ABSTRACT

KAHN, LANCE WYATT. The Effects of Personality on the Perceptions of Serendipity in College Students. (Under the direction of Raymond S. Ting.)

The study explores the potential relationship between personality and perceptions of serendipitous influence on academic and career decision-making. The study was conducted with 107 participants who were enrolled full-time at a rural, church affiliated private college in eastern North Carolina. The participants represented an accurate cross-section of the college in terms of age (mean = 21), sex (72% female, 28% male) and ethnicity (majority white, 26% African American, 7% Hispanic, 2% Native American, 1% Asian). Personality was defined as the Big Five Personality Factors and measured by the NEO-FFI-3. Perceptions of serendipity were measured using the Serendipitous Event Inventory (SEI), which was developed specifically for this study through a focus group and pilot study with participants from the same college. An exploratory factor analysis was conducted on the inventory resulting in a 14-factor solution accounting for 63% of the variance. The results indicate that there is a statistically significant difference between male and female perceptions of serendipitous influence with males reporting a greater number of serendipitous influences on average. With all data combined there was no significant relationship between personality factors and the sum of positive responses on the SEI. A correlation was then conducted between the personality factors and serendipity factors resulting in five weak, but statistically significant relationships. The data was then separated by sex and the personality factors were again compared to perceptions of serendipity resulting in moderate (r = .38) relationships between both Agreeableness and Conscientiousness and the sum of positive

responses on the SEI. In addition, 44 weak and moderate relationships between personality factors and serendipity factors when data was separated by sex. Aside from the Agreeableness and Conscientiousness factors, no consistent pattern of relationships emerged.

The Effects of Personality on Perceptions of Serendipity in College Students

by
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BIOGRAPHY

The author, Lance Kahn, has been a practicing career counselor for over 15 years. His work has focused primarily on college students, having worked specifically at Barton College, Lynn University, the University of Massachusetts, and Colorado Mesa University. He earned his Master's of Science in Counselor Education in Counselor Education in 1998 from the University of Wyoming, and a Bachelor's of Science in Psychology from the State University of New York at Oneonta in 1993.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

The Effects of Personality on Perceptions of Serendipity in College Students

Since the inception of career counseling the predominant theories of career development have described decision making as a rational process. Whether the theories stem from Parson's (1909) influential trait and factor theory or the developmental models of Super (1957; 1990), career decision making as been presented as the product of person and environment in which the person seeks better understanding of him or herself and the environment. The assumption has been that with improved, or accurate, understanding the person can evaluate the expected utility of potential career paths (Murtagh, Lopes, & Lyons, 2011). It has been reasonably argued that such models of career decision making present an idealized version or prescriptive model of how career decision should occur (Goti & Asher, 2001) or that such models are no longer appropriately complex or dynamic to be applicable to contemporary career development (Bright & Pryor, 2003; 2005; Mitchell, Levin, & Krumboltz, 1999; Savakas & Baker, 2005).

Although a few authors and researchers such as Crites (1969) and Salomone and Slaney (1981) included chance events in their concepts of career development, little attention diverged from the strictly rational explanations of career development until the end of the twentieth century. Betsworth and Hansen (1996) and Williams, Soeprapto, Like, Touradji, Hess and Hill (1998) conducted empirical studies that began to lend legitimacy to serendipitous influences beyond the anecdotally supported practical knowledge that career decision making is a complex process that includes unexpected and even unpredictable influences. Williams et al. (1998) found that all of their interviewed participants reported at least one influencing serendipitous event while Betsworth and Hansen (1996) reported 63%

of male subjects and 57% of female subjects experiencing serendipitous events that influenced their career development. Subsequent studies that have explored serendipity have consistently found similarly large proportions of participants perceiving serendipity and chance having a meaningful influence on their careers. Bright, Pryor, Wilkenfeld and Earl (2005) found that 90% of their participants indicated experiencing serendipitous events, Bright, Pryor and Harpham (2005) found 74% of their participants indicated serendipitous influences, and Hirshi (2010) reported 64.7% of participants indicated serendipitous influences.

Foci of Recent Work

Although empirical confirmation of the common occurrence of serendipity as a career influence is important, it merely begs additional questions. Most common among those questions are what types of specific events do people credit as serendipitous influences and what differences exist between participants who have perceived serendipity in their career development and those who have not.

Categories of events. Betsworth and Hansen (1996) initially established 11 categories of serendipitous events. The authors sought to access the prevalence of serendipitous influence in older people, and under what circumstances people reported experiencing serendipitous influences on their careers. The authors surveyed attendees and their spouses at a class reunion to determine if they had experienced a serendipitous event that influenced their careers. Participants who responded positively to the inquiry of chance events influencing their careers were asked to provide detailed accounts of the incidents. The authors performed a card sort and a team of three judges established the following descriptive

categories: Professional and personal connections, unexpected advancement, right place/right time, influences of marriage and family, encouragement from others, influences from previous work/volunteer experiences, military experiences, temporary work became permanent, obstacles to original career path, influence of historical events, and unexpected exposure to an interest area. It is interesting to note that Betsworth and Hansen's (1996) participants provided descriptions of 14 incidents that the judges could not fit into a category and 17 incidents that the judges disagreed with the participants that the described incidents were in fact the rational outcomes of planning or action and not subject to chance or serendipity.

Although these 11 categories are often cited and used in subsequent studies several variations of the categories have occurred. Bright, Pryor and Harpham (2005) conducted a two-part study on perceptions of serendipity. For the second study the authors expanded Betsworth and Hansen's (1996) original 11 categories to 15 by dividing the item on unintended exposure to an interest area to two items inquiring if the participants experienced unexpected exposure to work or activities that they either found interesting or did not find interesting. Bright et al., (2005a) also included items assessing unexpected personal events, unexpected financial support or problems and an open "other unexpected event" (2005, p. 569). In the first study Bright et al., (2005a) used a survey that included a more restricted eight categories. They found that perceptions of serendipitous influence were common with multiple experiences often reported. The Percentage of positive responses by category were: Personal or work relationships (44%), previous work of social experiences (60%), barriers to your previous career plan (36%), an injury or health problem (11%), unintended exposure to

work or activity that you find interesting (43%), unintended exposure to work or activity that you did not enjoy (33%), a major change in residence over which you had little control (11%), and any other unplanned event (10%). The eight category instrument was a modification the authors felt was more appropriate for university aged participants who had more limited life experience than Betsworth and Hansen's (1996) class reunion attendees.

The modified eight-item list of serendipitous event categories was later used by Bright, Pryor, Wilkenfeld and Earl (2005) to define unplanned events in a study of contextual influences on career decision making, and by Hirschi (2010) in an assessment of personality on perceptions of serendipitous career influences. Bright, Pryor, Chan, and Rijanto (2009) further shorted the list to 6 nonspecified categories in their research comparing perceptions of single/multiple and positive/negative serendipitous events. Further complicating any agreement on categories of serendipitous events, Bright et al., (2005b) conducted a study of perceived contextual influences on career development. They created a 47-item survey that included the eight categories labeled unplanned events. Results of factor analysis indicated that labeled unplanned events constituted one of four contextual factors in the study. The other factors of contextual influences were the media, family and friends, and teachers and lecturers. The individual items and the factors were not labeled as serendipitous or unplanned despite having been specifically defined as such in previous studies (Williams et al., 1998; Mitchell, et al., 1999). In fact, Williams, et al., (1998) cited encouragement of others (specifically family, friends, teachers and university professors) as the most commonly reported for of serendipitous influence on the careers of their participants.

Based on his explanation of the ubiquity of serendipitous influences on career, Krumboltz (1998) would likely define all of the items Bright et al., (2005b) described as contextual to be serendipitous influences. By their nature contextual influences, especially distal media influences, are beyond the control of the participant. Any career decisions influenced by such contextual factors would be unpredictable and serendipitous if the participant did not seek out that contextual factor for the purpose of finding assistance in making a career decision.

Differences between participants. The simple fact is that very little empirical study has been done to distinguish any differences between the majority participants who perceive serendipity as an influence on their careers and those who have not. The foci of the studies that have been conducted has been limited to demographic differences, education or career stage differences, socio-career differences and personality differences.

Consistently no gender differences have been found (Bright, et al., 2005a; Bright, et al., 2009; Hirshi, 2010). The work of Hart, Reyner and Christensen (1971) indicated that there was a difference in perception of the influence of serendipitous events between people in professional fields and those in semiskilled or skilled professions, specifically that participants working in professional fields were less likely to report serendipitous events as having an influence on their careers. This study was credited as inspiration for Bright, et al.'s, (2005a) two studies on differences in perception of serendipitous influences based on level of education. Despite Bright, et al., (2005b) finding self-reported decreases in contextual (familial and media) influences in 3rd and 4th year university students, no differences in reported perception of serendipitous influence existed in either study based on

educational level (Study 1, 1st year, 2nd year, 3rd year and 4th year undergraduates and graduate students; Study 2, undergraduates, graduate students and working professionals).

The only significant difference that Bright, et al., (2005a) were able to find between participants who perceived serendipity as an influence on their careers and those who did not was in locus of control behavior. Participants with a higher external locus of control were more likely to report serendipitous influences than participants with a high internal locus of control. Although the difference only accounted for 9% of the overall variance. These findings supported the earlier work in which Denga (1984) also found that male students at a particular Nigerian school with high internal locus of control were more likely to credit intrinsic qualities to career development than high external locus of control students, who more often credited career development to chance events.

More recent studies found somewhat similar results with Bright, et al., (2009) finding only that participants with high external locus of control behavior were more likely to report experiencing a series of negative independent chance influence, but not singular (positive or negative) chance experiences or series of positive independent chance experiences.

In her study of 8th and 11th grade Swiss students, Hirschi (2010) explored locus of control behavior and the openness personality factor to see how they corresponded with perceptions of chance events as career influences. Her findings regarding locus of control behavior supported Bright, et al.'s, (2005a) findings in that students with high external locus of control were more likely to report chance influences than students with high internal locus of control.

Of the big five personality factors (Costa & McCrae, 1992) only the Openness factor was assessed in regards to serendipity. Hirschi's (2010) findings regarding openness were exactly the opposite of what she had hypothesized. Her results indicated that students with high openness scores were less likely to report serendipitous influences than students with low openness scores. Hirschi (2010) did not compare any of the other four personality factors.

Shortcomings of the Current Literature

The first and most obvious shortcoming concerning research into chance or serendipity as an influence on careers is that there is so little of it. The totality of research on serendipity as a career influence does not number much in excess of a dozen studies, most of those having been completed following Betsworth and Hansen's (1996) study. In the studies that have been completed the authors and researchers show little agreement in terminology or definitions of unexpected events or influences. Even if there was consistency in the studies, which there is not, the small number of studies does little to bring attention to a phenomenon that clearly holds a significant place in career development.

Betsworth and Hansen (1996) were the first reserachers to attempt to define and categorize serendipitous events that helped shape their participants' careers. Although Betsworth and Hansen (1996) developed 11 categories of serendipitous career events based on the described experiences of their research participants, the categories are generalized and not descriptive when presented to participants of new studies. Bright, et al., (2005a) surveyed Australian university students with an instrument designed to assess perceived contextual and chance influences on careers. When considering Bright et al.'s, (2005a)

research instrument, the contextual influences and chance events listed in question 2 (Q2) categories do not appear to be mutually exclusive. Perceived influences from family members, friends or even teachers and professors should probably not represent individual contextual categories when they could as easily describe "A personal or work relationship" and "Previous work or social experiences" (Bright, et al., 2005a, p. 565). These two categories of serendipitous events are the most commonly reported experiences of their participants. Participants should be presented with more clearly defined categories or serendipitous events that would allow them to more accurately assess whether they have experienced such an event. Further clarification would also benefit counselors and future researchers that wish to better understand the concept.

Although it makes logical sense to expect perceptions of serendipity to differ along different personality types, the work done to explore this concept has been limited. To date the only aspects of personality to be studied regarding serendipity as been locus of control behavior (Bright, et al., 2005a; Bright, et al., 2009; Hirschi, 2010) and the Openness personality factor (Hirschi, 2010). I believe that the narrow focus does too little to explore the true range of differences between participants who perceive serendipity as a career influence and those who do not. A better comparison may be provided by contrasting all of the Big Five personality factors (Costa & McCrae, 1992) to more effectively expand the knowledge of the difference that personality may cause in the perception of serendipity as a career influence.

All of the authors researching serendipity have been clear in their intention, not of assessing objective experiences, but of the participants' perception of their influences.

Krumboltz's (1998; 2009) assertion that unexpected and unplanned influences are a fact of career development, is accepted as a given. The resulting question is then why some minority of people credit all of the events in their career development to the outcomes of rational decision making.

Serendipity as a Theoretical Construct

There is little doubt that rational decision making provides the driving force behind career development, but with the current complex and volatile job market career plans that lack flexibility or acknowledge the possibility of unplanned and unexpected opportunities are inadequate to function as intended. Still the overwhelming majority of career theories behind contemporary career counseling include no concept or inclusion of serendipity. The exceptions to this state are Planned Happenstance (Mitchell, et al., 1999; Krumboltz, 2009) and the Chaos Theory of Careers (CTC; Bright & Pryor, 2003).

Happenstance learning theory. HLT is the most current iteration of Krumboltz' Social Learning Career Theory (Krumboltz, 1979). He asserts that people base career decisions on what they have learning through life experience and vicarious observation. The concept of happenstance (serendipity) has become the prominent feature of the theory because Krumboltz believes that very few of our learning experiences are intentionally sought. Happenstance is so common as to be ubiquitous, occurring daily, often as often as dozens of times in one day (Krumboltz, 1998). These serendipitous learning experiences occur because we live in a world occupied by people over whom we have little control, whose actions and decisions effect us directly or indirectly through our perpetually social selves.

Chaos theory of careers. Bright and Pryor (2003) developed CTC by applying one of the central concepts of chaos theory, sensitive dependence, to career development. With similarities in concept to HLT, this application means that small, seemingly insignificant experiences have the potential to change us and change the way we perceive the world around us. As we exist within a social world and not in physical and social isolation, our experiences often involve the actions of other people and situations that we have little control over. We experience a potential accumulation of innumerable experience that may potentially change our perceptions, we undergo continuous growth through change, reacting to new experiences that, in their turn influence people and things in our environment. Opportunities for learning and for career development arise through these constant changes.

The theories were inspired by the failure of contemporary career theories to adequately address the complex nature of career decision-making and established as an attempt to persuade career counselors to incorporate concepts of serendipity into their work with clients. Both theories initial publications included or were followed-up with specific interventions or guidelines for use by counselors (Krumboltz, 2009; Bright & Pryor, 2005; Pryor & Bright, 2006; Pryor & Bright, 2007).

Although the theories are cited as motivation in nearly all of the abovementioned studies little knowledge has been added to career theory beyond the support that serendipity is a legitimate influence of career decisions and locus of control behavior has some effect on the differences in perception of serendipitous events.

Purpose of a New Study

It is my intention to conduct a study that specifically addresses the shortcomings of the current research on the influence of serendipity on career development. The new study would take place in two phases. The first phase would consist of a qualitative study of the perceptions of serendipitous events. I will facilitate a focus group of college students to ask them to discuss and assess personal and vicarious incidents of serendipity affecting the career development experiences of college students. In addition to any events proposed by the focus group, events and categories from the Betsworth and Hansen (1996) and Bright, et al., (2005a) studies will be presented to the group for assessment and categorization. I plan on following up the student results by having a group of career counseling personnel evaluate the conclusions of the student panel and provide their opinions on the validity and accuracy of the panel's assessment.

My first hypothesis (Hypothesis 1) is that a valid and reliable instrument can be developed to accurately assess the perceptions of serendipitous influence for college students. The instrument will be created based on the results of the first phase of the study. The instrument will contain questions about commonly perceived serendipitous events. The purpose of the eventual instrument will be to assess college students' perceptions of personally experienced events that may be described as serendipitous. I will administer the newly created instrument along with the NEO Five-Factor Inventory (NEO-FFI, Costa & McCrae, 1992) to a sample of college students at a small private, college located in rural eastern North Carolina to determine if there is any significant difference in perceptions of personal serendipity experience by personality type as defined by the Big Five Personality

Factors (Costa & McCrae, 1992). My concern does not pertain to any argument about the objective reality of the decision-making process, or the existence of serendipity as a legitimate influence. In my opinion, that assertion has already been sufficiently supported. My concern is with the differences between research participants who perceive serendipity as an influence and those who believe that their career development, the current state from the outcome of their career decisions, is the outcome only of a rational thought process and effort.

I also hypothesize (Hypothesis 2) that participants will differ in their likelihood to perceive serendipity as a career influence according to the following criteria:

1. Scores in Neuroticism will show a positive correlation to scores on the serendipitous influence inventory.
2. Scores in Extraversion will show a positive correlation to scores on the serendipitous influence inventory.
3. Scores in Openness will show a positive correlation to scores on the serendipitous influence inventory.
4. Scores in Agreeableness will show a positive correlation to scores on the serendipitous influence inventory.
5. Scores in Conscientiousness will show a negative correlation to scores on the serendipitous influence inventory.

Defining Serendipity

Throughout the research on serendipity there has been little agreement on terms or definitions of the concept. Some authors use the terms serendipity and chance

interchangeably (Williams, et al., 1998) while others prefer the term chance (Bright & Pryor, 2003; 2005) happenstance (Mitchell, et al., 1999; Krumboltz, 2009) or even synchronicity (Guindon & Hanna, 2002). Whatever the terminology used, the concepts that the authors are describing appear to be the same, that an event takes place that is unexpected or unplanned which alters the career direction or decision making of an individual. I prefer the term serendipity to chance or happenstance as it holds less of a connotation of random occurrences. Although some things in life may truly be random, much more is the outcome of complex interactions. For instance, a person may take action that has both direct and indirect outcomes, or the consequences of a decision may be delayed to the point where the individual no longer recognizes the connection to the original activating event. Just because something was unplanned and unexpected does not mean that there is no justifiable explanation or cause for its occurrence.

The term serendipity is unfortunately often misunderstood. It is commonly and inaccurately defined as a happy accident (Meyers, 2008). I prefer to apply the originally intended definition of the term by Horace Walpole (Merton & Barber, 2004) that serendipity described the application of an intellectual ability to make use of an unexpected occurrence to gain insight or new understanding. This definition fits well with career development in that the activating event is reflected upon by the individual and results in increased self-awareness and motivation to take action, that did not exist before the unexpected event or reflection.

Possible Limitations

The most obvious limitation for the proposed study is the same that many of the previous studies on serendipity have had: limited generalizability based on the sample used. It seems obvious to me that all studies are limited by the cultural geography of the location in which they are conducted. In the majority of studies previously mentioned (Bright, et al., 2005a; Bright, et al., 2005b; Bright, et al., 2009; Denga, 1984; Hirschi, 2010) almost no demographic information is provided. The reason that little is provided is that the participants live in a region that lacks ethnic or racial diversity. These studies were conducted at a primarily white Australian university, predominately white Swiss high school and an all black, male, Nigerian high school.

My proposed study would be limited to the demographic make-up of the college from which I will draw my participants. However, I do not feel that this restriction creates too great a limitation. The college is small, private, church affiliated and located in rural eastern North Carolina, but has a student body demographically similar to many other colleges and universities in the United States. The majority of the students are female, 50% of the students are first generation college students, and 34% are African-American. If I collect a random sample of participants from the student body, then I should have a representative sample of the college that would be similar to that drawn from many other colleges.

It is my intention with this study to explore two ideas. The first is to find what college students define as serendipitous events. The process will be accomplished by creating a focus group of students to assess information from existing research on serendipity. I believe that college students are in a uniquely qualified position to define such

events as they are in the process of concentrated career decision-making. Their reflections on personal and vicarious experiences are immediately relevant to career development and not removed by a significant period of time. The results should add clarity to an issue in which there is little agreement.

