Ego-Resiliency and Growth Through Adversity

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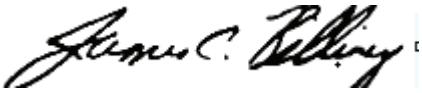

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Abstract

Research on stress and trauma has begun focusing on growth through adversity, which is positive psychological change that results from adverse circumstances. Meaning Making Theory has related this growth process to a re-evaluation of deeply held values and beliefs about the self and the world set in motion because of adverse life circumstances. While growth through adversity is theorized to result in personality change, the interaction of personality theory and growth through adversity is not well understood. Ongoing research into growth through adversity should therefore be informed by personality theory. The purpose of this quantitative correlational study was to examine the relationship between trait personality theory, specifically the trait of ego-resiliency, and growth through adversity using a convenience sample of 192 Canadian university students. Four self-report measures were administered in an online environment to gather data about the subjects' stress levels, perceptions of distress, degree of trait ego-resiliency, and indicators of growth through adversity related to their most stressful event. Regression analysis techniques were applied to draw conclusions from the data. The results revealed that while both ego-resiliency and stress were positively related to growth through adversity, and ego-resiliency was negatively related to perceived distress, perceptions of distress were not significantly related to growth. This lack of relationship was surprising, given the current importance placed on the role of distress in growth through adversity. The best model for predicting growth consisted of ego-resiliency in combination with stress. The application of trait personality theory does improve the understanding of growth through adversity. The results are discussed in the context of psychological theory, with recommendations being made for practice and future research.

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This road has been a long one, and fraught with obstacles, but I am very grateful to have finally arrived at the culmination. It has been a worthwhile journey.

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Chapter 1: Introduction

Background

While it is widely accepted that stressful and traumatic experiences often trigger various psychological symptoms (Sveen, Arnberg, Arinell, & Johannesson, 2016), it has more recently been discovered that they also hold the possibility for acting as catalysts for positive psychological changes (Park, 2013a). These positive psychological changes have been termed "growth through adversity" (GTA), a term which includes both post-traumatic growth (PTG) and stress-related growth (SRG); both of these types of growth are believed to arise from similar psychological processes (Joseph & Linley, 2005). The term PTG is the preferred when describing growth arising out of traumatic circumstances and SRG is used when the growth is the result of extremely stressful rather than traumatic circumstances (Park et al., 1996).

Some researchers have hypothesized that GTA is not real growth, but rather a cognitive adaptation arising out of the individual's struggle to maintain a high self-esteem, a belief in mastery and a sense of optimism in the face of stressful circumstances (Helgeson, Reynolds, Siminerio, Becker, & Escobar, 2014). This hypothesis is derived from Taylor's (1983) Cognitive Adaptation Theory (CAT), that people adjust to adversity by regaining a sense of personal control, esteem and optimism following the adverse event. This adaptation to adverse circumstances may be brought about by simply adapting one's thinking, without actually experiencing real or lasting change (Helgeson et al., 2014). However, a growing body of research has supported that GTA is actual growth, that is real psychological change, and several models have been proposed in order to explain the processes involved with most of them ascribing a central role to the process of assigning meaning to life experiences (Joseph, 2012; Joseph et al., 2012). These models are fairly compatible, and while they vary in the details, they

all describe a broad process involving negative life experiences triggering a re-evaluation of deeply held values and beliefs about the self and the world (Joseph, 2012; Joseph, Murphy, & Regel, 2012; Park, 2013a; Triplett, Tedeschi, Cann, Calhoun, & Reeve, 2012). In all of these models, it is the process of struggling to find new meaning when these fundamental beliefs have been challenged that is theorized to result in growth (Joseph et al., 2012).

As a specific example, Meaning Making Theory argues that people interpret life events through the creation of both global meaning, tied to the meaningfulness of life as a whole, and situational meaning, the appraisal of what that event means to them personally (Park, 2013a). When a stressful event interferes with the consistency of these meanings, then the individual experiences distress, and is motivated to adjust their meanings so as to reduce these inconsistencies (Losavio, Cohen, Laurenceau, Dasch, & Parrish, 2011). It is this process that is theorized to drive GTA.

While a large amount of research has focused on understanding the cognitive processes that lead to growth, personality researchers are just beginning to examine how personality theory may inform the area of GTA (Jayawickreme & Blackie, 2014). Here the literature connects GTA with specific personality traits, such as openness to experience and extraversion, as well as broader personality concepts, such as resilience, hardiness and self-efficacy (Popa & Podea, 2013; Salim, Wadey, & Diss, 2015). A personality trait of particular importance to GTA may be ego-resiliency because it has been shown to be related to increased resilience to stressors (Jayawickreme & Blackie, 2014). Ego-resiliency relates to flexibility of coping and is correlated with extraversion (Farkas & Orosz, 2013), which is in turn correlated with GTA (Tedeschi & Calhoun, 1996). Ego-resiliency also predicts effective problem solving and coping performance in stressful situations (Farkas & Orosz, 2015). The question of whether or not people who are

high in ego-resiliency are more or less likely to report positive changes when experiencing high levels of stress is important to the understanding of GTA (Jayawickreme & Blackie, 2014). Current theories of GTA, which emphasize positive meanings and growth, would lead to a prediction that higher levels of ego-resiliency should be associated with higher levels of reported GTA. If ego-resiliency is indeed related to higher levels of GTA then the role of meaning making in growth would be supported. However, if ego-resiliency relates instead to lower levels of GTA then the role of distress in growth may be supported. Of course making these determinations would also require measuring stress and distress.

This study explored the relationship between ego-resiliency and reported GTA in an effort to examine the connections between GTA and personality theory. This is an important addition to the research literature, because GTA purportedly results in changes to personality, and the process of GTA may also be influenced by existing personality traits, so the study of GTA ought to be informed by exploring the connects between GTA and personality theory (Jayawickreme & Blackie, 2014).

Statement of the Problem

The problem addressed in this quantitative correlational study was an examination of the relationship between ego-resiliency, stress, distress and growth in Canadian undergraduate college students. University students, particularly first-year students are typically exposed to very high levels of stressful events (Anders, Frazier, & Shallcross, 2014; Pennebaker, Colder, & Sharp, 1990; Stoliker & Lafreniere, 2015). There is a related increase in negative psychological symptoms and serious consequences, such as increased anxiety, depression, burnout and suicide, currently being experienced by university students (Anders et al., 2014; Cole et al., 2015; Stoliker & Lafreniere, 2015). It is possible that certain personality traits may be associated with

increased positive outcomes from stress, such as GTA (Cole et al., 2015; Jayawickreme & Blackie, 2014).

Ego-resiliency is a key personality trait that is related to coping and stress (Jayawickreme & Blackie, 2014), and has been associated with psychological well-being (Cole et al., 2015), an increased ability to function adaptively in stressful environments (Galatzer-Levy & Bonanno, 2013) and increased positive meanings following stressful events (Farkas & Orosz, 2015). Ego-resiliency may be increased using specific therapies (Jang & Choi, 2012) and interventions using ego-resiliency appear to be effective in reducing the severity and rates of relapse in depression (Johnson, Emmons, Rivard, Griffin, & Dusek, 2015; Waugh & Koster, 2015).

Understanding if there is a relationship between GTA and ego-resiliency has theoretical benefits because increasing the understanding of the interactions between personality theory and GTA also increases the understanding of the processes involved in GTA (Jayawickreme & Blackie, 2014). It also has practical benefits for students by identifying a protective factor against stress; a factor that may be teachable (Jang & Choi, 2012) and therefore strategically increased as part of proactive, resiliency based treatment for the stress inherent in their university experience. If ego-resiliency is related to GTA then therapists, counsellors and psychologists may incorporate ego-resiliency training as part of the intervention portifolio based on an understating that improving ego-resiliency is also likely to positively influence psychological wellbeing. This quantitative study addressed this problem by examining the relationship between ego-resiliency, stress, perceived stress, and GTA in Canadian undergraduate college students.

Purpose of the Study

The purpose of this quantitative correlational study was to address the problem by examining the relationship between reported GTA, stress, perceived stress, and ego-resiliency in Canadian undergraduate university students. Existing self-report measures were used to gather data regarding ego-resiliency, stress, perceived stress, and GTA from 192 university students drawn from undergraduate psychology courses in Edmonton, Alberta, Canada (copies of these are found in Appendix A). The study addressed this purpose by using self-report measures to examine the relationship between ego-resiliency, stress, perceived stress, and GTA. Multivariate regression analysis of the data from the self-report inventories was used to examine the relationships between three predictor variables (amount of stressful events, perceived stress and ego-resiliency) and one criterion (outcome) variable (GTA). The goodness of fit for a predictive model including all of the predictor variables, as well as the predictive value of each independent variable were analyzed using *F* tests and *t* tests respectively (Field, 2013).

Theoretical/Conceptual Framework Overview

Students may benefit from increased understanding of ego-resiliency and GTA to the extent that this helps to inform the creation of resilience based treatments that promote GTA in this population. Personality theory describes both how life experiences may alter characteristic cognitive and behavioral patterns and how these patterns relate to psychological well-being (Jayawickreme & Blackie, 2014). Personality theory is beginning to contribute to the understanding of GTA, offering explanations relating to the process of GTA (Eve & Kangas, 2015). Person centred personality theory in particular offers explanations for GTA and may offer techniques to facilitate the process of GTA (Joseph, 2015). This study grows out of the need to forge linkages between personality theory and the phenomenon of GTA (Jayawickreme

& Blackie, 2014). While the general research literature on resilience and coping with stress has included examinations of relevant personality traits, the field of GTA has so far largely ignored personality traits that could contribute to the current understanding of GTA. Instead, research has favored examination of various theories emphasizing cognitive factors in relation to growth (Kastenmüller, Greitemeyer, Epp, Frey, & Fischer, 2012).

The study that was conducted examined the relationship between Block's theory of personality and the construct of ego-resiliency (Farkas & Orosz, 2015) and GTA as described by meaning making theory (Park, 2013a). Ego-resiliency is different from resilience, in that it is a stable personality trait that describes the ability to modify the level of self-control being used in response to the demands of the current situation (Alessandri, Eisenberg, Vecchione, Caprara, & Milioni, 2016). Ego-resiliency is related to an individual's ability to adapt positively in the face of stress and adversity. Meaning making theory describes GTA as a process of reinterpreting either situational or global meanings (or both) in response to the discomfort that accompanies feeling distress in response to environmental events (Park, 2013a; Park & George, 2013). People create meaning so as to interpret the events occurring in their environments that have an impact on them. Global meanings are tied to the meaningfulness of life as a whole, and are based on individual religious beliefs, life purposes and personal values (Park, 2013a). Situational meanings are the appraisal of what the event means to them personally. People strive to maintain global and situational meanings that are consistent with one another. A stressful or traumatic event may challenge previously held beliefs, causing the individual to question their global meanings (Lindstrom, Cann, Calhoun, & Tedeschi, 2013; Triplett et al., 2012). When a stressful event, or series of events, interferes with the consistency of these meanings, then the individual experiences distress, and is more likely to exert the cognitive effort necessary to adjust

their meanings so as to reduce these inconsistencies (Losavio et al., 2011). It is this process that is theorized to drive GTA.

It is logical that ego-resiliency, which involves cognitive flexibility in response to environmental demands and acts to optimize the functioning of the personality system to the current environmental context (Farkas & Orosz, 2015), could play a key role in the process of meaning making as it relates to GTA. If an individual is responding to a stressful event, high levels of ego-resiliency could allow a more effective re-adjustment of meaning so as to result in greater levels of GTA. Alternatively, high levels of ego-resiliency could allow for more effective coping with stressful events, thereby reducing the level of perceived stress and also of GTA. Both of these processes could also be occurring simultaneously.

Research into the relationship between personality and GTA offers the field of personality insight into the process of personality change and may also further elaborate the processes involved in GTA (Jayawickreme & Blackie, 2014). It is acknowledged that personality can change in response to events and understanding the role of personality in GTA could demonstrate such change occurring in response to stressful events. The field of GTA is also enriched by increasing the scope of understanding of the variables that are associated with GTA by examining to what extent personality factors that are associated with positive meaning making and coping with stress, such as ego-resiliency, are related to individuals' experienced GTA.

Research Questions

Q1. Is there a significant relationship between ego-resiliency, stress, perceived stress, and GTA?

Q2. Is GTA significantly predicted by ego-resiliency?

Q3. Is GTA significantly predicted by perceived stress?

Q4. Is GTA significantly predicted by stress?

Q5. Is GTA better predicted by ego-resiliency, perceived stress, or stress?

Hypotheses

$H1_0$. There will be no relationship between the ER89, PSS-10, and / or RLCQ scores, and the scores on the SRGS in Canadian undergraduate psychology university students.

$H1_a$ There will be a statistically significant relationship between the ER89, PSS-10, and / or RLCQ scores, and the scores on the SRGS in Canadian undergraduate psychology university students.

$H2_0$. The SRGS scores will not be significantly predicted by the ER89 scores in Canadian undergraduate psychology university students.

$H2_a$ The SRGS scores will be significantly predicted by the ER89 scores in Canadian undergraduate psychology university students.

$H3_0$. The SRGS scores will not be predicted by the PSS-10 scores in Canadian undergraduate psychology university students.

$H3_a$ The SRGS scores will be significantly predicted by the PSS-10 scores in Canadian undergraduate psychology university students.

$H4_0$. The SRGS scores will not be predicted by the RLCQ scores in Canadian undergraduate psychology university students.

$H4_a$ The SRGS scores will be significantly predicted by the RLCQ scores in Canadian undergraduate psychology university students.

$H5_0$. There will be no significant differences between the ER89 scores,' RLCQ scores,' and the PSS-10 scores' contributions to the SRGS scores in Canadian undergraduate psychology university students.

$H5_a$ There will be a significant difference between the ER89 scores,' RLCQ scores,' and the PSS-10 scores' contributions to the SRGS scores in Canadian undergraduate psychology university students .

Nature of the Study

While research looking at GTA as an adaptive process has identified the potential role played by pre-existing personality traits, the relationship between those traits and GTA is not well understood (Jayawickreme & Blackie, 2014). In order to expand the understanding of GTA by exploring the potential links between meaning making theory and personality theory, further research into the relationship between personality traits and GTA is needed. This quantitative study examined the relationship between ego-resiliency, which is a personality trait of particular relevance, and GTA in Canadian undergraduate university students. Specifically, the study used self-report measures to answer five questions: (a) Is there a relationship between ego-resiliency, as defined by the ER89, stress, as defined by the RLCQ, perceived stress, as defined by the PSS-10 and GTA, as defined by the SRGS, in Canadian undergraduate psychology university students? (b) Is GTA, as defined by the SRGS, predicted by ego-resiliency, as defined by the ER89, in Canadian undergraduate psychology students? (c) Is GTA, as defined by the SRGS, predicted by stress, as measured by the PSS-10, in Canadian undergraduate psychology university students? and (d) Is GTA, as defined by the SRGS, predicted by stress, as measured by the RLCQ, in Canadian undergraduate psychology university students? and finally (e) Is GTA, as defined by the SRGS better predicted by ego-resiliency, as defined by the ER89, stress,

as measured by the RLCQ, or perceived stress, as measured by the PSS-10, in Canadian undergraduate psychology university students?

The study examined the relationship between ego-resiliency, perceived stress, stress, and GTA using the correlations between these variables as measured by self-report inventories. Ego-resiliency's ability to predict GTA was compared to that of stress and perceived stress, which had previously been established (Anders et al., 2014). Because the study was exploratory in nature, a cross sectional approach was used to examine the correlations (Salim et al., 2015). Evaluating relationships between variables is best accomplished using information from a larger number of subjects in order to improve the validity of the conclusions drawn from the data that is gathered (Lewandowski, Ciarocco, & Strohmetz, 2015). Exploring the value of specific variables in predicting specific outcomes involves quantitative measurement of those variables. Because both GTA and ego-resiliency are internal characteristics that are not easy to directly observe, self-report measures are more suitable for data collection and are an accepted standard in both GTA and personality research (Anders et al., 2014; Back, 2015; Park & George, 2013; Salim et al., 2015).

Determining if there is a relationship between ego-resiliency and GTA and then evaluating the ability of perceived stress, stress and ego-resiliency to predict GTA required the use of correlational techniques and regression analysis. Because there is no existing model for the relationship between perceived stress, stress, ego-resiliency and GTA, linear regression analysis of the data was used to examine these relationships and to develop an overall model to predict GTA from measures of ego-resiliency, stress, and perceived stress (Field, 2012). The goodness of fit for the predictive model including both of the predictor variables was further

evaluated using an *F* test, additionally the predictive value of each individual variable was analyzed using *t* tests (Field, 2012; Wuensch, 2007).

Other study designs, such as qualitative or longitudinal quantitative designs were also considered. However, qualitative methods were quickly discarded as being unsuited to this research question. Qualitative designs are useful for research that seeks to understand attitudes or specific experiences by examining questions related to how or why a phenomenon is experienced (McCusker & Gunaydin, 2015). The data, most often from a small number of participants, is the personal narrative related to each subjects' viewpoint. This approach most often focuses on a subjective truth by providing a high level of data from a small number of subjects, allowing the exploration of the nuances associated with individual experience (Lewandowski et al., 2015). Quantitative methods on the other hand are more useful for examining objective truths, by providing a neutral examination of numerical data collected from larger samples (McCusker & Gunaydin, 2015). Qualitative methods are therefore not well suited to hypothesis testing, nor are they particularly useful in examining the relationships between variables (Lewandowski et al., 2015). Qualitative methods are more suited to examining relationships between variables, and exploring the shared experiences of larger groups.

Longitudinal methods were also briefly considered. These methods are useful for observing change over time, and are very suited to describing patterns of change and stability, establishing the temporal order of events and exploring developmental effects (De Vaus, 2013). However, longitudinal designs are also more time and resource intensive, requiring greater numbers of subjects and more resources to successfully be conducted. They are also subject to mortality, practice effects and maturation threats. A longitudinal approach would require a very large sample that could potentially be followed for an extensive period of time. While a

longitudinal design that followed subjects over time to see if those scoring higher in ego-resiliency also experience more GTA might potentially answer the research questions, this design was rejected due to the higher resources and time required, and the uncertainty associated with the design's ability to generate the required data. For these reasons the method chosen for this study was a quantitative, cross-sectional design using self-report surveys to gather data from a larger number of subjects.

Significance of the Study

This study provided valuable information about the nature of the relationship between ego-resiliency, perceived stress, stress, and GTA in Canadian university students. Ego-resiliency may be a key personality trait for understanding GTA because it has been related to psychological well-being (Cole et al., 2015), as well as coping and stress (Jayawickreme & Blackie, 2014). Previous studies also support that ego-resiliency may be increased using specific therapeutic interventions (Jang & Choi, 2012). Improving the understanding of the relationship between ego-resiliency, perceived stress, stress, and GTA in students provides insight into the variables involved in the process of adapting to and growing from stress (Jayawickreme & Blackie, 2014). If ego-resiliency is related to increased levels of GTA, then this provides some support for the role of meaning making and positive adaptation to stress in the process of GTA. If ego-resiliency is related to reduced levels of GTA and perceived stress, then this may support the importance of experienced distress in the process of GTA. Clearly understanding the relationship between GTA, stress, perceived stress and ego-resiliency expands the understanding of the complex process of growth. This information may be beneficially applied in helping students to better adapt to and cope with the high levels of stressors to which they are exposed

during their academic careers (Anders et al., 2014; Pennebaker et al., 1990; Stoliker & Lafreniere, 2015).

Definition of Key Terms

Actual growth. The objective presence of actual positive psychological change that has occurred in an individual separate from the individual's report of their having experienced positive psychological change is referred to as actual growth (Bjorck & Byron, 2014).

Cognitive Adaptation Theory. Cognitive Adaptation Theory (CAT) is an attempt to explain perceptions of growth as a form of cognitive coping strategy that focuses on maintaining a high self-esteem, a belief in mastery and a sense of optimism in the face of stressful circumstances (Helgeson et al., 2014; Taylor, 1983).

Ego-resiliency. Ego-resiliency, also referred to as ego resilience, is a personality trait describing the capacity for adapting to the changing demands of the environment that relates to resourcefulness of personality and emphasizes flexibility and resiliency to constantly varying situations (Farkas & Orosz, 2015).

Experienced growth. This is an individual's reporting of their personal experience of having grown (i.e. experienced positive psychological change) and is also referred to as perceived growth (Bjorck & Byron, 2014). That an individual reports positive change is not the same as an objective assessment that change has occurred.

Global meaning. The larger sense of meaning experienced by the individual in their life as a whole, based on their religious beliefs, life purpose and personal values is defined as their global meaning (Park, 2013a).

Growth through adversity. Positive psychological changes resulting from adverse (stressful or potentially traumatic) circumstances have been termed growth through adversity.

This is an umbrella term that includes both post-traumatic growth and stress-related growth (Joseph & Linley, 2005).

Meaning Making. Meaning making is the process of appraising a situation and creating a favorable understanding of both the situation and its implications (Park, 2013a; Park 2016). This process may involve re-evaluating global or situational meanings, or questioning one's sense of meaning in life in order to improve the fit between the appraised meaning of the situation and the global meanings it has impacted.

Perceived stress. The extent to which an individual defines an event as personally threatening in some manner is referred to as their perceived stress (Barbosa-Leiker et al., 2013). This includes both the individual's experienced level of discomfort or distress related to the events in their current environment and their perceptions related to their ability to adequately cope with these events.

Post traumatic growth. PTG refers to the beneficial psychological changes that occur in an individual's perception of self, relationships with others, and philosophy of life, arising out of their attempts to cope with an experienced traumatic event (Tedeschi & Calhoun, 1996).

Resolution. The extent to which an individual feels emotionally resolved regarding a specific event that was previously experienced as being stressful is the resolution of that event (Losavio et al., 2011). The resolution of the event is negatively correlated with the strength of the individual's emotional response resulting from the event.

Situational meaning. The immediate sense of meaning experienced by the individual in relation to a specific event or situation that results from their personal appraisal of the event is described as the situational meaning (Park, 2013a).

Stress. The general response of the body to any psychological, physical or environmental demand is described by the term stress (Selye, 2013). This term is also frequently applied to external events that qualify as environmental demands (stressors).

Stress related growth. SRG refers to the positive changes in personal resources, social resources, and coping skills that arise out of an individual's struggle with highly challenging life circumstances (Schaeffer & Moos, as cited in Park et al., 1996).

Summary

Several theories that describe GTA exist, and the literature consistently emphasizes the role of psychological meaning in relation to GTA (Joseph et al., 2012; Park, 2013). Initial research into the potential role played by personality in GTA has identified some traits, such as optimism, that appear to be related to the experience of GTA (Shigemoto & Poyrazli, 2013). More work is needed to explore the relationship between GTA and personality because research connecting these two fields of inquiry enriches the understanding of both personality, specifically personality change, and the processes involved in GTA (Jayawickreme & Blackie, 2014). The quantitative study contributed to both of these fields by using regression analysis to examine the relationship between self reports of perceived GTA, ego-resiliency, stress and perceived stress in Canadian university students.

Chapter 2: Literature Review

Recent studies support the existence of growth through adversity (GTA), which are positive psychological changes that result from exposure to stressful and traumatic events (Park, 2013a). The purpose of this quantitative study was to test the hypothesis that ego-resiliency, stress, and perceived stress will predict perceptions of GTA in Canadian undergraduate university students. Self-report measures were used to gather data in order to examine the potential connections between the personality theory construct of ego-resiliency (Block, 1993; Farkas & Orosz, 2015) and the Meaning Making Theory of GTA (Park, 2013a). It applied regression analysis techniques on the self-report data to examine these variables and evaluated the role that they play in GTA. By examining the role of ego-resiliency in GTA further understanding of the connection between personality theory and meaning making theory in GTA was gained.

Documentation

A detailed search of the research literature related to GTA was undertaken prior to selecting the current research question. Initially a broad search with no date constraints was initiated using the terms *stress related growth* and *posttraumatic growth.* Following a review of the peer reviewed documents identified in that search, the initial area for investigation, the connection between personality and GTA, was identified. Further searches were then undertaken.

These additional searches focused on peer reviewed literature using the keywords *stress related growth, posttraumatic growth, resilience, ego-resiliency, stress* and *personality*. Later searches also limited the date of publication to ensure that only peer reviewed articles published in the last five years were included for consideration. The total articles resulting from these

searches provided a thorough selection of the key studies conducted in the broader areas of GTA and ego-resiliency.

This general search was followed by a narrowed approach focused on the most recent research that has been conducted in the areas of GTA and personality traits. Further database searches using the keywords identified above were conducted and the reference sections of current articles were also examined, to further add articles for consideration. These search practices were repeated until they failed to turn up new sources. All searches were conducted using the Roadrunner Search Discovery Service through the Northcentral University's library services.

This chapter will be a review of the research literature organized into sections dealing with particular topics of importance to the study that is being proposed. After a broad introduction of the theoretical framework for the study being proposed, the terminology used for the study will be reviewed. This will be followed by a general discussion of the research being reviewed, and this will start from a broader focus and proceed to more narrowly focus topics. First, the literature on stress and resiliency will be discussed. Then, research related to GTA will be examined. Next, the theories that have been proposed to explain GTA will be discussed, followed by the relevant personality theories. Then issues related to the measurement of growth will be explored. Finally, the lack of connection between personality theory and GTA theory will be discussed.

