLS: Satisfaction with Life Scale; JSS: Job Satisfaction Scale; C1: Career Concern; C2: Career Control; C3: Career Curiosity; C4: Career Confidence; CAAS: Career Adaptability; PGS: Personal Growth Initiative.