The second idea that I wish to explore is to expand what is known about the differences between people who perceive serendipity as an influence on their career development and those who have not. To accomplish this I will use a randomly selected sample of participants from the same source as the first part of the study. The participants in the second part of the study will be asked to complete an instrument that inquires whether they have experienced incidents of serendipity as defined by the participants of the first part of the study. The second study will also include the participants completing the NEO-FFI (Costa & McCrae, 1992) to assess their personalities according to the Big Five Personality Factors. I have chosen the NEO-FFI (Costa & McCrae, 1992) over the more detailed NEO-PI-R (Costa & McCrae, 1985; 1992) because it is briefer, focusing strictly on the general factors and not the expanded facets within each factor. For the purposes of the study only the general factors are of interest. Using the results of the new instrument and the NEO-FFI (Costa & McCrae, 1992), I will determine if any differences in personality result in significant differences in perceptions of serendipitous events influencing career development.

CHAPTER 2

REVIEW OF LITERATURE

The research that I propose is dependent on the clarity and validity of two different concepts; that of serendipity, and personality as defined by Costa and McCrae (1992). There are no similarities or to my knowledge, any published work that has fully linked the two concepts. As a word in the English language, serendipity is relatively young, being coined in 1754 by Horace Walpole to describe the application of intellect to gain new understanding as a result of an unexpected experience (Merton and Barber, 2006). Costa and McCrae (1985;1992) described personality along five factors describing expression of behaviors and preferences along independent scales labeled: Openness, Conscientiousness, Extroversion, Agreeableness, and Neuroticism (OCEAN).

Serendipity in Theory

Serendipity has been included as a central construct in only two career development theories: Happenstance Learning Theory (HLT; Mitchell, et al., 1999; Krumboltz, 2009) and Chaos Theory of Careers (CTC; Bright & Pryor, 2003). Neither of the original publications of these theories used the term serendipity; however, the authors have subsequently used the term synonymously with both happenstance (Krumboltz, 1998) and chance (Bright, et al., 2005; Mitchell, et al., 1999). For the sake of clarity and parsimony I will refer to the phenomena as serendipity regardless of the word used in the referenced work.

Happenstance learning theory

HLT is the product of a career's worth of refined and redirected ideas. Originally inspired by Bandura's (1977) social learning theory, John Krumboltz sought to apply the

concept of observational learning to career decision-making. Out of this ambition the social learning theory of career decision-making was developed (Krumboltz, 1979) and eventually expanded to become the learning theory of career counseling (Krumboltz, 1996). In it's new iteration Krumboltz's theory presented four influencing factors of career development: genetic endowment, environmental conditions, learning experiences, and task oriented skills. In these four factors Krumboltz (1996) found a reasonable description of the career development process that sought to describe decision-making as it occurs naturally rather than describing an idealized model of decision- making.

Genetic endowment. The social learning theory of career decision-making recognizes that individuals possess genetic traits that have the potential to influence the decision to pursue, or not pursue, a career direction. Genetic factors may include physical characteristics, such as physical build, or innate potential as in musical or athletic ability. In his explanation of genetic trait influences in social learning theory, Sharf (2002) points out that tone-deaf people are not likely to pursue careers as musicians.

Environmental conditions. Environmental conditions and events incorporate the cultural and sociological factors of career development. An individual may not select or have control of these aspects of the environment that includes the cultural restrictions and opportunities that exist in the life situation to which a person is born. One person may be born and raised in an environment that includes educational and occupational opportunities that are either lacking or in particular abundance. These are not aspects of which a person may exert control of, but must react to instead. For example, we can consider a person raised and residing in a landlocked state such as Wyoming, and has general interests related to

environmental sciences. Due to the physical and cultural geography of Wyoming, this person may have experiences that foster a desire to pursue academic studies and a career in range and soil science, a career path of relevance and applicability in Wyoming. The same conditions that support this desire similarly restrict experiences that might foster further interest in coastal ecology or oceanography. The concept of environmental conditions in HLT is consistent with the concept of background contextual affordances in Social Cognitive Career Theory's (Lent, Brown, & Hackett, 1996) model of interest development and decision-making.

Learning experiences. The learning aspect of social learning theory derives from individual experience as *Instrumental Learning Experiences* and *Associative Learning Experiences*. Instrumental learning experiences are the direct effects of engaged activity. If a student studies for a test, learns the material and does well on the test, that student has derived a direct benefit from studying and will likely repeat the experience under similar circumstances. Associative learning experiences can occur from observing another person's actions, evaluating the positive or negative outcome and applying the knowledge for his or her own benefit. It may also occur by successfully associating knowledge gained from an experience to another unrelated experience.

Task-approach skills. Task-approach skills are the individual's ability to understand and apply genetic endowments, environmental conditions and events, and learning experiences. The application of these other factors means that the individual is able to obtain useful vocational information, set career goals and evaluate the progress toward those goals, generating appropriate alternatives when necessary.

The four factors remained intact as the theory progressed from social learning theory of career decision-making to planned happenstance theory (Mitchell, et al., 1999). In fact, much of the theory remains unchanged with the exception of the new focus on learning based on unanticipated events, or happenstance. Planned happenstance is a theoretical acknowledgement that people are influenced by contextual factors in their lives, that they have limited control over the events in their environment, and that the contextual influences are not known or anticipated in advance. Despite this acknowledgment of the general unpredictability and limits of control, happenstance does not absolve the individual from personal responsibility or control of career development. The ubiquity of serendipitous events beyond individual control means only that there is a potential to understand and utilize happenstance in career development.

Planned happenstance appears to be modified from the learning theory of career development specifically as a tool to improve career counseling. As the name would imply, HLT proposes that unexpected influences can paradoxically be predicted and prepared for (Mitchell, et al., 1999). The specific instances will not be known but Mitchell, et al., (1999) and Krumboltz (1998; 2009) argue that career counselors and the clients they serve should take advantage of such events and work to create them. To successfully accomplish these tasks two conditions must be met: a change in role of career counselor from career "matchmakers" to "facilitators of the learning process" (Mitchell, et al., 1999, p. 119), and develop a greater understanding of how beneficial serendipitous events occur.

In the most current iteration of the theory, Krumboltz (2009) modifies the name of the theory to Happenstance Learning Theory to stress the potential to enhance the quality of

clients' lives by moving from a model in which people search for an ideal career, to a model of increased learning. This change is consistent with Friedel's (2001) assertion that all discovery by its nature, is unpredictable and unexpected and thus serendipitous. Career development is a process contingent upon self-discovery based on the acquisition of new knowledge and experiences. Krumboltz (2009) presents HLT as a treatise to counselors urging them to embrace happenstance as a basic reality of career development and life. Krumboltz did not simply present the concept but includes suggestions for applications for counseling practice and research ideas that will lend to greater understanding of happenstance and improve methods of implementing the theory into practice.

Chaos theory of careers

CTC was originally conceived by Robert Pryor and Jim Bright to address the failure of predominate career development theories to account for the realities of the contemporary experiences of 21st century students and workforce (Pryor & Bright, 2003). They sought to move away from traditional trait matching and developmental theories that they felt had little connection with real life career decision making. When an individual is faced with making a career decision, that person is not likely to overtly consider aspects of their personality in comparison to corresponding activities and values associated with a career field. Instead, that person is more likely to consider opportunities that arise in their environment, listen to recommendations of family, friends and respected authorities, and consider how the outcomes to decisions will effect their short-term life situation (Bright & Pryor, 2005).

Influenced by recent applications of constructivism (Savickas, 1995) and systems theory approaches (Patton & McMahon, 1997; 1999) to career development, Pryor and

Bright (2003) sought to apply the mathematic principles of chaos theory and complexity to better understand career decision-making. Chaos theory may be ideally suited to provide an objective model of career decision-making in non-idealized, realistic conditions. Chaos theory describes the complex behavior of non-linear, dynamic systems (Gleick, 1987). What this terminology means is that the effects or influence of a change in one variable within the system has the potential to produce a disproportional change to the entire system (non-linearity) and that those resulting changes feed back upon the original variable further changing it to produce an open system that is undergoing constant change and growth (dynamic).

Much of CTC functions based on assumptions provided by systems theory. Unfortunately, some understanding of systems theory is required to understand the application of chaos theory to career development. Systems theory is fairly complicated and any attempt to properly describe it would be as lengthy and cumbersome as chaos theory. As there will be many references to systems, I believe that a brief explanation is required. Perhaps one of the better explanations of systems theory applied to people is Bronfenbrenner's (1977) ecological systems theory in which the individual (system of thoughts, functions and action) exists within concentric and interactive systems of immediate environment (Microsystem), local community environment (Exosystem) and global geopolitical economic environment (Macrosystem). In this model the systems are open and recursive with behaviors or actions of each system exert influence or effects both the systems within and without.

Similarly, one weakness of applying chaos theory to understand career development is that very few counselors are familiar with chaos theory. For people who are unfamiliar with chaos theory the most common reaction is to assume that it is about random behavior and disorder. Bright and Pryor attempt to ameliorate this prominent misperception through a series of articles presenting the theory (Pryor & Bright, 2003; Pryor & Bright, 2007a; Pryor, Amundson, & Bright, 2008) and providing specific guidelines on incorporating chaos theory into counseling (Bright & Pryor, 2005; Pryor and Bright, 2006; Bright & Pryor, 2007; Pryor & Bright, 2007b; Pryor & Bright, 2008). The authors present CTC as a theory that considers the individual as a whole within an ecological environment that is influenced by the person's actions while exerting influence upon the person in turn. CTC deliberately avoids the traditional person-environment (P x E) practice of defining and utilizing aspects of the person or their environment (career) but instead defines both person and their environments as dynamic and recursive (Bright & Pryor, 2005).

As with the theory it is derived from, CTC eschews reductionism as it is antithetical to the entire concept of chaos theory. However, to facilitate understanding, some description of dependent aspects of the theory must be described as separate from the whole. The result is that the theory is difficult to briefly summarize or present as component parts. For convenience sake McKay, Bright and Pryor (2005) have described CTC as having four central elements of complexity, change, chance and constructiveness. It must be acknowledged in the presentation or description of these elements that they are not entirely separate and distinct from one another, nor do they provide anything that can be referred to as a comprehensive model of chaotic career development. Any explanation of an element

must contain aspects and influences from the other elements. The analogy of a ball of mixed colored modeling clay has been use to describe this type of inseparability (Kahn, 2006). Any attempt to separate the ball into colored parts would result in some parts of other colors remaining in the separated results.

Complexity. Complexity is a result of sensitive dependence on initial conditions, or non-linearity. Sensitive dependence is perhaps the most common descriptor of chaos theory (Gleick, 1987). It means two relatively simple things. The first is that the future state, or behavior, of a system will be the result of the current conditions of the system. This current state of the system is therefore the result of previous states, or that behavior within a system was caused by whatever conditions existed previously. The second meaning is that any event within the system has the potential to create disproportional change to the system. Translated to a person, sensitive dependence on initial conditions means both that a person's decisions or behavior are not random but are based on previous learning. Any experience in a lifetime of innumerable experiences has the potential to change the entire person and consequently the person's environment. When every experience has the potential to result in meaningful learning, and every decision is based on what has been learned, life is complicated or complex.

Change. Change is the general acknowledgement that nothing in life is fixed or constant. No person's body, mind or environment stays the same, but is undergoing constant change. If you consider an individual's career development across the span of career or life, that person undergoes constant change. The changes may not be rapid or immediately noticeable, but there is change. In the context of complexity, every experience in life, every

interaction with other people, has the potential to result in meaningful learning. With every new thing learned about self or the world, the individual alters his or her perception of the world and his or her place in it. This altered perception may result in changes to interests, ambitions, or assessment of abilities that can and will have an effect on career.

Pryor and Bright's (2003) assessment of the realities of the 21st century workforce were based at least in part of the current instability of jobs. Unlike the times when Parsons (1909) published his trait matching theory, or Super's (1957) developmental career theories, people no longer stay employed with the same employer within the same field. It is entirely possible that the career field that a person chooses when they first enter the workforce will not exist, at least in its current form, when that person retires. It is the nature of change in career that prompted Pryor, et al., (2008) to suggest that career counselors reevaluate their focus on decision-making as a vehicle to attain stable satisfying careers, to a goal of helping clients to recognize possibilities and opportunities.

Constructiveness. Constructiveness is the tendency of people to construct mental models of the world around them to base decisions on those models. People construct these mental models based on their experiences, readjusting or reconstructing the models to be more accurate based on new experiences and outcomes of decisions based on previous models. For example, if I mention the career of cabinetmaking any reader might picture cabinets that he or she has physically interacted with combined with any woodworking shops that he or she has been in or seen on television. The individual mentally constructs a model of the cabinetmaking career according to this limited information. Based on this constructed model of a cabinetmaker, a person will decide if they would enjoy the work. As life

experiences differ from person to person, so do models of the same concepts. Unfortunately, because of limited experiences and limited capacity to accurately process a lifetimes' worth of experience, mental models are never complete or accurate. For example, if I mention a career as an attorney, readers may conjure up images of attorneys they have met or hired. Some readers may have never interacted with an attorney and will instead recall an experience of watching a television show featuring an attorney. Neither of these scenarios would result in a mental representation that comes anywhere near to an accurate depiction of what is involved or required to be a practicing attorney. Still, these are the constructed representations that people will base a decision on whether or not to pursue a career as an attorney.

As we continue to engage in new experiences our constructs continue to change, just as the real environments change. The continuous systemic changes (internal, constructs, and environment) lead to continued complexity and uncertainty. Consider that the outcomes of our decisions, that were all based in constructs of limited accuracy, change our environments due to recursiveness while simultaneously changing our constructs concerning the contexts of the decision.

Chance. McKay, et al., (2005) presents chance as "unplanned and unpredictable events and experiences that are often crucial and sometimes determinative in the narrative of people's careers" (p. 100). The word chance is not consistently employed in CTC and was likely chosen for alliteration. In terms of chaos theory, chance does not imply that events are the result of random behavior. Instead, chance becomes the product of sensitive dependence. Sensitive dependence on initial conditions requires that all behavior within a system (the

individual system, and the immediate environment Microsystem) results from previous conditions. Current conditions do not spring into existence without a root cause, even if an observer does not initially understand the cause. Chance events are observed when conditions under consideration are the indirect result of an activating event or are the results from the actions of others in the shared environmental systems. The term chance describes a quality of unexpectedness or failure (and inability) to successfully predict the events.

People refer to indirect results as chance because any connection requires effort and the ability to reflect and trace the results back to an activating event. That activating event often seems disproportionate to the result. Consider the following well-known proverb: *For want of a nail the shoe was lost. For want of a shoe a horse was lost. For want of a horse the rider was lost. For want of a rider a battle was lost. For want of a battle a kingdom was lost*. It may be absurd to blame the loss of a kingdom on the lack of a horseshoe nail, but the proverb presents a series of events that resulted from a seemingly inconsequential initial condition. For students, the college environment provides an innumerable range of opportunities and experiences that may potentially provide these seemingly inconsequential initial conditions. Students may choose a class to fulfill a requirement and be inspired to pursue a career by the content of the course, by a guest lecturer, or by encouragement from the instructor.

Often such an inspiring experience is considered chance only because it was unexpected by the person who experienced it. Chance becomes a matter of perspective. One of the chance, or serendipitous events most commonly cited by college students is the unexpected encouragement to pursue a field from a professor (Bright, et al., 2005b;

Williams, et al., 1998). Although the experience is reported as a serendipitous event by the student, it was likely the specifically intended purpose of the professor to inspire consideration of the field.

Another example of chance as a matter of perspective would be a drunk driver getting into a collision with another car. As an observer, the accident appears to be the direct, rationally predictable result from the driver's actions. The accident is not a chance event. However, for any person whose car is struck by a drunk driver, the event always comes as a surprise. It is not only a matter of perspective, but prediction. It is reasonable to predict that a person that drinks and drives will crash into a car. It is not reasonable to predict that your car will be hit by a drunk driver.

Such is the nature of chance in chaos theory. It is understandable that events do not occur randomly, with no root cause, but were simply unanticipated by the participant. Chance is the failure to predict an event, regardless of its cause. Serendipity, especially in career development, includes the response of finding purposeful meaning in the unpredicted event and taking a corresponding action. Both HLT and CTC rely on serendipity in their models or career development.

Research on Serendipity

Just as there has been limited inclusion of serendipity as a construct of career development, there has been a corresponding dearth of empirical study of serendipity as a influence on career decision-making and career development. Of the serendipity research that has been published, the bulk of it has followed and was influenced by Betsworth and Hansen's (1996) first categorization of serendipitous career events. This historical absence

can be easily understood as the introduction of HLT and CTC have occurred only recently. The research on serendipity that came before was sporadic and not based or motivated on any theoretical model. Prior to Krumboltz' (1998) claim that the influence of serendipitous events were ubiquitous in career decision-making, serendipity was ignored or mentioned by authors (Crites, 1969; Osipow, 1973) as unusual perturbations or anomalous sources of error in concrete models of career development. Much of the early research on serendipity (Hart, et al., 1971; Miller, 1983; Salomone & Slaney, 1981; Scott & Hatalla, 1990) focused on the idea that it existed, or attempted to consolidate some support that chance or accidents played a role in career development. Williams, et al., (1998) and Diaz de Chumaceiro (2004) explored the concept in more detail through qualitative studies that examined serendipitous influences respectively in the career paths of women in counseling psychology and music conducting.

The research of Betsworth and Hansen (1996) diverged from simply reporting perceptions of serendipitous influences to attempt to develop categories serendipitous influence. Since the publication of this research there have essentially been two types of research regarding serendipity: categorization of serendipitous events, and differences between participant who perceive serendipity as an influence and those who do not.

Categorical Research

Betsworth and Hansen (1996) performed a qualitative study that included of the use of a brief questionnaire covering influences on the careers of older adults and a follow-up request for a detailed explanation if the serendipity question was answered with an affirmative. The questionnaire included a serendipity question of whether the participants

had experienced "events that were not planned or predictable but had a significant influence on your career" (Betsworth & Hanson, 1996, p. 94). The pool of participants was made up of alumni and spouses attending a class reunion at a large Midwestern university and retired university employees and their spouses. Of the participants 62.7% of the men and 57.4% of the women responded positively to the serendipity question. A total of 167 explanations of personal stories of serendipity were provided from 141 of the participants.

The researchers performed an analysis of critical incidents. Three judges independently sorted the incidents into categories before convening as a team to reach consensus on division into specific categories. Of the original 167 submitted perceived incidents of serendipity from the participants 35 were omitted because they could not fit into any category and 17 incidents were omitted because the judges agreed that they described "natural processes of career development" (Betsworth & Hansen, 1996, p. 95) and were not serendipitous regardless of participant perceptions. Eventually, 11 categories of serendipitous events were agreed upon and were labeled: Professional or personal connections, unexpected advancement, right place/right time, influence of marriage and family, encouragement of others, influence of previous work/volunteer experience, military experience, temporary position becoming permanent, obstacles to original career path, influence of historical events, and unexpected exposure to interests.

As the study used a qualitative design, the authors used three judges, Betsworth and two graduate assistants employed by Hansen, individually categorizing the 167 submitted incidents to strengthen the internal validity of their findings. The procedures followed by the judges were done so following the suggestions described by Lincoln and Guba (1985) for

analysis of data obtained through a naturalistic process. The suggested analysis consisted on placing each described incident on a card that would be sorted by the judges. Each judge then (1) sorted the incident cards according to similarity of the content, (2) created a corresponding title for each category of similar incidents, and (3) outlined specific rules for or descriptions of the sorted categories. The judges then met to discuss the outcome of the individual sorting and categorization and reached a consensus on the categories. Each judge in turn read the categories, titles and descriptor with the other judges comparing their own categories and descriptors until all different categories were exhausted. The result was the 11 categories mentioned above with 35 uncategorized incidents discarded.

Although the participants used in the study may be ideal for considering span of career serendipitous influences, the usefulness and applicability of some of the findings is limited when applied to traditional age college students. The participants of Betsworth and Hansen's (1996) study made references to experiences obtained after college graduation. For example, few college students are likely to include military experiences as influences on their careers nor are many likely to be influenced by spouses as few traditionally aged American college students are married.

Betsworth and Hansen's (1996) research and the categories developed from it greatly influenced subsequent research on serendipity. These 11 categories have functioned as a base for expansion and reevaluation for continued research. Bright, Pryor and Harpham (2005) expanded these 11 categories to 15 to include negative experiences in their research on college students' perceptions of serendipitous influence. These negative experience additions were: obstacles to original career path, unintended exposure to a type of work or

activity that you did not find interesting, unexpected personal event (e.g., death, injury, health problems), and unexpected financial support or problems.