Terminology

There are several terms which are applied to the phenomenon of growth resulting from adversity, including stressful and traumatic events. These include the previously mentioned SRG, PTG and GTA. Of these three, GTA stands out as the most practical for use, because this

term encompasses both growth resulting from stressful circumstances and that which results from traumatic events. Therefore, for simplicity's sake, I have chosen to the broader term, GTA, in my discussion of the literature related to this phenomenon as this term subsumes both SRG and PTG.

Theoretical/Conceptual Framework

Positive psychology is a relatively new but extremely broad and rapidly growing area of study which focuses on personal strengths and processes contributing to well-being, growth and optimal functioning (Rusk & Waters, 2013). In a quantitative analysis of the literature related to positive psychology Rusk and Waters (2013) identified over 18,000 published articles belonging to positive psychology. Their analysis revealed that positive psychology research is being conducted in many areas including resilience, growth through adversity and positive personality functioning. This quantitative study used self-report data gathered from a convenience sample of Canadian university students to add to the knowledge of GTA. The data examined the potential links between personality theory and GTA (Jayawickreme & Blackie, 2014). The relationship between Block's theory of personality, specifically his construct of ego-resiliency (Block, 1993; Farkas & Orosz, 2015) and the Meaning Making Theory of GTA (Park, 2013a) were examined. In order to better understand how these two theoretical areas may relate to one another, some discussion of the specific theories is first needed.

Research in personality theory has examined how particular personality traits impact coping and responses to stress (Jayawickreme & Blackie, 2014). Studies have already demonstrated increased GTA in relation to several well validated personality traits, such as openness to experience, extraversion, hardiness and self-efficacy (Popa & Podea, 2013; Salim, Wadey, & Diss, 2015). Ego-resiliency is the ability to modify the level of self-control being

used in response to the demands of the current situation, and previous studies support that this is a relatively stable personality trait (Alessandri, Eisenberg, Vecchione, Caprara, & Milioni, 2016). In effectively exercising self-control to adapt to the continually changing circumstances involved in daily living, the individual must balance a tolerable level of emotional experience, a functional mesh with the demands and limitations of the current situation and an effective level of impulse expression (Block, 1993). The construct of ego-resiliency describes the personality system's capacity to maintain an adaptive balance between these three (emotional experience, impulse expression, and functioning in the current situation) and so maintain the highest level of optimal functioning possible given the current demands of a particular situation. Ego-resiliency is closely related to ego-control, which is the ability to inhibit emotional or behavioral responses when they are counterproductive. In this role, ego-resiliency functions to maintain an optimal level of control so that responses are neither out of control, nor are they over-controlled. Ego-resiliency has been demonstrated to be positively related to psychological well-being, including life purpose and personal growth measures in Korean adolescent athletes (Back, 2015). Life purpose and personal growth are directly related to GTA and the process of meaning making proposed by Park (2013a). The finding that ego-resiliency is related to psychological well-being, including life purpose and personal growth, is some small support for the hypothesis that ego-resiliency may also facilitate the processes involved in GTA.

In delineating her Meaning Making Theory of growth, Park (2013a) posited that people maintain their sense of psychological well-being by holding consistent and positive beliefs (meanings) about themselves and the world they live in. People use these created meanings to interpret the events that occur in their lives. Meaning Making Theory describes two separate kinds of personal meanings that are individually held: situational meanings and global meanings.

Situational meanings are an individual's appraisal of what a specific event that has been experienced means to them personally. Global meanings are broader beliefs regarding the overall meaningfulness of life. These global meanings are informed by the individual's religious beliefs, life purposes and personal values. Several studies support Park's hypothesis that people strive to maintain consistency between the global and situational meanings that they hold (Park, 2013a; Park & George, 2013). In situations where a stressful event or series of events results in inconsistencies between situational and global meanings then personal beliefs are adjusted in an attempt to reduce these inconsistencies (Losavio, Cohen, Laurenceau, Dasch, & Parrish, 2011). Ego-resiliency, as the ability to modify the level of self-control being used in response to the demands of the current situation (Block, 1993), potentially reflects a key component of the meaning making process, as it could theoretically have a strong influence on an individual's ability to actively engage in the meaning making process and to successfully re-establish the consistency between their global and situational meanings that is hypothesized to be a key process in GTA (Park, 2013a).

It could be that ego-resiliency plays an important role in the human stress response and the process of GTA, but the exact nature of that role is, as of yet, unknown (Jayawickreme & Blackie, 2014). Because ego-resiliency is related to more effectively adjusting cognition in response to stress (Block, 1993), it could potentially mediate between the number of stressors and the level of perceived stress resulting from them. If this is the case, then it has the potential to impact GTA in several ways. GTA is related to finding positive meanings (Cassidy, McLaughlin, & Giles, 2014; Yeung, Lu, Wong, & Huynh, 2016) and also to maintaining consistency between personal and global meanings in the face of negative life events (Park, 2013a). Ego-resiliency is related to the ability to arrive at positive conclusions about life events,

such as a sense of increased hope for the future (Back, 2015), so it is logical to predict that higher levels of ego-resiliency should be associated with higher levels of GTA. However, the existing research could also be interpreted to support the statement that higher levels of ego-resiliency would be correlated with better coping skills in response to environmental stressors (Block, 1993). If this is the case, then high ego-resiliency would be expected to be associated with lower levels of perceived stress. This has been demonstrated in a cross sectional study using 245 Korean grade five students. Self-report measures showed reduced levels of stress and negative affect in the elementary students who scored higher on a measure of ego-resiliency, but not those who scored low in ego-resiliency (Park, 2013b). Because higher levels of stress are associated with a greater likelihood of GTA (Johnson & Boals, 2015), it is also logical to predict that higher levels of ego-resiliency should therefore be associated with lower levels of GTA. Examining these predictions together reveals the possibility that there exists an important and complex relationship between GTA, stress, perceived stress and ego-resiliency.

The studies described above could lead to the conclusion that what is known about ego-resiliency, stress and GTA may support several, potentially conflicting predictions. First, because ego-resiliency is related to psychological well-being and increased hope for the future (Back, 2015), it is possible that higher levels of ego-resiliency would be associated with *higher* levels of GTA. Second, because higher levels of perceived stress are associated with a greater likelihood of GTA (Johnson & Boals, 2015) and ego-resiliency is associated with better coping with stressors (Block, 1993), it is also possible that higher levels of ego-resiliency would be associated with *lower* levels of GTA. Third, it could also be the case that ego-resiliency does not impact the processes related to GTA; that is there is no significant relationship between ego-resiliency and GTA whatsoever.

This quantitative study explored connections between the personality theory construct of ego-resiliency (Block, 1993; Farkas & Orosz, 2015) and the Meaning Making Theory of GTA (Park, 2013a). Multiple regression analysis techniques were applied to data collected from a convenience sample of Canadian university students to examine the relationships between ego-resiliency, stress, perceived stress, and perceived GTA. This allowed the role that these variables play in the process of GTA to be evaluated. The information gained by exploring the potential role of ego-resiliency in GTA supported an important connection between personality theory and meaning making theory as these both apply to GTA.

Stress

Stress and trauma have long been topics of research in psychology and a variety of models have been proposed to explain the negative impact of stressful events as well as factors that increase resilience to stress (Lancaster, Klein, Nadia, Szabo, & Mogerman, 2015). Broadly speaking, stress is the general response of the body to any psychological, physical or environmental demand (Selye, 2013). In common usage this definition of stress has been expanded over time to include both the external event (technically termed a stressor) and the individual's reaction to that event (Barbosa-Leiker et al., 2013).

The individual's reaction may be conceptualized as consisting of two factors: the perceived negative psychological states (described by the term stress) and the perceived positive psychological states (described by the term counter stress) which, when combined, determine the individual's subjective experience of the stressor (Barbosa-Leiker et al., 2013). Stated another way, the impact of stressful events on an individual is mediated by their unique perceptions of the stressfulness of the event to them (Cohen, Kamark, & Mermelstein, 1983). Therefore, to

more fully understand how stress impacts an individual, both the external stressor and the individual's positive and negative perceptions of the stressor must be understood.

One of the most broadly used scales measuring environmental stressors is the social readjustment rating scale (SRRS) first developed in the early 1960s (Holmes & Rahe, 1967). The scale was first developed by having 394 subjects assign a life change units (LCU) value to a list of 43 stressful life events. This list was created by the authors based on a thorough examination of over 5 000 medical records. The values assigned by their subjects were averaged, resulting in a mean LCU value for each item on the test. On the original SRRS these values ranged from 11 to 100. These mean LCU values were then systematically verified as the SRRS was applied in both research and treatment. The scale was more recently updated and altered, with out of date items being dropped and newer items added (Miller & Rahe, 1997). At that time the LCU values were also re-determined using similar methods (again by averaging ratings, this time producing LCU scores that ranged from 18 to 123) using a diverse sample consisting of 427 volunteers. The resulting recent life changes questionnaire (RLCQ) consists of 73 yes-no items. The RLCQ has been extensively used in research, and the LCU values have shown strong reliability (α = .84 to .96). While the use of LCU ratings represents an attempt to account for individual differences in the response to stress, the RLCQ remains largely a measure of the potential health impacts of stress, based on the number of stressors experienced in a given six month or one year period. Scores exceeding 300 LCU (for six months) or 500 LCU (for one year) are interpreted as revealing high levels of recent life stress, which are very likely to have negative impacts on overall health and functioning.

Because the individual response to an external stressor is not solely dependent on that stressor, but also on the subjective cognitive appraisal of that stressor as a threat, Cohen et al.

(1983) set out to create an inventory to measure individual perceptions of stress. They wished to produce a global measure of perceived stress to expand on the understanding of how stressors impact health. The resulting perceived stress scale (PSS) was evaluated using three samples, two of college students, and a third gathered from a community based smoking cessation program. The measure displayed strong reliability, with alpha levels exceeding .80 (α = .84, .85 and .86 respectively) in all three of the samples. The PSS scores were also compared to scores from other scales that measured the number of stressful life events, degree of social anxiety, number of depressive symptoms and number of medical visits in order to establish concurrent and predictive validity. The participants' PSS scores were significantly correlated with the number of reported psychological and physical symptoms. PSS scores also significantly predicted the number of healthcare visits during the course of the study, which lasted 12 weeks.

A more recent exploration of the current version of the PSS (PSS-10) by Barbosa-Leiker et al., (2013) supported the inventory's use in measuring both stress (the perceived negative psychological states) and counter stress (the perceived positive psychological states). This study used a large sample, including 871 men and women, who were each tested twice over a two-year time frame. The results were analyzed using maximum likelihood estimation in structural equation modeling (SEM). The PSS-10 displayed strong reliability, with α = .87 for the total score, and α = .81 and α =.80 for the stress and counter stress subscales respectively. While both a one-factor and a two-factor model of the PSS 10 were tested for fit, only the two-factor model provided acceptable fit according to the results. The general rule for assessing fit in SEM require the χ^2 to be non-significant, the standardized mean square residuals (SRMR) to be less than or equal to .09, and the comparative fit index (CFI) to be equal to or above .95 (Iacobucci, 2010). Barbosa-Leiker et al., (2013) reported values of .981 for the CFI, 0.028 for the SRMR and a non-

significant χ^2 value of 78 ($df = 34$). These results supported the hypothesis that the PSS-10 measures two latent factors, stress and counter stress, doing this equally well in both male and female subjects (Barbosa-Leiker et al., 2013). While these results look positive, they are limited by the use of a sample composed predominantly of Caucasians. Further studies using more ethnically diverse samples would strengthen the generalizability of these results.

In conducting research on the impacts that stress has, it is important to identify subjects who are experiencing stress as it would be ethically unacceptable to create high levels of stress in subjects over the long term (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, & Social Sciences and Humanities Research Council of Canada, 2014). Young adult students attending universities or colleges are particularly vulnerable to the negative psychological consequences of stress such as student burnout, and psychological issues related to anxiety, depression, and suicide (Anders, Frazier, & Shallcross, 2014; Cole et al., 2015; Stoliker & Lafreniere, 2015). This is due in part to the high level of stress that is a regular part of the student lifestyle (Anders et al., 2014). This means that university students are particularly suitable subjects for researching the impact of stress, because they are voluntarily experiencing higher than usual levels of stress. It is for these reasons that the proposed study will use students as subjects in order to ethically explore the relationships between ego-resiliency, stress, perceived stress, and GTA.

Resilience

Stress is experienced differentially by various societal groups, with the highest levels of over-all stress being reported by women and young adults (Cohen & Janicki-Deverts, 2012). One of the factors that accounts for some of this variation in response to stress is a construct known as resilience (Waugh & Koster, 2015). Resilience is not the same as ego-resiliency, also

called ego-resiliency, even though the two may be strongly related they are in fact two different entities (Alessandri et al., 2016). While the latter is a conceived of as a stable personality trait, the former is not. Frequently resilience is simply defined as an individual's ability to cope with stressors (Waugh & Koster, 2015), but there is more to the construct than that. Resilience is a multidimensional construct which can only be understood in the context of the interaction between the person and their environment (Pangallo, Zibarras, Lewis, & Flaxman, 2015). It is conceptualized as a complex interaction between internal resources, such as emotional intelligence (Sharma, Gangopadhyay, Austin, & Mandal, 2013) and external resources, such as social support (Pangallo et al., 2015) that results in improved individual functioning in the face of environmental stressors. Resilience, represented by positive adaptation to stress, is also highly variable, and it is expected to change over time, depending on the individual and the circumstances they face.

Many factors have been related to increased resilience to stress, including mindfulness practices, participation in physical education programs, experiencing a sense of hope, the presence of higher levels of social support, and the use of specific coping strategies (Back, 2015; Cole et al., 2015; Ogińska-Bulik & Kobylarczyk, 2015; Rahat & İlhan, 2016; Shing, Jayawickreme, & Waugh, 2016; Villasana, Alonso-Tapia, & Ruiz, 2016). Mindfulness was shown to be related to significantly lower negative impacts from academic stress in a sample of 431 Ghanaian college students (Cole et al., 2015). A sense of hope was found to mediate a significant relationship between participation in physical education and reduced negative impacts of academic stress in high school students (Back, 2015). Data collected from self report measures given to 80 paramedics who experienced traumatic events through their work examined the impact of specific coping strategies on resilience (Ogińska-Bulik & Kobylarczyk,

2015). Specific coping strategies, such as venting negative emotions and focusing on the problem by thinking about it and planning what should be done, appeared to promote increased resilience to stress. Similar results were also observed using self report inventories in a sample of 527 at risk university students in Turkey (Rahat & İlhan, 2016). The researchers used hierarchical multiple regression techniques and found that specific coping styles, including not only planning, but also positive reinterpretation and using instrumental social support were significantly associated with higher levels of positive psychological adjustment. That different coping strategies vary the degree of an individual's resilience to stress has been well documented (Ogińska-Bulik & Kobylarczyk, 2015; Rahat & İlhan, 2016; Shing et al., 2016; Villasana et al., 2016).

In addition to coping styles, Rahat & İlhan (2016) also examined the role of perceived social support and resilience characteristics, such as life purpose, positive outlook and relationship building, on psychological adjustment. All of these factors were found to be significantly associated with higher levels of positive psychological adjustment. While all of these studies are limited by their reliance on the use of self report surveys, they have demonstrated that resilience to stress may be impacted by several factors, and demonstrated this impact in a variety of cultures. Thus a variety of practices, coping behaviors and personality traits have been shown to interact with resilience and individual responses to stress such that the negative impacts of stress may be mitigated (Back, 2015; Cole et al., 2015; Ogińska-Bulik & Kobylarczyk, 2015; Rahat & İlhan, 2016; Shing et al., 2016; Villasana et al., 2016).

Seeking to understand the negative impacts of stress led to the discovery that people vary in their response to stress (Lancaster et al., 2015). Studying this phenomenon led to some understanding of individual resilience to the negative impacts of stress. More recently, research

on resilience and stress has also been focused on positive psychological changes, or growth, that occur due to adversity (Cassidy et al., 2014; Joseph, 2012). This shift in emphasis has included many research studies examining GTA in response to non-traumatic stress (Park, 2013a; Park & George, 2013; Popa & Podea, 2013). The idea that individuals who experience adversity may grow as a result is not new, but it has only been a significant focus of psychological research in relatively recent times (Jayawickreme & Blackie, 2014).

Growth Through Adversity

Researchers have observed psychological growth in connection with severe stressors in diverse populations. Many studies have focused on psychological growth resulting from traumatic adversity and these have reported that growth is not a rare outcome of adversity (Cadell et al., 2014; Tsai, El-Gabalawy, Sledge, Southwick, & Pietrzak, 2015; Ulloa, Hammett, Guzman, & Hokoda, 2015). Survey responses from 3 157 veterans participating in the National Health and Resilience in Veterans Study revealed that 50% of all veterans surveyed reported moderate growth related to a traumatic event (Tsai et al., 2015). In veterans who screened positive for PTSD the proportion increased to 72%. The events that were most associated with growth included a life-threatening illness or injury and re-experiencing symptoms of trauma. An in-depth analysis of the literature related to intimate partner violence (IPV) revealed strong evidence for both trauma and growth in victims of IPV (Ulloa et al., 2015). Several predictors of growth were identified, including specific personality traits, social support, religiosity and having a sense of life purpose. GTA has also been demonstrated in caregivers of children born with terminal illnesses(Cadell et al., 2014). A total of 273 adult caregivers of children with terminal illnesses from Canada and the United States completed self-report measures. The researchers then used SEM to test two separate models of growth and also examined possible factors related

to growth. They found support for a process model of growth in which personal well-being contributed to finding positive meaning in the caregiving experience. This in turn facilitated the process of GTA.

Other studies have focused on normative adversity, experiences that are highly stressful, but not traumatic per se. For example, a large sample of Japanese college students (N = 589) who experience the death of a family member within the last five years were used to explore the phenomenon of GTA in individuals going through bereavement (Taku, Tedeschi, & Cann, 2015). Self-report measures were used to gather information about growth, degree of stress and a variety of demographic variables. While self-reported evidence of growth was observed in the subjects, the relationship between stress and growth was linear for some of the specific domains of growth (personal strengths and new possibilities) and curvilinear for others (relating to others, spiritual change and appreciation of life). Another study used self-report inventories to measure growth, social context, and a variety of factors related to attitudes and homosexual lifestyle in 102 predominantly Caucasian gay and lesbian subjects (Solomon, McAbee, Åsberg, & McGee, 2015). The data that resulted from these surveys was used to examine the often highly stressful experience of coming out to family and friends. Regression analysis revealed a weak positive association between negative social reactions to coming out and GTA. A stronger positive link was found between positive social reactions and GTA.

Even mundane stress, such as that experienced by patients with chronic skin disorders (Zhai, Huang, Gao, Jiang, & Xu, 2014), or that is associated with every day events, such as interpersonal relationships and career or academic pursuits can be sufficient to trigger positive psychological change (Cassidy et al., 2014). Zhai et al. (2014) set out to examine the factor structure of the Chinese version of the posttraumatic growth inventory (PTGI) using 297 patients

being treated for chronic skin diseases. They found evidence of perceived growth in their subjects, with higher levels of growth being reported by their subjects (mean of 81.24) than had been reported by cancer patients examined by other studies (mean of 60.2 in a study by Weiss, as cited in Zhai et al., 2014). Cassidy et al. (2014) used 855 undergraduate students to develop and test a generic multidimensional measure of growth. Analyzing the self-report data using SEM, support was found for a model of GTA that was positively related to psychological and social resources, but inversely related to degree of stress.

The research literature has been largely built using similar methods of research, with most studies making use of self-report, cross sectional methodologies (Cadell et al., 2014; Cassidy et al., 2014; Solomon et al., 2015; Tsai et al., 2015; Zhai et al., 2014). For that reason most of these studies also share the limitation that no causal conclusions may be drawn from their results (Field, 2013). While much of the research has used convenience samples, the use of diverse populations in the studies does allow for a greater ability to generalize the broad support that has been discovered for the phenomenon of GTA. However, a clear relationship between growth and stress remains elusive. While most of the studies revealed a positive relationship between stress and growth (Cadell et al., 2014; Tsai et al., 2015), some results supported a curvilinear relationship (Taku, Tedeschi, et al., 2015), or even a negative relationship (Cassidy et al., 2014) between these two variables. Clearly more research is needed to understand this complex phenomenon.

While there is no clear agreement on the terminology applied to the phenomenon of GTA, the two terms most frequently used in the research literature are SRG and PTG. These two terms were coined simultaneously: SRG by Park et al. (1996) and PTG by Tedeschi and Calhoun (1996). Other researchers appear to have used the term related to the specific inventory used by

them in their research. Adding to this confusion over terminology, these two terms are frequently used interchangeably, and there is considerable conceptual overlap between SRG and PTG (Bjorck & Byron, 2014). While research focusing on PTG is often seen as having a narrower focus because of the reliance on using only subjects who have been exposed to traumatic events, these two terms may actually represent the same overall process of growth in response to adverse life circumstances. When growth occurs as a result of exposure to potentially traumatic events, PTG is the preferred term (Joseph, 2012). When it is the result of stress, the term SRG is frequently used (Park, Cohen, & Murch, 1996).

Post traumatic Growth. Tedeschi and Calhoun (1996) first introduced the concept of GTA (using their term, PTG) when they developed the post traumatic growth inventory (PTGI), a scale purporting to measure growth resulting from exposure to potentially traumatic events. After a thorough examination of the literature related to trauma and stress they identified several areas of perceived benefits resulting from traumatic events. They conceptualized these perceived benefits as positive changes occurring in three broad areas: self-perception, interpersonal relationships and philosophy of life. Using this as a starting point, they created a series of questions related to each of the three areas of change and set out to develop a scale to measure GTA using undergraduate university students from a large university in the Southeastern United States. The subjects responded to each question about experienced changes in relation to the same personally experienced traumatic event, one which they had chosen. The subjects' responses were collected using Likert scaled items. Factor analysis was used to identify the questions which appeared to best measure GTA and then the scale was further evaluated using a new sample drawn from the same university.

The inventory which they developed displayed good internal consistency and acceptable test retest reliability (Tedeschi & Calhoun, 1996). Subjects who experienced a traumatic event scored significantly higher on the PTGI than those who had not experienced a traumatic event (F (1,113) = 12.33, $p < .001$). They also found that women endorsed a significantly greater number of items reflecting positive change then men did (F (1,113) = 10.69, $p < .001$). They concluded that their scale measures a person's tendency to experience negative events in a way that produces perceptions of positive change in one or more of the three areas measured.

This was a beginning step in the development of self-report inventories to study the phenomenon of GTA. While the PTGI looked promising for use in research, the generalizability of the inventory still needed to be demonstrated, as it had been developed solely using university students from the United States (Tedeschi & Calhoun, 1996). This concern has largely been addressed through ongoing research efforts that have supported strong reliability in samples drawn from a variety of other sources, including Japanese university students (Taku, Tedeschi, et al., 2015), American veterans (Tsai et al., 2015), the general public in the United States (Abel, Walker, Samios, & Morozow, 2014), Australian firefighters (Armstrong, Shakespeare-Finch, & Shochet, 2014), and spouses of stroke victims in the United Kingdom (Hallam & Morris, 2014). The PTGI showed acceptable reliability when used in all of these groups with Cronbach's α values ranging from .69 to .95 (most of the studies reported values that exceeded .80).

The self-report nature of the inventory also prevented concluding whether or not the positive changes endorsed by the subjects represented actual psychological growth or simply self-perceptions of growth (Tedeschi & Calhoun, 1996). The authors themselves noted this fact, stating that further research would be needed in order to determine whether the benefits were merely perceived or represented objective growth experienced by the subjects they tested. This

study is important to the area of GTA, because it is often credited with beginning the empirical study of GTA (Joseph, 2015).

Tedeschi and Colhoun (1996) then defined the term PTG as being the individual's experience of positive change occurring after exposure to some form of traumatic situation. Several areas of positive changes have been reported in GTA, including in the areas of relationship enhancement, changed views of one's self, and/or changes in personal life philosophies (Joseph et al., 2012; Park, 2013a; Tedeschi & Calhoun, 1996). Trauma may conceivably simultaneously contribute to both negative changes, such as post-traumatic stress disorder (PTSD), and positive changes, such as GTA (Kira et al., 2013). In fact, several studies show that PTSD and GTA may be highly related outcomes; both may arise out of the same traumatic experience. They also both appear to share several predictor variables and may represent different outcomes of the same basic psychological processes. War veterans with PTSD have even been shown to later experience GTA (Tsai et al., 2015). This involves helping veterans to gradually develop personally uplifting meanings associated with the traumatic event so they may ultimately experience a sense of positive change and growth.

