

**Self-Determination Theory and Posttraumatic Growth in University Students  
Experiencing Negative Life Events**

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## Abstract

Grounded in Self-Determination Theory (SDT; Deci & Ryan, 1985, 2000), the purpose of this thesis was to investigate the role of global/dispositional autonomous and controlled motivation orientations in facilitating posttraumatic growth (PTG; Tedeschi & Calhoun, 1996, 2004) following the experience of various significant negative life events (Manuscript 1), relationship dissolution (Manuscript 2), and bereavement (Manuscript 3) in two university student samples. The objectives were to investigate the contribution of dispositional autonomous and controlled motivation in statistically predicting PTG above and beyond previously researched correlates; and explore the mediating role of cognitive appraisals and coping strategies in explaining the relationship between dispositional motivation orientations and PTG. Consistent with the overall hypotheses of the thesis, dispositional autonomous motivation was positively associated with PTG across all three manuscripts. Across all three manuscripts, we found that dispositional autonomous motivation explained a unique portion of the variance in explaining PTG, above and beyond previously researched correlates of PTG and dispositional controlled motivation. Mediation results indicated an indirect effect of dispositional autonomous motivation on PTG through primary cognitive appraisal (Manuscript 1). Dispositional autonomous motivation was positively associated with task-oriented coping strategies across all three manuscripts. Moreover, task-oriented coping strategies were the strongest indirect effect in Manuscript 1, and the only significant indirect effect in Manuscript 2 and Manuscript 3 between dispositional autonomous motivation and PTG. Dispositional controlled motivation was positively related to disengagement-oriented coping strategies in Manuscript 1 and 2, but unrelated in Manuscript 3. Collectively, these findings highlight the importance of incorporating motivation orientations

into theoretical models of PTG and aiding practitioners in better recognizing the significance of motivational factors in facilitating posttraumatic growth.

### Acknowledgements

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## Content of Thesis and Contribution of Authors

The present thesis is comprised of a general introduction, three articles, and a general discussion followed by appendices. The general introduction reviews the literature on the models and determinants of posttraumatic growth, and reviews self-determination theory, motivation orientations, and their relationship to coping and cognitive appraisals, which set the stage for addressing the research questions at the heart of this dissertation. These sections are followed by a brief introduction to the three articles including their main goals and objectives. The first article entitled *Facilitating Posttraumatic Growth: The Role of Autonomous Motivation* will be submitted for publication in the weeks following the defense of the dissertation. The second article entitled *Posttraumatic Growth Following a Romantic Breakup: The Contribution of Self-Determination Theory* will be submitted for publication in the weeks following the defense of the dissertation. The third article entitled *Posttraumatic Growth and Bereavement: The Contribution of Self-Determination Theory* is currently under review at OMEGA – Journal of Death and Dying. Next, the general discussion summarizes the findings documented in the three articles; discusses the theoretical and clinical implications of the findings; acknowledges the strengths and limitations of the studies; and ends with a discussion of the continued conceptual issues in the posttraumatic growth literature and fruitful avenues for future research. The final section of the dissertation is comprised of appendices which include the study materials that were used in the dissertation. The author of the dissertation appears as first author while the thesis supervisor and a former honours student from the supervisor's research laboratory appear as co-authors on all three articles. The following are the contributions of the authors in each of the three articles.

**Article 1.** The first author conceptualized the research project described in Article 1 including the study hypotheses and preparation and completion of the project submission form for approval

from the Research and Ethics Board of the University of Ottawa. The first author created the online survey that was administered to participants. The second author of the manuscript was the supervisor's honour's student who participated in the discussions pertaining to the conceptualization of the manuscript. The second author also provided edits to the manuscript and co-created tables and figures. The first author of the article conducted the literature review, analyzed the data, and wrote the entire paper under the guidance of the supervisor.