Bright, Pryor, Wilkenfeld and Earl (2005) diverged further from Betsworth and Hansen's (1996) 11 categories in their research on university students perceptions of contextual and serendipitous influences on career development. For this study Bright et al., (2005b) designed a 47-item survey to assess specific influences based on Lent, Brown and Hackett's Social Cognitive Career Theory (SCCT; 2000) concepts of *Background Contextual Affordances* and *Contextual Influences Proximal to Choice Behavior* along with a single item assessing unplanned influences with an abbreviated eight categories to choose from. The categories that Bright, et al., (2005b) listed were derived from the Bright, et al., (2005a) study and included: A personal or work relationship (43% of the participants responded positively), previous work or social experiences (61%), barriers to your previous career plan (not reported), an injury or health problem (10%), unintended exposure to a type of work or activity that you found interesting (44%), unintended exposure to a type of work or activity that you did not enjoy (31%), a major change in residence over which you had little or no control (10%), and any other unplanned event (10%).

The authors performed a factor analysis to assess the items of the survey and confirm their hypothesis that a three factor solutions would be found based on proximal social environment (parents, friends, advisors), distal social environment (the media, sporting personalities, politicians, etc.), and chance or unplanned events. The results of the factor analysis failed to confirm this hypothesis. The authors followed Tabachnick and Fidell's (2001) criteria for factor determination and arrived at a four factor solution labeled Media

(television, film, print media and Internet), Teachers and Lecturers (favorite university lecturer, other university lecturer, favorite teacher, other teacher), Family and Friends (mother, father, best friend) and Unplanned Events (influence of a relationship, a prior experience, an unplanned bad job experience, and an unplanned good job experience). The first three factors showed high internal estimate scores with Square Mean Correlations (SMC) above .70 and eigenvalues ranging from 1.63 to 2.15. The fourth factor of Unplanned Events had only a moderate internal estimate score with an SMC of .64 with an eigenvalue of 1.30. The total cumulative variability explained by the four factors was 37.17%.

Although Bright et al., (2005b) presented contextual factors from an SCCT (Lent, et al., 2000; Lent, Brown & Hackett, 2002) perspective, Krumboltz (1996; 1998; 2009) argued that the influence of many contextual factors was beyond the control and predictability of individuals and would thus be defined as happenstance or serendipity. I believe that there is weakness in the construct validity of Bright's et al. (2005b) survey due to a logical separation between Contextual Influences Proximal to Career Choice that are rational and concrete influences on career decision-making and those that are serendipitous. For instance, in the Media factor participants were likely to intentionally access the Internet in pursuit of information to assist with their career decisions, a rational decision-making process. Those same participants are not likely to visit the movie theatre or tune in to their preferred television shows for the purpose of gathering information to base career decisions upon. Influential information garnered from these media sources is serendipitous because it was not intentionally sought, but unplanned and unpredictable. A similar separation of concrete and serendipitous incidents could be made of the other significant factors of teachers and

lecturers, and family and friends; however, Bright et al., (2005b) make no such distinction in their instrument.

A second threat to the internal validity of Bright's et al. (2005b) study is ambiguous temporal precedence (Heppner, Wampold, & Kivlighan, 2008). In fact this is likely to be a threat to the internal validity of any study on perceptions of serendipity. Participants are asked to reflect on a cause and effect relationship for events that occurred in the unspecified past. Bright, et al. (2009) have pointed out the significance of Ross and Nisbett's (1991) fundamental attribution error in the study of the influence in serendipity, that while reflecting on past events people have a tendency to underemphasize situational factors in favor of personal factors when attributing causes to their actions.

Finally, there are two significant threats to the external validity of Bright's et al. (2005b) study. The first threat is that there was no random sampling of the university population to select participants. Participants were solicited through advertisements on campus and on the university's career services office webpage. The participants self-selected participation in the study. There is therefore no assurance that the sample is representative of the university as a whole or anything else in particular. The second threat compounds the first in that very little demographic information on the participants is provided. Information on age, gender and educational level of the participants is included but nothing is mentioned of race or ethnicity. With this lack of information one cannot determine if the sample is representative of the population of Australia, where the study was performed, or hold any similarity to, or generalizability to an American population.

The limits to the generalizability to an American population is an interesting one because there has as yet been no quantitative study on the categorization of perceived serendipitous events published that uses participants from the United States.

Perception Difference Research

Although 100% of Williams', et al., (1998) research participants reported serendipity as a perceived influence on their careers, this level of agreement in perception is not found in quantitative studies. Other researchers (Betsworth & Hansen, 1996; Bright, et al., 2005b; Bright, et al., 2009; Murtagh, et al., 2011) have instead found a significant majority of participants that perceive serendipity as an influence on their career development. Recently some researchers have begun to pursue an answer to the question of what differences might exist between those participants who perceive serendipity as an influence on their career decision-making and those participants who report no such perception.

Bright, et al., (2005a) sought to explore the idea that personality and career stage effect perceptions of serendipity. For this study they defined career stage by years of enrollment for university students and at least two years of professional work experience for college graduates. The undergraduate student group was made up of 95 participants enrolled at the University of New South Wales that had completed the survey. The ages of the student participants ranged from 16 to 42 (Mean = 19.7, *SD* = 3.18), with 36% male (34) and 64% female (61). There were 40 older adult participants in the second group ranging in age from 24 to 50 years old (Mean = 32.3, *SD* = 6.1), with 65% male (24) and 35% female (16). Based on Denga's (1984) findings of locus of control differences in perceptions of influence of

education and career development of African, male high school students, Bright et al., (2005a) selected locus of control behavior (LCB) as an aspect of personality to explore.

To assess the two central constructs of the study Bright et al. (2005a) used the locus of control behavior scale developed by Craig, Franklin and Andrews' (1984) locus of control behavior scale and a chance event survey created specifically for the study. The chance event survey consisted primarily of demographic items and included two items to assess perceptions of serendipitous influence. The first serendipity question (Q1) asked the participants to rate the overall influence of serendipitous events as "great", "some", or "none" (Bright, et al. 2005a, p. 569). The second question (Q2) asked participants to rate the influence of 15 categories, expanded from Betworth and Hansen's (1996) 11, on the same scale as Q1. The categories provided were: professional or personal connections, unexpected advancement, right place/right time, influence of marriage and family, encouragement of others, influence of pervious work/volunteer experiences, military experience, temporary work becoming permanent, obstacles to original career path, influence of historical events, unintended exposure to work that you did find interesting, unintended exposure to work that you did not find interesting, unexpected personal event, unexpected financial problems, and any other unexpected event.

As with other research on perceptions of serendipity, they found no significant gender differences (Betsworth & Hansen, 1996; Bright, et al., 2005b; Bright et al., 2009, Murtagh, et al., 2011). They also failed to find any differences between different stages of career development. What they did find was that 90% of all participants reported that their career development had been influenced either to "some extent" (74%) or a "great extent" (10%)

with an average of 7.72 (*SD* = 2.25) incidents reported under the expanded 15 events categories.

The only difference that was found was through a series of Pearson's product-moment correlation coefficients computed on the scores of the LCB scale and the Chance Event scale after the age groups were discarded and the participants considered as one group. A small, but significant correlation between LCB Scale (Craig, et al., 1984) score and the likelihood of perceiving serendipitous influences was found ($r = .29$, $p < .1$). Participants with high external locus of control were more likely to perceive serendipity as an influence than participants with higher internal locus of control. However, the main result of the study was that locus of control accounted for just over 8% of the total variance in reporting chance events.

The Bright et al. (2005a) study suffers from the same threats to validity as the Bright et al. (2005b) study and for most of the same reasons. The participants are still being asked to reflect on a cause and effect relationship between events occurring in an unspecified past leaving the possibility of ambiguous temporal precedence (Heppner, et al., 2008) and flaws from fundamental attribution error (Ross & Nisbett, 1991). Limits to generalizability still exist because no information is provided on the race and ethnicity of the participants. There is also a possible weakness in construct validity, but not for the same reason as the Bright et al. (2005b) study. By providing categories as items on the instrument instead of specific instances, the authors sacrificed some construct validity for the sake of brevity. For example, the category of *right place/right time* is entirely ambiguous without any reference for the participants or the readers. Krumboltz (2010) pointed out that a better understanding of

serendipitous events can assist counselor to facilitate the accumulation of such events for their students and clients. An ambiguous category such as *right place/right time* leads to no increased practical knowledge or ability to relate in a counseling situation.

The unexpectedly weak results of the Bright et al., (2005a) study prompted a follow-up in which Bright et al., (2009) sought to better understand the nature of influence from multiple chance events that included perceptions of multiple concatenated (related) chance events in comparison to independent multiple chance events or single events, and the possible positive relationship between locus of control behavior and perceived influence of multiple chance events. The participants consisted of 62 university students and working adults, ages ranged from 18 to 56 years old (M = 25, SD = 8.33), 28% were male with 72% female. All participants completed a chance event recollection survey and Craig et al. (1984) locus of control behavior scale.

The chance event recollection survey was created specifically for the study and consisted of a number of demographic questions and items based on six categories of serendipitous events. Unlike the previous studies' categories, these were not generalizations of events. The categories used were single positive event (SP), single negative (SN), multiple-related positive (MCP), multiple related negative (MCN), multiple-independent positive (MIP), and multiple-independent negative (MIN). Participants were provided with two specific examples for each category. The participants were asked to respond to four questions for each category. The questions concerned whether the participants considered the (1) presence of such events as influences, the (2) frequency of occurrence, (3) the

strength of influence on their career, and (4) the future likelihood of such influences. All responses were reported on a 5-point Likert-type scale.

More of the participants reported the presence of single event influences (SP = 82.3%, SN = 66.1%) than multiple-related events (MCP = 64.5%, MCN = 58.1%), with the lowest percentage reporting multiple-independent events (MIP = 54.8%, MIN = 48.6%). This trend of independent influences, to multiple-related, to multiple-independent responses occurring in descending order continued for the remaining questions with the positive experiences consistently reported more frequently than the negative counterparts.

Contrary to the findings of the previous study (Bright, et al., 2005a) the study found that there was no significant relationship between LCB and the perceived influence of single or multiple chance events, with one exception. The only significant finding regarding personality was a moderate correlation ($r = .40$, $p < .05$) between LCB and multiple independent serendipitous events that resulting in a negative career outcome. Participants with high external locus of control were more likely to report experiencing multiple, unrelated negative chance events than participants with internal locus of control. The correlations of LCB to the other categories ranged from $r = -.073$, $p > .05$ (MCP) to $r = .306$, $p > .05$ (MCN).

To some extend the threats to internal validity and construct validity that affected the previous studies (Bright, et al., 2005a; Bright, et al., 2005b) were ameliorated by the change in format and content of the survey. Participants were no longer limited to reflecting on a causal connection between an unspecified event and their career decision-making, but to reflect and rank their perceptions, strength of influence, frequency and likelihood of future

occurrences. Unfortunately, the limitation of only providing demographic information on age and gender continues to threaten the generalizability of the studies of serendipity.

After the contradictory results of the previous studies, Hirschi (2010) decided to expand beyond looking for a relationship between LCB and perceptions of serendipity of 11th grade students in Switzerland. This study focused on an expanded selection of "personal" (Hirschi, 2010, p. 40) qualities that included LCB and the Openness personality factor from Costa and McCrae's (1992; 1997) Big Five personality factors. Also included were socio-demographic differences (nation of origin, school track and gender) and career development differences of planfulness and decidedness. Two cohorts were used in the study. Cohort 1 consisted of students considering their current career development situation of transition into the workforce or continued education. Cohort 2 consisted of students reflecting on their two-year old transition (eighth/ninth grade) to their current educational track. Using the same serendipitous event survey at Bright, et al. (2005a) with essentially two questions about perceptions of serendipity: Q1 requiring them to rate the influence of serendipitous events on their career decision-making from great, some or no, and Q2 requiring the participants to indicate categories of events that they have personally experienced.

As with all the previously mentioned studies, no gender differences were found. The other socio-demographic variables did show a relationship to perceptions of serendipity. Immigrant students reported greater overall perception of serendipitous events than Swiss nationals and participants in basic education tracks reported greater overall perception of serendipitous events than students in more academically advanced programs. This finding is consistent with research and opinions that people with more adverse career and education

conditions (or less affluent participants) perceive serendipity as more influential than people with more financial and economic support (Hart et al., 1971; Rojewski, 1999; Salomone & Slaney, 1981).

Contrary to expectations, career development variables of planfulness and decidedness showed no relationship to perceptions of serendipity. This result is certainly counter-intuitive, as one might expect a person who put more effort into career planning to be less likely to perceive serendipitous influence or at least experience fewer incidents of serendipity than someone who was less planful.

As for personality factors Hirschi (2010) found that participants with high external LCB were more likely to perceive serendipitous events as an influence on their career development, and report a greater breadth of serendipitous experience, than participants with high internal LCB. This finding supports Bright et al.'s, (2005a) findings concerning LCB.

Although LCB showed a straightforward relationship to perception of serendipity, the personality factor of Openness showed a more complicated relationship to it. For Cohort 1, reflecting on their current career development, a positive correlation was found between Openness and perceptions of serendipity. Participants with higher Openness scores were significantly more likely to report experiencing serendipitous influences on their career development. Participants in Cohort 2, reflecting on educational/career transitions two years prior, had the opposite results. Cohort 2 participants with higher Openness scores were significantly less likely to report experiencing serendipitous influences in the past than participants with low Openness scores.

Hirschi (2010) performed multiple hierarchical regression analysis to explore the effect size of all variables on the responses to Q1 and Q2. For Cohort 1 Q1, overall perception of the influence of serendipity, Hirschi found that socio-demographic variables accounted for 8% of the variance [$F(3,225) = 6.55$, $p < .001$], with personal variables accounting for an additional 7% of the variance [$F(2, 223) = .9.09$, $p < .001$]. For Q2, breadth of serendipitous influences, Hirschi found that socio-demographic variables accounted for 7.2% of the variance [$F(3, 225) = 5.78$, $p < .001$], while personal variables accounted for an additional 6.8% of the variance [$F,(2, 223) = 8.82$, $p < .001$]. With Cohort 2 weaker, but still significant effects were found. For Q1, Hirschi found that socio-demographic variables accounted for 5.6% of the variance [$F(3, 189) = 3.73$, $p < .05$], with personal variables accounting for an additional 3.2% of the variance [$F(2, 187) = 3.32$, $p < .05$]. For Q2 Hirschi found that socio-demographic variables accounted for 11.8% of the variance [$F(3, 190) = 8.48$, $p < .001$], and personal variables accounting for an additional 3.3% of the variance [$F(2, 188) = 3.68$, $p < .05$]. For both cohorts and both questions career development variables accounted for a non-significant positive change in variance.

I have found the complexity of the Openness personality factor results surprising, but very little else from the research was unexpected. It makes logical sense that people who credit external sources for control of their lives (external locus of control) would report views of serendipity (an external source) consistent to this trend. I believe that the research that has been conducted thus far regarding the relationship between personality and perception of serendipity has been too limited in scope. Aside from the inclusion of one out of the five factors of personality (Costa & McCrae, 1992) personality has been exclusively limited in the

research to LCB (Bright et al., 2005a; Bright et al., 2009; Hirschi, 2010). I understand that with the number of other variables Hirschi (2010) was including in the research there was little desire to add another four aspects of personality. However, I am curious to know what the relationship between personality and perceptions of serendipitous career influences might be on a broader spectrum that includes all five of Costa and McCrae's (1985; 1992) Big Five personality factors.

Criticism of CTC and HLT

I have not found any specific criticism of HLT or specific criticism of serendipity as a career development construct. However, there has been some criticism of the application of chaos theory to career development, and to the social sciences in general. Peitgen, Juergens and Saupe (1992) warn in general terms of the overtaxing of chaos theory that may result from a popular culture (and media generated) push to attempt to apply chaos theory to any field or idea that includes behavior resembling chaos.

A more comprehensive critique of chaos theory, applied in part to vocational counseling, is provided by Gluck (1997). The critique was provided before CTC was introduced by Pryor and Bright (2003) and appears to be provoked by early interest in chaos theory by counselors such as Gelatt (1995), Butz (1995) and Chamberlain (1995). Gluck's (1997) critique appears prior to the latter two authors more extensive application of chaos theory to clinical psychology and counseling (Buetz, 1997; Chamberlain & Butz, 1998).

Gluck's (1997) concerns break down into two arguments: that chaos theory's vague and complicated nature lends itself to metaphysical and philosophical misuse, and that chaos theory fails as a scientific theory based on the concept that scientific theories are intended to

make predictions and reduce error in those predictions. The first argument has in part been born out, but to very little consequence. It is true that some authors have attempted to apply metaphysical, spiritual or religious meaning to the concepts of chaos theory when applied to social sciences and counseling. This application is done with an utter lack of irony, the application of concepts from a theory that attempts to provide mathematical explanations to the limitations of rational predication and planning. Guidon and Hanna (2002) wrote about a case study in which they use the terms serendipity, fate, synchronicity, and hand of god as synonymous concepts. Their study leans far to the metaphysical as they compare concepts from chaos theory to Jung's (1969) concept of synchronicity, the underlying connectedness of life. Block (2005) similarly used chaos theory and complexity as tools to explore spirituality in career development. It is understandable perhaps that mathematicians and physicists may be wary of the co-opting of terminology and rough concepts of a mathematical theory of measurement error to intangibles such as spirituality and underlying connectedness. However, the majority of work applying chaos theory to counseling has focused on quantifiable human behavior and is no more metaphysical or philosophical than applications of chaos theory to economics or even biology. CTC is supported by empirical study of its concepts (Bright et al., 2005a; Bright et al., 2005b, Bright et al., 2009) and of its application (McKay et al., 2005).

The second criticism that chaos theory is not truly a scientific theory may have some validity, but may also be a mistake of logic or interpretation. Gluck (1995) provides a definition for scientific theory that a theory makes predictions about some measurable concept and that the theory attempts to reduce error in the measurement. At first glace chaos

theory may appear to fail at these relatively simple requirements. Chaos theory points out the flaw in prediction. That is a prediction. Chaos theory dictates that as all measurements are flawed or rounded, sensitive dependence will lead to errors of prediction. In fact, chaos theory can be used to make several types of predictions. First is what Peitgen, et al., (1992) referred to as the predictability horizon. The predictability horizon is the point of time in which predictions fall below significant validity. The horizon can be measured and it can be manipulated based on the specificity of the information (measurements) that is available. Another prediction is emergent order. We can with a reasonable amount of certainty, predict that there will by occasions when a system appears orderly and rational. We can also predict with absolute certainty that this order is temporary. One final prediction of chaos theory is aperiodicy, that patterns will repeat irregularly and never be exactly the same. An example of aperiodicy is the seasons. We can predict that the seasons will repeat but not exactly how or when. According to calendars, spring begins on March 21, but that does not mean that weather patterns and temperatures change specifically on that date. In addition, we can predict that temperatures in spring will increase from winter and that rain will fall, but we cannot predict temperatures for specific days in spring, when it will rain or how much based on previous springs. There is no season that is the exact duplicate of any season that has come before.

Gluck's (1995) assertion that chaos theory fails as a scientific theory because it does not make predictions is mistaken. He might be justified in a criticism that chaos theory's predictions are non-specific or overly generalized, but this criticism cannot disqualify any theory from being scientific. Too few scientific theories could hold up to such scrutiny. For

example, biologists and medical doctors can predict that the human gestational period is 9 months, or 266 days. However, anyone that has ever been a parent knows that this is a very rough estimate. A reasonable response to this example might be that with more information, more accurate and detailed predictions can be make about any given birth. The same is true of chaos theory. Predictions of chaos theory would only be applicable to the specific system being examined and large amounts of data are necessary to make accurate predictions. In part, that is the goal of my proposed research. The first stage of the study should increase the general knowledge that is available on how serendipitous events influence career decision-making, leading to reduction of errors in prediction relative to the topic.