Stress related growth. Traumatic experiences are not the only source of stress that may drive change; SRG is this basic process of growth from discomfort when it is arising out of non-traumatic, but highly stressful experiences (Park et al., 1996). Just as Tedeschi and Calhoun (1996) proposed GTA in response to trauma based on efforts to develop the PTGI, Park et al. (1996) used similar methods to examine GTA resulting from stressful life events that were not traumatic in the creation of a self-report inventory they called the stress related growth scale (SRGS). Building on a conceptual model proposed by Schaefer and Moos (as cited by Park et al., 1996), the SRGS was developed using questions related to the three major areas of positive

growth proposed in their model: new or improved coping skills, enhanced social resources and enhanced personal resources. Items for consideration were generated and then evaluated using factor analysis of the responses provided by a convenience sample of 506 college students drawn from introductory psychology classes. The clear majority of subjects (more than 90%) were freshmen and Caucasian. These subjects were administered 82 personal growth items selected for evaluation, as well as questions related to their ratings of stressfulness the most stressful event they have experienced the last six months. Two additional self-report inventories were administered, the Impact of Events Scale (IES), a self-report scale used to measure an individual's perceptions of the negative impact of particularly stressful events, and the Marlowe-Crowne Social Desirability Questionnaire, an inventory designed to detect social desirability as a response bias in subjects providing self-report responses.

The results of a series of factor analysis of the data collected from this sample supported the inclusion of 50 of the 82 proposed items in the final SRGS (Park et al., 1996). This factor analysis did not support the use of factor scores associated with three major areas of positive growth used to create the SRGS, therefore only the total SRGS score was used in further analyses. The total SRGS score was statistically significantly correlated with the self-reported level of stress associated with the past year's most negative event ($r = .46$, $p <. 001$), and the total score of the IES ($r = .31$, $p <. 001$). According to the Marlowe-Crowne Social Desirability Questionnaire results, the scores on the SRGS were not influenced by the social desirability response set. Similar to the findings reported by Tedeschi and Calhoun (1996), the data collected by Park et al. (1996) also supported that women reported significantly higher levels of perceived growth than men did ($t(505) = 4.66$, $p < .001$).

The reliability and validity of the SRGS were also examined using the same data (Park et al., 1996). The SRGS displayed good internal consistency (Cronbach's $\alpha = .94$) and test retest reliability over a two-week period ($r = .81$). A second study used a new sample of 160 college students to evaluate the accuracy of SRGS responses by comparing self-report responses to data gathered from the subjects' friends and relatives. The college student sample completed the SRGS and provided names of friends or relatives to be contacted on their behalf. A total of 52% (73 subjects) of the contacted friends and relatives consented to participate in the study. These individuals completed an alternate version of the SRGS, which was filled out in relation to the original research participant. Test statistics revealed good internal consistency for the informant version of the SRGS (Cronbach's $\alpha = .93$). There were no significant differences between the scores of the participant and informant versions of the SRGS (paired $t(67) = .05$, ns) and these two scores had a significant positive correlation ($r(72) = .21$, $p < .05$). This correlation was even higher for data gathered from informants reporting an extremely close relationship to the research participant ($r(56) = .31$, $p < .05$). Kappa values were calculated for score pairs in order to measure intrapair agreement correcting for chance agreement. Twelve out of the 50 SRGS items had significant scores, with the kappa values ranging from .26 to .40 ($p < .05$).

A third study longitudinally evaluated predictors of GTA using a convenience sample of 256 students taking part in introductory psychology classes (Park et al., 1996). Participants were tested on two different occasions, separated by six months. During time one a battery of self-report questionnaires was completed in random order, and each of students was asked to describe two separate events, the most negatively stressful and the most positive, that had occurred during the past year. Each subject completed a separate SRGS for each of the two events which they described. At time two the subjects were again asked to complete the same inventories with the

addition of a measure of coping, and life stress. Students were once again asked to describe the most stressful negative life event experienced during the past six months (since time one) and then completed the SRGS in relation to that event.

Data analysis revealed that the measures of intrinsic religiousness, social support satisfaction, the level of stressfulness of the negative event, positive reinterpretation and acceptance as coping strategies, and the number of recent positive life events were all positively associated with the total SRGS scores (Park et al., 1996). The correlation coefficients ranged from $r = .21$ to $r = .55$, all at $p < .01$. The researchers made several recommendations for future studies including the use of nonstudent samples to improve the generalizability of the SRGS results. They also suggested the need for research to examine growth as a development process, and the need for studies to determine whether specific personality characteristics are related to the process of GTA.

While these three studies have resulted in a useful measure of GTA for use in research, there are some methodological limitations present in all three of them (Park et al., 1996). Generalizability beyond a college population is limited due to the use of college students at all stages of the development of the SRGS. Park et al. (1996) partially described a further study using a sample of 400 parents of disabled children randomly chosen from the mailing list of the Parent Information Centre in Delaware. The results of the data collected from the parent sample were described as closely matching that which was gathered from the college students, with a mean total score on the final 50-item version of the SRGS of 60.40 (SD = 13.80) and a Cronbach's α of .97 (compared to 50.68 (SD = 9.62) and a Cronbach's α of .94 for the college students). It is impossible to further evaluate these results, as they are not fully reported.

In common with the development of the PTGI, the SRGS may reflect objective psychological changes or simply perceptions of change on the part subjects (Park et al., 1996; Tedeschi & Calhoun, 1996). These studies provided no data that could support a differentiation between these two possible outcomes (Park et al., 1996). Clearly more research is required in order to determine if the SRGS measures truly objective growth, or some form of emotion focused coping represented by a perception of growth as a response to stress. Studies examining GTA occurring in day to day stressful events have identified relationships between optimism, core belief disruption, rumination and both positive and negative affective reactions (Losavio et al., 2011). As is the case in PTG, the research examining SRG supports that growth is ultimately perceived as a positive emotional experience, but that it involves emotional discomfort, effortful cognitive processing, and an examination of core beliefs. The exact role that growth plays in the individual's response to stressful events is not fully understood.

While similar processes are believed to be involved in both PTG and SRG, PTG requires the experience of a traumatic event, while SRG may be experienced by virtually anyone in society. Because a far greater proportion of the population experiences stressful events in their lives than are exposed to traumatic events, it is logical to conclude that far more people are likely to experience SRG than will experience PTG.

Theoretical Approaches to Growth

Many theories have been proposed to explain the processes involved in GTA and these fall broadly into several types. Some theories, such as Meaning Making Theory, argue that GTA is a type of problem focused coping, and represents a cognitive process of adjustment to stress that results in real psychological growth (Kastenmüller, Greitemeyer, Epp, Frey, & Fischer, 2012). Here GTA is a long-term change resulting from stress. A competing view is that

perceived GTA is not actual psychological change, but rather it is simply an attempt at emotion focused coping in response to stress (Jayawickreme & Blackie, 2014; Kastenmüller et al., 2012). This view describes GTA as an illusion that is accepted in order to minimize the negative emotional impact of the stressful event (Kastenmüller et al., 2012). In this case GTA is a short-term accommodation to cope with the emotions engendered by stress.

Perceived growth as emotion focused coping. The validity of the construct of GTA continues to be questioned because of a number of studies that appear to demonstrate that any growth may exist only in the perceptions of the subject (Bjorck & Byron, 2014). Using a stressful event analog task that was developed with previous studies, Bjorck and Byron exposed 91 university students to a series of three vignettes and asked about real life stressors to assess the students' GTA and coping plans. Because GTA is theorized to involve enduring changes in positive coping efforts, their goal was to evaluate the construct validity of GTA by examining the relationship between GTA and changes in coping intentions. Support for the construct validity would be found if GTA was related to changes in positive coping intentions for future stressors. The subjects were first asked to report the most stressful event that they had experienced in the past 12 months, and then completed several self-report inventories. These include the Brief COPE, a measure of coping behaviors which is filled out in relation to a specific event, and the SRGS-SF (an abridged version of the SRGS). The Brief COPE was completed several times, filled out in relation to one stressful event that had actually been experienced by the subject, and again indicating future intentions for coping with that event, were it to occur again. Subjects then read each of three vignettes describing a stressful event, and completed the Brief COPE in relation to each vignette.

In analyzing the data, the researchers compared the results of the SRGS-SF with both positive and negative coping strategies (Bjorck & Byron, 2014). The SRGS-SF scores had significant positive correlations with both positive coping (reframing and emotional support seeking), as well as negative coping (denial). The researchers concluded that these findings were inconsistent with the view that GTA is coping enhancement, and therefore GTA may actually represent coping in the form of retroactive reappraisal of the stressful event rather than actual growth resulting from it.

While this study attempted to examine the validity of the concept of GTA, there are several concerning methodological limitations (Bjorck & Byron, 2014). Most obvious is the fact that, while they support their use of a vignette technique by citing previous research using the same technique, exposing students to imaginary situations and asking about their coping intentions may not yield accurate results as to how the students actually respond to real-life situations. The cross-sectional nature of the study also precludes any cause-and-effect conclusions from being made (Field, 2013). Ultimately, the results of this study failed to support the construct validity of GTA (Bjorck & Byron, 2014). While the researchers' conclusion that GTA does not result in changes in coping intentions appears to be supported, further studies with similar findings would be needed before their broader assertion that the construct of GTA represents retrospective coping rather than actual growth could be supported (Bjorck & Byron, 2014). More work is required in order to determine whether the self-reported growth following stressful events represents actual personality change, or is simply a perception that encourages coping in the person who holds it.

Cognitive Adaptation Theory (CAT) is an attempt to explain perceptions of growth as simply a form of cognitive coping strategy (Helgeson et al., 2014; Taylor, 1983). People cope

with stress by maintaining three adaptive cognitive fictions: a) that the self is good, b) that the individual has control over the events that occur and c) that positive events are more likely to be experienced than negative events. These three factors are respectively described as self-esteem, mastery and optimism.

In the context of CAT, GTA is then interpreted as a short-term adaptation in thinking that allows an individual to maintain the illusions of self-esteem, mastery and optimism in order to more ably cope with the stressors being experienced (Helgeson et al., 2014). A short coming of the research exploring CAT is the large overlap between indicators of cognitive adaptation and indicators of distress. More work is needed to fully differentiate the cognitive adaptation as described by CAT and psychological distress in order to determine if they are actually separate processes.

One potential result of the application of CAT to researching the relationship between ego-resiliency and growth would be the prediction that higher levels of ego-resiliency should be associated with lower levels of reported growth (Bensimon, 2012). This is because an individual with high ego-resiliency would be expected to be able to adapt to stress without the need for maintaining any of the adaptive cognitive fictions hypothesized in CAT, resulting in better psychological adjustment overall (Helgeson et al., 2014). However, the initial studies examining the relationship between ego-resiliency and GTA have supported the opposite: higher levels of ego-resiliency appear to be associated with higher levels of growth (Bensimon, 2012; Duan, Guo, & Gan, 2015). This may be interpreted as very tentative support for growth as real personality change. Clearly more studies replicating these results would be needed to strengthen the support for this conclusion.

Growth as personality change. Part of the human reaction to stressful circumstances is often an attempt to assign a meaning to the events; an effort is made to understand why this is happening (Park, 2013a). Making meaning in relation to life events is related to personal changes in several areas including appraisals of the stressful event itself, broader changes in global beliefs, such as religious values or life goals, and perceived GTA (Park, 2016). This process of assigning meaning to stressful and traumatic events has been identified as one of the key processes involved in GTA (Groleau, Calhoun, Cann, & Tedeschi, 2013). A qualitative study using face-to-face interviews of participants attending suicide bereavement groups applied a grounded theory process to examine the impacts of suicide bereavement (Groos & Shakespeare-Finch, 2013). The data collected from 13 subjects strongly supported the role of group participation in aiding the bereavement process, and supported the role of meaning making in GTA. Subjects who were able to find a meaning in the suicide of a loved one that allowed them to accept this event also showed a greater ability to be compassionate towards themselves and others, and displayed higher levels of positive personal change following their participation in the bereavement group. While this study did report a high response rate (76%), it is limited by the use of volunteers who are already participating in the grief support group. It is possible that individuals who are attending a suicide support group are also at a certain stage in the bereavement process. Maybe people who are coping adequately with the death of a loved one by suicide are even more likely to participate in the group, or more likely to volunteer for the research. Because of these considerations, replication of these findings is needed before confidence in the results is warranted. The model that was developed using this qualitative data described a process of gaining insight, and developing meaningful narratives about the suicide as the key factors that were related to positive change (i.e. GTA).

In another study, this time a quantitative design using 187 university students, researchers used self-report measures administered in an online environment to examine the relationship between event centrality, the degree to which a stressful event becomes a central part of an individual's life story, and GTA (Groleau et al., 2013). Event centrality relates to meaning making in that the centrality of an event is largely determined through a process of meaning making in which the stressful event is appraised by an individual who may conclude that it does (or does not) play a central role in their life. Several self-report measures were administered in a random order, and each subject made their responses in relation to a highly stressful event that had occurred within the last two years. The scores on the self-reported measure of growth were highly correlated with scores on the inventories measuring the degree of disruption to core beliefs, found meaning, and the degree of centrality assigned to the stressful event. The results of a hierarchical multiple regression analysis supported that the degree of centrality assigned to the stressful event was a significant predictor of perceived growth. The centrality of events score was also a small but significant predictor of the subject's degree of posttraumatic distress. Because the researchers relied on a convenience sample of students, the generalizability of the study is limited (Field, 2013). The use of self-report data is also problematic in that any conclusions must be limited to subjects' perceptions of growth, distress and meaning. These constructs are difficult to objectively measure as they are believed to represent internal psychological processes and are therefore not easy to objectively observe (Groleau et al., 2013). The results do appear to support the assertion that the process of assigning meaning to stressful events plays a role in individual perceptions of both negative and positive psychological changes (i.e. GTA).

A relationship between GTA and the process of re-examining core beliefs has also been demonstrated in Japanese students who experienced a significant earthquake (Taku, Cann, Tedeschi, & Calhoun, 2015). A convenience sample of 314 students recruited from psychology courses in Kanto, Japan, filled out three self-report inventories. These were the PTGI–J, a Japanese version of the PTGI that was used as a measure of GTA, and a Japanese version of the core beliefs inventory (CBI-J), a measure of perceived challenge to core beliefs, and the event - related rumination inventory (ERRI–J), a measure of event related cognitive processing. Growth was significantly correlated with the students' self-reported levels of the stressfulness of the event, as well as the scores on the CBI-J and ERRI–J. The results of a hierarchical regression analysis revealed that, of the variables that were measured, the disruption of core beliefs was the strongest predictor of GTA. While the cross-sectional nature of this design precludes drawing causal conclusions, the results do support a correlational relationship between meaning making, as represented by the disruption of core beliefs, and GTA.

The role of cognitive appraisal and meaning making in GTA appears to have adequate research support (Groleau et al., 2013; Groos & Shakespeare-Finch, 2013; Taku et al., 2015). In fact, many of the theories describing GTA specifically emphasize this process of meaning making by hypothesizing that it is the process of assigning positive meanings to stressful events that facilitates growth (Kastenmüller et al., 2012; Park, 2016; Tedeschi & Blevins, 2015). This process takes place when an emotional crisis is triggered by stressful events. In meaning making theory, the process when an individual experiences a crisis is described as occurring when their appraised meanings for a stressful or traumatic event violate the global meanings they hold about their life, their religious ideals, the nature of the universe, and the meaning of their place within it (Park, 2013a). This lack of consistency between their global meanings and the situational

meanings related to the stressful event is believed to result in a psychological crisis that results in emotional distress and discomfort (Park, 2016). The emotional discomfort of this crisis motivates the individual to make the effort to take effective cognitive action. Through active coping and ruminative cognitive processes, the individual is forced to gradually re-evaluate the event and their global meanings. If they are able to adjust the meanings that they have assigned to the event so that they are once again aligned with their religious beliefs, life purpose and personal values, then GTA is more likely to occur. Personal resources reflected in well-being (self-esteem, optimism, depression and spirituality) may also be involved in the positive meaning making which contributes to GTA (Cadell et al., 2014).

Park (2013a) described this theoretical process in some detail. Exposure to a potentially stressful situation results in an initial appraisal of the meaning of the event; this appraisal may be consistent with or discrepant from the individual`s global meanings. When there is a discrepancy between personal and global meanings the individual experiences distress. This distress motivates them to undertake the process of meaning making as an effort to cope with the emotional distress that has been produced. As new, more consistent meanings are made, the discrepancy is reduced and GTA may occur. The resultant growth, if any, depends on the specific meanings that are created through this process. Longitudinal research has highlighted the critical role that the re-examination of one's core beliefs may play over time in GTA by demonstrating a positive relationship between increased challenges to core beliefs and an increased likelihood of GTA (Danhauer et al., 2013). There is evidence that each individual may have an optimal level of stress such that they will experience less growth if they are exposed to more or less than this optimal level of stress (Taku et al., 2015). These findings fit with the assertion that the stressful event must challenge fundamental beliefs and create enough

discomfort that of these result in a meaning making process in order for growth to occur (Park, 2013a; Taku et al., 2015).

Several self-report measures, including the PTSD checklist - military version, the stressful event appraisal (SEA), the SRGS-Sf (a brief version of the full SRGS) and the meaning in life questionnaire (MLQ) were used in a quantitative study examining the relationship between discomfort, meaning making and growth (Steger, Owens, & Park, 2015). These measures were administered online to 130 veterans of the Vietnam war. The results again supported a relationship between the severity of stress, violations of global beliefs and both the severity of PTSD symptoms and the degree of reported GTA. Path analysis techniques were used to evaluate three models of meaning making and growth. A final model was later constructed by optimizing the fit between the data and the model through deleting the non-significant paths. In the final model the violation of life goals was significantly related to both PTSD and GTA. The role of goal violation in GTA was moderated by the process of searching for meaning in the stressful event. The only test score that was significantly correlated with the SRGS-Sf was the MLQ score. This supported the conclusion that GTA is related to meaning in life. The final model, which best explained the overall pattern of the data, included a significant relation between the process of searching for meaning in stressful events and GTA.

While the study does broadly support the role of meaning in GTA, the cross-sectional nature precludes any causal conclusions from being drawn (Field, 2013). Additionally the use of a convenience sample of veterans who have experienced a significant trauma 40 or more years previously introduces a retrospective memory bias, i.e. the subjects current experiences may have created a bias in their recall of stressful events in their distant past (Steger et al., 2015).

Despite these limitations these results do provide some support for the role of meaning making in GTA.

Personality Theory

Despite the fact that GTA is theoretically a change in personality as a result of exposure to stressful events, there has been little if any research into the phenomenon of GTA from the perspective of personality theory (Jayawickreme & Blackie, 2014). One of the main theoretical approaches to the study of personality is trait theory, which asserts that the best way to understand personality is by examining enduring traits (Fleeson & Jayawickreme, 2015). These traits are defined as characteristic behaviors and reactions that are highly consistent across a variety of situations. While research into the Big Five traits has provided strong evidence for the existence of consistent behavioral traits (Critcher, Dunning, & Rom, 2015; DeYoung, Weisberg, Quilty, & Peterson, 2013), a weakness of trait theory is that it does nothing to explain the source of traits, or how traits develop, or the mechanism by which traits operate (Fleeson & Jayawickreme, 2015).

The other main theoretical approach to the study of personality is social cognitive theory, which describes personality in terms of basic cognitive and affective personality structures (Scott & Cervone, 2016). The cognitive structures that make up personality, such as self-schemas and temperaments, are hypothesized to be relatively stable and enduring. These personality structures are also hypothesized to develop through a complex interaction of genetics and social experiences. They give rise to characteristic patterns of behaving, feeling and thinking based on previous experience; these characteristic patterns of behaving, feeling and thinking are the building blocks of personality.

A new development in personality theory is whole trait theory, which is an attempt to combine both trait theory and social cognitive theory (Fleeson & Jayawickreme, 2015). Whole trait theory relies on trait theory for the strength of its personality description and on social cognitive theory for the explanation of the source of these traits, and the mechanisms by which they develop and operate. Whole trait theory hypothesizes that traits are composed of two parts: an explanatory part (social cognitive mechanisms) and a descriptive part (trait theory definitions). Each personality trait is expected to have two forms, a trait (the enduring aspect of personality) and a state (the expression of that trait in the current situation). The social cognitive mechanisms are hypothesized to cause the enduring traits, and also to play a role in their expression in various situations as states. This relationship between personality traits and personality and affective states is garnering some support in the research literature (Ching et al., 2014). The personality mechanisms proposed by social cognitive theory have been demonstrated to reliably predict the manifestation of traits in various situations (Judge, Simon, Hurst, & Kelley, 2014). Furthermore, the situational expression of traits has been shown to occur in a manner that is consistent with social cognitive explanations of personality (Church et al., 2013).

Personality traits associated with growth. Researchers have examined how GTA relates to the Big 5 personality traits, concluding that GTA is significantly related to some personality traits, such as openness to experience and extraversion (Tedeschi & Calhoun, 2004). Changes in self-reported extraversion, one of the Big 5 personality traits have also been linked to ego-resiliency (Farkas & Orosz, 2013). A computer-based gambling task and several self-report measures were used in a quantitative cross-sectional study to assess the relationship between ego-resiliency and the big five trait personality theory. A convenience sample of 93 students from the University of Szedged in Hungary completed personality measures before and after

engaging in a solitary risk taking task. Prior to completing the Iowa Gambling Task and the Game of Dice tasks each of the subjects completed a Hungarian version of the Big Five Inventory (BFI), a self-report measure of the big five personality traits, and a Hungarian version of the ER89, a measure of ego-resiliency. After completing each of the gambling tasks, the BFI was once again filled out by each of the subjects. The results revealed that the subjects' BFI profiles produced lower scores on extraversion following participation in the solitary gambling tasks. The magnitude of reduction in their extraversion scores was reliably predicted by their scores on the ER89. Subjects who scored high in ego-resiliency also reported more significantly introverted scores following the solitary gambling task. The researchers concluded that ego-resiliency interacted with the contextual factors (the solitary tasks) resulting in modified self-characterization of the extraversion personality trait. The researchers also concluded that individuals who scored higher in ego-resiliency adapted more readily to the social isolation of the gambling task, which resulted in a more introverted self-perception.

These findings provide some support for a relationship between ego-resiliency and changes in extraversion based on the environmental demands of the situation (Farkas & Orosz, 2013). If ego resiliency is related to changes in extraversion and extraversion is in turn related to GTA (Tedeschi & Calhoun, 2004) then there would appear to be some value in further exploration of the possibility that there is a stronger link between GTA and ego-resiliency. This link is also logical from a theoretical perspective, given the nature of ego-resiliency as a personality construct (Farkas & Orosz, 2015).

Ego resiliency. Ego-resiliency encompasses flexibility and adaptive responding, as well as general personality resourcefulness (Farkas & Orosz, 2015). It is the dynamic capacity to optimize individual functioning with respect to the current environment by adaptively shifting

the degree of self-control being exercised in response to changing interactions with the environment. A high level of ego-resiliency is associated with flexible responding to environmental demands and greater ease in adapting to changes in circumstances (Farkas & Orosz, 2013). Individuals who score high in ego-resiliency are also more likely to interpret difficulties as having positive meanings than are individuals with low ego-resiliency (Farkas & Orosz, 2015). Ego-resiliency may predict successful resolution of traumatic and stressful events. Greater understanding of the role played by ego-resiliency in GTA may help explain the variability in responses to stressful circumstances. It may also help explain why some people report high levels of growth soon after stressful events, but others do not experience any level of GTA (Danhauer et al., 2013).

Ego resiliency and GTA. There is a positive relationship between ego-resiliency and general psychological well-being (Back, 2015). Because GTA is an aspect of psychological well being, it stands to reason that there could also be a relationship between ego resiliency and GTA. Research has begun to examine this relationship by looking at the possibility that ego resiliency plays a mediating role between PTSD and GTA in individuals who have experienced traumatic events (Bensimon, 2012). This cross-sectional study used college students with PTSD and demonstrated a statistically significant ($p < .05$) and moderately strong ($r = .25$) positive correlation between ego resiliency and GTA in students who had experienced trauma. A growth facilitative role for ego resiliency in GTA has also been supported in a sample of Chinese university students who had experienced a variety of traumatic events ranging from life-threatening accidents, to assault with a weapon, to sexual abuse (Duan et al., 2015). Self-report inventories were administered cross-sectionally to 95 volunteers, all of whom reported some level of both GTA and PTSD symptoms. Only 36 of the subjects met the criteria for a diagnosis

of PTSD. Ego resiliency was found to be a significant predictor of GTA ($t = 3.29$ $p < .01$), but only in the students who were diagnosed with PTSD. Both of these studies are limited by the use of cross sectional methods of data gathering, a reliance on student subjects, and the use of subjects exposed to traumatic events who also displayed symptoms of PTSD (Bensimon, 2012; Duan et al., 2015). These aspects of the studies limit not only the ability of causal conclusions to be drawn from the results, but also the generalizability of the findings beyond a trauma exposed student population (Field, 2013).

Two of the issues that have been raised in relation to the research being conducted on GTA continue to be contentious. These include the overuse of self-report measures in studying GTA (Blackie et al., 2016; Jayawickreme & Blackie, 2014; Shakespeare-Finch & Barrington, 2012) and the lack of connection with personality research (Jayawickreme & Blackie, 2014). Both of these will be dealt with next.

Measurement of Growth

Many researchers have expressed concern over the measurement bias in GTA research (Blackie et al., 2016; Jayawickreme & Blackie, 2014; Shakespeare-Finch & Barrington, 2012). The vast majority of studies have relied on self-report measures and this practice has been criticized on a number of fronts, most notably the accuracy of such self-report measures is questioned (Frazier & Kaler, 2006). Researchers have also questioned whether self-report measures, such as the SRGS or PTGI are even measuring actual growth and change (Johnson & Boals, 2015). Also, responding to the self-report inventories requires a complex series of steps that may be too demanding for some research participants (Blackie et al., 2016).