**Article 2.** The first author conceptualized the research project described in Article 2 including the study hypotheses and preparation and completion of the project submission form for approval from the Research and Ethics Board of the University of Ottawa. The first author created the online survey that was administered to participants. The second author of the manuscript was the supervisor's honour's student who used the Study 1 dataset for their honour's thesis related to PTG following breakups. The honours thesis was co-supervised by the first author who conceptualized the honours project, guided and edited the literature review and discussion sections, and analyzed the data. Sections of the honours thesis including, some parts of the literature review, results, and discussion were included in Article 2. The second author participated in the discussions pertaining to the conceptualization of Article 2. The second author also provided edits to the manuscript and co-created tables and figures. Except for some parts in the literature review and discussion sections taken from the second author's honours thesis, the first author of the manuscript analyzed all data and wrote the entire manuscript. Every step of the research process was conducted in consultation with and under the guidance of the thesis supervisor.

**Article 3.** The first author conceptualized the research project described in Article 3 including the study hypotheses and preparation and completion of the project submission form for approval

from the Research and Ethics Board of the University of Ottawa. The first author created the online survey that was administered to participants. The second author of the manuscript was the supervisor's honour's student who participated in the discussions pertaining to the conceptualization of the manuscript. She also provided edits to the manuscript and co-created tables and figures. The first author of the article conducted the literature review, analyzed the data, and wrote the entire paper under the guidance of the supervisor.

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## INTRODUCTION

The idea that one can find meaning and positive psychological changes in the face of stressful and challenging life experiences has been reported for centuries. Religions, literature, and philosophies have emphasized the personal gain found in suffering, and this idea is central to the existential-humanistic tradition of psychology (Frankl, 1961; Linley, 2008; Maslow, 1954). However, the empirical study of growth following adversity has only become a main focus within the past two decades, following the launching of the positive psychology movement in the late 1990's (Joseph & Linley, 2008).

Historically, psychology has been grounded in the illness ideology and medical model, whereby the emphasis has been on individual deficiencies, abnormal behaviour, biological diseases, and poor adjustment (Tedeschi, Park, & Calhoun, 1998). In relation to traumatic and stressful life events, psychology has primarily focused on their negative effects (i.e. posttraumatic stress disorder). Even though an array of evidence reveals most individuals are quite resilient and report several positive outcomes in the face of adversity (Linley & Joseph, 2004; Tedeschi et al., 1998), this tradition has devoted less attention to the potential for positive change or posttraumatic growth. Contrary to the illness ideology, positive psychology is equally concerned with understanding and enhancing psychological well-being and functioning as it is with alleviating maladaptive functioning and distress. Positive psychology emphasizes that psychopathology differs in degree and not kind, that mental health disorders are a reflection of interactions between the individual and their environment, and that it is essential as a positive psychologist to identify human strengths and promote mental health (Joseph & Linley, 2008).

There have been several terms used to describe the positive changes following a stressful life crisis or traumatic event including *positive psychological changes* (Yalom & Lieberman,

1991), *perceived benefits* (Calhoun & Tedeschi, 1991), *thriving* (O’Leary & Ickovics, 1995), and *stress-related growth* (Park, Cohen, & Murch, 1996). However, it is the term *posttraumatic growth (PTG)* coined by Tedeschi and Calhoun (1995) that has proven to be the most successful in stimulating interest to this area of positive psychology. Posttraumatic growth (PTG) refers to “positive psychological change experienced as a result of the struggle with highly challenging life circumstances” (Tedeschi & Calhoun, 2004, pp. 1). PTG is a process and an outcome where individuals may grow beyond their previous level of psychological functioning as a result of a highly stressful event (Tedeschi et al., 1998). PTG is specifically about psychological well-being and not emotional states and subjective well-being. Psychological well-being involves active engagement with existential challenges in life including understanding one’s place in the world, self-acceptance, environmental mastery, personal growth, autonomy, fostering good relationships with others, and having meaning and purpose in life (Ryff & Singer, 1996). In addition, seeing that PTG is related to tragedy, a eudaemonic view of human flourishing indicated by Ryan and Deci (2001), which emphasizes meaning and self-realization seems appropriate as the hedonic view includes increased pleasure, satisfaction, and subjective well-being only (Ryan & Deci, 2001; Ryan, Huta, & Deci, 2008).