Personality Factors

Both the NEO-PI (Costa & McCrae, 1985) and the NEO-FFI (Costa & McCrae, 1989; Costa & McCrae 1992) appear to be the products of research on stability of personality traits across the lifespan. The development of these assessments and the specified five factors of personality represent Costa and McCrae's reassessment of a wealth of historical theories of personality factors (Digman, 1990). The work of Fiske (1949) and Tupes and Christal (1961) resulted in a five-factor precursor that included factors of *Surgency, Agreeableness, Dependability, Emotional Stability* and *Culture*, while Eysenck's (1970) *Neuroticism/Emotional Stability*, *Extroversion/Introversion*, and *Psychoticism* factors show distinct similarities to the NEO (*Neuroticism, Extroversion and Openness*) factors of big five.

Costa and McCrae's (1985; 1992) theory and assessments are based on lexical factor analysis (Costa & McCrea, 1997). They performed a factor analysis on adjectives in the

English language that people use to describe personalities. The resulting five-factors are Neuroticism, Extroversion, Openness, Agreeableness, and Conscientiousness.

The factors are intended to be descriptive of normal functioning personality, not descriptive of pathological behavior or personality disorders, making them ideal for comparison of perception differences toward serendipity in college students. Each factor is measured on a bipolar scale. Neuroticism describes emotional stability with low scores indicating more even temper and high scores indicating emotional expression of high intensity and more mercurial changes in mood. I believe that participants scoring high in Neuroticism are more likely to perceive serendipitous influence as people experiencing intense affect have shown a tendency toward affective congruence in social interaction. In other words, in a social interaction with another person (family, friend, teacher, professor) and that influencing person is excited and positive about recommending a particular career path, the highly emotional individual is more likely to match the person and be influenced in his or her decision-making (Bower, 1981; Bower & Forgas, 2001; Forgas, 2006). Similarly, people in more intense affective states, as someone scoring high in Neuroticism is prone to, is more likely to base decisions on emotions and anticipated emotional outcome rather than rationality (Baumeister, Vohs, & Tice, 2006). Therefore, a person scoring high on Neuroticism is likely to perceive him or herself having experienced serendipitous events that resulted in career decisions rather than credit only a rational decision-making process.

Extroversion describes the inclination to seek out social interaction. High scores may indicate that a person is assertive, energetic and optimistic. Low scores do not indicate the opposite of unfriendly or pessimistic outlooks but rather that the individual prefers

independence and quiet reflection. I hypothesize that people with higher scores on Extroversion will be more likely perceive serendipity as an influence as studies indicate that commonly cited influencing events involve social interaction (Betsworth & Hansen, 1996; Bright et al., 2005a; Williams et al., 1998).

Openness describes an individual's willingness to engage in experiences. Scoring high on the Openness factor is linked with active imaginations, intellectual curiosity and a willingness to entertain the unconventional. High scores on Openness have been linked to educational achievement and measured intelligence (Costa & McCrae, 1992), but the authors stress that neither the NEO-PI-R (Costa & McCrae, 1985) nor the NEO-FFI (Costa & McCrae, 1992) include an assessment of intelligence nor should high scores on Openness be interpreted as high intelligence. Lower scores on Openness indicate more conventional and concrete thinking. People scoring low on Openness tend to be more conservative with their social behavior and political beliefs. They may have a narrower scope of interests, but engage those interests with intensity.

Openness is the only factor among Costa and McCrae's (1985; 1992) Big Five personality factors that has been included in research on perceptions of serendipity. Hirschi (2010) selected Openness as a variable because it corresponds so closely with the concepts Krumboltz (2009) used in his presentation of HLT. I would agree with Hirschi's (2010) hypothesis that higher scores in Openness relate to an increased likelihood of perception of serendipitous influences as an openness to experience and influence of unconventional ideas logically relates to perceived external (and unanticipated) influences. As unexpected endorsement and encouragement from others is a commonly reported serendipitous event

(Betsworth & Hansen, 1996; Bright et al., 2005a; Williams et al., 1998), I would expect that a person who scores high in Openness would likely be accepting of such encouragement and endorsement. Similarly, as Openness is associated with capacity for abstract thinking, it may be reasoned that people scoring high in it would be likely reflect upon unanticipated experiences to serendipitous benefit, as described originally by Walpole (Merton & Barber, 2004), that would logically fit into Betsworth and Hansen's categories of *influence of previous work/volunteer experience*, *military experience*, *historical events*, and *obstacles to their original career path*.

The factor of Agreeableness describes a person's tendency toward positive responses to social interactions. Someone scoring high on Agreeableness would be described as altruistic, sympathetic and accepting. Low scores on Agreeableness would indicated that a person is more prone to protecting self-interests, suspicious of others motives, and skeptical. Therefore, Agreeableness should correlate positively with serendipitous influence of social interactions according to Betsworth and Hansen's (1996) categories of *professional and personal connections*, *influences of marriage and family*, and *encouragement from others*.

Conscientiousness describes an individual's tendency to manage desires and to organize and maintain goal pursuit. High scores on Conscientiousness indicate that a person is able to develop plans for the accomplishment of goals and tasks and to follow those plans through to achievement. Such a person may be viewed as determined or intractable, while a person scoring low on Conscientiousness may be viewed as spontaneous, adaptable or flighty. I believe that scores on Conscientiousness will correlate negatively with likelihood of perceiving serendipitous influences on career development. A person with high scores on

this factor is likely to devote tremendous effort to developing and following a career plan, perhaps to his or her own detriment by not always considering contextual factors or an aversion to opportunities that do not fit within the plan.

Criticism of the Big Five

Both the theory and the instruments designed to assess the Big Five personality factors have their share of criticism. Personality factors as a concept is not without criticism to its accuracy and utility. Interests and confidence in personality factor theory has tended to wax and wane throughout the years (Digman, 1990). After the developing a 16-factor theory of personality, and an instrument to measure those factors, Cattell's (1957) instrument was used by Tupes and Christal (1961) to factor five dimensions of personality that was a precursor to Costa and McCrae's big five. Cattell's reaction was to reject the concept of five personality factors, eventually referring to the theory as the five-factor heresy (Cattell, 1995). Such vitriol is not indicative of the overall discourse on differing views of personality, but is one of the numerous disagreements in the topic.

Perhaps the most common criticism of the Big Five personality factors is that they are "merely descriptive" of behaviors (Costa & McCrae, 1995, p. 232). Costa and McCrae (1995) go to great lengths to refute this claim, presenting research and concepts that personality factors help explain behaviors. Other arguments have been presented that the Big Five personality factors are not fixed traits at all, but are subject to change throughout adulthood (Bleidom, Kandler, Reimann, Anleitner, & Spinath, 2009; Roberts, Walton, & Viechtbauer, 2006), and that they might be culturally specific (Hull, Beaujean, Worrell & Verdisco, 2010). The later argument has come forward in response to Costa and McCrae's

(1997) claims of cultural universality of the theory and the NEO-PI-R (Costa & McCrae, 1985; 1992) and the NEO-FFI (Costa & McCrae, 1992).

Critics of the Big Five personality factors and the NEO-PI-R (Costa & McCrae, 1985; 1992) and the NEO-FFI (Costa & McCrae, 1992) certainly have valid concerns about the limitations of the concepts and instruments, but the limitations are not sufficient to discard the tools for the purpose of my proposed research. The participants that I will be assessing will be of a restricted age range, roughly 18 to 23 years-of-age, and nationality. As the overwhelming majority of people in my pool of possible subjects are college students at a small private college in Eastern North Carolina. The NEO-FFI (Costa & McCrae, 1992) should have sufficient reliability to provide me with a snapshot of the relationship between the five personality factors to perceptions of serendipity in college students.

Similarly, the claims that the factors resulting from the use of the NEO-FFI (Costa & McCrae, 1992) are merely descriptive should not be a deterrent as long as the descriptions are consistent across subjects. My concern is the reliability of the instrument. The NEO-FFI (Costa & McCrae, 1992) has a two-week retest reliability that ranges from .86 to .90 across the five scales (McCrae & Costa, 2004). Logically, if the instrument is successful in providing consistently reliable descriptions across subjects, then I can reasonably assess relationships between people who can be described with these traits and their perceptions of serendipity.

Still, the NEO-FFI (Costa & McCrae, 1992) has received consistent criticism that items within their factors do not load as well as the full instrument it was derived from (Egan, Deary, & Austin, 2000; Hill, et al., 2003; Yoshimura, ono, Nakamura, Nathan, & Suzuki,

2001). The NEO-FFI (Costa & McCrae, 1992) is an abbreviated version of the NEO-PI-R (Costa & McCrae, 1992) that reduces the 240 items to 60, providing 12 individual items to assess each factor. Critics of the NEO-FFI (Costa & McCrae, 1992) pointed out that their research showed uneven factor loadings for some of the factors (Openness and Agreeableness) while confirming the five-factor traits. The critics suggested that Costa and McCrae revisit the NEO-FFI (Costa & McCrae, 1992) and replace some items with others from the NEO-PI-R (Costa & McCrae, 1992).

In response, McCrae and Costa (2004) conducted their own assessment of the instrument and found that their critics' analysis of the NEO-FFI (Costa & McCrae, 1992) was well justified. A new revised version of the instrument was developed to address the weak items, eventually replacing 14 of the items (McCrae & Costa, 2007). The third revision of the NEO-FFI (Costa & McCrae, 1992) has coefficient alphas ranging from .78 (Openness) to .86 (Neuroticism) for adult participants and correlations to the NEO-PI-R (Costa & McCrae, 1992) that range from .94 (Conscientiousness) to .97 (Openness). It is the self-rated (form S) of this instrument that I will use to assess personality factors for participants of my proposed research.

There are two research questions that I wish to answer with my proposed study. The first is, can a functional and reliable instrument be developed to measure the perceived influence of serendipitous events on career development. With a positive response and inventory created by answering the first question, the second research question is, what is the relationship of personality, defined by the Big Five Personality Factors, to the perception of serendipity.

CHAPTER 3

METHOD

Introduction

My intent was to complete a study of the effects of personality on perceptions of serendipity in college students through two phases. The purpose of the first phase of the study was to develop an instrument to assess the participants' perceptions of serendipitous influence on career decision-making. No established assessment that suits the purpose of the study yet exists, although several variations of serendipity assessments have been used. With the exception of the Betsworth and Hansen (1996) study, which requested incident descriptions from participants, all studies on perceptions of serendipity have used inventories that present general categories of serendipity (Bright, et al., 2005b; Bright et al., 2009; Hirschi, 2010). Therefore, what qualifies as an incident of serendipity on these assessments has remained undefined and subject to the imagination of the participants.

After the new instrument was developed, it was used in the second phase of the study. The second phase involved participants completing the new inventory along with an assessment of personality. The results of both assessments were analyzed to determine if there is a reasonable claim to a relationship between aspects of personality and perceptions of serendipity.

Participants

Participants in both phases of the study were students of a private, church-affiliated, comprehensive college located in eastern North Carolina. For the first phase of the study, students serving at the college as orientation leaders participated in a focus group to evaluate

potential incidents of serendipity. The evaluation by the focus group also helped develop new items for the serendipity instrument. Orientation leaders are students of the college who have been hired to assist the college administration during new student orientations that occur for one week (two separate two-day events) during the summer and one week prior to the beginning of classes in the fall. Orientation leaders comprise a small group of 26 students that are intentionally representative of the general student population in terms of gender, ethnicity, age and academic discipline. They differ from the general population of students only in terms of grade point averages. All students selected as orientation leaders for the college have maintained a cumulative grade point average above a 2.7. With the exception of the availability of food and soft drinks during the focus groups, the participants of the first phase of the study received no compensation or incentives to participate.

The task of the focus group was to discuss their own experiences related to serendipitous influences with serendipity defined as unplanned or unexpected experiences that influenced their academic and career decisions. The focus group also assessed a pool of potential inventory items describing serendipitous influencing events. The outcome of the focus group discussion was a draft version of the instrument that was subsequently assessed and further refined through a pilot study. Participants for the pilot study were students enrolled in on campus summer session courses at the college.

For the second phase of the study participants were invited from the student body of the college. Using the campus email system, all full-time students enrolled in 12 or more semester hour credits were invited to participate in the study. Students invited to participate in the study were offered an opportunity to win one of four $50 gift cards for approximately

20 to 30 minutes of their time. All students completing both inventories received a raffle ticket that was used to draw the winners of the four gift cards. Using the campus email system, limiting possible selection to currently enrolled full-time students, the pool of possible participants was comprised of 885 people. It was my goal to have at least 100 students participate in the study.

Procedure

As orientation leaders, participants of the focus group meet regularly on a bi-weekly basis during the spring semester. I conducted the focus group at and following one of the scheduled meetings over the span of approximately one hour. The meeting took place in the Multipurpose room of an administrative building at the college. The meetings were coordinated with cooperation from the college's Office of New Student Programs, which employs the orientation leaders, on the condition that meals are provided for the orientation leaders during or after the meeting.

Participation in the focus group was voluntary and not a condition of the job of orientation leader. Any orientation leader who did not want to participate or had a conflict could refuse with no repercussions. Of the 26 orientation leaders, 24 agreed to participate in the focus group. The discussion of the focus group was centered on the singular question that has been repeatedly used in instruments to assess perceptions of serendipity, "Sometimes an unplanned or change event can influence a person's thinking about a career. Did any of the following unplanned events have a significant influence on your career decision making?" (Bright, et al., 2005a, p. 565; Bright et al., 2005b, p. 24; Hirschi, 2010). The instruments in these studies provided a list of eight general serendipitous event categories

modified from Betsworth and Hansen's (1996) original 11. The use of general categories rather than specific instances leaves much to the interpretation and imagination of the participants.

The interpretation and imagination, if communicated, can be useful in better understanding specific instances under which serendipitous influencing events occur. Instead of fitting their own experiences into categories, I had expected the participants to provide specific examples of serendipitous events that have influenced their career decision-making. I asked the focus group participants to evaluate their personal and vicarious knowledge of occurrences in response to a collection of serendipitous event examples (Appendix A). Ideally, I wanted the resulting inventory to take no more than 20 minutes to complete. I believed that it should therefore have approximately 60 to 80 items including demographic information items. The pool of serendipitous event items (Appendix A) included 75 specific events for the focus group to evaluate and expand upon.

A draft version of the serendipity event survey was given to a small group of participants as a pilot study. I contacted the instructors for all on campus summer session courses by email and asked if I could speak to their students at the end of one of their class meetings. I received positive responses from instructors of four courses; biochemistry, social work, and two gerontology classes. I spoke briefly to the students, explained the research study, and asked if any of them would be willing to take 10 minutes to complete the pilot serendipitous event inventory. A total of 28 students agreed to participate.

Participants from the final phase of the study came from the full-time students of a small, church-affiliated liberal arts college. I used campus email to send invitations to

participate in the study to all students that were registered for at least 12 semester hour credits for the fall 2012 semester (N=885). The invitation to participate in the study informed interested students that they could come to the lobby or Student Affairs office in the Hamlin Student Center from 9:00 am to 6:00 pm on Wednesday September 12th or Thursday September 13th to complete the serendipitous event inventory and the NEO-FFI-3 (Costa & McCrae, 1992; McCrae & Costa, 2007). All participants received a raffle ticket after completion of both assessments. They were to write their names and campus email addresses on one half of the ticket, which I used for the drawing. The drawing for the gift cards took place on Friday September 14th and the winners, selected at random, were informed and given their cards. All administrations of the assessments functioned with identical instructions for the completion of the inventories. The serendipitous events inventory were introduced with a reading of the primary question, "Sometimes an unplanned or chance event can influence a person's thinking about a career. Did any of the following unplanned events have a significant influence on your career decision-making?" (Bright, et al., 2005a, p. 565). Participants were reminded to consider the items as unplanned or chance events. Afterwards, the participants were given the NEO-FFI-3 (Costa & McCrae, 1992; McCrae & Costa, 2007). Completion of both instrument require between 20 and 30 minutes of the participants time. The assessments were all numbered so that individual participants' results could be identified and matched by number without any other identification information. All participants were asked to briefly make sure that the numbers on both the serendipitous event inventory and the NEO-FFI-3 (Costa & McCrae, 1992; McCrae & Costa, 2007) matched before completing the inventories.

All participants received an interpretation of the NEO-FFI-3 (Costa & McCrae, 1992; McCrae & Costa, 2007) immediately after completing the assessment. Those participants who could not fit the interpretation into their immediate schedule were told to remember their test number and could return to the student center at a more convenient time to have their results interpreted.

All inventories were collected and paired based on the identifying number, serendipity event inventory paired with same participant's NEO-FFI-3 (Costa & McCrae, 1992; McCrae & Costa, 2007). The inventories were hand scored and manually entered into a database maintained by the author. Participant assessments were evaluated based on a simple score from the serendipity event inventory that is comprised of the number of items from the inventory that they perceive as having been personally experienced. The results from the NEO-FFI-3 (Costa & McCrae, 1992; McCrae & Costa, 2007) were comprised of five scores on bi-polar scales that indicate relative high or low levels of self-perceived traits according to each of the personality factors.

Research Design

Overall, the study was a passive correlational study. I wished to determine if there is a relationship between personality, as defined by the Big Five personality factors (Costa & McCrae, 1992), and the perceived influence of serendipity in college students. The relationship was measured by determining the Pearson product moment correlation between scaled *T* scores on the NEO-FFI-3 (Costa & McCrae, 1992; McCrae & Costa, 2007) and scores on a serendipity event inventory. The design is considered passive because there is no manipulation of either variable from the researcher (Heppner, Wampold, & Kivlighan, 2008).

The scales are both designed to measure specific qualities as they exist and do not provide a measure of change following any manipulation.

I have determined that there does not currently exist any established instrument for measuring the perceptions of serendipitous events that fit the purposes of the study. Therefore, one needed to be created that could reliably measure a significantly comprehensive range of perceived incidences of serendipitous influences of college students. To create the inventory, I followed the steps of scale construction outlined by Lee and Lim (2008). The scale construction included a qualitative focus group for the dual purposes of generating items for the scale and initial analysis of the items that were considered for the scale.

Instrumentation

The first phase of the study was focused on the development of the serendipitous event inventory to be used in combination with the NEO-FFI-3 (Costa & McCrae, 1992; McCrae & Costa, 2007) in the second phase of the study. Lee and Lim (2008) suggested a seven-step process for constructing a useable scale. Steps 1 and 2, conceptualizing and operationalizing the construct of interest and conducting a literature review, were taken prior to the writing of this proposal and are outlined in chapters 1 and 2 of the proposal.

Step 3, generating the items, indicators, and response formats had begun initially based on previous research studies on serendipity. I had generated a pool of items based on serendipitous experiences cited as specific examples in serendipity research (Betsworth & Hansen, 1996; Bright et al., 2005a; Bright et al., 2005b, Diaz de Chumaceiro, 1999; Diaz de Chumaceiro, 2004; Williams et al., 1998) and anecdotes from college student affairs

personnel. There were 75 preliminary examples in the pool of serendipitous events (Appendix A). Following Kline's (2005) suggestions for presenting scale items, the examples each deal with only one concept, are brief and precise, avoid awkward or negative wording, present no irrelevant information, contain no double negatives, and avoid absolute and indeterminate terms (all/none, sometimes/often). The focus groups provided an opportunity to expand the pool of possible items and begin Step 4's content analysis.

After providing possible items based on their own and vicarious experiences, participants in the focus groups were presented with the preliminary survey and asked to respond to the individual items with one of four options, each weighed at a scaled value. The participants could select, *Yes, personally experienced* (3), *Experienced by a student known to me* (2), *Likely to be experienced by a student, but not known to me* (1), or *Not likely to occur to a student/not serendipity* (0). Serendipitous influencing events that are commonly supported by receiving an average score of 1.95 or higher were retained as items in the serendipitous event inventory while examples and incidents that do fall below an average response score of 1.95 were discarded. Feedback was also sought from the focus group to evaluate the clarity and readability of the items.

The modified instrument based on the remaining edited items was used in a pilot test. Participants volunteering from on-campus summer session classes were asked to take the assessment and provide comments on any items they felt were worded poorly or ambiguously. Items may be removed from the inventory if they were repeatedly deemed to be unclear or if fewer than 5% of the participants select the item.

For the second phase of the study the newly created serendipitous event inventory was administered along with the NEO-FFI-3 (Costa & McCrae, 1992; McCrae & Costa, 2007). Analysis of the serendipitous event inventory continued in Step 5 by using a self-selected cross-section of students from the college and analyzing the results of the new survey through factor analysis (Step 7). Step 6 (Translating and Back-translating the scale) was not conducted as there are currently no plans to use the inventory on a non-English speaking population.