The self-report inventories currently used in GTA research first require subjects to determine the most stressful and/or traumatic event that they have experienced (Blackie et al.,

2016). Next the subjects must go through five cognitively complicated steps in order to generate the necessary responses. For each question the subjects must go through all of the following cognitive steps: (a) determine their current level of the dimension in question, (b) remember the level of the dimension that they had prior to the event's occurrence, (c) compare these two levels to each other, (d) deduce the degree of change that they believe they have experienced in the dimension under consideration, and finally (e) determine the degree of the change they have experienced that was due to the stressful event and rate this using the numerical scale provided (Blackie et al., 2016; Jayawickreme & Blackie, 2014). Not only do the self-report measures of GTA require complex cognition for accurate replies, but many researchers, including Johnson and Boals (2015), question if the inventories are measuring objective growth at all.

The subject's responses on inventories such as the PTGI and the SRGS may simply reflect perceptions of growth, completely divorced from any actual growth and change that may have occurred (Johnson & Boals, 2015). This concern has led to recommendations that more specific terminology be used in order to differentiate between perceptions of growth and actual growth (Frazier & Kaler, 2006). Two more specific terms, perceived growth (individual perceptions that change has been experienced as a result of stressful circumstances) and genuine growth (objective and relatively enduring personality change resulting from stressful circumstances) are frequently used to differentiate these two. It has been argued that the over-use of self-report measures in GTA research has led to some confusion between self-perceptions of change and actual quantifiable growth in the overall body of literature related to GTA (Jayawickreme & Blackie, 2014).

In order to correct the problems related to the overuse of self-report measures in GTA research several attempts are underway to develop alternative measures of growth (Blackie et al.,

2016; Shakespeare-Finch & Barrington, 2012; Shakespeare-Finch & Enders, 2008). Jayawickreme and Blackie (2014) discuss the need to begin applying research methodology used in personality psychology to the study of GTA. This could include the use of methods of measurement currently used in personality research, such as daily process methods like experienced sampling methodology (ESM). In ESM researchers gather time sensitive assessment data through the use of technologies, such as smart phones and text messaging, which allow subjects to respond to prompts regarding their thoughts, behaviors and feelings at several particular points in time each day (Blackie et al., 2016). The use of ESM is currently being developed into a state measure of GTA. While the initial results look promising, only one study using this particular method has been completed. While efforts to develop this measure of state GTA continue, at this time the inventory is still under development and does not appear to be ready for use.

As some researchers have focused on the attempts to develop alternate measures (Blackie et al., 2016), others are using multiple methods of measurement in order to corroborate the convergent validity of self-report measures of GTA such as the PTGI (Shakespeare-Finch & Barrington, 2012; Shakespeare-Finch & Enders, 2008). Trauma survivors and their significant others were used to gather corroborating evidence for the validity of the conclusions drawn from self-report measures, specifically the PTGI (Shakespeare-Finch & Enders, 2008). While trauma survivors filled out the PTGI, their significant others completed similar questionnaires identifying their perceptions of positive change which had taken place in the trauma survivors. Each subject pair completed their questionnaire separately, providing independent answers. Correlational analysis revealed that the self-reported changes assessed by the PTGI were also corroborated by the outside observations of significant others (*r* values ranged from .51 to .72, all

at p< .05 or lower). The overall findings of this study supported the validity of assessing GTA using self-report measures such as the PTGI.

Another study sought to compare the self-reported growth measured by the PTGI with measures of actual behavior change in the same subjects (Shakespeare-Finch & Barrington, 2012). Again using trauma survivors and significant others as their subjects, the results of the PTGI completed by trauma survivors were compared to questionnaires asking them about positive behavioral changes experienced since the trauma. These results were further compared to questionnaires completed by the significant others which assessed the significant others' observations of the trauma survivors' growth (similar to that measured by the PTGI) as well as their observations related to positive behavioral changes in the trauma survivors. The data gathered supported that the self-reports of positive change measured by the PTGI were reliably corroborated by not only the behavioral reports made by the trauma survivors, but also both the external observations of growth and behavioral change reported by their significant others.

While not conclusive, both of these studies provide support for the validity of self-report measures, specifically the PTGI (Shakespeare-Finch & Barrington, 2012; Shakespeare-Finch & Enders, 2008). Other researchers examining the validity of the PTGI concluded that the accuracy of self-report measures may also be dependent on specific factors associated with the event which triggered growth (Johnson & Boals, 2015). An examination of the relationship between PTGI scores, stress, depression, and anxiety found that these relationships were mediated by the level of the event centrality. This event characteristic, centrality, refers to the extent to which the stressful experience is interpreted as affecting core perceptions related to identity. This study produced two important findings. Firstly, subjects who experienced events that were low in centrality had PTGI scores with low correlations to measures of depression,

anxiety, and stress, and were associated with increased levels of all three. Secondly, the subjects who experienced events that were high in centrality had PTGI scores that were both significantly positively correlated to measures of depression and anxiety, and significantly negatively correlated to measures of stress. This study found the same results cross-sectionally and prospectively.

Given the mix of research findings related to their use, concerns about the validity of self-report measures of GTA may or may not be founded. While it is correct to point out that the majority of studies examining GTA rely on self-report measures such as the PTGI and the SRGS, this may not be a significant concern. There is support for the validity of these self-report measures, particularly the PTGI, and their ability to accurately gauge objective change (Johnson & Boals, 2015; Park & George, 2013; Shakespeare-Finch, Martinek, Tedeschi, & Calhoun, 2013). This, in combination with the robust data supporting the internal consistency, validity, and test-retest reliability of inventories such as the PTGI, appears to support the continued use of these inventories, along with other measures, in GTA research.

Lack of Connection to Personality Theory

Research in the area of positive psychology has firmly established that the human reaction to stressful events often includes an attempt to understand the importance and impact of the events by examining the meaning of those events (Park, 2013a). This process of assigning meaning to stressful and traumatic events is hypothesized to be one of the central processes involved in GTA (Groleau et al., 2013). There is a positive relationship between some personality traits, such as ego-resiliency, and general psychological well-being (Back, 2015). GTA is an aspect of psychological well being, so it is logical that there could be some form of relationship between GTA and various personality traits (Jayawickreme & Blackie, 2014).

Researchers have examined how GTA relates to a few personality traits, notably those traits related to the Big Five Traits theory of personality (Tedeschi & Calhoun, 2004). The research to date appears to support the conclusion that GTA is significantly related to some of those personality traits, such as openness to experience and extraversion. Other personality traits, such as optimism, have also shown a demonstrable relationship to GTA (Shigemoto & Poyrazli, 2013). Recent research has begun to examine the possible relationship between ego-resiliency, PTSD, and GTA in individuals who have experienced traumatic events (Bensimon, 2012; Duan et al., 2015). However, studies examining potential connections between personality theory and GTA continue to be limited in number and scope (Jayawickreme & Blackie, 2014).

This lack of research exploring GTA from the perspective of personality theory is unusual given that the growth purported to be experienced results in relatively enduring changes to the individual's personality (Jayawickreme & Blackie, 2014). While some research has been conducted examining the relationship between GTA and the Big Five Traits theory of personality very little effort has been invested into strengthening the relation the understanding the relationships between personality, personality development and the processes involved in GTA. Ego-resiliency remains a trait of suspected interest in GTA, but it has only been studied in the context of trauma exposure and GTA in students who display PTSD symptoms (Bensimon, 2012; Duan et al., 2015).

Summary

Several theories that describe GTA exist, and the literature related to them has consistently emphasized the role of psychological meaning in relation to GTA (Joseph et al., 2012; Park, 2013a; Taku et al., 2015). Meaning making theory in particular emphasizes the importance of psychological meaning by attributing GTA to the specific situational and global

meanings that are created in reaction to emotional distress (Park, 2013a). Initial research into the potential role played by personality theory in GTA has identified some traits, such as optimism, openness to experience, and extraversion, that appear to be related to perceptions of GTA in people who have experienced traumas (Shigemoto & Poyrazli, 2013; Tedeschi & Calhoun, 2004). More work is needed to explore the relationship between GTA and personality because research connecting these two fields of inquiry enriches the understanding of both personality theory, specifically personality change, and the processes involved in GTA (Jayawickreme & Blackie, 2014). This quantitative study contributed to both fields by examining the relationship between perceived GTA, ego-resiliency, stress and perceived stress in Canadian university students.

Understanding the relationship between personality traits, stress, and positive outcomes from stress, such as GTA could greatly benefit students (Cole et al., 2015; Jayawickreme & Blackie, 2014). Despite the fact that GTA is considered to result in permanent personality changes, little research is being conducted exploring the connections between theories of GTA and personality theory (Jayawickreme & Blackie, 2014). The relationship between stress, growth and ego-resiliency is particularly important, in that previous studies have demonstrated that ego resiliency may be increased through the use of specific therapies using specific therapies (Jang & Choi, 2012). Ego-resiliency is also a personality trait that has been related to the ability to cope with stress, and with general psychological well-being (Cole et al., 2015; Jayawickreme & Blackie, 2014). Understanding the relationship between the ego resiliency and GTA could potentially open the door to the development of a variety of ego resiliency based interventions of great benefit to students. The study examined these possibilities by applying quantitative measurements to a cross-sectional sample of students attending a Canadian university.

Chapter 3: Research Method

While research looking at GTA as an adaptive process has identified the potential role played by pre-existing personality traits in this growth process, the relationship between personality traits and GTA is not well understood (Jayawickreme & Blackie, 2014). Further research exploring potential links between meaning making theory and personality theory is needed to more fully understand the phenomenon of GTA through a more thorough examination of the relationship between personality traits and GTA. This quantitative study explored the relationship between ego-resiliency, which is a personality trait of particular relevance, and GTA in Canadian undergraduate university students. Specifically, self-report measures were used to answer five questions: (a) Is there a relationship between ego-resiliency, as defined by the ER89, stress, as defined by the RLCQ, perceived stress, as defined by the PSS-10 and GTA, as defined by the SRGS, in Canadian undergraduate psychology university students? (b) Is GTA, as defined by the SRGS, predicted by ego-resiliency, as defined by the ER89, in Canadian undergraduate psychology students? (c) Is GTA, as defined by the SRGS, predicted by stress, as measured by the PSS-10, in Canadian undergraduate psychology university students? and (d) Is GTA, as defined by the SRGS, predicted by stress, as measured by the RLCQ, in Canadian undergraduate psychology university students? and finally (e) Is GTA, as defined by the SRGS better predicted by ego-resiliency, as defined by the ER89, stress, as measured by the RLCQ, or perceived stress, as measured by the PSS-10, in Canadian undergraduate psychology university students?

This chapter will be organized into sections, each dealing with a specific aspect of the design of the study that was conducted. First the overall design and considerations will be discussed. Then the population, sample and inventories that were used will be described. After providing operational definitions of the variables, the specific procedures used for the study and

the collection of data will be described at length. Next, the various assumptions, limitations, and delimitations related to the study will be described. Finally, the ethical considerations and procedures will be discussed.

Research Design(s)

The study examined the relationship between ego-resiliency, stress, perceived stress and perceived GTA using the correlations between these variables as measured by self-report inventories. Second, the ability of ego-resiliency, as measured by the ER89, to predict GTA, as measured by the SRGS, was examined using regression analysis. This technique was also used to examine the ability of perceived stress, as measured by the PSS-10, and stress, as measured by the RLCQ, to predict perception of GTA as measured by the SRGS. Finally, a complete multiple regression analysis of all the variables was used to determine which variables, or combination of variables, best predicted the outcome of perceived GTA. Because the study was exploratory in nature, a cross sectional approach was used to examine the relationships between these variables (Salim et al., 2015).

Evaluating relationships between variables is best accomplished using information from a larger number of subjects in order to improve the validity of the conclusions drawn from the data that is gathered (Lewandowski, Ciarocco, & Strohmetz, 2015). Exploring the relationships between specific variables involves quantitative measurement of those variables. Because both perceptions of GTA and ego-resiliency are internal characteristics that are not easy to directly observe, self-report measures are more suitable for data collection and are an accepted standard in both GTA and personality research (Anders et al., 2014; Back, 2015; Park & George, 2013; Salim et al., 2015). Determining if there is a relationship between ego-resiliency and GTA and then evaluating the ability of stress and ego-resiliency to predict GTA, by definition, required the

use of correlational techniques and regression analysis. Because there is no existing model for the relationship between perceived stress, ego-resiliency and GTA, multiple regression analysis of the data was used to examine these relationships and to develop an overall model to predict GTA from ego-resiliency and perceived stress (Field, 2012). The goodness of fit for the predictive model including all of the predictor variables was further evaluated using an *F* test, additionally the predictive value of each individual variable was analyzed using *t* tests (Field, 2012; Wuensch, 2007).

Other study designs, such as qualitative or longitudinal quantitative designs were also considered. However, qualitative methods were quickly discarded as being unsuited to this research question. Qualitative designs are useful for research that seeks to understand attitudes or specific experiences by examining questions related to how or why a phenomenon is experienced (McCusker & Gunaydin, 2015). The data, most often from a small number of participants, is the personal narrative related to each subjects' viewpoint. This approach most often focuses on a subjective truth by providing a high level of data from a small number of subjects, allowing the exploration of the nuances associated with individual experience (Lewandowski et al., 2015). Quantitative methods on the other hand are more useful for examining objective truths, by providing a neutral examination of numerical data collected from larger samples (McCusker & Gunaydin, 2015). Qualitative methods are therefore not well suited to hypothesis testing, nor are they particularly useful in examining the relationships between variables (Lewandowski et al., 2015). Qualitative methods are more suited to examining relationships between variables, and exploring the shared experiences of larger groups.

Longitudinal methods were also briefly considered. These methods are useful for observing change over time, and are very suited to describing patterns of change and stability,

establishing the temporal order of events and exploring developmental effects (De Vaus, 2013). However, longitudinal designs are also more time and resource intensive, requiring greater numbers of subjects and more resources to successfully be conducted. They are also subject to mortality, practice effects and maturation threats. A longitudinal approach would require a very large sample that could potentially be followed for an extensive period of time. A longitudinal design that followed subjects over time to see if those scoring higher in ego-resiliency also experience more GTA might potentially answer some of the research questions, but was rejected due to the higher resources and time required, and the uncertainty associated with the design's ability to generate the required data. For these reasons the method chosen for this study was a quantitative, cross-sectional design using self-report surveys to gather data from a larger number of subjects. This design provided data appropriate to use in regression analysis examining all five of the research questions.

After receiving approval to run the study from the appropriate ethical bodies, the questionnaires were first entered into the Sona systems website, which was then used to gather and securely store the data ("Sona Systems : Privacy," 2016). The subjects were able to access all of the questionnaires and complete their participation entirely online. Notices were posted on the secure Sona research website associated with MacEwan University in Edmonton, Alberta, Canada. This site is only accessible by undergraduate psychology students at this university through a secure login procedure. Subjects in introductory psychology classes who chose to participate first read the consent form (see Appendix B) and indicated their consent by clicking an icon. They were then shown the study instructions and completed the questionnaires. All subjects were first asked to name the most stressful event that they had experienced in the previous twelve months. Following this, they completed the four questionnaires (the SRGS,

ER89, RLCQ and PSS-10). To minimize the impact of order effects each subject was presented with the questionnaires in a random order. Subjects were finally shown the debriefing form (see Appendix D) and thanked for their participation.

The debriefing information included contact information for the researchers and the ethics boards (The Northcentral University IRB and the MacEwan University REB). Subjects were clearly told that they may contact the researchers with any questions, and the researchers or the ethics boards if they had any concerns about the study. Subjects were also provided with contact information for local free counseling services in the event that they experienced any untoward effects from responding to the questionnaires.

Once the required number of participant responses was collected, participant access to the study via the Sona website was terminated. The data files were then downloaded to a password protected desktop computer that was stored within a locked office in a locked hallway within the psychology department of MacEwan University. The data files were analyzed using the multiple regression analysis functions of SPSS. Further details are provided in the study procedures section below.

Population/Sample

The population of interest was university students attending MacEwan University in Edmonton, Alberta, Canada. The student population of MacEwan University consists of 19,606 full and part-time students, with the majority ranging in age from 18 to 30 years old (MacEwan University, 2016). The majority of students are female (64.6%) rather than male (35.4%). The subjects should have similar characteristics, but as introductory psychology students will be used, it is anticipated that most of the subjects will be within the first years of their academic career. This means that the sample will likely have fewer academic credits and be younger in

age than the overall population. Because it is unethical to create stress in the lives of volunteers, a sample population that was already living in a set of circumstances that results in higher stress was used. University and college students are just such a population, because students are experiencing higher levels of stress and exposure to potentially traumatic events than the normal population (Anders et al., 2014; Stoliker & Lafreniere, 2015).

A convenience sample of 192 MacEwan University students attending introductory psychology courses was used as subjects because they are a readily available sample of individuals who are experiencing significant levels of personal stress as they adjust to a novel environment (Pennebaker, Colder, & Sharp, 1990). The demands of attending and financing classes, forming new social relationships while maintaining old ones, and balancing academic personal and job related needs often result in day to day stressful events occurring in their lives. Because the goal of this study involved exploring the relationship between the variables of GTA, stress, perceived stress and ego-resiliency, generalizing to other populations was not a significant consideration and therefore a convenience sample was an appropriate choice for the study (Lewandowski et al., 2015).

The final subjects were drawn from the population of undergraduate students attending introductory psychology classes at MacEwan University, a midsized undergraduate institution in Edmonton, Alberta, Canada. The inclusion criteria were that the subject was currently attending an introductory psychology student at the aforementioned university. The exclusion criteria were any subjects who were not attending an introductory psychology class at the aforementioned insitution. Based on power calculations for multiple regression analysis with four variables using $\alpha = .05$, $1 - \beta = .80$ and a small estimated effect size ($r^2 = .07$) this study planned to use a minimum sample of 159 students (Soper, 2016). Students attending

introductory psychology classes were offered a 2% bonus grade in exchange for their participation. It should be noted that MacEwan university consistently has 6% of the introductory psychology class grade based on research assignments (Streimer, 2017). Students have the choice of participating in three research studies, completing three alternate assignments that require a similar amount of time and effort, or any combination of the two. Each assignment completed earns the student 2% towards their final grade in the course. In the case that a student consents to participate, and then changes their mind, they still earn the 2% participation credit. Students were recruited using a confidential website and were allowed to participate in the study if they were 18 years of age or older and clicked the icon indicating their consent to participate after reading the study description in the consent form (see Appendix B).

Materials/Instrumentation

The variables of interest were measured using self-report inventories that have appropriately established their validity through previous research studies. Each of the inventories that was used has a history of use in prior research and already has an established relationship to the variables each purports to measure. See Appendix A for copies of each of the inventories. Appropriate permission was obtained for the use of all the self-report inventories, except in cases where the inventory has been made freely available for use in academic research. The written permissions or concrete evidence that the inventory was made freely available for use in academic research for each of the self-report inventories that was used in this study are found in Appendix C.

Ego-Resiliency Scale. The ER89 has been normed for use with young adults, specifically between the ages of 18 and 23 (Windle, Bennett, & Noyes, 2011). The scale has been found to have acceptable test retest reliability (r = .84) and adequate internal consistency,

with α ranging from .68 to .77 (Caldwell & Shaver, 2012; Farkas & Orosz, 2015). The ER89 has a good theoretical basis, was empirically derived and has been used in research extensively (Windle et al., 2011). The ER89 consists of 14 descriptive statements answered on a four point scale ranging from 1- does not apply at all, to 4- applies very strongly (Block & Kremen, 1996). The statements include items such as "I get over my anger at someone reasonably quickly," (p.352) or "I usually succeed in making a favorable impression on people" (p.352). Data from this scale was used for regression analysis to answer research questions one, two, and five.

Perceived Stress Scale. The PSS-10 has been normed for use with adults, and age based norms are available for individuals ranging from 18 to 65 and older (Cohen, 1994). This self-report inventory consists of 10 questions asking about thoughts and emotional reactions occurring during the previous month. It includes such items as "In the last month, how often have you been upset because of something that happened unexpectedly?" or "In the last month, how often have you felt things were going your way?" (Cohen, 1994, p.2). Each item is answered on a five-point scale ranging from 0 - Never to 4 – Very Often. The scale has adequate reliability for use in research with adults, with $\alpha = .78$ for the total scale and $\alpha = .83$ - .85 and .71 - .82 for the stress and counter stress subscales respectively (Barbosa-Leiker et al., 2013). The PSS-10 is frequently used in research and recent examinations of the properties of this scale have concluded that the PSS-10 allows for valid inferences to be made (Taylor, 2015). Data from this scale was used for regression analysis to answer questions one, three, and five.

Recent Life Changes Questionnaire. The RLCQ is an updated version of the Social Readjustment Rating Scale (SRRS) created by Miller and Rahe (1997). The original SRRS was empirically developed and the validity of the RLCQ results were confirmed using different convenience samples of volunteer subjects (Holmes & Rahe, 1967; Miller & Rahe, 1997). Both

scales have been used extensively in research, and while the life change unit values have been rescaled a number of times, the rankings have been very consistent over time and between groups of subjects separated based on demographic characteristics, such as age or gender (α = .84 to .96), supporting the use of a single set of values for a wide variety of subjects (Miller & Rahe, 1997). The scale consists of 74 items asking if specific events have or have not occurred during the previous 12-month period. Events such as "Death of Spouse" or "Marriage" are simply rated as having occurred or not having occurred. Data from this scale was used for regression analysis to answer research questions one, four, and five.

Stress-Related Growth Scale. The SRGS was empirically developed and the validity of the scale's results confirmed using college students (Park et al., 1996). The scale has been found to possess good internal consistency (α = .94) and acceptable test retest reliability (r = .81). This scale has been used extensively in research and continues to be used today (Bjorck & Byron, 2014). The SRGS consists of 50 statements that are rated in reference to the past year's most stressful event using a 3 point scale: 0 – not at all, 1 – somewhat, or 2 – a great deal (Park et al., 1996). The items are statements describing possible changes, such as "I learned not to let hassles bother me the way they used to,' or "I learned better ways to express my feelings." (Park et al., 1996, p. 76-77). Data from this scale was used for regression analysis to answer all five of the research questions.

Operational Definition of Variables

Outcome variable: Perceived GTA. The level of perceived GTA was determined by the subjects' scores on a standardized self-report measure, the SRGS. The SRGS was initially created through the use of factor analysis and then subsequently refined through two validity studies using undergraduate psychology students (Park et al., 1996). It consists of 50 self-report

items with good internal consistency ($\alpha = .94$) and acceptable test retest reliability ($r = .81$). Subjects respond on a three-point scale of 0 = not at all; 1 = somewhat; 2 = a great deal. The SRGS generates an overall growth score calculated by adding all of the responses, which yields an interval level score that ranges from 0 to 100.

Predictor variable 1: Perceived stress. The subjects perceived stress levels was defined as their score on the PSS-10. The PSS-10 measures an individual's cognitively mediated emotional response to an external event using 10 items rated on a 5-point scale (Taylor, 2015; White et al., 2014). Responses range from 1 (never) to 5 (very often) and individual items are scored and reverse scored into an interval level total score ranging between 10 and 50. Two subscales, stress and counter stress, may also be individually calculated, yielding interval level scores. Higher scores indicate greater stress, counter stress, or overall stress.

Predictor variable 2: Stress. The level of stress experienced by the subjects was defined as their score on the RLCQ. The RLCQ measures the number of objectively stressful events that have occurred over the previous 12 months (Miller & Rahe, 1997). Responses are simply "yes or no" in relation to the occurrence of each of 43 events. A total score is calculated using weighted values representing how stressful each event is on average. Higher scores indicate greater stress, with high levels of stress being defined as a six month and one year score of 300 and 500 or greater respectively.

Predictor variable 3: Ego-resiliency. Subjects' level of ego-resiliency was determined by the subjects' scores on the ER89. The ER89 consists of 14 items rated on a 4 point Likert type scale describing the extent to which each item applies to the individual who is responding (Farkas & Orosz, 2015). The items are added together and the resulting interval level score ranges from 14 (low resiliency) to 56 (very high resiliency). Three interval level subscale scores,

active engagement with the world (AEW), repertoire of problem solving strategies (RPSS) and integrated performance under stress (IPS) may also be calculated (Farkas & Orosz, 2015). Higher scores indicate more of the construct (ego-resiliency) being present.

Study Procedures

Prior to any data gathering or interaction with research subjects, approval to conduct the study was obtained from both the Northcentral University Institutional Review Board and the MacEwan University Research Ethics Board (the Canadian IRB equivalent). This involved making joint applications to both of these boards, and no work on the proposed study was undertaken until full acceptance by both boards was obtained. The present study was completed by participants online using a research website created and maintained by Qualtrics Labs, Inc., a survey software company that is hosted out of Provo, Utah ("Qualtrics," 2016). After the self-report inventories were entered into the website, they were briefly tested by the researcher to ensure that the questionnaires were being presented in the proper (random) order. A link to this specific study was then made available on the MacEwan student research participation website. Study participants were recruited using pre-existing procedures for the Introductory Psychology research pool at MacEwan University. These procedures have been approved by the research ethics board (REB) at the university, and have been used for many years. All Introductory Psychology students are given Research Participation information with their course syllabi at the beginning of their courses, and may complete up to 3 studies to obtain the participation mark allotment.