The following sections will further review predominant models of PTG, discuss the process of PTG, the various domains of PTG, PTG’s relationship with health outcomes, and provide a comprehensive review of the determinants of PTG. It will also introduce Self-Determination Theory (SDT; Deci & Ryan, 1985, 2002) as a useful framework for understanding individual differences in appraising and coping with stressful and challenging life events as well as directly predicting PTG.

## **Models in the PTG Literature**

There are several leading models that conceptualize PTG in different ways. For instance, some conceptualize PTG as a coping strategy (e.g., Affleck & Tennen, 1996), an outcome of processing the negative life event (Schaefer & Moos, 1992), or both a coping style and outcome (Calhoun & Tedeschi, 2004; Zoellner & Maercker, 2004). Moreover, some PTG models such as Schaefer and Moos' (1998) and Tedeschi and Calhoun's (1995, 2004) offer proposed mechanisms of PTG.

Schaefer and Moos (1998) offer a comprehensive model of PTG, explaining positive change following adverse life events. They focus on pre-trauma, trauma (event-related characteristics), and post-trauma factors. Their model is useful for understanding individual differences in and precursors of PTG. According to the model, positive changes are formulated by (a) the environmental system (e.g., social network, living conditions), (b) personal characteristics of individuals (e.g., self-efficacy, personality), (c) factors related to the negative life event (e.g., the duration of the event, the amount of time that has passed since the event), and (d) cognitive appraisals and coping responses (e.g., task-oriented, disengagement-oriented). This model has been empirically validated and tested in research across various populations and life crises, including cancer, bereavement, HIV, war and combat, and divorce (Arikan & Karanci, 2012; for review see Schaefer & Moos, 1998).

Another model is the functional descriptive model of Calhoun and Tedeschi (2004), which is based on the shattered assumptions theory (Janoff-Bulman, 1992). Within this model, the process of PTG relies on the assumption that as individuals we have a general set of beliefs about the world and how it works. These assumptions guide our actions and help us understand the causes and reasons for events we experience. This "assumptive world" (Parkes, 1971)

includes “everything we know or think we know” (p.103). Therefore, in order to begin the process of cognitive processing necessary for PTG, a loss and/or major life crisis must first take place that shatters an individual’s assumptive world view and his or her place in it, forcing the reconstruction of this assumptive world so that it can be brought in line with what one has been experiencing (Tedeschi & Calhoun, 2004). Janoff-Bulman (1992) defined the psychological crisis that coincides with the stressful life event as the extent to which fundamental aspects of the assumptive world are challenged, including assumptions related to predictability, one’s safety in the world, the controllability in the world, and one’s identity and future. These challenges to the assumptive world ultimately lead to high levels of psychological distress. According to Tedeschi and Calhoun’s (2004, 2007) conceptualization of PTG, the central element in the process of PTG appears to be the ability to cognitively process or rebuild a new schema that is more resistant to being shattered in the future. Thus, it is in the terms such as “rumination” and “cognitive processing” that refer to the process of re-examining the beliefs within the assumptive world that lead to growth (Tedeschi, Calhoun, & Cann, 2007). Slightly different from the definition in the coping literature, rumination according to Tedeschi and Calhoun (2007) refers to the persistence in facing the pain associated with the trauma while searching for meanings that ultimately will help one transform the suffering, which include cognitive-emotional processing. Suffering through a life crisis is a process that leads to greater reflection and elaboration of the self. It is not about the loss that results in growth, but rather the struggle to find meaning during the pain that underlies the transformations of a new understanding of the world and one’s place in it (Tedeschi & Calhoun, 2004). Nor is growth about how much time has passed, but rather what a person does with the pain in the aftermath that affects the trauma outcome (Stewart, 1998).

Ultimately, the reconstruction of the assumptive world is merely a reflection of one's psychological well-being (Joseph & Linley, 2008).