An exploratory factor analysis was conducted on the serendipitous events inventory to determine how many factors exist within the instrument. The number of factors selected will depend in the eigenvalues found explaining the overall variance explained by the factors. Items that do not fit into any of the determined factors will be eliminated from consideration for this study and removed from the instrument.

NEO-Five Factor Inventory

The self-report form (form S) of the NEO-Five-Factor Inventory-third revision (NEO-FFI-3; Costa & McCrae, 1992; McCrae & Costa, 2007) was used to assess the personality of the participants. The NEO-FFI-3 (Costa & McCrae, 1992; McCrae & Costa, 2007) is a 60-item abridged version of the NEO-PI-R (Costa & McCrae, 1985; 1992) designed to provide accurate measures of the big five personality factors. Twelve items are included for each of the personality factors. The participants are asked to respond to each item on a five-point Likert-type scale with responses of *Strongly Disagree, Disagree, Neutral, Agree,* or *Strongly Agree*. The raw score is determined by adding the individual score for each of the twelve items per factor. Charts are provided to determine the *T* score for each individual according

to sex. Researchers scoring the assessments use the charts to determine if the participant scored *Very Low, Low, Average, High* or *Very High* for each of the personality factors.

Data Analysis

Hypothesis 1 of the study is, can a scale can be created that accurately assesses the perceptions of college students' experiences of serendipitous influences? Data was collected in three stages of the study to assess hypothesis 1. Along each stage the data was used to either add or remove items from the scale in order to create the most reliable and valid scale possible. The first stage consisted of the focus group meeting in which personal experiences of the participants were collected and added to the pool of possible items for the scale. The same focus group was asked to rate those initial items on a scale of 0 to 3. All individual items that receive an average scale score below 1.95 will be eliminated.

The second stage of analyzing the data for hypothesis 1 was comprised of a pilot study using a draft of the serendipity scale. Participants of the pilot study were asked to indicate any and all events described in items that they have personally experienced. The participants were also asked to indicate any unclear wording or concepts that might confuse future participants regarding the items. The feedback was used to analyze and rewrite and eliminate unclear items or wording. In addition, any individual items that were not selected by at least 5% of the pilot study participants were eliminated from the scale.

The third stage of analysis of the data regarding development of the serendipitous event scale was comprised of administering the scale, along with the NEO-FFI-3 (Costa & McCrae, 1992; McCrae & Costa, 2007), to a cross-sectional group of student participants. Analysis of the data from the newly developed scale through an exploratory factor analysis

took place. No individual items were eliminated from the inventory at this phase as all items fit into determined factors with significant factor loadings.

Hypothesis 2 of the study concerns the relationship of perceptions of serendipitous events to personality. After the final adjustments to the instrument after the factor analysis, the results of the instrument, as an accumulated score based on positive responses were compared to scaled *T* scores across the five personality factors from the NEO-FFI-3 (Costa & McCrae, 1992; McCrae & Costa, 2007). Using a Pearson's product moment correlation, with possible scores ranging from -1.0 to 1.0, I specifically hypothesized that there will be a positive correlation between scores for perception of serendipity and scores for the personality factors of Openness, Agreeableness, Neuroticism and Extroversion (scores closer to 1.0), while there will be a negative correlation between perception of serendipity and scores on Conscientiousness (scores closer to -1.0).

Methodological Limitations

The most obvious methodological limitation of the study is that it involves the creation of a new scale to measure the perceptions of serendipity. Although various measures will be employed to assure the reliability and validity of the instrument, ideally a cross-validation using another sample with confirmatory factor analysis should be conducted with the instrument to reaffirm the findings of the exploratory factor analysis. However, practical constraints prohibit conducting an additional study using the scale.

Similar to most of the other studies on perceptions of serendipity (Bright, et al., 2005a; Bright et al., 2005b; Hirschi, 2010), my proposed study has a limitation to construct validity through ambiguous temporal precedence (Heppner, et al., 2008) and fundamental

attribution error (Ross & Nisbett, 1991). Participants will be asked to reflect on a cause and effect relationship resulting from an unspecified event that may have occurred at any time in the participant's past. Both recollection and perspective may be flawed and consequently weakening the results. Similarly, fundamental attribution error causes participants to attribute personal factors to the decision-making that they had done in the past, as opposed to attributing the decision to the situation or social/environmental circumstances at the time of the decision. The wording and the list of specific events rather than the use of categories are used with the intent of reducing the error by simply inquiring whether the participants had experienced a particular event.

Some threat to the external validity of the study exists through the source of the participants. Although the cross-section of the student body of a college is generally representative of the population of the college, that does not mean that the population of the college is representative of the entire population of college students in the United States. The pool of possible participants is entirely from the full-time enrolled students of the college. The college is a small (1200 students), church-affiliated, private college located in rural North Carolina. The student body of the college is certainly different from that of a large public university such as North Carolina State University. As there have been no published studies on the perceptions of serendipity in college students from the United States, results of the present study should not be generalized to the entire American college student population. Such generalizations would need further support from studies using participants from different types of colleges and universities.

CHAPTER 4

RESULTS

Focus Groups

Recruitment

Participants in the focus group were recruited from the Orientation Leaders at the college during their summer pre-orientation training. With cooperation from the Director of New Student Programs, the focus group meeting was included in the training schedule, however: the student participants could choose not to participate and have a free hour instead. A total of twenty-five students participated in the focus groups. Twenty-four of the participants completed a demographic information sheet with one abstaining. Of the reporting participants, 16 were female (66.7%) and 8 were male (33.3%) with ages ranging from 18 to 21 (mean = 19.46). The participants were able to select as many ethnicities from a list as they felt were appropriate. Eighteen of the participants identified as Caucasian/white, 5 as Hispanic, 3 as African American and 1 as Asian. Three of the participants selected more than one ethnicity. No participants selected "Other" or filled in the provided blank space. The participants reported enrollment in academic disciplines from every school at the college with the exception of the School of Business.

Statistics and Data Analysis

The participants were informed that the purpose of the focus group meetings was to learn about the serendipitous experiences that may have influenced their academic or

career decision-making. Serendipity was defined to the participants as an unplanned or unexpected event that influenced their decision-making. In the course of the focus group the participants shared personal experiences of serendipitous events that personally influenced their academic and career decisions. As new events were shared, they were written on a large dry-erase board. Wording on the written events were checked for accuracy with the contributing group member before moving on. A total of 17 separate and distinct event types were collected from the focus group. Of the 17 event types, nine were already included in the Pool of Sample Unplanned Events (Appendix A). The eight new items taken from the events described by participants in the focus groups are as follows:

1. A geographical opportunity (academic field or career specific to your area/location)?
2. Testimonial of a person in the field or profession?
3. An unexpected kindness?
4. Access to funds or funding?
5. A positive interaction with a person in the profession?
6. An information session or other non-academic presentation?
7. A conversation with students at a college/university (not previously known to you)?
8. Changed your academic or career goals to accommodate a family member?

The focus group participants were each provided with the Pool of Sample Unplanned Events (Appendix A) and asked to rate their perceptions of the sample events on a scale of 0 to 3 (3 = yes, personally experienced, 2 = experienced by a student known to me, 1 likely to be experienced by a student, but not known to me, 1 = not likely to occur to a student/not serendipity). The Pool of Sample Unplanned Events contained 75 items with resulting mean response scores ranging from 1.3 to 2.9. Any items specifically mentioned during the focus groups were automatically retained as logically they would have had average scores above a 2.0 since they had been experienced and discussed by members of the focus groups. All other items receiving an average response score below 1.95 were eliminated from inventory. The omitted items and their mean response scores were as follows:

- Watching a television show (non-fiction-TLC, Discovery Channel, etc.) 1.3
- Watching the news on television? 1.7
- Suffering from a prolonged illness? 1.6
- Suffering a debilitating injury? 1.5
- Discovering limitations to a necessary skill or talent? 1.7
- Receiving a criticism or recommendation that you not pursue a career field? 1.3
- Finding an interest in an elective course? 1.8
- Your involvement or participation in athletics? 1.8
- An offer of a job from a family member or relative? 1.7
- An offer of a job by a friend or parent's friend? 1.7

- To accommodate a spouses career? 1.6
- To accommodate a child's needs? 1.3
- A job opportunity with your employer (changing career field)? 1.4
- A change in your marital or romantic relationship (marriage, divorce, breakup, etc.) 1.7
- Physical limitations that prevented you from pursuing your desired career? 1.7
- A temporary job becoming permanent? 1.5
- A promotion involving different work or required skills from your previous job? 1.7
- An historic event (declaration of war, terrorist attack, natural disaster, etc.)? 1.5
- A job was offered while another you wanted was not? 1.7
- An epiphany resulting from drug use (tripping)? 1.3

The omission of several of these items was unexpected as they describe situations that have been often cited in previous research (Betsworth & Hansen, 1996; Bright, et al., 2005a; Bright, et al., 2005b; Bright, et al., 2009; Williams, et al., 1998). It is conceivable that the limited age range of the focus group participants caused low scores for certain items as none of the participants have much employment experience, have ever served in the military, have been married, had children, or been of working age during any historically relevant event. As young college students, the focus group participants have more limited life experiences than the older participants used in the abovementioned previous studies.

Pilot Study

Instrumentation

The outcome of the focus group was an initial pilot version of the Serendipitous Event Inventory (Appendix B) that consisted of a total of 67 items separated in two sections that would be used in the pilot study. The first section of the inventory contains five items covering demographic information of the participants with the remaining 62 items of the second section describing specific serendipitous events. Participants using the inventory were instructed simply to indicate items describing events similar to events that the participants had personally experienced that unexpectedly influenced their academic and career decision-making.

Recruitment

Participants for the pilot study were enrolled in on campus summer courses at the college. I contacted all instructors of on campus summer courses offered and requested 10 minutes following their classes to ask their students to participate in the pilot study. I received positive responses for instructors of four courses: Biochemistry, Social Work, and two Gerontology courses. A total of 28 students agreed to voluntarily participate. Of the participants, 22 were female and 6 were male. The ages of the participants ranged from 19 to 44 with an average age of 25.11. The majority of the participants identified as Caucasian/White (17), with 9 identifying as African American, 4 Asian, 1 Other (nonspecified) and no Hispanic participants. Three participants

selected more than one ethnicity. Table 1 shows the demographic breakdown of the pilot study participants.

Participants were briefly told the purpose of the research and presented with the same definition of serendipity as had been used with the focus group. The participants were asked to read through the listed items and indicate with a mark any described events that they had personally experienced that influenced their academic of career decision-making.

Table 1

Demographic Breakdown of Pilot Study Participants

Descriptor	Percent	Mean P Response	SD
Male	21.43	14.67	1.37
Female	78.57	18.91	11.02
White	60.71	18.36	8.59
African American	32.14	15.56	11.83
Hispanic	0	/	/
Native American	0	/	/
Asian	14.29	19.75	10.18
Other	3.57	17	0
Age	/	25.11	7.62
Sum of P responses	/	18	9.90

Note. N = 28. P = positive

Statistics and Data Analysis

Answers from the completed inventories were compiled and entered into a spreadsheet. Every participant reported experiencing multiple incidents of

serendipitous influence in their academic and career decision-making. The number of positive responses ranged from 6 to 45, with an average of 18.18 positive responses (Table 1).

As suggested by Agresti and Finlay (2009), I performed a comparison of means (Table 2) to determine if there was any significant difference between males and females and between the reported ethnicities. Male participants had an average of 14.67 positive responses with a standard deviation of 1.37. Female participants had an average of 18.91 positive responses with a standard deviation of 11.02, resulting in a comparison of means with a non-significant *t* score of 1.76 ($p < .05$). However, this *t* score would have two-tailed statistical significance at a $p < .10$. Such a *p* value was not considered significant in this study because it would provide only an 80% confidence level that the assertion that a significant difference between male and female participants was accurate.

Considering the possible differences between ethnicities, I compared the means of each ethnicity to the remainder of the group, labeled "Other's" Mean or SD (Table 2). I compared White participants to non-White participants, African American participants to non-African American participants, and Asian participants to non-Asian participants. No significant differences were found at a *p* value of .05 (or even at .10). White participants had an average of 18.35 positive responses with a standard deviation of 8.59. Non-White participants had an average of 17.45 positive responses

Table 2

Pilot Study Comparison of Means

Descriptor	Mean	SD	All Other's Mean	All Other's SD	SE	*t* score
Male	14.67	1.37	18.91	11.02	2.42	1.76*
Female	18.91	11.02	14.67	1.37	2.42	-1.76*
White	18.35	8.59	17.45	12.09	4.20	-0.26
African American	15.56	11.83	19.16	8.96	4.45	0.81
Hispanic	/	/	/	/	/	/
Native American	/	/	/	/	/	/
Asian	19.75	10.18	17.71	10.05	5.49	-0.37
Other	17.00	0.00	/	/	/	/
Age	25.11	7.62	/	/	/	/
Sum of pos responses	18.00	9.90	/	/	/	/

Note. $N = 28$ (White $n = 17$, African American $n = 9$, Asian $n = 4$, Other $n = 1$.
* indicates significant at $p < .10$.

with a standard deviation of 12.09. The comparison of means resulted in a *t* score of -0.26. African Americans had an average of 15.56 positive responses with a standard deviation of 11.83. Non-African American participants had an average of 19.16 positive responses with a standard deviation of 8.96. The comparison of means resulted in a *t* score of 0.81. Asian participants had an average of 19.75 positive responses with a standard deviation of 10.18. Non-Asian participants had an average of 17.71 positive responses with a standard deviation of 10.05. The comparison of means resulted in a *t* score of -0.37.

I chose not to pursue any inquiry into the differences that might exist between participants from differing academic fields of study. With 14 different academic majors within a sample of 28 participants the numbers would likely be too small to accurately assess any existing differences.

A significant relationship was found for the study participants between Age and positive responses on the pilot version of the serendipitous event inventory. A moderate negative relationship was indicated by a correlation coefficient of r=-.49, (p < .005).

In addition, the pilot instrument appears to be a reliable measure of students' perceived serendipitous experiences. A Cronbach's alpha of .90 indicates a high estimate of internal reliability.

Item removal

It was previously determined that any item that received less that 5% of the participants indicating a positive response would be eliminated from the inventory. The individual items received positive response rates ranging from 0.0% (two items) to 78.6%. A total of eight items were eliminated from the inventory for failing to meet the 5% (two participant) threshold. Those eliminated items include:

1. An internship experience that you disliked?
2. A client or customer recognizing your hard work and offering you a job (hiring away)?
3. A volunteer experience that you disliked?

4. A geographical opportunity (academic field or career specific to your area/location)?
5. A geographical restriction (the desired career is limited in your area)?
6. Being laid off?
7. An opportunity that arose through planned networking?
8. Being offered a position upon completion of an internship that was unrelated to the work of the internship (with the same company)?

To some degree, the elimination of these items was unexpected. Items 1 and 3 were specifically mentioned by the participants of Bright and Pryor's (2005a) research as being serendipitous events that they had commonly experienced. Items 4 and 5 were mentioned and included as a result of the focus group. It was also interesting to see that no participants indicated that they had experienced an unexpected influence on their academic and career decision-making as a result of networking, as it is an activity or strategy that is so often recommended by career counselors.

Comparison Study

Recruitment

I met with Rob Hudson, the director of Institutional Research at the college, to get a list of randomly selected students from the college to invite to participate. My original intent was that I would contact between 150 and 200 students that were enrolled full-time at the college with the hopes that I would get at least 100 to participate in the study. Mr. Hudson informed me that it was his opinion that

regardless of the incentive, I would not likely reach my goal if I invited so few students. It was his suggestion that I invite all full-time enrolled students to participate (N=885) and that I might reach the goal of 100 participants.

I followed Mr. Hudson's advice and emailed all 885 students currently enrolled in at least 12 semester hour credits. I was allowed to set up a workplace in the lobby of the student center and in the adjacent offices of Student Affairs and have students complete the NEO-FFI-3 and the Serendipitous Event Inventory (Appendix C). Students could show up and complete both inventories on Wednesday September 12, 2012 from 9:00 am until 6:00 pm and Thursday September 13, 2012 from 9:00 am until 6:00 pm. Over the two-day period 113 students agreed to participate in the study. Of that 113, five students failed to return the completed inventories and one student returned inventories having selected "Average" as a response for every item on the NEO-FFI-3 and a positive response on every item of the Serendipitous Event Inventory. The student's inventories were eliminated from consideration in the study. A total of 107 participants returned a completed and useable pair of inventories for the study. This group of 107 participants appears to accurately represent the college as a whole (Table 3). Females made up the majority of the group with 77 (71.96%) and 30 males (28.04%). The college is 72% female and 28% male. The majority of the participants were White (76) with 27 African Americans, 8 Hispanics, 2 Native American, 1 Asian and 1 Other. Eight of the participants selected more than one ethnicity. The ages

Table 3

Demographic Breakdown of the Comparison Study with Descriptive Statistics

Descriptor	Percent	Mean Pos Response	SD	Min Pos response	Max Pos response
Total	100	18.30	10.25	2	51
Male	28.04	22.07	11.82	4	9
Female	71.96	16.83	9.25	2	51
White	71.96	17.94	9.31	2	51
African American	26.17	19.14	12.80	4	48
Hispanic	7.48	19.63	5.63	10	26
Native American	1.87	12.00	5.66	8	16
Asian	0.93	4.00	0.00	4	4
Other	0.93	14.00	0.00	14	14
Age	/	20.86	4.29	17	41

Note. n = 107 (White n = 76, African American n = 27, Hispanic n = 8, Native American n = 2, Asian n = 1, Other n = 1). Pos = positive.

ranged from 17 to 41 years old with an average age of 20.86. A total of 25 academic disciplines were reported, representing every school of the college.

Serendipitous Event Inventory

The first hypothesis of the study was that I would be able to develop a valid and reliable instrument to measure the perceptions of serendipitous influence in college students. This first hypothesis appears to be supported. The instrument appears to be reliable with a high Cronbach's alpha estimate of internal reliability of .91.

Table 4

Factor Extraction Assessment Values

Factor Number	Eigenvalue	% Variance	Cum %	ChiSquare	p value
1	10.5605	19.201	19.201	2657.83	<.0001
2	2.6422	4.804	24.005	1925.94	<.0001
3	2.5436	4.625	28.629	1816.79	<.0001
4	2.3351	4.246	32.875	1708.09	<.0001
5	2.0096	3.654	36.529	1608.95	<.0001
6	1.9367	3.521	40.05	1529.83	<.0001
7	1.8605	3.383	43.433	1451.82	<.0001
8	1.755	3.191	46.624	1375.3	<.0001
9	1.6835	3.061	49.685	1302.95	<.0001
10	1.5683	2.851	52.535	1232.2	0.0003
11	1.5004	2.735	55.272	1167.12	0.001
12	1.4523	2.641	57.912	1103.6	0.0031
13	1.4282	2.597	60.509	1040.7	0.0094
14	1.3398	2.436	62.945	975.74	0.0302
15	1.2136	2.207	65.152	914.89	0.0729
16	1.1766	2.139	67.291	862.33	0.118
17	1.0924	1.986	69.277	809.8	0.1897
18	1.0343	1.881	71.158	762.161	0.2553
19	0.9969	1.812	72.97	717.133	0.3195
20	0.9963	1.811	74.781	672.77	0.3963

To assess the validity of the instrument I performed an exploratory factor analysis using the SAS Institute's *JMP 10.0 for Macs* statistical software. I chose the principle component analysis (PCA) method of extraction with a Varimax rotation of the 55 event items. A number of ideas were considered in deciding how many factors were appropriate for extraction (Table 4). The first consideration was the number of factors

with eigenvalues above 1.0. This method would have resulted in an 18-factor solution. Although this number of factors accounted for 71.2% of the variance, I considered 18 factors to be too cumbersome to be practical. I also assessed a scree plot of the eigenvalues to determine if there was a logical visual cutoff (Figure 1). Unfortunately, the scree plot examination appeared to recommend only one factor, which is not helpful. Instead, I conducted a large-sample chi-square goodness-of-fit test, as suggested by Pett, et al., (2003). The results indicated that a 14-factor solution would be significantly adequate fit to the data, accounting of 62.9% of the variance. The 14-factor solution resulted in factor loadings for all 55 items ranging from .29 to .74 (Table 5). Several of the items (19 out of 55) had strong loadings (>.40) in more than one factor. To evaluate the factors and determine appropriate selection of the factored items, I performed a card sort in which all items were written out on cards and placed in order based on factor loadings. Items with loadings into multiple factors were written on multiple cards in a different color than single factored items and placed in all factors in which the items displayed strong loadings. Card items within factors were then evaluated for overall logical consistency. The items with multiple placements were assigned to factors judged, by the author, to be the best logical fit. Duplicate item cards were then removed from other factors. The factors were then evaluated and labeled based on a general theme of the items.