The students were informed about the option to either participate in research or complete an alternate assignment as part of the first class of introductory psychology that they attended. Those who chose to participate in research were directed to create a log in for the Sona research

website associated with MacEwan University's Department of Psychology. After creating their accounts, students were able to choose studies from a list, based on brief titles, and initially without knowing details about the studies they were choosing. The title for this study was one of those posted on the MacEwan University Sona research site for selection by the students. All studies posted to the MacEwan University Sona research site had obtained prior REB approval to proceed.

Before beginning this specific study the potential participants were given the Informed Consent Form (see Appendix B) which described the study's goal, basic procedures and outlined any potential risks and benefits due to their participation. It also clearly stated that subjects could withdraw from the study at any time and without penalty, for any reason whatsoever. Subjects also completed a credit form, asking their name and course number, which was required for them to receive the grade credit for participating. This information was not related to the data collected for the research study in any way, and was electronically stored in a separate database so that there was no possibility of connecting these two data sources at any time. The researcher had no means of accessing this information, as it was not connected to the study being conducted. As part of this online consent procedure, all participants were provided with a warning on the consent form that this study would involve answering questions that may be considered personal and therefore could potentially cause them distress. Students who did not feel comfortable with this were given the opportunity to decline to consent, and received their participation credit as well as the option of choosing to participate in other studies being conducted by the Department of Psychology. Students who did not wish to participate in any study were advised of the option to complete alternative assignments, which required a similar amount of time and effort, also available to them for the same course credit. Participants

received 1 credit point (value 2%) towards their course grade for their participation in this study. This was the value assigned for studies requiring up to 90 minutes to complete (Streimer, 2017).

After completing each online page of the study, participants had the option to click one of two icons. They could either click an icon indicating their consent to continue participating, or a separate icon to indicate their decision to withdraw from the study. Subjects choosing to withdraw before completing the questionnaires were immediately taken to the debriefing page, where they were provided with the debriefing information, including a review of the study description, goals and potential risks and benefits. Contact information for free student counseling services, available to all MacEwan University students, was also provided in case the choice to withdraw was the result of feelings of discomfort due to their participation. Each subject was also advised that they would still receive full credits for their participation, as it is a basic ethical requirement that subjects be free to withdraw consent without penalty (Lewandowski et al., 2015).

The study began with the online consent procedure. Following this online consent procedure, students were asked to complete four self-report scales which were administered online: the RLCQ, PSS-10, the ER-89 and the SRGS. The presentation of these questionnaires was in a randomized order that varied for each participant. This was done to control for order and sequence effects. Before the SRGS, which required subjects to reply in relation to the past year's most stressful event, subjects were asked the question "What is the most stressful event which you have experienced during the past year?" In the event that a subject left this question blank, their responses were removed from the data pool because they may have inappropriately responded to the SRGS items. After completing the self-report measures, or upon deciding to terminate their participation, subjects read a debriefing statement which thanked them for their

participation and contained contact information for free counseling services, as well as for the primary investigator, their supervisor, the NCU IRB and the MacEwan REB for contact if the subjects had any questions, concerns, or ethical issues with the study (Appendix D).

Data Collection and Analysis

First, the data was gathered using a secured website, hosted through Sona systems, through which subjects accessed all three of the quantitative self-report inventories. This website specializes in secure hosting for research purposes and fully complies with American and Canadian statutes related to privacy of information ("Sona Systems : Privacy," 2016). The company's privacy policies and practices have been independently audited, and they have been awarded eTrust's Privacy Trust Seal. The four quantitative measures that were used were the SRGS, which is a brief measure of growth from stressful events (Park et al., 1996), the RLCQ, which measures the number of objectively stressful events that have occurred over the previous 12 months (Miller & Rahe, 1997), the PSS-10, which has been used extensively to measure subjects' appraisals of life events as stressful (White et al., 2014), and the ER89 which measures subjects' self-reported levels of the ego-resiliency personality trait (Farkas & Orosz, 2015).

Administration of these four questionnaires was automated using an established secure website that is used for ongoing research at the university. Students logged into the website on their own computer and responded to all the questions during a single session. Questions consisted of the four self-report measures. The process of responding to the inventories also resulted in data entry. Once useable data (completed in full) was obtained from the required number of participants, the data files were then downloaded by the researcher for analysis. The files were stored on a password protected desktop computer stored in a locked office within a locked hallway of the psychology department. No identifying information was collected, so

there was no possiblity that individual students' responses could be associated with any of the subjects. Only the primary researcher had access to the data files. Data analysis was conducted using the Statistical Package for the Social Sciences, version 24 (SPSS). Scoring of each of the inventories was done through SPSS, followed by the use of regression analysis techniques, which included correlational analyses of all of the variables measured (Field, 2013).

The analysis specified the SRGS scores as the outcome variable and the RLCQ, PSS-10 and ER89 as the predictor variables. The students' scores were evaluated to answer Q_1 using the multiple regression function of SPSS which also produced the correlational values that were used to examine the relationships between the four variables of interest, perceived GTA, ego-resiliency, stress and perceived stress. Examination of the correlational matrix allowed the strength and direction of the relationships between these variables to be evaluated.

The second, third and fourth research questions were answered by comparing the data using the SPSS linear regression analysis function in order to evaluate the relative utility of the ER89 scores and PSS-10 scores for predicting the SRGS scores (Field, 2012). This involved assessing the fit of the data to a regression equation consisting of SRGS = (b0 + RLCQ + PSS-10 + ER89) + error. The evaluation of the overall fit for our data to this linear regression equation was accomplished using an *F* test. The significance of the correlations between the individual predictors (the RLCQ, ER89 and PSS-10 scores) and the SRGS scores was assessed using *t* tests. The final research question was answered using multiple regression analysis to assess the significance of the relative contributions made by the RLCQ, ER89 and PSS-10 scores in predicting the SRGS scores (Field, 2013). Additionally, the reliability of the self-report data was assessed using Cronbach's Alpha score, which was calculated for each set of inventory responses that was collected.

Assumptions

The proposed study assumed that the population of university students attending MacEwan University were experiencing the relatively high levels of stress necessary to conduct this examination of GTA. That university students, as a general group, experience higher levels of stressors, experience new life changes, and report feeling higher levels of distress than the general population has been supported in previous research findings (Anders et al., 2014; Pennebaker et al., 1990; Stoliker & Lafreniere, 2015). The number of stressors and level of perceived stress in the subjects was also measured using the RLCQ and the PSS-10 respectively and will be discussed later.

The use of the SRGS required that subjects respond to the items with a specific event in mind (Park et al., 1996). The use of the SRGS required that this assumption be made. To mitigate the risk that subjects did not have a specific event in mind the question "What is the most stressful event you have experienced during the past year?" was included just before the subjects respond to the SRGS and subjects were instructed to complete the SRGS with that event in mind. No subjects left this question blank which would have required the removal of their data from consideration in this study.

The use of self-report inventories assumed that the subjects would respond truthfully and accurately to the questions being posed. Previous studies of self-reported measures of GTA have supported the accuracy of the subjects' responses by using outside sources of data to corroborate the subjects' responses (Shakespeare-Finch & Enders, 2008; Shakespeare-Finch et al., 2013). Furthermore, much of the research evaluating the reliability and validity of the inventories that were used for this study included university students as subjects and reported sufficiently high reliability and validity values that the efficacy of the inventories for measuring the constructs

related to each may be confidently accepted (Block, 1993; Caldwell & Shaver, 2012; Farkas & Orosz, 2015; Miller & Rahe, 1997; Park et al., 1996; Taylor, 2015).

The use of multiple linear regression to analyze the data required several assumptions inherent to this technique These included: that the relationship between these variables is linear and several of the variables will predict the SRGS scores; the sampling distribution of *b* scores is normally distributed; and homoscedasticity, meaning that each level of every predictor variable will have similar variance scores (Field, 2013). If these assumptions have been violated, then the statistical model derived from this data is not generalizable to other groups. As part of the statistical analysis using SPSS, the data and scatterplots were examined to determine if the relationships between the variables (if any) are linear or curvilinear.

Limitations

The generalizability of the conclusions drawn from this study may be somewhat limited by the use of a convenience sample of Canadian university students, drawn from a single campus (Lewandowski et al., 2015). The study sought to test the relationship between variables, and was primarily concerned with establishing that a relationship exists and describing the nature of that relationship. It was not overly concerned with generalizability to another population, and therefore this was an acceptable limitation. The discussion of the results has reflected the poorer ability to generalize the results beyond the population from which the sample was drawn.

The validity of the conclusions made based on the proposed study might be limited if the college aged subjects lack the life experience to reliably and adequately respond to the test items. While this is potentially a consideration, all but one of the self-report inventories being used in the proposed study relied heavily on the use of university aged subjects as part of the process of validating the tests for use in research (Cohen et al., 1983; Miller & Rahe, 1997; Park et al.,

1996). The single exception, the ER89 scale, was not developed and validated solely using students, but did use the same subjects tested at the ages of 18 and 23 years of age (Block & Kremen, 1996). Given that the inventories have all been validated for use with individuals in this age range, any limitation arising from the use of similarly aged subjects in the proposed study is expected to be minimal.

The validity of the conclusions drawn from this study may also be limited because of the use of cross sectional self-report methods, social threats related to the subject's responses, and the validity of the self-report inventories being used. The use of self-report measures in GTA research to examine constructs, such as ego-resiliency, GTA and perceived stress, all of which are not directly observable, is a well-established and acceptable practice in the social sciences (Kimberlin & Winterstein, 2008). This has also specifically been found to be the case in both personality and GTA research (Anders et al., 2014; Back, 2015; Park & George, 2013; Salim et al., 2015). While the use of cross sectional self-report methods is a common and accepted practice, this has still limited the ability to draw any kind of causal conclusion from the data examined in the proposed study (Field, 2013). This is a limitation that is true of correlational studies in general. Social threats, such as positive impression management and hypothesis guessing, may have also impact the validity of the conclusions drawn from the proposed study (Lewandowski et al., 2015). Previous research has found sufficiently high reliability and validity coefficients that biased responding does not appear to be a significant consideration in the results of the inventories that have been used in this study (Block, 1993; Caldwell & Shaver, 2012; Farkas & Orosz, 2015; Miller & Rahe, 1997; Park et al., 1996; Taylor, 2015). Additionally, a reliability statistic, the Cronbach's Alpha score, was calculated for each set of inventory responses gathered from the subjects as part of the proposed study (Field, 2013). These values

were used to evaluate the reliability of the data from which the conclusions of this study were drawn.

Delimitations

The specific choice was made to limit the subjects used in this study to university students. This decision was based on the requirement that subjects be experiencing higher than usual levels of stress, a facet of university life which has been validated by previous research (Anders et al., 2014; Pennebaker et al., 1990; Stoliker & Lafreniere, 2015). This choice was made largely due to ethical considerations which obviously would prohibit creating significant levels of stress in the lives of the subjects to be used (Lewandowski et al., 2015). For reasons of practicality, the convenience sample of subjects drawn for this study was also limited to introductory psychology students. This facilitated the process of recruiting a relatively large sample to gather data from. The use of a convenience sample was appropriate because the goal of the study was to examine the relationships between the variables, and therefore generalizing to other populations was not a primary consideration (Lewandowski et al., 2015).

Ethical Assurances

Prior to any collection of data or interaction with research subjects, approval to conduct the study was obtained from both the Northcentral University Institutional Review Board and the MacEwan University Research Ethics Board (the Canadian IRB equivalent) (Northcentral University, 2015). After approvals were obtained from both of these boards, then the study proceeded, fully adhering to all of the ethical rules for psychological research laid out by both the American Psychological Association and the Canadian Tri-council Policy Statement (Canadian Institutes of Health Research et al., 2014; "Ethical principles of psychologists and

code of conduct," 2017). The primary researcher was responsible for ensuring this adherence at all stages of the study.

Once subjects indicated interest in participating in the research project, but before they provided any responses, each subject was shown an electronic copy of the consent to participate form (see Appendix B). This form was displayed via the Sona website, and clearly described what the subject was being asked to do, listed the potential risks and benefits to the subject and emphasized that their participation was completed voluntary and at their discretion they could stop participating at any point in the study with no negative repercussions whatsoever; this is a basic requirement for conducting ethical research (Canadian Institutes of Health Research et al., 2014; "Ethical principles of psychologists and code of conduct," 2017). After reading the form, subjects indicated their consent to participate by clicking an icon clearly labelled "I agree to participate in this study. I understand that my participation is voluntary and that I am free to skip questionnaire items I do not wish to answer. I also understand that I am free to stop participating altogether." Subjects choosing to click on this icon then began providing their responses for the study. Another icon, clearly labelled "I do not agree to participate in this study. I understand that my choice not to participate will be confidential and that there is no penalty for choosing not to participate" resulted in the subjects being shown a copy of the debriefing form (see appendix D), and being thanked for their time. Each inventory filled out by those subjects who consented to participate also had two clearly labelled icons at the end of each inventory, each of which was on a single web page. These were clearly labelled to facilitate the process of each subject indicating their decision to either continue to the next questionnaire, or halt their participation. Subjects who chose to stop participating at any point were directed to the debriefing page.

Protection of the privacy of subjects is also of paramount concern for ethical research practices (Canadian Institutes of Health Research et al., 2014; "Ethics," 2015). The confidentiality of the subject responses was maintained automatically, as no identifying information was collected or stored in association with the study data from any of the participants. The data stored for the study was simply the responses to the inventories, with no indication beyond a randomly assigned subject number as to whose responses they are. No identifying data, such as names or IP addresses, was collected as part of this study. During the data gathering phase, all files were stored on a secured website, hosted through Sona systems, which is a secure hosting company that fully complies with American and Canadian statutes related to privacy of information ("Sona Systems : Privacy," 2016). Once the data was ready for analysis, it was downloaded onto a private computer, which was both password protected and stored in a locked office within the psychology department of MacEwan University in Edmonton, Alberta, Canada. Physical access to the office was limited to the researcher, and a select few university employees, such as the Chair of the Psychology Department. Access to the computer required a password known only to the researcher who conducted the study.

Summary

The connection between personality theory and GTA was explored in a study examining the relationship between GTA and ego-resiliency so as to increase the understanding of personality traits and the processes involved in GTA (Jayawickreme & Blackie, 2014). While GTA is theorized to result in personality change, the interaction of personality theory and GTA is not well understood. This study explored the relationship between ego-resiliency and reported GTA to expand the knowledge of how GTA and personality theory may be related. This is important because GTA is described as resulting in changed personality, and the process of GTA

is theorized to be influenced by pre-existing personality traits. The research into GTA should therefore be informed by personality theory.

Specifically, this quantitative study explored the relationship between ego-resiliency, and GTA in Canadian undergraduate university students. Self-report measures were administered in an online environment to a cross section of students. The data generated by these reponses was used to answer five questions: (a) Is there a relationship between ego-resiliency, as defined by the ER89, stress, as defined by the RLCQ, perceived stress, as defined by the PSS-10 and GTA, as defined by the SRGS, in Canadian undergraduate psychology university students? (b) Is GTA, as defined by the SRGS, predicted by ego-resiliency, as defined by the ER89, in Canadian undergraduate psychology students? (c) Is GTA, as defined by the SRGS, predicted by stress, as measured by the PSS-10, in Canadian undergraduate psychology university students? and (d) Is GTA, as defined by the SRGS, predicted by stress, as measured by the RLCQ, in Canadian undergraduate psychology university students? and finally (e) Is GTA, as defined by the SRGS better predicted by ego-resiliency, as defined by the ER89, stress, as measured by the RLCQ, or perceived stress, as measured by the PSS-10, in Canadian undergraduate psychology university students? These questions have been answered by evaluating the data gathered using the regression analysis functions in SPSS to examine the relationships between the four variables of interest (Field, 2013).

Examining the potential relationship between GTA and ego-resiliency benefits growth theory by increase the understanding of any interactions between personality theory and GTA and also improves the understanding of the processes involved in GTA (Jayawickreme & Blackie, 2014). If ego-resiliency increases GTA, this finding has the potential to be applied as a protective factor against stress, because increased ego-resiliency may be teachable (Jang & Choi,

2012). In the future this knowledge may then be applied to the benefit of students by creating programs to increase ego-resiliency in this population. The lack of research examining the connection between personality theory and GTA is both surprising and problematic (Jayawickreme & Blackie, 2014). This quantitative study addressed this problem by examining the relationships between ego-resiliency, stress, perceived stress, and GTA in Canadian undergraduate college students.

Chapter 4: Findings

The purpose of this quantitative study was to examine the relationships between ego-resiliency, stress, perceived stress, and perceived GTA in Canadian undergraduate college students. This chapter will summarize the results of the study, starting with descriptive statistics of the questionnaire results and an examination of the validity and reliability of the data collected. This will be followed by a summary of the statistical examination of the assumptions required or the regression techniques that were applied to the data. Finally, the results of the regression analyses of the data that was used to answer each of the five research questions will be summarized. The following specific research questions and hypotheses were addressed by this study:

Q1. Is there a significant relationship between ego-resiliency, stress, perceived stress, and GTA?

$H1_0$. There will be no significant relationship between the ER89, PSS-10, and / or RLCQ scores, and the scores on the SRGS in Canadian undergraduate psychology university students.

$H1_a$ There will be a statistically significant relationship between the ER89, PSS-10, and / or RLCQ scores and the scores on the SRGS in Canadian undergraduate psychology university students.

Q2. Is GTA significantly predicted by ego-resiliency?

$H2_0$. The SRGS scores will not be significantly predicted by the ER89 scores in Canadian undergraduate psychology university students.

$H2_a$ The SRGS scores will be significantly predicted by the ER89 scores in Canadian undergraduate psychology university students.

Q3. Is GTA significantly predicted by perceived stress?

$H3_0$. The SRGS scores will not be significantly predicted by the PSS-10 scores in Canadian undergraduate psychology university students.

$H3_a$ The SRGS scores will be significantly predicted by the PSS-10 scores in Canadian undergraduate psychology university students.

Q4. Is GTA significantly predicted by stress?

$H4_0$. The SRGS scores will not be significantly predicted by the RLCQ scores in Canadian undergraduate psychology university students.

$H4_a$ The SRGS scores will be significantly predicted by the RLCQ scores in Canadian undergraduate psychology university students.

Q5. Is GTA better predicted by ego-resiliency, perceived stress, or stress?

$H5_0$. There will be no significant differences between the ER89 scores,' RLCQ scores,' and the PSS-10 scores' contributions to the SRGS scores in Canadian undergraduate psychology university students.

$H5_a$ There will be a significant difference between the ER89 scores,' RLCQ scores,' and the PSS-10 scores' contributions to the SRGS scores in Canadian undergraduate psychology university students.

Validity and Reliability of the Data

A total of 201 subjects responded to the request for participation and answered the questionnaires used for data collection. Upon examination of the subject responses, eight of the subjects failed to respond to one or more of the questionnaires (e.g., the entire series of questions was left blank) and for that reason these questionnaires were removed from consideration. A single outlier was identified, with a RLCQ score more than 1 000 points higher than the next

highest score. This subjects responses were removed from consideration, due to the effect that such an outlier would have on the regression analysis (Field, 2013). This left a total of 192 complete sets of questionnaires with no missing data which were used for the data analysis for the study.

Primary variables. The means, standard deviations, medians, minimum and maximum values, and Cronbach's α values for each of the variables are presented in Table 1.

Table 1

Descriptive Statistics of Primary Variables

Variable	N	Mean	SD	Median	Minimum	Maximum	α
Stress	192	549.04	257.38	541.5	29	1369	.80
Perceived Stress	192	21.12	6.47	21	6	37	.84
Ego-resiliency	192	42.17	5.36	42	30	56	.73
Growth Through Adversity	192	59.54	20.52	60.5	7	100	.96

These values were calculated from the questionnaires used to measure each of the variables of interest. Stress was measured by the Real Life Changes Questionnaire (RLCQ), perceived stress by the Perceived Stress Scale-10 (PSS-10), ego-resiliency by the Ego-Resiliency-89 (ER-89) and growth through adersity by the Stress Related Growth Scale (SRGS). All four of these scales had high internal consistency, with Cronbach's $\alpha > .70$, which is a commonly accepted cut off value for the reliability of a scale (Field, 2013). These values are very similar to those produced in previous studies. The RLCQ had $\alpha = .80$ in the present study, compared to $\alpha = .84$ to .96 in previous studies (Miller & Rahe, 1997). The PSS 10 has produced $\alpha = .78$ for the total scale (Barbosa-Leiker et al., 2013), which is similar to the value of .84 found in this data. The ER89 produced $\alpha = .73$ and prior research reported values ranging from .68 to .77 (Caldwell & Shaver, 2012; Farkas & Orosz, 2015). Finally, the SRGS, which has previously

shown highly consistent results, with α values as high as .94 (Park et al., 1996), performed equally well in this study with a value of $\alpha = .96$. The Cronbach's α values support the conclusion that the data gathered was reliable, as they indicate that the responses consistently indicate a single construct, which is what each test is designed to do (Tavakol & Dennick, 2011).

Data assumptions for regression analysis. A variety of statistical tests were used to determine whether the data collected for this study appeared to have met the required assumptions to allow further inferential analysis using regression techniques. The assumptions required for regression analysis are that the relationships being modeled are linear, the regression residuals (errors between the predicted and the actual values of the outcome variable) are normally distributed, there is no multicollinearity, the residuals are independent, homoscedasticity of error terms (meaning that the variance of the residuals is constant), and using interval or ratio scale data (Field, 2013). As previously stated, the self-report scales that were used in this study did produce interval level data for the purposes of statistical analysis. Next, the remaining assumptions will each be examined independently.

Linear relationships. The scatter plots for each of the predictor variables with the outcome variable can show whether or not there is a linear relationship (Field, 2013). An examination of the scatter plots (Figure 1) revealed no indication of non-linear relationships for any of the variables. Closer examination of the scatter plot for stress, as measured by the RLCQ, and growth, as measured by the SRGS, clearly revealed the presence of an outlier (see Figure 1). This was a single subject with an RLCQ score far higher than any other subject, exceeding the second highest score by more than one thousand points. Because of the biasing effect of extreme scores on the results of regression analysis, all of the responses from this one subject were removed from the data analysis (Field, 2013).

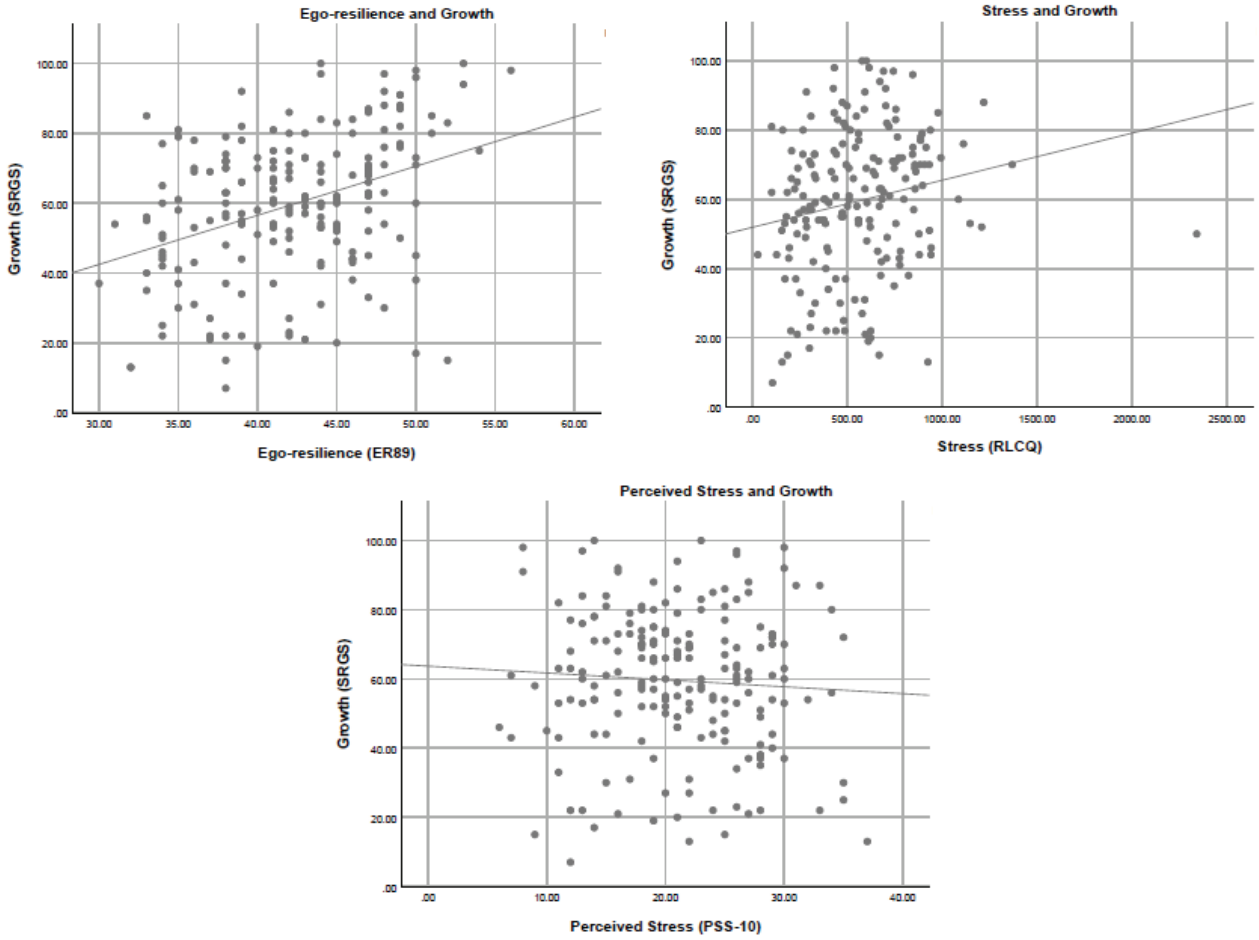

Figure 1. Scatter plots of the relationship between each of the predictor variables and the scores on the SRGS with regression lines.