Another theory influenced by the shattered assumptions theory is the organismic valuing theory (Joseph & Linley, 2005; Rogers, 1959), which provides a theoretical basis for the process leading to growth (i.e. psychological well-being) in the aftermath of a negative life event. This theory is grounded in the paradigm that individuals are intrinsically motivated toward growth (i.e. optimal functioning) throughout life and in the face of adversity. According to this theory, subsequent to a major life crisis there are potentially two directions in which cognitive-emotional processes can proceed as individuals experience cycles of appraisal, emotional states, and coping (Joseph & Linley, 2005). An individual may process negative life event/trauma-related information in one of two ways: assimilation or accommodation. Assimilation involves taking the negative life event/trauma-related information and using it to maintain one's existing model of how the world works. This will lead an individual to return to pre-event/trauma levels of psychological functioning and leave them just as vulnerable to future negative life events/trauma (Skinner & Edge, 2002). Accommodation on the other hand involves using the negative event/trauma-related information to modify one's perceptions of the world. The individual can now see the world as random or unjust (i.e. bad events can happen at any time) and change their worldviews accordingly in either a negative (e.g., helplessness, psychopathology) or positive direction (e.g., appreciate life, growth; Joseph & Linley, 2008).

Taylor and Armor (1996) offer another model that conceptualizes PTG as a "positive illusion" that acts as an adaptive function for psychological adjustment. In the face of threatening events, Taylor (1983) argues that individuals will use cognitive re-appraisal strategies to help maintain aspects of their self-concept, self-esteem, reduce a sense of victimization following the

negative life event, and increase their sense of control. These strategies may then help individuals to eventually accept their circumstances (Taylor & Armor, 1996). Similarly, Maercker and Zoellner (2004) proposed in their model that PTG consists of both illusory (i.e., self-deceptive) and constructive (i.e., functional) sides.

The current dissertation integrates several aspects from the various models of PTG in the literature. For instance, cognitive appraisal processes, coping strategies, and factors related to the negative life event (e.g., amount of time passed since the event) are included and are consistent with Schaefer and Moos' (1998) and Tedeschi and Calhoun's (2004) models. Moreover, we are investigating the contribution of a new variable in explaining PTG, namely, motivational orientations. Motivation orientations fit into the dispositional/personal characteristic factors of previous models and are directly in line with Joseph and Linley's (2005) organismic valuing theory.

### **Domains of PTG**

To illustrate how this process of PTG may occur, we will utilize Tedeschi and Calhoun's conceptualization to demonstrate how some individuals who experience a divorce may engage in the process of PTG. The experience of a divorce may lead one to feel a mixture of emotions such as anger, shame, guilt, and sadness. This event may result in challenging an individual's core assumptions and beliefs. For example, assumptions and beliefs about fairness and control, along with altering views of self as vulnerable, others as untrustworthy, and possibly the world as rejecting and unsafe. Initially, one may experience automatic rumination consisting of intrusive thoughts and memories about the relationship and divorce, and questioning how and why the divorce occurred. Following this, they may begin to deliberately ruminate, engage in purposeful reflection, where they explore not only the "why it happened", but start to focus on what can be

learned from the relationship and experience. According to Tedeschi and Calhoun (2004), this deliberate emotional-cognitive processing often co-occurring with distress, will lead to a potential modification of their life narrative, re-establish the individual's core assumptions for living and relationships, and ultimately experience positive life changes. Notably, this process of growth will be more likely if certain kinds of personality, coping, and social support (e.g., empathic acceptance of disclosures) characteristics are present. It is proposed that positive life changes will include shifts in cognitive, emotional, and behavioural patterns in various domains (e.g., stronger view of self, becoming more caring and connected to others).

According to the literature there are at least three main domains of posttraumatic growth. First, individuals suffering through a major life crisis have indicated positive changes in their self-perception (Joseph & Linley, 2008; Tedeschi & Calhoun, 1996). This comprises the psychological well-being dimensions of environmental mastery, personal growth, and self-acceptance. For example, research indicates that following a negative life experience, individuals have felt stronger and more self-assured (Collins, Taylor, & Skokan, 1990), and have grown emotionally (Affleck, Tennen, & Gershman, 1985). Second, individuals have identified significant changes in relationships with others (Joseph & Linley, 2008; Tedeschi & Calhoun, 1996). Traumatic and negative life events have the capacity to bring about a change in the closeness of one's relationships. Oftentimes, individuals report a deepening of their relationships in general, more positive relationships with family members, and better handling of relationships (Tedeschi & Calhoun, 1996). The recognition of one's vulnerability may lead to more emotional expression, willingness to seek help, and ultimately more empathy towards others (Collins et al., 1990). Third, many individuals report changes in their philosophy of life subsequent to negative life events. This comprises the psychological well-being dimensions of having a purpose in life