The serendipitous influence factors were label as follows: Factor 1 influences were labeled Mass Media, Factor 2 influences were labeled College Academic, Factor 3

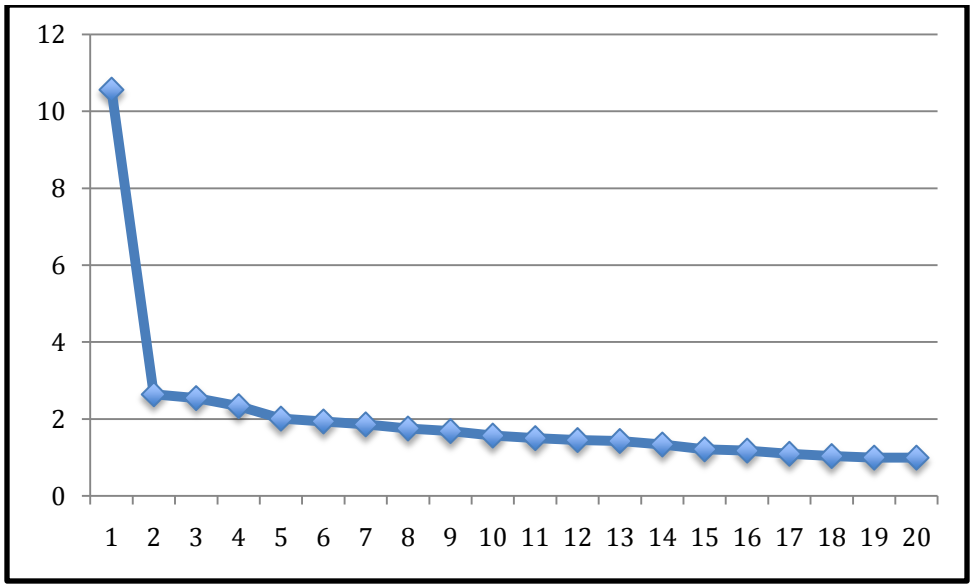

Figure 1

Scree plot of the Serendipitous Event Inventory Eigenvalues

influences were labeled Assignments, Factor 4 influences were labeled Witness, Factor 5 influences were labeled Obstacles, Factor 6 influences were labeled Situational, Factor 7 influences were labeled Positive Exposure, Factor 8 influences were labeled Authority Recommendations, Factor 9 influences were labeled Sibling Interactions, Factor 10 influences were labeled Testimonial, Factor 11 influences were labeled Military Experience, Factor 12 influences were labeled Modeled Careers, Factor 13 influences were labeled Family/Friend Witness, and Factor 14 influences were labeled Conversational.

Table 5

Factor Loadings for 14-Factor Solution for the Serendipitous Event Inventory

Question	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14
Q8	.64													
Q9	.72													
Q10	.66													
Q11	.64													
Q13	.43													
Q14	.35													
Q15	.33													
Q19		.39												
Q20		.66												
Q21		.62												
Q22		.49												
Q53		.42												
Q17			.59											
Q18			.63											
Q23			.53											
Q32			.43											
Q44			.39											
Q49			.29											
Q29				.70										
Q38				.55										
Q39				.34										
Q51				.42										
Q52				.47										
Q33					.30									
Q36					.55									
Q54					.58									
Q55					.56									
Q41						.66								
Q43						.32								
Q46						.64								

Table 5 Continued

Q30	.40										
Q34	.74										
Q35	.59										
Q48	.44										
Q6		.33									
Q24		.74									
Q31		.53									
Q2			.60								
Q27			.64								
Q50			.43								
Q7				.42							
Q37				.42							
Q40				.68							
Q42				.44							
Q16					.66						
Q12					.32						
Q4						.39					
Q45						.64					
Q47						.50					
Q25							.59				
Q26							.70				
Q28							.34				
Q1											.70
Q3											.54
Q5											.31

Note. F = Factor, Q = Question. All items factor-loading correlation coefficients are significant at $p < .05$

Labeling of the factors was followed by an examination of the internal reliability of the individual factors (Table 6). Overall, the estimates of internal reliability, Cronbach's alpha were weak, ranging a high of .82 (Factor 1, Mass Media) to a low of .36 (Factor 11, Military Experiences).

Table 6

Internal Reliability Estimates for the Individual Factors of the Serendipitous Event Inventory

Factors	Includes Items	Cronbach's Alpha
Mass Media	Q8, Q9, Q10, Q11, Q13,Q14,Q15	0.82
College Academic	Q19, Q20, Q21, Q22, Q53	0.73
Assignments	Q17, Q18, Q23, Q32, Q44, Q49	0.69
Witness	Q29, Q38, Q39, Q51, Q52	0.69
Obstacles	Q33, Q36, Q54, Q55	0.60
Situational	Q41, Q43, Q46	0.59
Positive Exposure	Q30, Q34, Q35, Q48	0.63
Authority Recommendations	Q6, Q24, Q31	0.63
Sibling Interactions	Q2, Q27, Q50	0.55
Testimonial	Q7, Q37, Q40, Q42	0.53
Military Experiences	Q12, Q16	0.36
Modeled Careers	Q4, Q45, Q47	0.59
Family/Friends Witness	Q25, Q26, Q28	0.63
Conversational	Q1, Q3, Q5	0.41

Note. Q = Question.

Based on Bright et al., (2005a; 2005b) reporting of percentages of participants experiencing the different categories of serendipitous events I further examined the number of individual positive responses per factor and the percentage of participants that experienced at least one of the specific events per factor (Table 7). The factors (as categories) experienced by the participants ranged from 17.76% (Military Experiences) to 92.52% (Conversational). It appears that all factors were experienced by a significant percent of the participants.

Table 7

Participant Experience of Serendipity Factors

Factors	Total of Positive Responses	Participants Experience of Factor
Mass Media	201	65.42%
College Academic	141	58.88%
Assignments	191	71.03%
Witness	122	57.01%
Obstacles	87	47.66%
Situational	72	53.34%
Positive Exposure	155	67.29%
Authority Recommendation	152	70.09%
Sibling Interactions	87	51.40%
Testimonial	145	71.96%
Military Experience	22	17.76%
Modeled Careers	162	78.50%
Family/Friends Witness	183	78.70%
Conversational	232	92.52%

Comparison of means. Again I performed a comparison of means to determine if there are any differences by sex or ethnicity (Table 8). Female participants had an average of 16.83 positive responses with a standard deviation of 9.26. Males participants had an average of 22.07 positive responses with a standard deviation of 11.81. The *t* score resulting from the comparison of means is 2.18, which is a significant difference at $p < .05$. It appears, from this study that the male students at the college perceive a significantly higher number of serendipitous influences on their academic and career decision-making.

There were no differences found when comparing the means of participants by ethnicity. White participants had an average of 18.04 positive responses with a standard deviation of 9.32. Non-white participants had an average of 18.94 positive responses with a standard deviation of 12.40, resulting in a non-significant *t* score of 0.36. African American participants had an average of 19.58 positive responses with a standard deviation of 13.19. Non African American participants had an average of 17.72 positive responses with a standard deviation of 9.25, resulting in a non-significant *t* score of -0.67. Hispanic participants had an average of 19.63 positive responses with a

Table 8

Comparison of Means for the Comparison Study

Descriptor	Mean	SD	All Other's Mean	All Other's SD	SE	*t* score
Male	22.07	11.81	16.83	9.25	2.40	-2.18*
Female	16.83	9.25	22.07	11.81	2.40	2.18*
White	18.04	9.32	18.94	12.40	2.47	0.36
African American	19.58	13.19	17.72	9.25	2.78	-0.67
Hispanic	19.63	5.63	18.19	10.55	2.26	-0.64
Native American	14.00	2.83	18.46	10.28	/	/
Asian	4.00	0.00	/	/	/	/
Other	14.00	0.00	/	/	/	/
Age	20.86	4.29	/	/	/	/
All Participants	18.30	10.25	/	/	/	/

Note. *N* = 107 (White *n* = 76, African American *n* = 27, Hispanic *n* = 8, Native American *n* = 2, Asian *n* = 1, Other *n* = 1). * indicates significance at $p < .05$.

standard deviation of 5.63. Non-Hispanic participants had an average of 18.19 positive responses with a standard deviation of 10.28, resulting in a non-significant *t* score of -.64. Comparisons of means were not conducted with Native American participants or Asian participants because the numbers were too small to achieve meaningful results.

Relationships

The second hypothesis previously put forth was that there would be evidence of a relationship between personality and perceptions of serendipitous influences. The specific sub-hypotheses were that:

1. Scores in Neuroticism will show a positive correlation to scores on the serendipitous influence inventory.
2. Scores in Extraversion will show a positive correlation to scores on the serendipitous influence inventory.
3. Scores in Openness will show a positive correlation to scores on the serendipitous influence inventory.
4. Scores in Agreeableness will show a positive correlation to scores on the serendipitous influence inventory.
5. Scores in Conscientiousness will show a negative correlation to scores on the serendipitous influence inventory.

The results showed no significant relationship between any personality factor and perceptions of serendipitous influence (Table 9) based on positive response scores for the entire group of participants. The correlation between the scaled *T* scores for

Neuroticism and the sum of individual positive item responses on the Serendipitous Influence Inventory was -.04. The correlation between the scaled *T* scores for Extroversion and the sum of individual positive item responses on the Serendipitous Influence Inventory was .08. The correlation between the scaled *T* scores for Openness and sum of individual positive item responses on the Serendipitous Influence Inventory was .09. The correlation between the scaled *T* scores for Agreeableness and the sum of individual positive item responses on the Serendipitous Influence Inventory was .08. The correlation between the scaled *T* scores for Conscientiousness and the sum of individual positive item responses on the Serendipitous Influence Inventory was .07.

Table 9

Correlations Coefficients of the Personality Factors to the Sum of Positive Item Responses

Factors	Correlation Coefficient
Neuroticism	-.04
Extroversion	.08
Openness	.09
Agreeableness	.08
Conscientiousness	.07
Age	-.08

Note. None of the correlations are significant at $p < .05$. Age was correlated with the sum of individual positive responses.

Based on the results of the pilot study and that of Bright et al., (2005a), I also examined the possible relationship between Age and perception of serendipity. The resulting correlation was also non-significant ($r = -.08$).

I further explored any relationship between Costa and McCrae's (1985; 1992) Big Five Personality Factors (and age) and the independent serendipity factors. The results were mixed. No personality factor displayed a consistent positive or negative relationship with all of the factors, but several factors showed a significant, although weak positive or negative relationship to the personality factors (Table 10).

Neuroticism showed a weak but significant positive relationship to Conversational factor influence (r=.23; p<.05). Agreeableness showed a weak but significant positive relationship to Situational factor influences (r=.25; p<.05), Positive Exposure factor influences (r=.21; p<.05), and Conversational factor influences (r=.21; p<.05). Conscientiousness showed a weak but significant negative relationship to Conversational factor influences (r=-.21; p<.05), while showing a weak but significant positive relationship to Modeled factor influences (r=.26, p<.05). These correlations result in small effect size R-squares ranging from .044 (Conversational factor) to .0676 (Situational and Modeled factors), thus accounting for only 4.4% to 6.76% of the overall variance in positive responses.

Table 10

Correlation Coefficients of the Personality Factors to the Serendipity Factors

	Sum	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**	**F9**	**F10**	**F11**	**F12**	**F13**	**F14**
Neuroticism	-.02	-.02	.07	-.01	-.13	.03	.00	-.10	-.08	-.12	-.03	-.09	-.09	-.04	.23*
Extroversion	.08	-.05	.03	.04	.14	.11	-.06	.13	.12	.13	-.01	-.06	.15	.00	-.11
Openness	.09	.13	.12	.18	-.04	.18	.09	-.02	.06	-.10	-.07	-.04	.05	-.01	.01
Agreeableness	.08	-.03	.04	.01	-.01	.04	.25*	.21*	.11	.09	-.01	-.10	.16	.12	-.17
Conscientiousness	.07	.00	.08	.03	.03	-.14	.14	.08	.10	.09	.03	-.05	.26*	.10	-.22*
Age	-08	-.05	-.12	.02	.03	-.09	.05	-.07	-.14	.05	-.07	.12	-.11	-.14	.00

Note. * indicates significance at $p < .05$, ** indicates significance at $p < .01$. Sum = the individual participant sum of positive responses. F = Factor.

Based on the significant difference between Male and Female responses I decided to separate their results to find if there were more significant correlations when comparing personality factors to serendipity factors based on sex (Table 11). The results indicated a greater number of significant relationships between the personality factors and the sum of serendipity factor positive responses separated by sex. Before separating by sex (Table 10), there were five significant relationships between personality factors and serendipity factors ranging from r =.21 to r =.26. After separating by sex there are 44 significant relationships between personality factors and serendipity factors ranging from r = .20 to r = .48. It appears that for some factors, males and females had opposing relationships that cancelled each other out when combined. For instance, when comparing Extroversion to Assignments (F3), females showed a negative relationship (r = -.38) while males showed a positive relationship (r = .20). This influence on the results appears across multiple relationships.

In general, male participants displayed a significant relationship between Agreeableness and overall positive responses (r = .38) and Conscientiousness and overall positive responses (r = .38). For the specific factors the results were mixed with little agreement between positive and negative relationships of personality factors by sex. The Neuroticism personality factor had a significant positive relationship with male participants for the Witness serendipity factor (r = .39) and significant negative relationships with Positive Exposure serendipity factor (r = -.23), the Military Experience serendipity factor (r = -.35), and the Family/Friends Witness serendipity factor (r = -.21). The Neuroticism

personality factor had no significant relationships with any of the serendipity factors for female participants.

The Extroversion personality factor has a significant positive relationship with male participants for the Situational serendipity factor (r = .20), the Positive Exposure serendipity factor (r = .28) and the Authority Recommendation serendipity factor (r = .32), but negative relationships with the Assignments serendipity factor (r = -.34) and the Military Experiences serendipity factors (r = -.37) for male participants. With female participants the Extroversion personality factor showed a significant positive relationship with the Obstacles serendipity factor (r = .21) and the Situational serendipity factor (r = .26), but a significant negative relationship with Military Experiences serendipity factor (r = -.36).

The Openness personality factor has a significant positive relationship for male participants with the Situational serendipity factor (r = .23), the Positive Exposure serendipity factor (r = .27) and the Authority Recommendations serendipity factor (r = .37), but significant negative relationships with the Assignments serendipity factor (r = -.32) and the Military Experience serendipity factor (r = -.36). Female participants showed significant positive relationships between the Openness personality factor and the Assignments serendipity factor (r = .21) and the Situational serendipity factor (r = .25), but a significant negative relationship with the Conversational serendipity factor (r = -.23).

The Agreeableness personality factor had an overall significant positive relationship with perceptions of serendipity for male participants (r = .38). However, Agreeableness did

not show a significant positive relationship to all the serendipity factors. Instead, Agreeableness showed significant positive relationships with the Mass Media serendipity factor (*r* = .37), the College Academic serendipity factor (*r* = .45), the Assignments serendipity factor (*r* = .22), the Witness serendipity factor (*r* = .32), the Situational serendipity factor (*r* = .39), the Authority Recommendations serendipity factor (*r* = .48), the Sibling Interactions serendipity factor (*r* = .23) and the Modeled Career serendipity factor (*r* = .21). Females did not show similar results but had significant relationships only between Agreeableness and Modeled Careers serendipity factor (*r* = .28) and Conversational serendipity factor (*r* = -.24).

The Conscientiousness personality factor was very similar to the Agreeableness personality factor in the relationships to serendipity factors separated by sex. Male participants showed significant relationship between the Conscientious personality factor and overall perceptions of serendipity (*r* = .38), while female participants showed no significant relationship between the personality factor of Conscientiousness and perceptions of serendipity. Examining the individual serendipity factors, Agreeableness showed significant positive relationships with the Mass Media serendipity factor (*r* = .37), the College Academic serendipity factor (*r* = .45), the Assignments serendipity factor (*r* = .21), the Witness serendipity factor (*r* = .31), the Situational serendipity factor (*r* = .39), the Authority Recommendations serendipity factor (*r* = .48), the Sibling Interactions serendipity factor (*r* = .23) and the Modeled Career serendipity factor (*r* = .22). Females did not show

similar results but had significant relationships only between Agreeableness and Modeled Careers serendipity factor (r = .28) and Conversational serendipity factor (r = -.24).

Table 11

Correlation Coefficients of Personality Factors and Serendipity Factors Separated by Sex

Factors	N T Male	N T Female	E T Male	E T Female	O T Male	O T Female	A T Male	A T Female	C T Male	C T Female
F1	-.02	.09	-.14	.05	-.12	.06	.37**	-.03	.37**	-.02
F2	-.07	.14	.01	.05	.04	.05	.45**	.00	.45**	.01
F3	.02	.18	-.34**	.20*	-.32**	.21*	.22*	.04	.21*	.04
F4	-.39**	.04	-.18	.10	-.14	.10	.32**	-.01	.31**	-.02
F5	.16	.04	-.11	.21*	-.09	.20*	.14	-.12	.15	-.12
F6	.06	.12	.20*	.26*	.23*	.25*	.39**	.03	.39**	.03
F7	-.23*	.09	.28*	.17	.27*	.17	-.12	.12	-.12	.12
F8	.15	-.04	.32**	.07	.37**	.03	.48**	.06	.48**	.07
F9	-.16	-.13	-.06	.14	-.02	.16	.23*	.10	.23*	.11
F10	-.07	0.1	.04	-.02	.03	-.02	.16	.01	.16	.01
F11	-.35**	.03	-.37**	.11	-.36**	.11	.10	-.02	.09	-.02
F12	-.15	.15	.08	.18	.12	.17	.21*	.28*	.22*	.28*
F13	-.21*	.04	.11	.15	.14	.11	.18	.11	.18	.11
F14	.15	-.10	.01	-.23*	.03	-.23*	.06	-.24*	.07	-.24*
SUM	-.11	.09	-.05	.17	-.01	.16	.38**	.04	.38**	.05

Note. * indicates significance at $p < .05$, **indicates significance at $p < .001$. N T = Neuroticism T scores, E T = Extroversion T scores, O T = Openness T scores, A T = Agreeableness T scores, C T = Conscientiousness T scores.

CHAPTER 5

DISCUSSION

Introduction

This research study was adopted to address a general shortage of knowledge regarding the influence of serendipitous events on career decision-making. Despite the relatively recent inclusion or incorporation into two contemporary career development theories, specifically chaos theory of careers (Pryor & Bright, 2003) and Happenstance Learning Theory (Krumboltz, 2009), relatively little research has been published. Of the recent research on serendipity that is available, the majority of it was conducted with older adult participants or students in Australia and Switzerland with little demographic information provided. Although the research available makes a good case to support Krumboltz's (1998) assertion that serendipitous influence is ubiquitous in career development, none of it is generalizable to use with the American college/university student.

The two goals of this study were to create a reliable and valid assessment tool to measure the perceived serendipitous influences of college students and to understand more about the possible differences between people who readily perceive serendipitous events as influencing their career decision-making and people who do not. Toward the first goal, I believe that this study was mostly successful. Toward the second goal the results are encouraging, but need to be expanded upon.