Normally distributed variables and residuals. The assumption of normally distributed variables may be checked by examining the histograms and the Q-Q plots for each variable, as well as examining the z-scores for kurtosis and skewness of the data (Field, 2013).

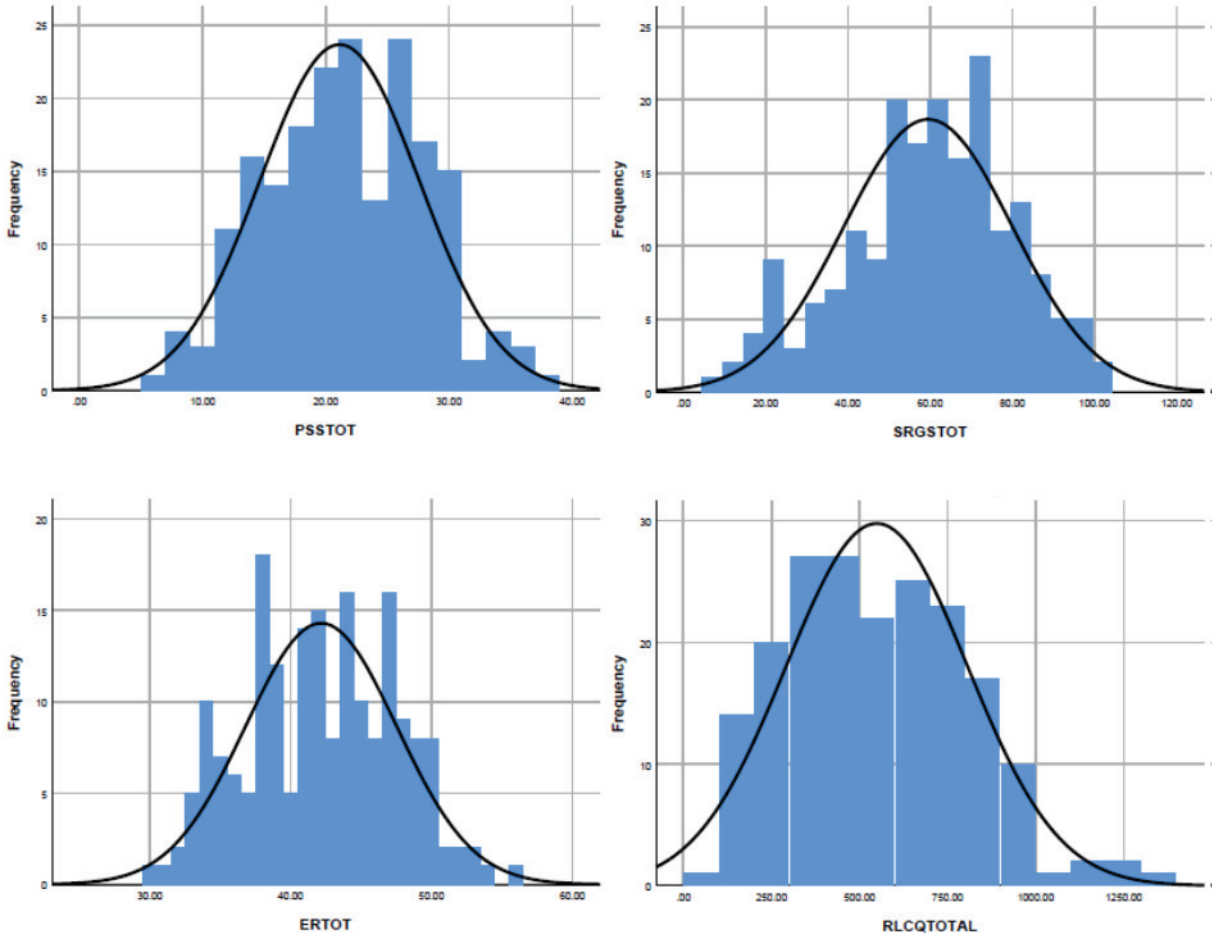

Figure 2. Histograms for each variable measured with normal curve indicated

While the histograms for the total scores of the PSS-10 (PSSTOT) and the SRGS (SRGSTOT) both appeared to be normally distributed, the scatterplots for both the ER89 (ERTOT) and particularly the RLCQ (RLCQTOT) appeared to show distributions that were somewhat skewed towards higher scores on those instruments. This assumption may be further evaluated using the z-scores for kurtosis and skewness of the data (Field, 2013). Z-scores were calculated for each variable by dividing the calculated scores for skewness and kurtosis by their respective standard error values. Due to the larger sample size, the conservative significance value of $p<.01$ was used, resulting in an absolute cutoff score of $z > |2.58|$ for both skewness and

kurtosis. None of the variables yielded a score exceeding this cut off (see table 2), so there does not appear to be significant skew or kurtosis in any of the test score distributions.

Table 2

Z Scores for Kurtosis and Skewness

Variable	RLCQ	PSS-10	ER89	SRGS
z Skew	2.103	-.097	-.023	-2.04
z Kurtosis	-.756	-1.479	-1.963	-.871

$p<.01 = |2.58|$

Finally, the Q-Q plots were examined for each variable. These plots compare the actual and expected (assuming a normal distribution) values for each variable (Field, 2013).

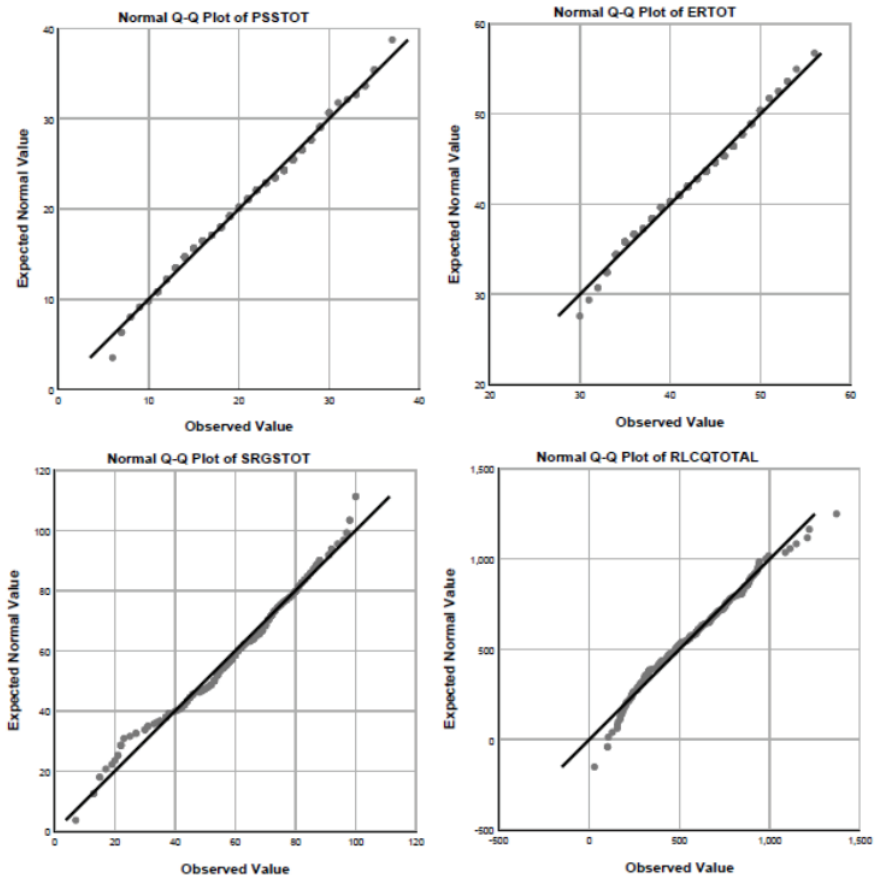

Figure 3. Q-Q Plots for each variable

The lines in Figure 3 represent the expected values, given a normal distribution, and the plotted points are the actual values from each test. None of the values appeared to deviate substantially from the expected values. There did appear to be some extreme scores in both the SRGS and RLCQ results, as both of these plots showed a small number of some scores that deviated from the line (Field, 2013). While the distributions are not all perfectly normal, over all, the data appears to meet the assumption of normal distributed data well enough for the use of regression analysis.

The assumption of normally distributed residuals was examined through the use of a histogram and P-P plot of the residuals, as well as through the use of the Kolmogorov-Smirnov goodness of fit test, calculated for the standardized residuals (Field, 2013). While the distribution of the residuals histogram (Figure 4) appears to be quite normal, the P-P plot (Figure 5) runs parallel to the line of expected values, but rarely touches it, which may be a concern.

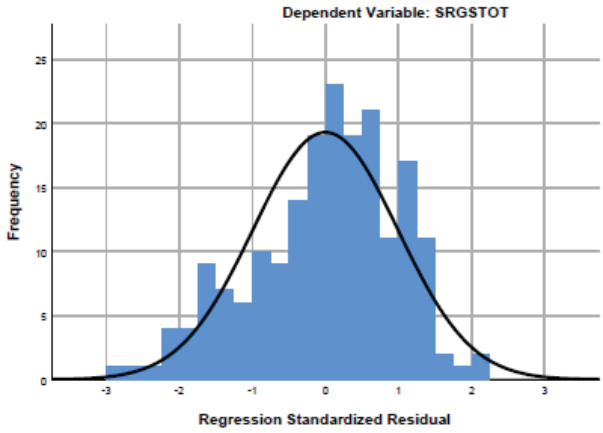

Figure 4. Histogram of standardized residual values

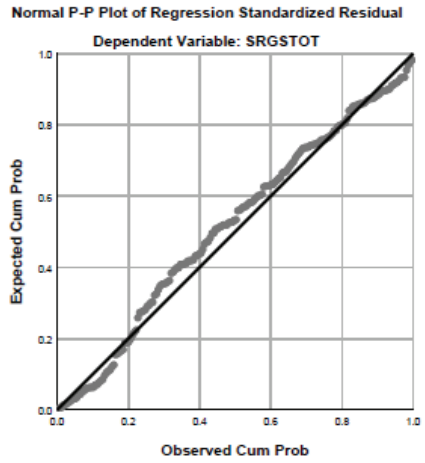

Figure 5. P-P Plot of Standardized Residual Values

Because of the large sample size the Kolmogorov-Smirnov goodness of fit test was interpreted using a conservative significance value of $p < .01$ (Field, 2013). This resulted in non-significant results, $D(192) = .07$, $p = .023$. Overall, it appeared that the data met the assumption of normally distributed residuals well enough to proceed with the use of regression analysis.

No multicollinearity. This assumption was examined using the correlations calculated between all of the variables, as well as by calculating two collinearity statistics, VIF and tolerance (Field, 2013). The values on Table 3 revealed that none of the correlations between any of the variables exceeds a value of .8, so none of the variables is too highly correlated.

Table 3

Correlations for all Variables

Variable	RLCQ	PSS-10	ER89	SRGS
RLCQ	1.000			
PSS-10	.211**	1.000		
ER89	.151*	-.237***	1.000	
SRGS	.231***	-.063	.368***	1.000

* $p < .05$, ** $p < .01$, *** $p < .001$

Conservative guidelines for interpreting VIF and tolerance scores were applied to each of the predictor variables. The standards used were VIF scores greater than 10 and tolerance scores

below 0.2 indicated that multicollinearity may be a concern (Field, 2013). The VIF scores and Tolerance values for each variable were PSS-10 (1.134 and .882), ER89 (1.109 and .902) and RLCQ (1.095 and .913). All scores were within the required limits; no multicollinearity appeared to be present in the data.

Residuals are independent. This assumption was evaluated by calculated the Durban-Watson statistic. The assumption is met if the value is close to 2, with values that are less than 1 or greater than 3 are cause for concern that the residuals are not independent (Field, 2013). With a Durban-Watson statistic equal to 1.810, this assumption appears to be met.

Homoscedasticity. Examination of the plot of standardized residuals against standardized predicted values (Figure 6) showed no obvious signs of funneling, which indicated that the variance of the residuals was constant. This meant that the assumption of homoscedasticity was met (Field, 2013).

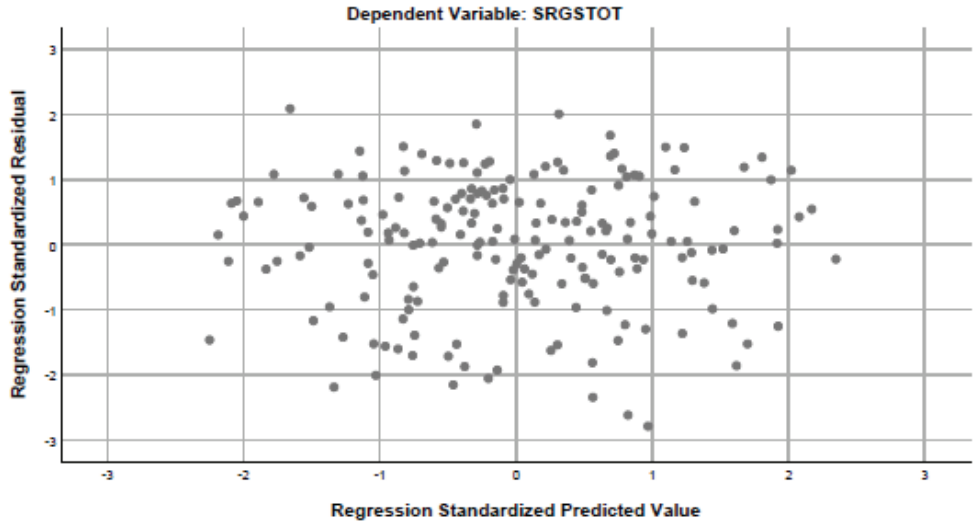

Figure 6. Plot of standardized residual vs standardized predicted values

Because the assumptions required for regression analysis all appeared to be met, a multiple regression analysis was run, using forced entry to simultaneously assess the

relationships between all the variables of interest. This is the recommended technique for testing theoretical hypotheses (Field, 2013).

Results

Two separate multiple regression analyses were used to answer the research questions. The first used forced entry methods to simultaneously assess the relationships between all the variables of interest. After this was completed, a second regression analysis was completed using hierarchical entry that entered the variables in order of each variable's correlation with the outcome variable (SRGS), from highest to lowest (ER89, RLCQ and PSS-10). This allowed the relative value of each variable in predicting the outcome to be more fully examined (Field, 2013).

Research question 1/hypothesis. Whether or not significant relationships were present between the variables was assessed by examining the correlations between the variables (see Table 3). Ego-resiliency, as measured by the ER89, was significantly related to all the other variables. The relationship with stress, as measured by the RLCQ, was $r = .151$, $p < .05$. The relationship with perceived stress, as measured by the PSS-10, was $r = -.237$, $p < .001$. The relationship with growth, as measured by the SRGS was $r = .368$, $p < .001$. Stress, as measured by the RLCQ was also significantly related to both growth ($r = .231$, $p < .001$) and perceived stress ($r = .211$, $p < .01$). While perceived stress, as measured by the PSS-10, was significantly related to both stress and ego-resiliency, it was not significantly related to growth ($r = -.063$).

The relationship between these variables was further examined by looking at the results of the forced entry regression analysis. The results of the regression analysis supported that the three predictor variables together significantly predicted the outcome of growth in the sample ($F(3, 188) = 12.577$, $R^2 = .167$, $p < .001$ see Table 4). While both ego-resiliency and life stress

were significant predictors of growth ($p < .001$ and $p = .009$ respectively), perceived stress was not a significant predictor of growth ($p = .746$).

Table 4

Summary of Forced Entry Regression Model for Ego-Resiliency, Stress and Perceived Stress on Growth

R	R^2	Adjusted R^2	*SE*	R^2 Change	*F* change	*Sig*
.409	.167	.154	18.87	.167	12.577	$p < .001$

	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	*t*	Sig.	*r*
Constant	-1.036	13.026		-.080	.937	
Ego-Resiliency	1.281	.268	.334	4.772	.000	.368
Stress	.015	.006	.185	2.657	.009	.231
Perceived Stress	-.073	.225	-.023	-.325	.746	-.063

Research question 2/hypothesis. Ego-resiliency's ability to predict growth was assessed by examining the predictor variable *t*-tests produced by the initial regression analysis. This showed that ego-resiliency was a significant predictor of growth $t = 4.772$, $p < .001$, $r = .382$. The null hypothesis was rejected (see Table 4).

Research question 3/hypothesis. The ability of perceived stress to predict growth was assessed by examining the predictor variable t-tests produced by the initial regression analysis. The results failed to reject the null hypothesis, as perceived stress was not a significant predictor of growth $t = -.325$, $p = .746$, $r = -.063$ (see Table 4).

Research question 4/hypothesis. The ability of stress to predict growth was assessed by examining the predictor variable t-tests produced by the initial regression analysis. The null

hypothesis was rejected. Stress was a significant predictor of growth $t = 2.657$, $p = .009$, $r = .231$ (see Table 4).

Research question 5/hypothesis. The relative value of each predictor variable, having been individually assessed using the predictor variable t-tests produced by the initial regression analysis was then further assessed by completing a hierarchical regression to assess the impact of each predictor on the overall linear model. The results of this regression appear in Table 5. Ego-resiliency alone was a significant predictor of growth ($F(1, 190) = 29.725$, $R^2 = .135$, $p < .001$). With the addition of stress, the ability of the overall model to predict growth was significantly improved (F change $(1, 189) = 7.123$, $R^2 = .167$, $p = .008$). With the addition of the final variable, perceived stress, there was no significant improvement (F change $(1, 188) = .105$, $R^2 = .167$, $p = .746$). Growth was best predicted by the combination of the ego-resiliency and stress measures.

Table 5

Summary of Hierarchical Regression Model

Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	Sig. F Change
Ego-Resiliency	.368	.135	.131	19.131	.135	29.725	$p < .001$
Ego-Resiliency, Stress	.408	.167	.158	18.830	.031	7.123	$p < .01$
Ego-Resiliency, Stress, Perceived Stress	.409	.167	.154	18.875	.000	.105	$p = .746$

Evaluation of the Findings

The first research question was: is there a relationship between ego-resiliency, stress, perceived stress, and growth? These results supported a statistically significant relationship between stress, as measured by the RLCQ, ego-resiliency, as measured by the ER89, and GTA, as measured by the SRGS, in Canadian undergraduate psychology university students. The relationship between perceived stress, as measured by the PSS-10 and GTA, as measured by the SRGS, was not statistically significant. The null hypothesis is largely, but not fully, rejected. The relationship between stress and GTA has been previously established, so it is not surprising that these results confirm the significance of this relationship (Cadell et al., 2014; Tsai et al., 2015).

The positive relationship between ego-resiliency and growth supported the current views of ego-resiliency as the ability to adjust psychological resources in response to environmental demands (Block, 1993; Farkas & Orosz, 2015). This finding also supports previous research that showed a relationship between ego-resiliency and flexibility of coping as well as extraversion (Farkas & Orosz, 2013), which has been associated in turn with GTA (Tedeschi & Calhoun, 1996). Other research has shown ego-resiliency to predict effective coping in stressful situations (Farkas & Orosz, 2015). An increased ability to do this would theoretically leave a greater amount of psychological resources available for the processes involved in GTA as described by the meaning making theory (Park, 2013a; Park & George, 2013). The statistically significant, negative relationship between ego-resiliency and perceived stress is exactly what would be expected, given current theories related to ego-resiliency and the increased ability to cope with stress that has been related to this trait (Duan et al., 2015; Park, 2013b).

The lack of relationship between perceptions of stress and GTA was surprising because this relationship is predicted by the meaning making model, which argues that one of the factors

which drives GTA is the psychological discomfort that results from stress (Park, 2013a; Park & George, 2013). It is possible that this is an artifact of how perception of stress was measured in this study. The PSS-10, which was used to measure perceptions of stress, asked subjects to consider the impact of stress in their lives over the previous month only (Cohen, 1994), which may have been too short of a time span in comparison to the previous year, which was the span used by both the RLCQ (Miller & Rahe, 1997)and the SRGS (Park et al., 1996). However, this finding may also provide tentative support for Meaning Making Theory, over Cognitive Adaptation Theory (CAT), which describes GTA as changes in perceptions of growth used as a coping mechanism (Helgeson et al., 2014; Taylor, 1983). If GTA is merely an adaptive change in perceived growth due to emotional distress, then GTA should be related to perceived stress. That was not the relationship revealed in this data. Ego-resiliency was both negatively related to perceived stress (distress) and positively related to GTA, and perceived stress was not significantly related to GTA. Therefore, ego-resiliency was related to growth, but distress was not.

GTA was shown to be significantly predicted by ego-resiliency, as the ER-89 scores significantly predicted the scores on the SRGS in Canadian undergraduate psychology university students. Therefore, the null hypothesis was rejected. Again, this was the outcome predicted based on current theories of ego-resiliency, and this result supports the conceptualization of ego-resiliency as an important factor in the response to stress and the likelihood of experiencing GTA during stress (Block, 1993; Farkas & Orosz, 2015). This finding supports the results of other studies that have implicated higher levels of ego-resiliency in healthier adaptations to stress and GTA (Bensimon, 2012; Cole et al., 2015). This finding is logical, because ego-resiliency has been related to psychological well-being and increased hope for the future (Back, 2015).

Perceived stress was not shown to be a significant predictor of GTA in Canadian undergraduate psychology university students and therefore this null hypothesis was not rejected. This result was surprising because Park's (2013a) Meaning Making Theory describes the psychological discomfort that results when stress causes conflict between global and situational meaning as the driving force behind GTA. The high stress and growth scores in these subjects support the hypothesis that the Canadian university students were experiencing both life stress and GTA. However, the predicted role played by perceptions of stress were not supported in these results.

In these Canadian university undergraduate psychology students GTA, as measured by the SRGS, was significantly predicted by stress, as measured by the RLCQ. The null hypothesis was rejected. This result adds support to other studies that have found a positive relationship between stress and growth (Cadell et al., 2014; Tsai et al., 2015). This relationship provides some support for the meaning making model of GTA which can be used to predict that greater stress levels should result in increased likelihood for GTA in individuals who are able to achieve positive meanings (Park, 2013a; Park & George, 2013).

In this sample of Canadian undergraduate psychology university students, the single best predictor of GTA was ego-resiliency which accounted for 13.5 percent of the variance in SRGS scores. This was followed by stress, which accounted for an additional 3.1 percent of the variance in SRGS scores after accounting for ego-resiliency. While the null hypothesis was rejected, the PSS-10 scores did not contribute significantly to the SRGS scores in this sample, accounting for less than .01 percent of the variance in SRGS scores after accounting for ego-resiliency and stress. The best model for predicting GTA consisted of ego-resiliency in combination with stress, F change (1, 189) = 7.123, R^2 = .167, p = .008. This model appeared to

be fairly generalizable, with the adjusted R^2 = .158 revealing a very modest shrinkage of 0.9% being predicted by the regression analysis.

Summary

The data gathered from this sample of Canadian undergraduate psychology university students revealed that both ego-resiliency and stress were positively related to GTA, ego-resiliency was also negatively related to perceived stress, but perceived stress was not significantly related to GTA. The positive relationship between stress and GTA has been previously established in other studies (Cadell et al., 2014; Tsai et al., 2015). The positive relationship between ego-resiliency and GTA supported the current views of ego-resiliency (Block, 1993; Farkas & Orosz, 2015), as did the negative relationship between ego-resiliency and perceived stress. The lack of relationship between perceptions of stress and GTA was surprising, given the current importance placed on the role distress plays in GTA (Park, 2013a; Park & George, 2013). The best model for predicting GTA consisted of ego-resiliency in combination with stress. This model appeared to be generalizable, with very modest shrinkage predicted by the regression analysis. The following chapter will explore the implications of these findings, including the recommendations for practice and future research.