and autonomy (Joseph & Linley, 2008). Researchers indicate findings such as an increased appreciation for life, strengthened spiritual beliefs, a change in priorities, taking life easier, no longer taking life for granted, and living each day to the fullest (Tedeschi & Calhoun, 2004; Tedeschi & Calhoun, 1996).

Tedeschi and Calhoun (1996) expanded these three domains of posttraumatic growth in their creation of the multidimensional Posttraumatic Growth Inventory (PTGI), one of the most established self-report measures of PTG. Although there is some overlap with the aforementioned domains, their 21-item questionnaire measures five domains (i.e. subscales) of PTG, namely, greater appreciation of life and changed sense of priorities; warmer, more intimate relationships with others; greater sense of personal strength; recognition of new possibilities or paths for one's life; and spiritual development (Tedeschi & Calhoun, 1996). Although these domains of PTG are positive, Tedeschi and Calhoun make it clear that growth does not necessarily signal an end to the distress that accompanies a major life crisis, nor does growth lead to viewing the negative life event as desirable. Instead, their research shows that continuing personal distress and growth often coexist (Tedeschi & Calhoun, 2004).

PTG appears to be taking place across an array of people and a wide range of negative life experiences. Some of the major life crises reported are college students experience of negative life events (Park, Cohen, & Murch, 1996), bereavement (Michael & Cooper, 2013), HIV infection (Schwartzberg, 1993), cancer (Collins et al., 1990), heart attacks (Affleck, Tennen, Croog, & Levine, 1987), sexual abuse (Frazier, Conlon, & Glaser, 2001), war (Elder & Clipp, 1989), being taken hostage (Cole, 1992), transportation accidents (Joseph, Williams, & Yule, 1993), and romantic breakups/dissolution (Tashiro & Frazier, 2003).

### **PTG's relationship to health outcomes**

A meta-analytic review of 87 studies by Helgeson, Reynolds, and Tomich (2006) examined the question of whether growth (PTG, stress related growth, benefit finding) was related to better psychological and physical health outcomes. The researchers found growth following adversity significantly related to better mental health outcomes, more intrusive and avoidance thoughts, and positive reappraisal coping. The experience of intrusive and avoidant thoughts is consistent with Tedeschi and Calhoun's (1996) theory, and experiencing a major life stressor may mean people are working through or cognitively processing the negative event related information, which could be leading to future growth. It may even be argued that this contemplation and rumination is necessary for the growth to occur (Tedeschi & Calhoun, 1998). Furthermore, this review found that being a minority, younger people, and being female are more likely to experience growth following major life crises. This sex difference is consistent with the coping literature where women engage in more positive reappraisal and more positive self-talk compared to their male counterparts (Tamres, Janicki, & Helgeson, 2002), coping strategies that have been documented to lead to growth (Joseph & Linley, 2004).

### **Determinants of PTG**

Several different theories have proposed varying determinants of growth following a major life crisis. Taylor's (1983) model of cognitive adaptation focuses on the coping mechanism of positive reinterpretation of the trauma experience (Park et al., 1996). Janoff-Bulman's (1992) model emphasizes rebuilding shattered schemas. Antonovsky (1987) focuses on the ability to comprehend and find meaning in the stressful experience. Lastly, Tedeschi and Calhoun (1996) pay attention to the struggle with the major life crisis and the cognitive-emotional processing (i.e. rumination) leading to growth. However, due to the various names

associated with positive changes following adversity most review papers have lumped the terms stress related growth, positive changes, benefit finding, adversarial growth, and posttraumatic growth together and discussed them as one term (Helgeson, Reynolds, & Tomich, 2006; Linley & Joseph, 2004; Park et al., 1996). Thus, the reader should keep this in mind during the following discussion of the determinants of growth following adversity.