Serendipitous Event Inventory

The original pool of unplanned events (Appendix A) consisted of 75 items that had been collected from events specifically mentioned in existing research, anecdotes of unplanned career influences, and suggestions from fellow counselors and student affairs personnel. The pool was intended to be as inclusive as possible with items that people had subjectively believed to be both serendipitous and affecting career decision-making. The items eliminated during the first and second phases of instrument development were not always those that I believed would be eliminated. Similarly, items were retained that I had not previously assumed would have been experienced by many college students. For example, I had not expected the items related to television shows and television news to be eliminated while the item about an advertisement was not. This may result from advertising's intentional, and apparently successful effort to influence observers, while the changing nature of television shows from scripted stories with developed fictional characters to witnessing aberrant behavior and extreme situations of "reality" television leaves less opportunity for viewers to witness the positive portrayal of careers on television. I was also surprised to see the historical event item eliminated while the military experience item was retained. All of participants have had significant historical events ongoing during their adolescence (multiple wars, terrorist attacks, and global recession) and I imagined that few had served in the military, considering their ages. Perhaps relative proximity to an Army base, and Air Force base and a Marine station resulted in a high percentage of students

with direct military experience. Although the final version of the inventory is limited by the intentional omission of serendipitous events known to influence participants of previous research, it was successful in the goal of discerning what specific serendipitous events influence contemporary American college students regardless of previous research and my personal assumptions.

It is interesting to note that during the pilot study, the individual who reported the fewest incidents of serendipitous influence (6) was the oldest participant (age 44). This participant's responses run contrary to Bright et al.'s, (2005a) assumption that people with more work experience, more life experience would have greater opportunities to experience serendipity and are more likely to report a higher number of serendipitous influences. In fact, in this pilot study there was a moderate negative correlation between age and positive responses (r=-.49). However, these results should not be taken as evidence of a generalizable negative relationship between age and perceptions of serendipitous influence. The majority of the participants in the pilot study were of traditional college age with a small number of outliers. The small number of older participants reported fewer experiences of serendipitous events and skewed the results. Any meaningful conclusions about a relationship between relationship and age would require more participants more evenly covering a range of ages. This statistically significant correlation between age and positive responses was not found in either the pilot study or the final comparison study.

This successful refinement of the instrument creates an inherent weakness to the instrument and the study in that it has been made very specifically to fit the college student sample at a small, rural private college in North Carolina. The make-up of the participants during every stage of development was representative of the make-up of the college where the participants attend. The participants were predominately female (roughly 70%), white (70%) and between the ages of 19 and 20 years olds. The study was successful in developing a reliable and valid instrument for measuring the perceived serendipitous influences on academic and career decision-making for college students. Ironically, the instrument may have limited generalizability to a broader college or adult population.

It is interesting to note that at every stage of development 100% of the participants selected some number of positive responses on the inventory. In previous studies, when participants are asked if they have experienced serendipitous influences on their career decision-making, a majority but not all have answered in the affirmative (Betsworth & Hansen, 1996; Bright, et al., 2005a; Bright, et al, 2005b; Hirschii, 2010). Williams, et al. (1998) and Diaz de Chumaceiro (1999; 2004) in their qualitative studies had 100% of their participants report experiencing serendipitous influences on their careers. However, as these were studies that suffered from selection bias because they involved interviews with female professionals in specific fields, any participant who stated that they believed that serendipity had no place in their career development would not have continued to be part of the study.

For the current study participants were not asked to respond to the question of whether or not they had experienced serendipitous influences on their career development. I sought to improve the research method of previous serendipity studies by presenting participants with the question at the beginning of the inventory without answering it. Instead, the participants were asked to read the subsequent items covering specific events that had previously been described as serendipitous and mark only those that they had personally experienced. It is possible that if they were asked to answer the question presented at the top of section 2 of the inventory, some would have responded "No" and not given the subsequent items significant thought or reflection.

The method of the current study was apparently successful in maintaining content validity by limiting the effects of ambiguous temporal precedence error (Heppner, et al., 2008) and fundamental attribution error (Ross & Nisbett, 1991) by providing specific examples for comparison rather than general categories. The 55 items of the final inventory received positive responses from between 9.3% and 81.3% of the participants.

Personality and Perceived Influence

In previous studies on serendipity the possibility of a relationship between personality and perceived serendipitous influence has been limited to personality defined by locus of control behavior (Bright, et al., 2005a; Hirschii, 2010) and the Openness personality factor (Hirschii, 2010). However, the Openness personality factor

of Hirschii's (2010) study failed to show a significant relationship to experienced breadth of serendipity (*r*=.093), which is (*r*=.057) similar to the current study. Locus of control behavior did show a significant positive relationship to perceived serendipity (r=.29) in Bright, et al., study (2005a), but was not a consideration in the current study. Bright, et al., (2005a) had hypothesized that older participants, with more work and life experience, would report more influence of serendipity and a positive correlation between age and breadth of positive responses. They found no positive correlation, which was attributed to younger participants scoring significantly higher in locus of control behavior. The relationships between age and locus of control, and locus of control and perceptions of serendipitous influence may account in part for the moderate negative correlation found during the pilot study of the current study (*r*=-.4554). However, the final study had a more restricted age range of participants and a lower mean age (pilot mean = 25.11, comparison mean = 20.86). With 88% of the participants between the ages of 18 and 22 it is possible that any existing relationship between age and perception of serendipitous influence would not appear.

When no significant relationships were found between the personality factors and general perception of serendipitous influences in the current study, the serendipitous influences were broken down into factors and compared again to the personality factors. Only five specific significant relationships resulted. It is interesting to note that of those five, three of the significant relationships were with Factor 14 *Conversational* (an interaction/conversation with a parent; and

interaction/conversation with a friend; an interaction/conversation with a professor outside of class). The Conversational Factor had a significant positive correlation with Neuroticism (r=.21), and a negative correlation with Conscientiousness (r=-.22).

It is possible that the reasons for the positive correlation between Neuroticism and Conversational factors exist for the reasons consistent with the original sub-hypotheses: Participants scoring high in Neuroticism are likely to be more open to outside influences that prompt frequent changes. In this study the only factor to show this hypothesized relationship was the Conversational influence factor. The relationship may exist in part because of a single item on the NEO-FFI-3 on the Neuroticism subscale about participants looking to other people to solve their problems. It is possible that the behavior indicated in the particular item either indicates a specific propensity to use conversational experiences to have others guide problem solving, or that the participants who experienced a conversational influence would have referred to the experience in answering that particular item on the NEO-FFI-3.

The negative relationship between Conscientiousness and the Conversation influence factor may also exist for reasons consistent with the original sub-hypothesis that participants scoring high in Conscientiousness are less likely to be open to influences (specifically Conversational influences) due to their inclination to pursue goals and retain plans. Logically, a person who tends to diligently follow through with plans will not perceive serendipitous influence unless the experience inspired the

original development of a plan. This tendency might explain the negative relationship with the Conversational influence factor (more casual and social) and a positive relationship with Modeled Careers influences.

It was something of a surprise that no significant relationship exists between Agreeableness and *Witness* (Factor 4), *Family/Friends Witness* (Factor 13) or *Authority Recommendation* (Factor 8) as a person scoring high in Agreeableness should logically be open to recommendations and someone witnessing potential and suggesting a career or major. Instead, a weak but significant positive correlation was found between Agreeableness and both Factor 6 *Situational* influences(Death of a loved one, right place at the right time, and an unexpected kindness) with a correlation of r=.25, and Factor 7 Positive Exposure (Told by an authority while volunteering that you would be good at a specific career or major, an aspect of a volunteer experience that you enjoyed, an aspect of the work that you enjoyed, and a personal interaction with a person performing the work of a career) with a correlation of *r*=.21. These positive relationships seem to be more congruous with the described nature of people scoring high in Agreeableness, that they may be influenced by positive experiences and unexpected but powerful experiences.

The Conscientious personality factor also had a significant positive correlation to the *Modeled* (Factor 12) serendipitous influence factor (A positive interaction with a person in the profession, being inspired by a person in a career, that you admired, and a conversation with a non-immediate family member) with a correlation of *r*=.26. My understanding of this

relationship is that a person scoring high in Conscientiousness might incorporate a positively modeled profession or major into their career plans, or vice versa.

Unlike previous studies on serendipity (Bright, et al., 2005a; Bright, et al., 2005b; Bright, et al., 2009; Hirschi, 2010) a significant difference was found between the male and female participants of the study, with male participants finding a significantly greater number of serendipitous events experienced. Because of this difference I repeated the comparison of personality factors and serendipity factors with the results of the different sexes separated. The results showed an increase of statistically significant relationships from five to 44 (Table 11). The results also showed that there were significant positive relationships for males between the personality factors of Agreeableness and Conscientiousness and perceptions of serendipity (both at $r = .38$). These results correspond with sub-hypothesis 4, that Agreeableness would relate positively to perceptions of serendipity, but run counter to sub-hypothesis 5, that Conscientiousness would relate negatively to perceptions of serendipity.

In general terms, the sub-hypotheses were meaningless because personality factors did not consistently correspond to perceptions of serendipity, even when serendipity was examined by factors rather than as a sum. It seems likely that the lack of more relationships, and stronger relationships, between the personality factors and the perception of serendipitous influence is the complexity of personality. The comparison is limited by the necessary restriction of our definition of personality. The NEO-FFI-3 was

selected because it provides a brief, but accurate and reliable measure of the Big Five Personality Factors. Each personality factor relies on only twelve items to define personality for the purposes of this research. The limitation may be too general and brief to define personality accurately enough to determine significant relationships to the perception of serendipity.

Comparison of Means

The only other statistically significant relationship found in the results was that male participants on average responded positively to more items on the inventory than their female counterparts. Such a statistically significant difference is unique to this current study of serendipity, with no other similar study finding any difference between male and female participants. The uniqueness of the results leads me to consider two possible explanations. The first is that American college students are sufficiently different from their Australian counterparts (Bright, et al., 2005a, 2005b) and older Americans (Betsworth & Hansen, 1996), that there is a difference between the sexes in American college students that does not exist in the other mentioned groups; or the sample size of male participants was too small and the results are skewed.

With the exception of differences between the sexes, the relationships found in the results were very small. Although some relationships between the personality factors and serendipity factors were found, the variance explained by the significant relationships ranged only from an *R-square* of .044 (Neuroticism x Conversation) to an

R-square of .0676 (Conscientious x Modeled). When results of the sexes were separated the variance explained by the significant relationships ranged from an *R-square* of .04 (Male Extroversion x Situational) to an *R-square* of .23 (Male Authority Recommendations x Agreeableness/Conscientiousness).

Limitations of the Study

The first limitation of the study is sampling. I was unable to get a sufficient random sample from the college. Instead of choosing randomly from the student population I invited the entire student population to participate in the study. Although the participants appear to represent the college well demographically, the students who chose to participate are those interested in studies for the experience, those who hope to win a prize for participating, and those students who recognized my name and wanted to help me.

The sampling is a limitation in a broader sense in that the study was conducted exclusively with students from a small, private, liberal arts college in rural North Carolina, which has the majority of its students originally from eastern North Carolina. If the study had been conducted at a large, public university with a more culturally diverse population of students, the results may have been different.

Although I was successful at developing an instrument to measure the perceptions of serendipitous influence of college students, this may be too restrictive of an instrument to be practical in other studies. During the elimination of specific items from the focus groups it became apparent that the life experiences of college students are limited to the

point that common and meaningful events that may result in unexpected or serendipitous outcomes are often experienced after college. Few if any of the participants had been married, had children or relocated for a job. Similarly, few of the participants in the focus group and pilot study had served in the military or been aware of significant global/socio-economic events enough to have their decisions influenced by such events. As a result, the construct validity would be lower if the same instrument were used with a broader or more diverse group of participants. Through the efforts to make a meaningful instrument to measure the perceived experiences of a significant group, that had not previously been studied, an instrument was developed with limited generalizability to other populations.

The correlational design is a limitation to the research. There may be a natural tendency to read the results and assume that perceptions of serendipity within the significant factors were due to the relationships to personality factors. As a correlation can show relationships, but not causality, any such assumption would not be based on evidence.

An additional limitation of the study as that the sample was not chosen at random. For practical purposes, a random sample using the college's students would not have provided an adequate number of participants. It does appear, based on the demographic information, that an accurate cross-section of the college participated in the study. The method of participant selection may have served better than requiring participation from

students enrolled in General Psychology courses, but does not remove sources of bias based on individual reasons for participation in the study.

Implications for Future Studies

It is clear from the results of this study that the nature of the differences between people who perceive strong serendipitous influences in their career decision-making and those who do not, are still largely unknown. The strongest difference found or relationship to perceptions of serendipity was the difference between male and female participants. This result is also unique to this study, as no other studies of serendipity have resulted in such a difference. In order to determine if these results are applicable to other college students, further study with college/university students from a different American college should be conducted. It would be interesting to learn if there was a statistical difference between the perceptions of serendipity in students of a large public university and a small private college.

Even greater potential for increased and meaningful understanding of the nature of perceived serendipitous influence might in the pursuit of two separate concepts. The first is a potential difference in age on the perceptions of serendipitous influence and the difference of locus of control behavior on the perceptions of serendipitous influence. Although versions of these studies exist, there have been significant limits to the generalizability of the findings. One limitation is that none of the studies have been conducted with ethnically and culturally diverse participants representative of United State

population. Both studies on age comparison and locus of control comparison (Bright, et al., 2005a; Hirschii, 2010) were conducted in Australia and Switzerland with little available demographic information. The age comparison study is also limited in its usefulness due to an initial comparison of ages defined by what year of university the participant was enrolled in. The results were similar to the current study that no significant differences are found in such a restricted age range. When Bright et al., (2005a) compared two separate age groups by defining age as enrollment in university and at least two years of professional work, the actual age ranges of the two groups overlapped considerably.

Conclusion

The most important results from the current study are that an instrument measuring serendipity was examined and a few meaningful relationships and differences were found. Yet it remains clear when looking at the individual response ranges (2 positive to 51 positive) that a great difference in perceptions of serendipitous influences exists between individuals. However, it seems apparent that personality, as defined by the Big Five Personality Factor (Costa & McCrae, 1985; 1992), does not have a significantly meaningful overall relationship to the perception of serendipity. In fact very little is still known about the differences in people who perceive serendipity as ubiquitous and those who are more prone to reject serendipity in favor of rationalism. It is possible the meaning may be found in further exploring differences in perceptions of specific serendipity factors.

References

Agresti, A., & Finlay, B. (2009). Statistical methods for the social sciences (4th ed.). Upper Saddle River, NJ: Pearson Prentice Hall.

Bandura, A. (1977). *Social learning theory*. New York: General Learning Press.

Baumeister, R. F., Vohs, K. D., & Tice, D. M. (2006). Emotional influences of decision making. In J. P. Forgas (Ed.) *Affect in social thinking and behavior* (pp. 143-160). New York: Psychology Press.

Betsworth, D. G., & Hansen, J. C. (1996). The categorization of serendipitous career development events. *Journal of Career Assessment, 4*, 91-98.

Bleidom, W., Kandler, C., Reimann, R., Angleitner, A., & Spinath, F. M. (2009). Patterns and sources of adult personality development: Growth curve analysis of the NEO-PI-R scales in a longitudinal twin study. *Journal of Personality & Social Psychology, 97*, 142-155.

Bower, G. H. (1981). Mood and memory. *American Psychologist, 36,* 129-148.

Bower, G. H. & Forgas, J. P. (2001). Mood and social memory. In J. P. Forgas (Ed.) *The handbook of affect and social cognition*. Mahway, NJ: Lawrence Erlbaum Associates, Inc.

Bright, J. E. H., & Pryor, R. G. L. (2005). Chaos theory of careers: A user's guide. *The Career Development Quarterly, 53,* 291-305.

Bright, J. E. H., & Pryor, R. G. L. (2007). Chaos careers assessment: How constructivist perspectives and psychometric techniques can be integrated into work and life decisions. *Career Planning and Adult Development Journal, 23,* 30-48.

Bright, J. E. H., Pryor, R. G. L., & Harpham, L. (2005). The role of chance events in career decision making. *Journal of Vocational Behavior, 66,* 561-576.

Bright, J. E. H., Pryor, R. G. L., Wilkenfeld, S., & Earl, J. (2005). The role of social context and serendipity in career decision making. *International Journal of Vocational and Educational Guidance, 5,* 19-36.

Bright, J. E. H., Pryor, R. G. L., Chan, E. W. M., and Rijanto, J. (2009). Chance events in career development: influence, control and multiplicity. *Journal of Vocational Behavior, 75,* 14-25.

Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist, 32,* 513-531.

Butz, M. R. (1995). Chaos theory, philosophically old, scientifically new. *Counseling and Values, 39,* 84-98.

Butz, M. R. (1997). *Chaos and complexity: implications for psychological theory and practice.* Washington, DC: Taylor & Francis.

Butz, M. R. & Chamberlain, L. L. (Eds.). (1998). Clinical chaos: A therapist's guide to nonlinear dynamics and therapeutic change. Philadelphia, PA: Brunner/Mazel.

Cattell, R. B. (1957). *Personality and motivation structure and measurement*. New York: World Book.

Cattell, R. B. (1995). The fallacy of the five factors in the personality sphere, *The Psychologist, 8,* 207-208.

Costa, P. T., Jr., & McCrae, R. R. (1985). *The NEO Personality Inventory manual*. Odessa, FL: Psychological Assessment Resources.

Costa, P. T., Jr., & McCrae, R. R. (1989). *The NEO-PI/NEO-FFI manual supplement*. Odessa, FL: Psychological Assessment Resources.

Costa, P. T., Jr., & McCrae, R. R. (1992). *Revised NEO personality inventory (NEO-PI-R) and NEO five-factor inventory (NEO-FFI) professional manual.* Odessa, FL: Psychological Assessment Resources.

Costa, P.T., Jr., & McCrae, R. R. (1995). Trait explanations in personality psychology. *European Journal of Personality, 9*, 231-252.

Costa, P. T., Jr., & McCrae, R. R. (1997). Personality trait structure as a human universal. *American Psychologist, 52,* 509-516.

Craig, A. R., Franklin, J. A., & Andrews, G. (1984). A scale to measure locus of control of behavior. *British Journal of Medical Psychology, 57*, 173-180.

Denga, D. I. (1984). Locus of control and its relationship to occupational choice behavior. *International Review of Applied Psychology, 33,* 371-379.

Diaz de Chumaceiro, C. L. (1999). Research on career paths: Serendipity and its analog. Creativity Research Journal, 12, 227-229. Doi: 10.1207/s15326934cjr1203_7

Diaz de Chumaceiro, C. L. (2004). Serendipity and pseudoserendipity in career paths of successful women: orchestra conductors. *Creative Research Journal, 16,* 345-356.

Digman, J. M. (1990). Personality structure: Emergence of the five-factor model. *Annual Review of Psychology, 41,* 417-440.

Egan, V., Deary, I., & Austin, E. (2000). The NEO-FFI: Emerging British norms and an item-level analysis suggests N, A, and C are more reliable than O and E. *Personality and Individual Differences,* 17, 441-444.

Eysenck, H. (1970). *The structure of human personality.* London: University Press.

Fiske, D. W. (1949). Consistency of the factorial structures of personality ratings from different sources. *Journal of Abnormal Social Psychology, 44,* 329-344.

Forgas, J. P. (2006). Affective influences on interpersonal behavior: Towards understanding the role of affect in everyday behavior. In J. P. Forgas (Ed.) *Affect in social thinking and behavior* (pp. 269-290). New York: Psychology Press.

Freidel, R. (2001). Serendipity is no accident. *Kenyon Review, 23,* 36-46.

Gati, I., & Asher, (2001). The PIC model of career decision making: Pre-screening, in-depth exploration, and choice. In F. T. L. Leong and A. Barak (Eds.), *Contemporary models of vocational psychology: A volume in honor of Samuel Osipow* (pp. 7-54), Mahwah, NJ: Erlbaum.

Gleick, J. (1987). *Chaos: Making a new science.* New York: Penguin Books.

Gelatt, H. B. (1995). Chaos and compassion. *Counseling and Values, 39,* 108-118.

Gluck, A. L. (1997). Chaos theory and its application to vocational counseling: A critical reappraisal. *Counseling and Values, 41,* 73-87.

Guidon, M.H., & Hanna, F.J. (2002). Coincidence, happenstance, serendipity, fate, or the hand of God: Case studies in synchronicity. *The Career Development Quarterly, 50,* 195-208.

Hart, D. H., Rayner, K, & Christensen, E. R. (1971). Planning, preparation and chance in occupational entry. *Journal of Vocational Behavior, 1,* 279-285.

Heppner, P. P., Wampold, B. E., & Kivlighan, D. M. Jr. (2008). *Research design in counseling* (3rd ed.). Belmont, CA: Thomson Brooks/Cole.