Chapter 5: Implications, Recommendations, and Conclusions

Research in the area of stress and trauma has recently began to focus on positive psychological changes that result from adverse circumstances (Park, 2013a). These changes have been described as post-traumatic growth (PTG), stress-related growth (SRG) and the broader term, growth through adversity (GTA). Regardless of the term used, it is similar psychological processes that are believed to underlie the growth (Joseph & Linley, 2005). There is debate in this area of research, with some researchers declaring that GTA a cognitive adaptation arising out of the individual's struggle to maintain greater self-esteem, mastery and a sense of optimism in the face of stressful circumstances (Helgeson, Reynolds, Siminerio, Becker, & Escobar, 2014). However, a growing body of research supports that GTA is real psychological change, and while several models have been proposed to explain the processes involved, most of them focus on the role of interpreting and assigning meaning to life experiences (Joseph, 2012; Joseph et al., 2012). These models describe a broad process involving a re-evaluation of deeply held values and beliefs about the self and the world that is set in motion because of adverse life circumstances (Joseph, 2012; Joseph et al., 2012; Park, 2013a; Triplett et al., 2012). In particular, Meaning Making Theory describes this process in some detail (Park, 2013a). Individuals create both global meanings, that are connected to the meaningfulness of life as a whole, and situational meanings, their appraisal of what a specific event means to them personally. When a stressful event results in inconsistencies between these meanings, then the individual experiences emotional distress, and is motivated to adjust their meanings so as to reduce these inconsistencies (Losavio, Cohen, Laurenceau, Dasch, & Parrish, 2011). It is this process that is theorized to drive GTA.

While GTA is theorized to result in personality change, the interaction of personality theory and GTA is not well understood (Jayawickreme & Blackie, 2014). This is an important gap in knowledge because GTA is theorized to result in personality changes, and because the process of GTA is theorized to be influenced by pre-existing personality traits. Ongoing research into GTA should therefore be informed by personality theory. This study explored the relationship between personality theory and GTA, focusing on ego-resiliency as a personality trait involved in the process of GTA. Examining this relationship benefits growth theory by increasing the understanding of the role personality theory may play in describing the processes involved in GTA. Improving the understanding of the relationship between ego-resiliency, perceived stress, stress, and GTA in students provides insight into the variables involved in the process of adapting to and growing from stress (Jayawickreme & Blackie, 2014). This knowledge may be of future benefit to Canadian university students by contributing to programs that help this specific population to deal with life stress (Jang & Choi, 2012). Knowing more about the relationships between GTA, stress, perceived stress and ego-resiliency meaningfully adds to the understanding of the processes that contribute to growth. This quantitative study addressed this problem by examining the relationships between ego-resiliency, stress, perceived stress, and GTA in Canadian undergraduate college students.

Four self-report measures, the ER89, PSS-10, RLCQ and SRGS, were administered in an online environment to a convenience sample of 192 Canadian university students. This data was used to answer the following five questions: (a) Is there a significant relationship between ego-resiliency, stress, perceived stress, and GTA in Canadian undergraduate psychology university students? (b) Is GTA significantly predicted by ego-resiliency in Canadian undergraduate psychology students? (c) Is GTA significantly predicted by perceived stress in Canadian

undergraduate psychology university students? (d) Is GTA significantly predicted by stress in Canadian undergraduate psychology university students? and finally (e) Is GTA better predicted by ego-resiliency, perceived stress or stress in Canadian undergraduate psychology university students?

There are several limitations that must be remembered while considering these results. This study was conducted with the assumption that students attending MacEwan University, similar to university students in general, would be experiencing significant levels of stress in their day to day lives (Anders et al., 2014; Pennebaker et al., 1990; Stoliker & Lafreniere, 2015). The high overall scores on the RLCQ supported the hypothesis that this assumption was true. While many of the concerns regarding the use of self-report measures were mitigated by choosing measures that were previously shown to be reliable, the results will still be limited by the degree to which the subjects responded truthfully to the measures used. The validity of the conclusions drawn from this data remains somewhat limited by the use of cross-sectional methods. While cross-sectional administration of self-report measures is an acceptable practice (Kimberlin & Winterstein, 2008), ultimately it still limits the ability to conclude that GTA is caused in part by ego-resiliency (Field, 2013). This limitation is not a significant concern for this study, as the main goal was describing the relationships between the variables, rather than discovering a causal connection (Trafimow, 2014). The choice to limit the subjects in this study to university students was made for ethical reasons, specifically causing long term stress in the lives of research participants would violate the principle of beneficence ("Ethics," 2015). While generalization to other populations was not an important consideration in this study, it is important to note that the use of a convenience sample of university students does nonetheless limit the generalizability of these results (Field, 2013).

The remainder of this chapter will discuss the theoretical implications of the results of this study. Following this recommendations for practice will be made based on these findings. Finally, recommendations for future research will be explored.

Implications

This section begins with a description of the results of the study in relation to the research questions. Then follows a discussion of the significance of the results and how these contribute to the literature.

The first question related to the relationship between ego-resiliency, stress, perceived stress, and GTA in Canadian undergraduate psychology university students. Regression analysis conducted using SPSS revealed that ego-resiliency was negatively related to perceived stress (r = -.237, $p < .001$) and positively related to both stress (r = .151, $p < .05$) and growth (r = .368, $p <$ .001). A statistically significant and moderately strong positive correlation between ego resiliency and growth (r = .25, $p < .05$) has also been observed in students who experienced trauma (Bensimon, 2012). Stress was also significantly related to both growth (r = .231, $p <$ .001) and perceived stress (r = .211, $p < .002$). A positive relationship between stress and growth has also been demonstrated in several previous studies, (Cadell et al., 2014; Tsai et al., 2015). While perceived stress and stress have been shown to be positively related in prior studies (Horsch et al., 2016; Scott, Jackson, & Bergeman, 2011), perceived stress was not significantly related to growth (r = -.063, p = .192) in the current results. Other recent studies have also failed to find a significant relationship between perceived stress and growth (Coroiu, Körner, Burke, Meterissian, & Sabiston, 2016).

The second question involved how well GTA is predicted by ego-resiliency. An examination of the predictor variable t-tests produced by the initial regression analysis showed

that ego-resiliency was indeed a significant predictor of GTA ($t = 4.772$, $p < .001$). Ego-resiliency was also the variable with the strongest correlation with growth ($r = .368$, $p < .001$). That the trait of ego-resiliency was shown to be related to higher levels of growth but lower levels of perceived stress supported the role of personality traits in the growth process and stress adaptation. This has previously been demonstrated in other studies (Jayawickreme & Blackie, 2014). This relationship between ego-resiliency, growth, and perceived stress may possibly be explained because ego-resiliency is related to the ability to arrive at positive conclusions about life events, such as a sense of increased hope for the future (Back, 2015) and growth is related to finding positive meanings (Cassidy et al., 2014; Yeung et al., 2016). Ego-resiliency has been associated with flexible responding and greater ease in adapting to environmental demands (Farkas & Orosz, 2013). Individuals who score high in ego-resiliency are more likely to interpret difficulties as having positive meanings (Farkas & Orosz, 2015). Ego-resiliency may therefore play a role in facilitating positive meanings that help to maintain consistent personal and global meanings in the face of negative life events (Park, 2013a).

The third question was is GTA significantly predicted by perceived stress in Canadian undergraduate psychology university students? The *t*-tests revealed that perceived stress was not a significant predictor of growth ($t = -.325$, $p = .746$). In the context of this study, this result is not surprising, given that perceived stress was not significantly related to growth. However, this finding must be reconciled with Meaning Making Theory, which would support the opposite prediction, that perceived stress is related to higher levels of growth (Park, 2013a).

The fourth question related to the ability of stress to predict GTA. While not as strongly related to growth as ego-resiliency, stress was a significant predictor of GTA ($t = 2.657$, $p < .01$). The current study supported a positive relationship between stress and growth allowing stress to

be used to predict growth outcomes. While this finding supported that of several previous studies, (Cadell et al., 2014; Tsai et al., 2015), a clear relationship between growth and stress must still take into account other studies that have supported a curvilinear relationship (Taku, Tedeschi, et al., 2015), or even a negative relationship (Cassidy et al., 2014) between stress and growth. Clearly more research continues to be needed to understand this complex phenomenon.

Finally, the fifth question examined the relative ability of stress, perceived stress and ego-resiliency in predicting GTA. The results of a second, forced entry regression analysis supported that ego-resiliency ($F = 29.725$, $p < .001$) and stress (F change = 7.123, $p < .01$) were both significant predictors of growth, but perceived stress (F change =.105, $p = .746$) was not. The overall regression equation showed that the three predictor variables together significantly predicted growth in the sample ($R^2 = .167$, $p < .001$). The overall results of both regression analyses showed that in this sample of Canadian university students ego-resiliency on its own was a significant predictor of GTA ($R^2 = .135$) and the addition of stress significantly improved the ability of the model to predict GTA ($R^2 = .167$). The final predictor variable, perceived stress, did not contribute significantly to the predictive formula for GTA. The best prediction was provided by the combination of the ego-resiliency and stress measures. The relatively small shrinkage value (Adjusted $R^2 = .158$, for shrinkage = -.9%) supported that these findings are very likely to generalize from this sample to the population of Canadian university students.

Recommendations for Theory/Practice

These results revealed that actual stress and ego-resiliency were both positively related to growth, but perceived stress was not. While Meaning Making Theory would lead to a prediction that ego-resiliency is related to greater levels of growth, which was one of the findings of the current study, it also supports the prediction that perceived stress and GTA should be positively

related (Park, 2013a), which was not the case here. So, while some of the findings from this study appear to have supported Meaning Making Theory, others do not. That higher levels of ego-resiliency appear to be associated with higher levels of growth has also been found in other studies (Bensimon, 2012; Duan et al., 2015).

That ego-resiliency and stress were positively related to growth, ego-resiliency and perceived stress were negatively related to each other, but perceived stress was not related to growth, may be a stronger argument against the distress theories of GTA, such as Cognitive Adaptation Theory - CAT (Bensimon, 2012). CAT is an attempt to explain perceptions of growth as simply a form of cognitive coping strategy (Helgeson et al., 2014). In the context of CAT, growth is viewed as a short-term adaptation to maintain illusions of self-esteem, mastery and optimism so as to cope with stress. This theory supports the prediction that ego-resiliency should be negatively related to both perceived stress and growth, because individuals who score high in ego-resiliency would be expected to cope with stress without having to resort to creating a personal fiction of growth (Bensimon, 2012). Additionally, CAT supports that perceived stress should be related to higher levels of growth, because distress would be expected to create a greater need for fictional growth as a coping strategy. In situations where a stressful event or series of events results in inconsistencies between situational and global meanings then personal beliefs are adjusted in an attempt to reduce these inconsistencies (Losavio et al., 2011). Because ego-resiliency relates to modifying self-control in response to environmental demands (Block, 1993), it could influence the engagement in the meaning making process that is hypothesized to be a key process in GTA (Park, 2013a). If high levels of ego-resiliency reflect more effective coping with stressful events, then CAT would predict both reduced levels of perceived stress and also of GTA (Helgeson et al., 2014). However, because ego-resiliency was shown to be related

to higher levels of growth but lower levels of perceived stress, and stress was positively related to growth as well, the overall pattern of relationships between the variables appeared to provide more support for Meaning Making Theory (Park, 2013a). The relationships between stress, perceived stress, ego-resiliency and growth revealed in this study may fit better with the narrative of GTA as real change, rather than perceptions of change. Neither CAT nor Meaning Making Theory were fully supported by the results of this study, but rather some findings appear to support each of these theories. Clearly more research is needed to shed light on this complex phenomenon.

University students have been shown to experience higher than normal levels of stress and stress related problems (Anders et al., 2014; Pennebaker et al., 1990; Stoliker & Lafreniere, 2015). The subjects in this study were no exception, with an average RLCQ score of 549, and results showing that 50% of the respondents exceeded a score of 541. This revealed very high stress levels among the subjects, given that scores exceeding 500 LCU (for one year) are interpreted as revealing high levels of recent life stress, which are very likely to have negative impacts on overall health and functioning (Miller & Rahe, 1997). This is due in part to the high level of stress that is a regular part of the student lifestyle (Anders et al., 2014). While this supports the reasoning behind choosing to conduct this study using these subjects, it also highlights the need for interventions to help students cope with stress. The positive relationship between ego-resiliency and growth demonstrated in this study may be of particular importance. Previous studies have demonstrated that ego-resiliency may be increased through the use of specific therapies (Jang & Choi, 2012). If increased levels of ego-resiliency could contribute to greater levels of GTA, or allow for more effective coping with stressful events, by reducing the level of perceived stress, then it may be beneficial to have student training to improve ego-

resiliency and positively influence psychological wellbeing. Further research is needed to develop such programs.

Recommendations for Future Research

The results of this study added to the GTA research literature in several ways. First, the case for ego-resiliency as a personality trait that is important to growth was further supported by demonstrating a relationship between ego-resiliency and GTA associated with life stress. A similar relationship had been demonstrated in GTA associated with traumatic events (Bensimon, 2012). This is particularly important because ego-resiliency is a personality trait that may be increased using psychological interventions (Jang & Choi, 2012). Second, the need for research linking personality theory and GTA has been previously documented (Jayawickreme & Blackie, 2014), and this study added to the slowly growing body of knowledge connecting personality theory and GTA research. Because Meaning Making Theory supported the prediction that ego-resiliency would be significantly related to growth, this finding provided some support to that theory (Park, 2013a). This begins to delineate the connections between theories of GTA and personality theories. Third, this study provided valuable information about the nature of the relationship between ego-resiliency and growth in Canadian university students. Improved understanding of this relationship extended the knowledge of GTA by providing greater insight into the variables involved in the process of adapting to and growing from stress (Jayawickreme & Blackie, 2014). Overall, the results of this study not only added to the theoretical knowledge related to personality traits, stress and GTA, but also provided information which may one day be applied to helping students better adapt to and cope with the high levels of stress that is part of their academic careers (Anders et al., 2014; Pennebaker et al., 1990; Stoliker & Lafreniere, 2015).

The current study supported ego-resiliency as a personality trait that is important to growth by revealing a significant relationship between ego-resiliency and GTA. Examining whether this relationship is causal in nature is an important next step in GTA research. This would not only more completely describe the role played by ego-resiliency in the growth process, but also meet the research goal of strengthening the connections between personality theory and theories of growth (Jayawickreme & Blackie, 2014). Evidence for a causal relationship requires demonstrating three components: covariation of cause and effect, temporal precedence of cause, and eliminating alternative explanations (Lewandowski et al., 2015). Eliminating alternative explanations will require much ongoing research over many years. The current study, along with others, has demonstrated covariation of ego-resiliency (the cause) and growth (the effect) (Bensimon, 2012; Duan et al., 2015). Longitudinal research would allow the question of temporal precedence of ego-resiliency and growth the be examined. This information is needed to determine if the relationship between ego-resiliency and growth is causal in nature.

The use of a convenience sample of Canadian university students in this study may have limited the generalizability of these results (Setia, 2016). The regression results support reasonable generalizability to the population from which this sample was drawn (Field, 2013). However, convenience samples often differ from the general population in meaningful ways (Owen et al., 2014). Because university students differ randomly from the general population across many variables, such as attitudes, and systematically vary across other variables, such as age and level of education, research results cannot be assumed to generalize beyond the student population (Hanel & Vione, 2016). The subjects used in this study did posses much higher average levels of life stress than the general population (Miller & Rahe, 1997). This high life

stress was specifically why university students were chosen as subjects (Anders et al., 2014; Pennebaker et al., 1990; Stoliker & Lafreniere, 2015). Given that these findings may have limited generalizability beyond student populations, it would be logical to replicate this study with samples drawn from differing populations so as to establish whether or not these results are generalizable to the population at large.

An ongoing limitation that has been identified in GTA research is the reliance on self-report measures of growth (Shakespeare-Finch & Barrington, 2012; Shakespeare-Finch & Enders, 2008; Shakespeare-Finch et al., 2013). While this study has done nothing to address this limitation, the self-report measures used for all the variables all had strong reliability statistics. Further, all of the measures used have been demonstrated to possess adequate reliability and validity (Barbosa-Leiker et al., 2013; Bjorck & Byron, 2014; Caldwell & Shaver, 2012; Farkas & Orosz, 2015; Miller & Rahe, 1997; Park et al., 1996; Taylor, 2015). This limitation is therefore not likely to have a significant effect on these results. However, the validity of important constructs such as growth, ego-resiliency, or distress require studies that develop and/or use other measures for growth (Shakespeare-Finch & Enders, 2008) and personality traits (Jayawickreme & Blackie, 2014), such as ego-resiliency would be improved by more research assessing the criterion related validity of these measures.

Many of the theories of GTA ascribe an important role to distress in the process of growth (Losavio et al., 2011; Park, 2013a). Park's (2013a) Meaning Making Theory specifically describes psychological discomfort as one of the factors driving growth. However, perceived stress was not shown to be a significant predictor of GTA in the student sample used for this study. It is possible that this was an artifact due to the short timeline subjects were asked to consider in responding to items measuring perceived stress (Cohen, 1994). Further examination

of the role of perceived stress in GTA would help determine if it truly does play a role in this process or not. This is a question with some theoretical importance as the findings could provide differential support for either Meaning Making Theory (Park, 2013a), which describes distress as a motivator for real psychological growth, or Cognitive Adaptation Theory (CAT), which describes illusory growth as a perceptual change used to cope with distress (Helgeson et al., 2014).

Because ego-resiliency may be important to stress, coping and GTA, future research should elaborate on the understanding of this personality trait. Whole trait theory combines trait theory for personality description and social cognitive theory to explain the operation and development of traits (Fleeson & Jayawickreme, 2015). Any personality trait, such as ego-resiliency is expected to have two forms, a trait (the enduring aspect of personality) and a state (the expression of that trait in the current situation). Closer examination of both trait and state ego-resiliency and how they relate to stress, coping and GTA would not only further the understanding of personality and growth (Jayawickreme & Blackie, 2014), but also could help contribute the development of ego-resiliency based interventions for stress and trauma (Jang & Choi, 2012).

Finally, some further examination of stress in university students also appears to be warranted by the results of this study. This convenience sample of undergraduate students reported very high levels of stressful events in their lives. The mean RLCQ score revealed high levels of recent life stress, which are very likely to have negative impacts on overall health and functioning (Miller & Rahe, 1997). Indeed, more than 50% of the respondents reported stress levels higher than the cut off score for stress having a negative impact on health. Many studies have identified university students as a population at risk for stress related problems (Anders et

al., 2014; Pennebaker et al., 1990; Stoliker & Lafreniere, 2015). There is a need for more studies exploring the sources of this stress, as well as ways to improve student coping and responses to stress. Ego-resiliency's relationship with GTA may have some applications in this area. As psychological programs have been shown to increase ego-resiliency, further research is needed to develop such programs and examine the effects of implementing them with student populations (Jang & Choi, 2012).

Conclusions

The purpose of this quantitative, correlational study was to examine the relationships between ego-resiliency, stress, perceived stress, and perceived GTA in a cross-section of Canadian undergraduate college students. Analysis revealed several interesting findings. Ego-resiliency was positively related to stress and growth, but negatively related to perceived stress. Stress was positively related to ego-resiliency, perceived stress and growth. Perceived stress was not significantly related to growth. Both ego-resiliency and stress were significant predictors of growth in this sample of Canadian university students. Adding perceived stress did not contribute significantly to the prediction of growth. The regression analysis results supported the generalizability of these results from this sample to the population of Canadian university students (Field, 2013). The use of a convenience sample makes the application of these results to the general population more limited (Owen et al., 2014; Setia, 2016).

This study provided valuable information about the relationships between ego-resiliency, perceived stress, stress, and GTA in Canadian university students. The results revealed a significant positive relationship between ego-resiliency and growth, providing some support for predictions based on the Meaning Making Theory of growth (Park, 2013a). While there is still a great need to apply personality theory to GTA (Jayawickreme & Blackie, 2014), these findings

have provided insight into personality variables involved in the process of adapting to and growing from stress. This is particularly important because of the high levels of stress and stress related concerns prevalent in post-secondary students (Anders et al., 2014; Pennebaker et al., 1990; Stoliker & Lafreniere, 2015). Because ego-resiliency may be increased using specific therapeutic interventions (Jang & Choi, 2012), this information may be beneficially applied in helping students to better adapt to and cope with high levels of stressors, increasing their chances for positive outcomes, such as growth.

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Appendices

Appendix A: Inventories

Stress Related Growth Scale (SRGS)

FORM 8.11

STRESS-RELATED GROWTH SCALE©

INSTRUCTIONS: Rate how much you experienced each item below as a result of this past year's most stressful event.

Please respond to each item with either: "0" (not at all), "1" (somewhat), or "2" (a great deal).

1. I developed new relationships with helpful others	0	1	2
2. I gained new knowledge about the world	0	1	2
3. I learned that I was stronger than I thought I was	0	1	2
4. I became more accepting of others	0	1	2
5. I realized I have a lot to offer other people	0	1	2
6. I learned to respect others' feelings and beliefs	0	1	2
7. I learned to be nicer to others	0	1	2
8. I rethought how I want to live my life	0	1	2
9. I learned that I want to accomplish more in life	0	1	2
10. My life now has more meaning and satisfaction	0	1	2
11. I learned to look at things in a more positive way	0	1	2
12. I learned better ways to express my feelings	0	1	2
13. I learned that there is a reason for everything	0	1	2
14. I developed/increased my faith in God	0	1	2
15. I learned not to let hassles bother me the way they used to	0	1	2
16. I learned to take more responsibility for what I do	0	1	2
17. I learned to live for today, because you never know what will happen tomorrow	0	1	2
18. I don't take most things for granted anymore	0	1	2
19. I developed/increased my trust in God	0	1	2
20. I feel freer to make my own decisions	0	1	2
21. I learned that I have something of value to teach others about life	0	1	2
22. I understand better how God allows things to happen	0	1	2
23. I learned to appreciate the strength of others who have had a difficult life	0	1	2
24. I learned not to "freak out" when a bad thing happens	0	1	2
25. I learned to think more about the consequences of my actions	0	1	2
26. I learned to get less angry about things	0	1	2
27. I learned to be a more optimistic person	0	1	2
28. I learned to approach life more calmly	0	1	2
29. I learned to be myself and not try to be what others want me to be	0	1	2
30. I learned to accept myself as less than perfect	0	1	2
31. I learned to take life more seriously	0	1	2
32. I learned to work through problems and not just give up	0	1	2
33. I learned to find more meaning in life	0	1	2
34. I changed my life goals for the better	0	1	2
35. I learned how to reach out and help others	0	1	2
36. I learned to be a more confident person	0	1	2
37. I learned not to take my physical health for granted	0	1	2
38. I learned to listen more carefully when others talk to me	0	1	2
39. I learned to be open to new information and ideas	0	1	2
40. I now better understand why, years ago, my parents said/did certain things	0	1	2
41. I learned to communicate more honestly with others	0	1	2

42. I learned to deal better with uncertainty	0	1	2
43. I learned that I want to have some impact on the world	0	1	2
44. I learned that it's okay to ask others for help	0	1	2
45. I learned that most of what used to upset me were little things that aren't worth getting upset about	0	1	2
46. I learned to stand up for my personal rights	0	1	2
47. A prior relationship with another person became more meaningful	0	1	2
48. I became better able to view my parents as people, and not just parents	0	1	2
49. I learned that there are more people who care about me than I thought	0	1	2
50. I developed a stronger sense of community, of belonging, that I am part of a larger group	0	1	2

Recent Life Changes Questionaire (RLCQ)

Life change event	LCU
Health	
An injury or illness which:	
kept you in bed a week or more, or sent you to the hospital	74
was less serious than above	44
Major dental work	26
Major change in eating habits	27
Major change in sleeping habits	26
Major change in your usual type and/or amount of recreation	28
Work	
Change to a new type of work	51
Change in your work hours or conditions	35
Change in your responsibilities at work:	
more responsibilities	29
fewer responsibilities	21
promotion	31
demotion	42
transfer	32
Troubles at work:	
with your boss	29
with coworkers	35
with persons under your supervision	35
other work troubles	28
Major business adjustment	60
Retirement	52
Loss of job:	
laid off from work	68
fired from work	79
Correspondence course to help you in your work	18
Home and family	
Major change in living conditions	42
Change in residence:	
move within the same town or city	25
move to a different town, city, or state	47
Change in family get-togethers	25

Life change event	LCU
Major change in health or behavior of family member	55
Marriage	50
Pregnancy	67
Miscarriage or abortion	65
Gain of a new family member:	
birth of a child	66
adoption of a child	65
a relative moving in with you	59
Spouse beginning or ending work	46
Child leaving home:	
to attend college	41
due to marriage	41
for other reasons	45
Change in arguments with spouse	50
In-law problems	38
Change in the marital status of your parents:	
divorce	59
remarriage	50
Separation from spouse:	
due to work	53
due to marital problems	76
Divorce	96
Birth of grandchild	43
Death of spouse	119
Death of other family member:	
child	123
brother or sister	102
parent	100
Personal and social	
Change in personal habits	26
Beginning or ending school or college	38
Change of school or college	35
Change in political beliefs	24
Change in religious beliefs	29
Change in social activities	27
Vacation	24
New, close, personal relationship	37
Engagement to marry	45
Girlfriend or boyfriend problems	39
Sexual difficulties	44
"Falling out" of a close personal relationship	47
An accident	48
Minor violation of the law	20
Being held in jail	75
Death of a close friend	70
Major decision regarding your immediate future	51
Major personal achievement	36
Financial	
Major change in finances:	
increased income	38
decreased income	60
investment and/or credit difficulties	56
Loss or damage of personal property	43
Moderate purchase	20
Major purchase	37
Foreclosure on a mortgage or loan	58

Perceived Stress Scale (PSS-10)

Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts **during the last month**. In each case, you will be asked to indicate by circling *how often* you felt or thought a certain way.