Joseph and Linley (2004) conducted a review of 40 studies that employed a total of seven different measures of adversarial growth, and found several variables that predicted adversarial growth in the literature. More specifically, of the Big Five personality variables extraversion, openness to experience, agreeableness, and conscientiousness were significantly related to growth. Additional personality constructs related to growth were self-efficacy, hardiness, high self-esteem, and optimism. Coping strategies positively associated with growth included, problem-focused, emotion-focused, acceptance, positive reinterpretation, positive religious coping, and social support satisfaction. The cognitive processing variables such as rumination, intrusions, avoidance, and awareness and controllability of the event were also significantly associated with adversarial growth (Joseph & Linley, 2004). Other variables including positive affect, higher education and income were also positively related to growth. Only two studies in this review included detailed longitudinal outcomes (Abraido-Lanza, Guier, & Colon, 1998; King, Scollon, Ramsey, & Williams, 2000). Both studies found positive affect, negative affect, and self-efficacy to be predictive of growth following adversity over a 3 -year time period. Moreover, in their review, Park et al. (1996) examined determinants of stress related growth (i.e. negative life events) in college students and found that at 6-month follow-up, positive reinterpretation, the number of positive life events, acceptance coping, intrinsic religiousness, initial stress of the traumatic event, and social support satisfaction were significant predictors of

growth. Therefore, due to the minimal longitudinal research and somewhat inconsistent findings in the literature, Linley and Joseph (2004) concluded that individuals are more likely to experience growth when the negative life events they encounter are more severe, when individuals are optimistic, intrinsically religious, and experience more positive affect, and when individuals use positive reinterpretation and acceptance coping strategies. More recently, a longitudinal study by Frazier et al. (2009) found perceived PTG was related to increases in distress from pre-to post (8 weeks) negative life event.

Although most research has focused on personality and coping factors in predicting PTG, theoretical models also posit that cognitive appraisals of the event predict PTG (Holahan, Moos, & Schaefer, 1996; Shaefer & Moos, 1998; Tedeschi & Calhoun, 1996). Most researchers have focused on appraisal dimensions such as loss, threat, challenge, controllability, and severity (Armeli et al., 2001; Park et al., 1996; Peacock & Wong, 1990). Research indicates that within college aged samples cognitive appraisals of high event stress are associated with PTG (Park et al., 1996). In addition, when individuals appraise an event as highly threatening, high loss, report having high social resources, and high coping ability they experience higher levels of PTG (Armeli et al., 2001). However, minimal amount of research has investigated the interactive nature of appraisals and coping in predicting PTG (Armeli et al., 2001) and most research usually focuses on only a few cognitive appraisal dimensions.

A review of the empirical evidence (Tedeschi & Calhoun, 2004) specifically targeting posttraumatic growth as measured by the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) revealed individual characteristics, aspects of cognitive processing, and social support as significant determinants of PTG following major life crises. More specifically, similarly to Joseph and Linley's (2004) findings related to adversarial growth, they found that

personality characteristics of extraversion, openness to experience, and optimism were modestly related to PTG (Tedeschi & Calhoun, 1996). Moreover, cognitive-emotional processing including the concept of rumination is related to PTG. Beyond what has been mentioned previously, rumination includes reflecting on discrepancies involving unattained goals or schemas and events, and placing them into a trauma narrative that allows the individual to see themselves before and after the negative life event and to visualize the major life crisis as a turning point (McAdams, 1993). Evidence suggests social support coping is important in facilitating PTG (Park et al., 1996; Tedeschi & Calhoun, 2004). Seeking social support is believed to help individuals evaluate the traumatic events as being less stressful (Cohen & Wills, 1985) and provides the opportunity to incorporate other perspectives into new schemas of the assumptive world (Parkes, 1971; Tedeschi & Calhoun, 1998). In general, the above findings illustrate that it is not so much the event, but rather one's personality characteristics and how one copes through cognitive-emotional processing and social support that determines PTG. However, due to this research being in its infancy and the potential differences in growth across various types of negative life experiences, we are still unsure as to the consistent determinants of posttraumatic growth across major life crises, and whether certain domains of growth outcomes are event specific. Moreover, there may be other variables in the literature that may add to the prediction of PTG. Thus, Linley and Joseph (2004) recommended that researchers should endeavor to identify new variables that contribute to posttraumatic growth (Linley & Joseph, 2004).