Hirschi, A. (2010). The role of chance events in school-to-work transition: The influence of demographic, personality and career development variables. *Journal of Vocational Behavior, 77,* 39-49.

Hull, D. M., Beaujean, A. A., Worrell, F. C., & Verdisco, A. E. (2010). An item-level examination of the factorial validity of NEO Five-Factor Inventory scales. Educational & Psychological Measurement, 70, 1020-1041. Doi: 10.1177/0013164410378091

Jung, C. G. (1969). Synchronicity: An acausal connecting principle. In *The collected works of C. G. Jung* (Vol. 8). Princeton, NJ: Princeton University Press (Bollingen Series). (Original work published in 1931)

Kahn, L. W. (July, 2006). *Chaos of decision-making*. Presentation at the National Career Development Association's Global Conference. Chicago, IL.

Kline, T. J. B. (2005). *Psychological testing: A practical approach to design and evaluation*. Thousand Oaks, CA: Sage.

Krumboltz, J. D. (1979). A social learning theory of career decision-making. In A. M. Mitchell, G. B. Jones, & J. D. Krumboltz (Eds.), *Social learning and career decision making* (pp. 19-49). Cranston, RI: Carroll Press.

Krumboltz, J. D. (1996). A learning theory of career counseling. In M. L. Savickas, & W. B. Walsh (Eds.), *Handbook of career counseling theory and practice* (pp. 55-80). Palo Alto, CA: Davies-Black Publishing.

Krumboltz, J. D. (1998). Serendipity is not serendipitous. *Journal of Counseling Psychology, 45,* 390 – 392.

Krumboltz, J. D. (2009). The happenstance learning theory. *Journal of Career Assessment, 17*, 135-154. doi: 10.1177/1069072708328861

Lee, D. G., & Lim, H. W. (2008). Scale construction. In P. P. Heppner, B. E. Wampold, & D. M. Kivlighan, Jr. (Eds.) *Research Design in Counseling* (3rd ed., pp. 494-510). Belmont, CA: Thomson Brooks/Cole

Lent, R. W., Brown, S. D., & Hackett, G. (1996). Career development from a social cognitive perspective. In D. Brown, L. Brooks, & Associates (Eds.) *Career Choice & Development* (3rd ed., pp. 373-421). San Francisco: Jossey-Bass.

Lent, R. W., Brown, S. D., & Hackett, G. (2000). Contextual supports and barriers to career choice: A social cognitive analysis. *Journal of Counseling Psychology, 47,* 36-49. doi:10.1037/0022-0167.47.1.36

Lent, R. W., Brown, S. D., & Hackett, G. (2002). Social cognitive career theory. In D. Brown & Associates (Eds.) Career Choice and Development (4th ed., pp. 255-311). San Francisco: Jossey-Bass.

Lincoln, V. S., & Guba, E. G. (1985). *Naturalistic Inquiry.* Beverly Hills, CA: Sage.

McCrae, R. R., & Costa, P. T. Jr. (2004). A contemplated revision of the NEO Five-Factor Inventory. *Personality and Individual Differences, 36,* 587-596.

McCrae, R. R., & Costa, P. T. Jr. (2007). Brief versions of the NEO-PI-3. *Journal of Individual Differences, 28,* 116-128. Doi: 10.1027/1614-0001.28.3.116

McKay, H., Bright, J.E.H., & Pryor, R.G.L. (2005). Finding order and direction from chaos: A comparison of chaos career counseling and trait matching counseling. *Journal of Employment Counseling, 42,* 98-112.

Meyers, M.A. (2007). *Happy accidents: Serendipity in modern medical breakthroughs*. New York: Arcade Publications.

Merton, R.K., & Barber, E. (2004). *The travels and adventures of serendipity: A study in sociological semantics and sociology of science.* Princeton, NJ: Princeton University Press.

Miller, M. J. (1983). The role of happenstance in career choice. *Vocational Guidance Quarterly, 32,* 16-20.

Mitchell, K. E., Levin, A. S., & Krumboltz, J. D. (1999). Planned happenstance: Constructing unexpected career opportunities. *Journal of Counseling & Development, 77,* 115-125.

Murtagh, N., Lopes, P. N., & Lyons, E. (2011). Decision making in voluntary career change: An other-than-rational approach. *The Career Development Quarterly, 59,* 249-263.

Parsons, F. (1909). *Choosing a vocation*. Boston: Houghton Mifflin.

Patton, W. & McMahon, M. (1997). Career development in practice: A systems theory perspective. North Sydney: New Hobsons Press.

Patton, W. & McMahon, M. (1999). Career development and systems theory: A new relationship. Pacific Grove, CA: Brooks/Cole.

Peitgen, H. O., Juergens, H., & Saupe, D. (1992). *Chaos and fractals: New frontiers of science.* New York: Springer-Verlag.

Pryor, R. G. L., Amundson, N. E., & Bright, J. E. H. (2008). Probabilities and possibilities: The strategic counseling implications of the chaos theory of careers. *The Career Development Quarterly, 56,* 309-318.

Pryor, R. G. L., & Bright, J. E. H. (2003). Order and chaos: A twenty-first century formulation of careers. *Australian Journal of Psychology, 55,* 121-128.

Pryor, R. G. L., & Bright, J. E. H. (2006). Counseling chaos: Techniques for practitioners. *Journal of Employment Counseling, 43,* 2-16.

Pryor, R. G. L., & Bright, J. E. H. (2007a). Applying chaos theory to careers: Attraction and attractors. *Journal of Vocational Behavior, 71,* 375-400.

Pryor, R. G. L., & Bright, J. E. H. (2007b). The chaos theory of careers: Development, application, and possibilities. *Career Planning and Adult Development Journal, 23*, 49-64.

Pryor, R. G. L., & Bright, J. E. H. (2009). Game as a career metaphor: A chaos theory career counseling application. *British Journal of Guidance & Counseling, 37*, 39-50.

Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean level change in personality traits across the life course: A meta-analysis of longitudinal studies. *Psychology Bulletin, 132,* 1-25.

Rojewski. J. W. (1999). The role of chance in the career development of individuals with learning disabilities. *Learning Disability Quarterly, 22,* 267-278.

Ross, L., & Nisbett, R. E. (1991). *The person and the situation: Essential contributions of social psychology.* New York: McGraw Hill.

Salamone, P. R., & Slaney, R. B. (1981). The influence of chance and contingency factors on the vocational choice process of nonprofessional workers. *Journal of Vocational Behavior, 19,* 25-35.

Savickas, M. L. (1995). Constructivist counseling for career indecision. *The Career Development Quarterly, 43,* 363-373.

Savickas, M. L. & Baker, D. B., (2005). The history of vocational psychology: Antecedents, origin, and early development. In W. B. Walsh and M. L. Savickas (Eds.), *Handbook of Vocational Psychology* (3rd ed.). Mahwah, NJ: Erlbaum.

Scott, J. & Hatalla, J. (1990). The influence of chance and contingency factors on career patterns of college-educated women. *Career Development Quarterly, 39,* 18-29.

Sharf, R. S. (2002). *Applying career development theory to counseling* (3rd ed.). Pacific Grove, CA: Brooks/Cole.

Super, D. E. (1957). *The psychology of careers.* New York: Harper & Row.

Super, D. E. (1990). A life-span, life-space approach to career development. In D.Brown, L. Brooks, & Assoc. (Eds.), *Career choice and development: Applying contemporary theories to practice* (2nd ed., pp. 197-261). San Francisco: Jossey-Bass.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). New York: Harper Collins.

Tupes, E. C. & Christal, R. E. (1961). *Recurrent personality factors based on trait ratings*. USAF ASD Tech. Rep. No. 69-97, Lackland Airforce Base, TX: U. S. Air Force

Williams, E. N., Soeprapto, E., Like, K., Touradji, P., Hess, S., & Hill, C. E. (1998). Perceptions of serendipity: Career paths of prominent academic women in counseling psychology. *Journal of Counseling Psychology, 45*, 379-389.

Yoshimura, K., Ono, Y., Nakamura, K., Nathan, J. H., & Suzuki, K. (2001). Validation of the Japanese version of the NEO Five-Factor Inventory in a large community sample. *Psychological Reports, 88,* 443-449.

APPENDICES

Appendix A

POOL OF UNPLANNED EVENTS

Sometimes an unplanned or chance event can influence a person's thinking about a career. Did any of the following unplanned events have a significant influence on your academic or career decision-making?

In the space provided to the left of the item, place the following numbers in accordance with your experience:
3 – If you have personally experienced such an influencing event
2 – If you know of someone who experienced such an event, but have not experienced it yourself
1 – If you have not experienced such an event, do not know of anyone who has, but consider it to be possible or likely to happen to a college student.
0 – If it is not serendipitous or not likely to happen to a college student.

1. _____An interaction/conversation with a parent?
2. _____An interaction/conversation with a sibling?
3. _____An interaction/conversation with a friend?
4. _____A conversation with a non-immediate family member (grandparent, aunt, etc.)
5. _____An interaction/conversation with a professor outside of class
6. _____An interaction/conversation with a teacher (high school, middle etc.)
7. _____A conversation with a college admissions counselor
8. _____Seeing a career portrayed in a documentary (movie)?
9. _____Seeing a career portrayed in a movie (job of a character)?
10. _____Seeing a career portrayed on a television show (job of a character)?
11. _____Reading of a career or a character in a novel?
12. _____Seeing a career portrayed in an advertisement?
13. _____Reading a magazine article?
14. _____Visiting a social networking site (facebook, myspace, etc.)
15. _____Reading an Internet article or blog?
16. _____Watching a television show (non fiction – TLC, Discovery Channel, etc.)
17. _____Watching the news on television?
18. _____An event while serving in the military?
19. _____Reading a textbook for a class?
20. _____Completing a class assignment?
21. _____A college professor's lecture or in class discussion?
22. _____A guest lecturer in class?
23. _____A speaker on campus?
24. _____Participating in an on-campus activity?

25. _____Told by a professor that you would be good at a specific profession.
26. _____Told by a teacher (prior to college) that you would be good at a specific career or major?
27. _____Told by a friend that you would be good at a specific career or major?
28. _____Told by a parent that you would be good at a specific career or major?
29. _____Told by a sibling that you would be good at a specific career or major?
30. _____Told by a (non-immediate) family member that you would be good at a specific career or major?
31. _____Told by a work supervisor that you would be good at a specific career or major?
32. _____Told by an authority while volunteering, that you would be good at a specific career or major?
33. _____Told by an adult/authority figure (not work/school/family related) that you would be good at a specific career or major?
34. _____Being called to active military duty?
35. _____Suffering from a prolonged illness?
36. _____Suffering a debilitating injury?
37. _____Discovering limitations to a necessary skill or talent?
38. _____An internship experience that you disliked?
39. _____A work experience that you disliked?
40. _____A school affiliated experience that you disliked?
41. _____Receiving a criticism or recommendation that you not pursue a career field?
42. _____An aspect of a volunteer experience that you enjoyed?
43. _____An aspect of a work experience that you enjoyed?
44. _____Doing poorly in a required class?
45. _____Finding an interest in a course you selected to satisfy a general education requirement?
46. _____Finding an interest in an elective course?
47. _____A client of customer recognizing your hard work and offering you a job (hiring away)?
48. _____A person liking your personality and offering you a job?
49. _____Hearing someone speak enthusiastically about a major or career?
50. _____Your involvement or participation in athletics?
51. _____A volunteer experience that you disliked?
52. _____An offer of a job from a family member or relative?
53. _____An offer of a job by a friend or parent's friend?
54. _____A geographical restriction (the desired career is limited in your area)?
55. _____An accommodation to a spouse's career?
56. _____An accommodation to a child's needs?
57. _____A job opportunity with your employer (changing career field)?
58. _____Being laid off?

59. _____A change in your marital or romantic relationship (marriage, divorce, breakup, etc.)
60. _____The death of a loved one?
61. _____Physical limitations that prevented you from pursuing your desired career?
62. _____A temporary job becoming permanent?
63. _____A promotion involving different work or required skills?
64. _____An historical event (declaration of war, terrorist attack, natural disaster, etc.)?
65. _____You were in the right place at the right time?
66. _____A job was offered while another you wanted was not?
67. _____Being inspired by a person in a career who you admired?
68. _____A personal interaction with a person performing the work of a career?
69. _____An opportunity that arose through informal socializing?
70. _____An opportunity that arose through planned networking?
71. _____Being offered a position upon completion of an internship (with the same employer)?
72. _____Being offered a position upon completion of an internship that was unrelated to the work of the internship (with the same company)?
73. _____Being recommended or referred for a position with a company/organization that you had not applied to?
74. _____You were asked to take over the duties or responsibilities of a person who was absent or otherwise unable to perform the duties?
75. _____An epiphany resulting from drug use? (Tripping)

Appendix B

PILOT STUDY INVENTORY

Section 1 Demographic Information

1. Age _____
2. Sex (circle one): Male/Female
3. Academic Field (Major): _____
4. Ethnicity (circle all that apply)
    a. Caucasian/White
    b. African American
    c. Hispanic
    d. Asian/Pacific Islander
    e. Native American

Section 2 Serendipitous Influence Scale

Sometimes an unplanned or chance event can influence a person's thinking about a career. Did any of the following unplanned events have a significant influence on your academic or career decision-making?

In the space provided to the left of the item, place a check if your academic or career decisions were influenced by the described experience.

1. _____An interaction/conversation with a parent?
2. _____An interaction/conversation with a sibling?
3. _____An interaction/conversation with a friend?
4. _____A conversation with a non-immediate family member (grandparent, aunt, etc.
5. _____An interaction/conversation with a professor outside of class
6. _____An interaction/conversation with a teacher (high school, middle etc.)
7. _____A conversation with a college admissions counselor
8. _____Seeing a career portrayed in a documentary (movie)?
9. _____Seeing a career portrayed in a movie (job of a character)?
10. _____Seeing a career portrayed on a television show (job of a character)?
11. _____Reading of a career or a character in a novel?
12. _____Seeing a career portrayed in an advertisement?
13. _____Reading a magazine article?
14. _____Visiting a social networking site (facebook, myspace, etc.)
15. _____Reading an Internet article or blog?
16. _____An event while serving in the military?

17. _____Reading a textbook for a class?
18. _____Completing a class assignment?
19. _____A college professor's lecture or in class discussion?
20. _____A guest lecturer in class?
21. _____A speaker on campus?
22. _____Participating in an on-campus activity?
23. _____Told by a professor that you would be good at a specific profession.
24. _____Told by a teacher (prior to college) that you would be good at a specific career or major?
25. _____Told by a friend that you would be good at a specific career or major?
26. _____Told by a parent that you would be good at a specific career or major?
27. _____Told by a sibling that you would be good at a specific career or major?
28. _____Told by a (non-immediate) family member that you would be good at a specific career or major?
29. _____Told by a work supervisor that you would be good at a specific career or major?
30. _____Told by an authority while volunteering, that you would be good at a specific career or major?
31. _____Told by an adult/authority figure (not work/school/family related) that you would be good at a specific career or major?
32. _____An internship experience that you disliked?
33. _____A work experience that you disliked?
34. _____A school affiliated experience that you disliked?
35. _____An aspect of a volunteer experience that you enjoyed?
36. _____An aspect of a work experience that you enjoyed?
37. _____Doing poorly in a required class?
38. _____Finding an interest in a course you selected to satisfy a general education requirement?
39. _____A client of customer recognizing your hard work and offering you a job (hiring away)?
40. _____A person liking your personality and offering you a job?
41. _____Hearing someone speak enthusiastically about a major or career?
42. _____A volunteer experience that you disliked?
43. _____A geographical opportunity (academic field or career specific to your area/location)?
44. _____A geographical restriction (the desired career is limited in your area)?
45. _____Being laid off?
46. _____The death of a loved one?
47. _____Testimonial of a person in the field or profession?
48. _____An unexpected kindness?
49. _____Access to funds or funding?
50. _____A positive interaction with a person in the profession?

51. _____You were in the right place at the right time?
52. _____Being inspired by a person in a career who you admired?
53. _____A personal interaction with a person performing the work of a career?
54. _____An opportunity that arose through informal socializing?
55. _____An opportunity that arose through planned networking?
56. _____Being offered a position upon completion of an internship (with the same employer)?
57. _____Being offered a position upon completion of an internship that was unrelated to the work of the internship (with the same company)?
58. _____Being recommended or referred for a position with a company/organization that you had not applied to?
59. _____You were asked to take over the duties or responsibilities of a person who was absent or otherwise unable to perform the duties?
60. _____An information session or other non-academic presentation?
61. _____A conversation with students at a college/university (not previously known to you)?
62. _____Changed your academic or career goals to accommodate a family member?

Appendix C

SERENDIPITOUS EVENT INVENTORY

Section 1 Demographic Information

1. Age _____
2. Sex (circle one): Male/Female
3. Academic Field (Major): _____
4. Ethnicity (circle all that apply)
    f. Caucasian/White
    g. African American
    h. Hispanic
    i. Asian/Pacific Islander
    j. Native American

Section 2 Serendipitous Influence Scale

Sometimes an unplanned or chance event can influence a person's thinking about a career. Did any of the following unplanned events have a significant influence on your academic or career decision-making?

In the space provided to the left of the item, place a check if your academic or career decisions were influenced by the described experience.

1. _____An interaction/conversation with a parent?
2. _____An interaction/conversation with a sibling?
3. _____An interaction/conversation with a friend?
4. _____A conversation with a non-immediate family member (grandparent, aunt, etc.)
5. _____An interaction/conversation with a professor outside of class
6. _____An interaction/conversation with a teacher (high school, middle etc.)
7. _____A conversation with a college admissions counselor
8. _____Seeing a career portrayed in a documentary (movie)?
9. _____Seeing a career portrayed in a movie (job of a character)?
10. _____Seeing a career portrayed on a television show (job of a character)?
11. _____Reading of a career of a character in a novel?
12. _____Seeing a career portrayed in an advertisement?
13. _____Reading a magazine article?
14. _____Visiting a social networking site (facebook, myspace, etc.)
15. _____Reading an Internet article or blog?
16. _____An event while serving in the military?

17. _____Reading a textbook for a class?
18. _____Completing a class assignment?
19. _____A college professor's lecture or in class discussion?
20. _____A guest lecturer in class?
21. _____A speaker on campus?
22. _____Participating in an on-campus activity?
23. _____Told by a professor that you would be good at a specific profession.
24. _____Told by a teacher (prior to college) that you would be good at a specific career or major?
25. _____Told by a friend that you would be good at a specific career or major?
26. _____Told by a parent that you would be good at a specific career or major?
27. _____Told by a sibling that you would be good at a specific career or major?
28. _____Told by a (non-immediate) family member that you would be good at a specific career or major?
29. _____Told by a work supervisor that you would be good at a specific career or major?
30. _____Told by an authority while volunteering, that you would be good at a specific career or major?
31. _____Told by an adult/authority figure (not work/school/family related) that you would be good at a specific career or major?
32. _____A work experience that you disliked?
33. _____A school affiliated experience that you disliked?
34. _____An aspect of a volunteer experience that you enjoyed?
35. _____An aspect of a work experience that you enjoyed?
36. _____Doing poorly in a required class?
37. _____Finding an interest in a course you selected to satisfy a general education requirement?
38. _____A client or customer recognizing your hard work and offering you a job (hiring away)?
39. _____A person liking your personality and offering you a job?
40. _____Hearing someone speak enthusiastically about a major or career?
41. _____The death of a loved one?
42. _____Testimonial of a person in the field or profession?
43. _____An unexpected kindness?
44. _____Access to funds or funding?
45. _____A positive interaction with a person in the profession?
46. _____You were in the right place at the right time?
47. _____Being inspired by a person in a career who you admired?
48. _____A personal interaction with a person performing the work of a career?
49. _____An opportunity that arose through informal socializing?
50. _____Being offered a position upon completion of an internship (with the same employer)?

51. _____Being recommended or referred for a position with a company/organization that you had not applied to?
52. _____You were asked to take over the duties or responsibilities of a person who was absent or otherwise unable to perform the duties?
53. _____An information session or other non-academic presentation?
54. _____A conversation with students at a college/university (not previously known to you)?
55. _____Changed your academic or career goals to accommodate a family member?