Name _____ Date _____

Age _____ Gender (*Circle*): **M F** Other _____

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
2. In the last month, how often have you felt that you were unable to control the important things in your life?	0	1	2	3	4
3. In the last month, how often have you felt nervous and "stressed"?	0	1	2	3	4
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	0	1	2	3	4
5. In the last month, how often have you felt that things were going your way?	0	1	2	3	4
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	0	1	2	3	4
7. In the last month, how often have you been able to control irritations in your life?	0	1	2	3	4
8. In the last month, how often have you felt that you were on top of things?	0	1	2	3	4
9. In the last month, how often have you been angered because of things that were outside of your control?	0	1	2	3	4
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

Please feel free to use the *Perceived Stress Scale* for your research.

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The PSS Scale is reprinted with permission of the American Sociological Association, from Cohen, S., Kamarck, T., and Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*, 386-396.

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Ego-Resilience Scale (ER89)

The Ego Resilience Scale				
Please read the below statements about yourself and indicate how well it applies to you by circling the answer to the right from 1 (*does not apply at all*) to 4 (*applies very strongly*). Let me know how true the following characteristics are as they apply to you generally:				
Characteristics About You	Does not Apply at All			Applies Very Strongly
1. I am generous with my friends.	1 Does not apply at all	2 Applies slightly	3 Applies somewhat	4 Applies very strongly
2. I quickly get over and recover from being startled.	1 Does not apply at all	2 Applies slightly	3 Applies somewhat	4 Applies very strongly
3. I enjoy dealing with new and unusual situations.	1 Does not apply at all	2 Applies slightly	3 Applies somewhat	4 Applies very strongly
4. I usually succeed in making a favorable impression on people.	1 Does not apply at all	2 Applies slightly	3 Applies somewhat	4 Applies very strongly
5. I enjoy trying new foods I have never tasted before.	1 Does not apply at all	2 Applies slightly	3 Applies somewhat	4 Applies very strongly
6. I am regarded as a very energetic person.	1 Does not apply at all	2 Applies slightly	3 Applies somewhat	4 Applies very strongly
7. I like to take different paths to familiar places.	1 Does not apply at all	2 Applies slightly	3 Applies somewhat	4 Applies very strongly
8. I am more curious than most people.	1 Does not apply at all	2 Applies slightly	3 Applies somewhat	4 Applies very strongly
9. Most of the people I meet are likable.	1 Does not apply at all	2 Applies slightly	3 Applies somewhat	4 Applies very strongly
10. I usually think carefully about something before acting.	1 Does not apply at all	2 Applies slightly	3 Applies somewhat	4 Applies very strongly
11. I like to do new and different things.	1 Does not apply at all	2 Applies slightly	3 Applies somewhat	4 Applies very strongly
12. My daily life is full of things that keep me interested.	1 Does not apply at all	2 Applies slightly	3 Applies somewhat	4 Applies very strongly
13. I would be willing to describe myself as a pretty "strong" personality.	1 Does not apply at all	2 Applies slightly	3 Applies somewhat	4 Applies very strongly
14. I get over my anger at someone reasonably quickly.	1 Does not apply at all	2 Applies slightly	3 Applies somewhat	4 Applies very strongly

Source: (J. Block & Kremen, 1996)

Scoring Interpretation

Score	47-56	35-46	23-34	11-22	0-10
Level of Resilience	**Very High** Resiliency Trait	**High** Resiliency Trait	**Undetermined** Trait	**Low** Resiliency Trait	**Very Low** Resiliency Trait

Appendix B: Consent Form

To be administered online:

Introduction:

My name is Sean Rogers. I am a doctoral student at Northcentral University, as well as an Instructor at MacEwan University. I am conducting a research study on the relationship between ego-resiliency, a personality characteristic that relates to how people respond to change, stress, perceived stress and perceptions of positive changes (growth). Indirect relationships have been shown between ego-resiliency and growth and I am attempting to determine if there is a direct relationship between them, and if so, determine the nature of that relationship. I am completing this research as part of my doctoral degree. I invite you to participate.

Activities:

If you participate in this research, you will be asked to:

1. You will be asked a few brief questions, which will be used to assign your participation credit. This will take less than one minute to complete.
2. Following this you will be administered 4 longer questionnaires in a random order. These are the Recent Life Changes Questionnaire (RLCQ), the Perceived Stress Scale (PSS-10), the Ego-Resiliency Scale (ER-89), and the Stress Related Growth Scale (SRGS). This will take approximately 40 to 60 minutes to complete.

Eligibility:

You are eligible to participate in this research if you:

1. Are a MacEwan University student who is also registered in an Introductory Psychology class.

You are not eligible to participate in this research if you:

1. Are not a MacEwan University student who is also registered in an Introductory Psychology class

I hope to include 150 people in this research.

Risks:

There are minimal risks in this study. As a participant in this study, you will be asked to answer questions regarding some common stressors you may have experienced in the last year, which may be considered personal and disturbing as it is a reminder of the stressors that have occurred. Some possible risks include: experiencing psychological or emotional

discomfort upon answering these questions. There are no physical risks associated with this study.

To decrease the impact of these risks, you can: skip any question and/or stop participation at any time.

Benefits:

If you decide to participate, the direct benefits to you are: reflecting about stressful events that have occurred over the last year may result in greater awareness about the amount of stress in your life.

The potential benefits to others are: The knowledge could be used to benefit the many individuals exposed to high stressful circumstances, such as emergency personnel, members of the armed forces, and even university students.

Confidentiality:

The information you provide will be kept confidential to the extent allowable by law. Some steps I will take to keep your identity confidential are: no identifying information will be stored in association with the answers you provide. All responses will be related to a confidential subject number, which will not be traceable to the individual who provided the responses.

The people who will have access to your information are: Myself and my dissertation chair (Dr. Nelson) will have access to your responses, but not access to any of your identifying information. The Northcentral University Institutional Review Board and/or the MacEwan University Research Ethics Board may also review my research and view the data you provide. Neither of these bodies will have access to any identifying information.

I will secure your information with these steps: The data you provide will be stored anonymously on a password protected computer kept in a locked office, within a locked hallway of the MacEwan University Psychology Department.

I will keep your data for 7 years. Then, I will delete electronic data and destroy paper data.

Contact Information:

If you have questions for me, you can contact me at: M.Rogers7663@email.ncu.edu or at 780-497-4541.

My dissertation chair's name is Dr. Deborah Nelson. She works at Northcentral University and is supervising me on the research. You can contact her at dnelson@ncu.edu or at 410-802-4253.

If you have questions about your rights in the research, or if a problem has occurred, or if you are injured during your participation, please contact the Institutional Review Board at: irb@ncu.edu or 1-888-327-2877 ext 8014. The MacEwan REB may also be contacted at: REB@macewan.ca or 780-633-3274.

Voluntary Participation:

Your participation is voluntary. If you decide not to participate, or if you stop participation after you start, there will be no penalty to you. You will not lose any benefit to which you are otherwise entitled.

Compensation:

To thank you for your willingness to participate, each participant will receive 2% course credit upon completion of the study. Details about how credit is awarded are described in your course outline, and you may contact the research pool coordinator, Danielle Streimer (psychologyresearch@macewan.ca), if you have any additional questions related to course credit.you will be given.

Appendix C: Permissions for inventories

SRGS permission

Subject:	Re: Use of the SRGS (Please disregard my previous email)
From:	Park, Crystal (crystal.park@uconn.edu)
To:	rogersler@yahoo.ca;
Date:	Friday, December 30, 2016 3:32 PM

Dear Sean,

Thanks for your interest in my work and our SRGS. It is not copyrighted and you are free to use it. I am attaching both the full and short forms here.

Good luck with your dissertation!

Regards, Crystal

From: Sean Rogers <rogersler@yahoo.ca>
Sent: Thursday, December 29, 2016 2:26:37 PM
To: Park, Crystal
Subject: Use of the SRGS (Please disregard my previous email)

Dear Dr. Park,

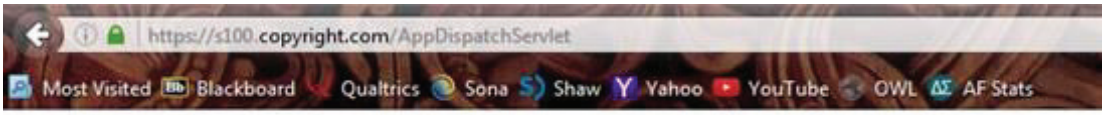
My name is Sean Rogers and I am a doctoral candidate at Northcentral University (NCU). I am conducting my dissertation study on the relationship between ego-resiliency and stress related growth. I am writing to ask your permission to use the stress related growth scale (SGS) which you have developed, as one of the data gathering instruments for this research study. My Dissertation Chair is Dr. Deborah Nelson (dnelson@ncu.edu).

I would require a brief letter from you, granting me permission to use the SRGS for this purpose. A PDF sent via email would suffice. If you have any questions, or wish to discuss this further, please do not hesitate to contact me at this email address.

Thank you for your time in considering this request.
Sincerely,

Sean Rogers
rogersler@yahoo.ca
m.rogers7663@email.ncu.edu

RLCQ permission



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ER-89 Permission

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Licensed Content Date	Feb 1, 1996
Licensed Content Volume	70
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Expected completion date	Jun 2017

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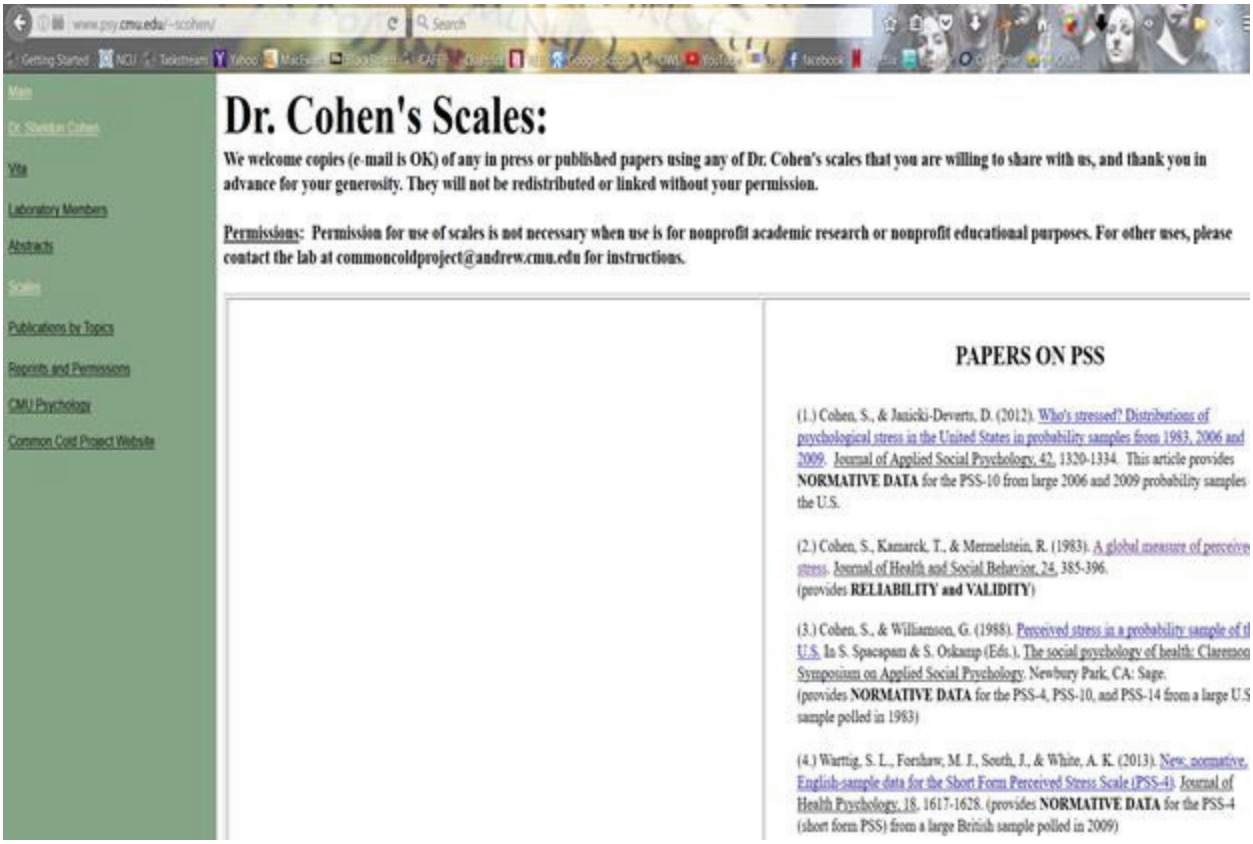

Screenshot from Dr. Cohen's website indicating that no permission is needed when PSS-10 is used for non-profit academic research.

Appendix D: Debrief form

To be administered online:

Thank you for your time and participation in this study exploring the relationship between ego-resiliency, stress, perceived stress and perceptions of positive changes (growth).

If you are experiencing any distressing thought or feelings following participation in this study, please contact MacEwan Counseling Services 780-497-5063 for support.

Please remember that if you have any questions or concerns about the study or your participation that you may contact the researcher or the chair of his dissertation commitee. You may also contact him if you are interested in learning the final results of the study:

Researcher: Sean Rogers, MA, Registered Psychologist, Instructor, Department of Psychology, MacEwan University, 780-497-4541, Rogerss10@macewan.ca

Dissertation Committee Chair: Dr. Deborah Nelson, Instructor, Northcentral University, dnelson@ncu.edu, 410-802-4253.

This project has been approved on ethical grounds in Canada by the MacEwan University Research Ethics Board on 19 September, 2017 and in the United States of America by the Northcentral University Instituional Review Board on 3 November, 2017. Any questions regarding your rights as a participant or any concerns you have regarding the ethics of this study may be addressed to the Northcentral University Institutional Review Board at irb@ncu.edu or 1-888-327-2877 ext 8014 or the MacEwan University Research Ethics Board at 780-633-3274 or REB@macewan.ca.

Appendix E: Ethics Certificates

Canada (TCPS 2)

PANEL ON RESEARCH ETHICS
Navigating the ethics of human research

TCPS 2: CORE

Certificate of Completion

This document certifies that

Michael Rogers

has completed the Tri-Council Policy Statement:
Ethical Conduct for Research Involving Humans
Course on Research Ethics (TCPS 2: CORE)

Date of Issue: **18 May, 2016**

United States of America (CITI)

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Michael Rogers (ID: 2513564)
- **Institution Affiliation:** Northcentral University (ID: 786)
- **Institution Email:** irb@ncu.edu
- **Institution Unit:** Behavioural Health and Science

- **Curriculum Group:** Human Research
- **Course Learner Group:** IRB Required Modules for NCU
- **Stage:** Stage 1 - Basic Course

- **Record ID:** 22305659
- **Report Date:** 09-May-2017
- **Current Score**:** 93

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
Research, Ethics, and Society (RCR) (ID: 15198)	09-May-2017	3/5 (60%)
History and Ethical Principles - SBE (ID: 490)	02-May-2017	5/5 (100%)
Defining Research with Human Subjects - SBE (ID: 491)	02-May-2017	5/5 (100%)
Belmont Report and CITI Course Introduction (ID: 1127)	02-May-2017	3/3 (100%)
Records-Based Research (ID: 5)	08-May-2017	3/3 (100%)
The Federal Regulations - SBE (ID: 502)	03-May-2017	5/5 (100%)
Data Management (RCR-Basic) (ID: 16600)	08-May-2017	5/5 (100%)
Assessing Risk - SBE (ID: 503)	03-May-2017	5/5 (100%)
Informed Consent - SBE (ID: 504)	03-May-2017	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	08-May-2017	4/5 (80%)
Research with Prisoners - SBE (ID: 506)	08-May-2017	4/5 (80%)
Research Misconduct (RCR-Basic) (ID: 16604)	09-May-2017	4/5 (80%)
Research with Children - SBE (ID: 507)	08-May-2017	5/5 (100%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	08-May-2017	4/5 (80%)
International Research - SBE (ID: 509)	08-May-2017	5/5 (100%)
Internet-Based Research - SBE (ID: 510)	08-May-2017	5/5 (100%)
Research and HIPAA Privacy Protections (ID: 14)	08-May-2017	5/5 (100%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	08-May-2017	4/4 (100%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	08-May-2017	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	08-May-2017	5/5 (100%)
Avoiding Group Harms - U.S. Research Perspectives (ID: 14080)	08-May-2017	3/3 (100%)
Cultural Competence in Research (ID: 15166)	08-May-2017	5/5 (100%)
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	08-May-2017	5/5 (100%)
Research with Persons who are Socially or Economically Disadvantaged (ID: 16539)	08-May-2017	4/5 (80%)
Gender and Sexuality Diversity (GSD) in Human Research (ID: 16556)	08-May-2017	5/5 (100%)
Research with Subjects with Physical Disabilities & Impairments (ID: 16657)	08-May-2017	4/5 (80%)
Consent and Subject Recruitment Challenges: Remuneration (ID: 16881)	08-May-2017	4/5 (80%)

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COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Michael Rogers (ID: 2513564)
- **Institution Affiliation:** Northcentral University (ID: 786)
- **Institution Email:** irb@ncu.edu
- **Institution Unit:** Behavioural Health and Science

- **Curriculum Group:** Human Research
- **Course Learner Group:** IRB Required Modules for NCU
- **Stage:** Stage 1 - Basic Course

- **Record ID:** 22305659
- **Completion Date:** 09-May-2017
- **Expiration Date:** 09-May-2019
- **Minimum Passing:** 85
- **Reported Score*:** 93

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Belmont Report and CITI Course Introduction (ID: 1127)	02-May-2017	3/3 (100%)
History and Ethical Principles - SBE (ID: 490)	02-May-2017	5/5 (100%)
Defining Research with Human Subjects - SBE (ID: 491)	02-May-2017	5/5 (100%)
The Federal Regulations - SBE (ID: 502)	03-May-2017	5/5 (100%)
Assessing Risk - SBE (ID: 503)	03-May-2017	5/5 (100%)
Informed Consent - SBE (ID: 504)	03-May-2017	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	08-May-2017	4/5 (80%)
Research with Prisoners - SBE (ID: 506)	08-May-2017	4/5 (80%)
Research with Children - SBE (ID: 507)	08-May-2017	5/5 (100%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	08-May-2017	4/5 (80%)
International Research - SBE (ID: 509)	08-May-2017	5/5 (100%)
Internet-Based Research - SBE (ID: 510)	08-May-2017	5/5 (100%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	08-May-2017	5/5 (100%)
Cultural Competence in Research (ID: 15166)	08-May-2017	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	08-May-2017	5/5 (100%)
Consent and Subject Recruitment Challenges: Remuneration (ID: 16881)	08-May-2017	4/5 (80%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	08-May-2017	4/4 (100%)
Gender and Sexuality Diversity (GSD) in Human Research (ID: 16556)	08-May-2017	5/5 (100%)
Research with Persons who are Socially or Economically Disadvantaged (ID: 16539)	08-May-2017	4/5 (80%)
Research with Subjects with Physical Disabilities & Impairments (ID: 16657)	08-May-2017	4/5 (80%)
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	08-May-2017	5/5 (100%)
Records-Based Research (ID: 5)	08-May-2017	3/3 (100%)
Avoiding Group Harms - U.S. Research Perspectives (ID: 14080)	08-May-2017	3/3 (100%)
Research and HIPAA Privacy Protections (ID: 14)	08-May-2017	5/5 (100%)
Data Management (RCR-Basic) (ID: 16600)	08-May-2017	5/5 (100%)
Research Misconduct (RCR-Basic) (ID: 16604)	09-May-2017	4/5 (80%)
Research, Ethics, and Society (RCR) (ID: 15198)	09-May-2017	3/5 (60%)

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- **Name:** Deborah Nelson (ID: 3981667)
- **Institution Affiliation:** Northcentral University (ID: 786)
- **Institution Email:** dnelson@ncu.edu
- **Institution Unit:** Graduate School
- **Phone:** 410-772-9059

- **Curriculum Group:** Human Research
- **Course Learner Group:** IRB Required Modules for NCU
- **Stage:** Stage 1 - Basic Course

- **Record ID:** 20609405
- **Completion Date:** 07-Jun-2017
- **Expiration Date:** 07-Jun-2019
- **Minimum Passing:** 85
- **Reported Score*:** 99

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Belmont Report and CITI Course Introduction (ID: 1127)	06-Jun-2017	3/3 (100%)
History and Ethical Principles - SBE (ID: 490)	06-Jun-2017	5/5 (100%)
Defining Research with Human Subjects - SBE (ID: 491)	07-Jun-2017	5/5 (100%)
The Federal Regulations - SBE (ID: 502)	07-Jun-2017	5/5 (100%)
Assessing Risk - SBE (ID: 503)	07-Jun-2017	5/5 (100%)
Informed Consent - SBE (ID: 504)	07-Jun-2017	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	07-Jun-2017	5/5 (100%)
Research with Prisoners - SBE (ID: 506)	07-Jun-2017	5/5 (100%)
Research with Children - SBE (ID: 507)	07-Jun-2017	5/5 (100%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	07-Jun-2017	5/5 (100%)
International Research - SBE (ID: 509)	07-Jun-2017	5/5 (100%)
Internet-Based Research - SBE (ID: 510)	07-Jun-2017	5/5 (100%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	07-Jun-2017	5/5 (100%)
Cultural Competence in Research (ID: 15166)	07-Jun-2017	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	07-Jun-2017	5/5 (100%)
Consent and Subject Recruitment Challenges: Remuneration (ID: 16881)	07-Jun-2017	5/5 (100%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	07-Jun-2017	4/4 (100%)
Gender and Sexuality Diversity (GSD) in Human Research (ID: 16556)	07-Jun-2017	5/5 (100%)
Research with Persons who are Socially or Economically Disadvantaged (ID: 16539)	07-Jun-2017	5/5 (100%)
Research with Subjects with Physical Disabilities & Impairments (ID: 16657)	07-Jun-2017	5/5 (100%)
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	07-Jun-2017	5/5 (100%)
Records-Based Research (ID: 5)	07-Jun-2017	3/3 (100%)
Avoiding Group Harms - U.S. Research Perspectives (ID: 14080)	07-Jun-2017	3/3 (100%)
Research and HIPAA Privacy Protections (ID: 14)	07-Jun-2017	5/5 (100%)
Data Management (RCR-Basic) (ID: 16600)	07-Jun-2017	5/5 (100%)
Research Misconduct (RCR-Basic) (ID: 16604)	07-Jun-2017	5/5 (100%)
Research, Ethics, and Society (RCR) (ID: 15198)	07-Jun-2017	4/5 (80%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

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COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Deborah Nelson (ID: 3981667)
- **Institution Affiliation:** Northcentral University (ID: 786)
- **Institution Email:** dnelson@ncu.edu
- **Institution Unit:** Graduate School
- **Phone:** 410-772-9059

- **Curriculum Group:** Human Research
- **Course Learner Group:** IRB Required Modules for NCU
- **Stage:** Stage 1 - Basic Course

- **Record ID:** 20609405
- **Report Date:** 07-Jun-2017
- **Current Score**:** 99

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
Research, Ethics, and Society (RCR) (ID: 15198)	07-Jun-2017	4/5 (80%)
History and Ethical Principles - SBE (ID: 490)	06-Jun-2017	5/5 (100%)
Defining Research with Human Subjects - SBE (ID: 491)	07-Jun-2017	5/5 (100%)
Belmont Report and CITI Course Introduction (ID: 1127)	06-Jun-2017	3/3 (100%)
Records-Based Research (ID: 5)	07-Jun-2017	3/3 (100%)
The Federal Regulations - SBE (ID: 502)	07-Jun-2017	5/5 (100%)
Data Management (RCR-Basic) (ID: 16600)	07-Jun-2017	5/5 (100%)
Assessing Risk - SBE (ID: 503)	07-Jun-2017	5/5 (100%)
Informed Consent - SBE (ID: 504)	07-Jun-2017	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	07-Jun-2017	5/5 (100%)
Research with Prisoners - SBE (ID: 506)	07-Jun-2017	5/5 (100%)
Research Misconduct (RCR-Basic) (ID: 16604)	07-Jun-2017	5/5 (100%)
Research with Children - SBE (ID: 507)	07-Jun-2017	5/5 (100%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	07-Jun-2017	5/5 (100%)
International Research - SBE (ID: 509)	07-Jun-2017	5/5 (100%)
Internet-Based Research - SBE (ID: 510)	07-Jun-2017	5/5 (100%)
Research and HIPAA Privacy Protections (ID: 14)	07-Jun-2017	5/5 (100%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	07-Jun-2017	4/4 (100%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	07-Jun-2017	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	07-Jun-2017	5/5 (100%)
Avoiding Group Harms - U.S. Research Perspectives (ID: 14080)	07-Jun-2017	3/3 (100%)
Cultural Competence in Research (ID: 15166)	07-Jun-2017	5/5 (100%)
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	07-Jun-2017	5/5 (100%)
Research with Persons who are Socially or Economically Disadvantaged (ID: 16539)	07-Jun-2017	5/5 (100%)
Gender and Sexuality Diversity (GSD) in Human Research (ID: 16556)	07-Jun-2017	5/5 (100%)
Research with Subjects with Physical Disabilities & Impairments (ID: 16657)	07-Jun-2017	5/5 (100%)
Consent and Subject Recruitment Challenges: Remuneration (ID: 16881)	07-Jun-2017	5/5 (100%)

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