## **Self-Determination Theory**

Self-Determination Theory (SDT; Deci & Ryan, 1985, 2002), a well-grounded theory of motivation is a useful framework for understanding individual differences in appraising and coping with stressful and traumatic life events as well as directly predicting PTG.

SDT consists of four mini-theories that reflect an organismic and dialectical perspective regarding human beings. Consistent with viewpoints of most researchers in the field of positive psychology (Seligman & Csikszentmihalyi, 2000), the organismic perspective argues that humans embody an inherent tendency to be active agents in their lives, to be innately proactive, and to naturally integrate ongoing experience in order to develop a coherent and unified sense of self (Ryan & Deci, 2002). Rather than being passively controlled by inner (e.g. emotions) and outer (e.g., environment) forces, individuals are naturally inclined to master these factors and to engage in both inner and outer environments in attempts to experience personal growth and optimal psychological health. However, SDT argues that this innate tendency towards optimal development does not come automatically, and in order for individuals to actualize their intrinsic nature and potentials they require certain nutriments from their environment (Ryan & Deci, 2002). Consequently, the dialectical perspective stipulates that specific social-contextual factors can facilitate or undermine these natural attempts at optimal personal growth and development. This organismic-dialectical perspective that underlies SDT emphasizes the interaction between a proactive, growth-oriented individual, and the social environment that either supports or thwarts the individual's natural tendency towards personal development and psychological well-being. Accordingly, psychological growth is an active potential that requires "proximal and distal conditions of nurturance" (Ryan & Deci, 2002, p. 6).

Within the dialectical perspective, SDT proposes that social environments can influence whether and to what extent our inherent tendency towards growth is fulfilled. SDT contends that satisfaction of three psychological needs is essential for individuals to experience optimal development and psychological well-being. Psychological needs within this SDT are considered universal, meaning they operate across gender, culture, and time (Chirkov, Ryan, Kim, & Kaplan, 2003) and are required to support healthy functioning and well-being and prevent poor functioning and ill-being. As humans, even if we are not consciously seeking these needs as a goal, the healthy psyche continuously strives to satisfy these needs and is drawn towards situations that provide them (Deci & Vansteenkiste, 2004). Although, all three needs are essential, the degree to which they are satisfied varies from one context to another. The three needs include autonomy, competence, and relatedness. The need for autonomy refers to feeling one's actions are based on self choice, to self initiate, to fully endorse one's behaviour, and to act in accordance with one's interests and integrated values (Deci, 1975; deCharms, 1968). The need for competence refers to feeling effective in one's abilities and interactions with their environment, capable of producing desired outcomes and preventing undesirable ones, and the tendency to experience challenge and mastery (White, 1959). Rather than a skill to be obtained, competence is more of a felt sense of confidence and effectance in action. The need for relatedness refers to feeling connected to others, feeling accepted by others, caring for others, and the tendency to establish stable relationships with others, otherwise known as the "need to belong" (Baumeister & Leary, 1995; Ryan & Deci, 2000). Ultimately, the satisfaction of these needs through optimal social contexts leads to feelings of effectiveness, connectedness, and intrinsic motivation (Patrick et al., 2007). Research indicates there is a significant association

between each of the three needs and psychological health and well-being (for a review see Deci & Ryan, 2000).

When psychological needs are satisfied individuals engage in behaviours/activities for more self-determined (i.e., autonomous) reasons. To be self-determined is to “endorse one’s actions at the highest level of reflection” and to “experience a sense of freedom to do what is interesting, personally important, and vitalizing” (Deci & Ryan, 2002). Self-determined behaviours are those chosen out of choice and pleasure, which allow for the attainment of important goals, and are coherent with one’s values. In fact, satisfaction of needs is the central process by which intrinsic motivation, the most self-determined type of motivation is facilitated. Conversely, need thwarting leads to engaging in behaviours/activities for low or non-self-determined (i.e., controlled) extrinsic reasons and goal pursuits (Deci & Vansteenkiste, 2004).

Deci and Ryan (1985, 2002) view the motivation to engage in behaviours and activities from a multidimensional perspective that includes types of motivation that vary along a self-determination continuum. They identify three general components of motivation, which include intrinsic motivation, extrinsic motivation, and amotivation. Intrinsic motivation is the most self-determined type of motivation, and involves engaging in activities for the inherent pleasure of the activity, for a sense of accomplishment, and for learning. In extrinsic motivation individuals engage in activities not for the inherent interest in the activity, but rather for the instrumental or important outcomes as a result of the activity. Research by Deci, Ryan, and colleagues (Deci & Ryan, 1985, 1991) identified four types of extrinsic motivation or regulatory styles that vary in their degree of self-determination. These regulatory styles also differ in their degree of internalization. According to SDT, internalization is when individuals take external reasons for engaging in behaviours and transform them in to personally endorsed values and integrate them

into their sense of self (Ryan, Connell, & Deci, 1985). The higher internalization the more individuals engage in behaviours for self-determined reasons (Deci & Ryan, 2000). *Integrated regulation* is the most self-determined type of extrinsic motivation and involves engaging in activities because they have been internalized, integrated into one's value system and are in harmony with one's sense of self and identity (e.g., 'because by doing them I am fully expressing my deepest values'). *Identified regulation* involves engaging in activities because one acknowledges the underlying value and benefits of the behaviour (e.g., 'I exercise to improve my health'). At the first stage of the internalization process is *introjected regulation*, where individuals take previous external regulations and bring them within themselves. Due to internal pressure from the self, individuals engage in behaviours out of obligation, usually to avoid feeling guilty or to support conditional self-worth (e.g., pride; 'because I would feel bad if I do not do them'). *External regulation* refers to engaging in behaviours for the least self-determined reasons, namely, due to external pressure - to avoid punishment and obtain rewards (e.g., 'in order to attain prestige'). This is considered the classic example of extrinsic motivation, consistent with operant theory (Skinner, 1953). Lastly, *Amotivation* is an absence of motivation, where individuals do not engage in behaviours to attain an outcome, nor do they see the perceived value in engaging in activities (e.g., 'although it does not make a difference whether I do them or not'). Amotivation is similar to learned helplessness (Abramson, Seligman, & Teasdale, 1978), where individuals feel incompetent and perceive little if any control over their environment. In the past decade, researchers have shifted their focus from intrinsic versus extrinsic motivation, to a potentially more meaningful focus on autonomous versus controlled motivation (Chemolli & Gagne, 2014; Deci & Ryan, 2008; Koestner & Losier, 2003). Autonomous motivation includes intrinsic, integrated, and identified regulations; whereas

controlled motivation includes introjected and external regulations. Research investigating cognitive, behavioural, and affective outcomes indicates that autonomous motivation is associated with several positive outcomes including greater persistence, positive mood states, healthier lifestyles and behaviours (e.g., Pelletier, Dion, Slovenic-D'Angelo, & Reid, 2004), and higher ratings of psychological well-being (Ryan, Rigby, & King, 1993); whereas controlled motivation will more often lead to negative outcomes (see Deci & Ryan, 2000 and Vallerand, 1997, for reviews).

Personality and social psychologists have long viewed the self as consisting of both stable and flexible components. More specifically, it has been argued that certain parts of the self are fairly stable across contexts and are not as subject to influence based on the situation (Allport, 1961), whereas other parts appear to vary from context to context or change based on the immediate situation (Gergen, 1993). Consistent with this hierarchical structure of the self, SDT proposes a similar hierarchy of motivation represented within an individual at three levels of generality (Vallerand, 1997). Some motivations are more stable and are representative of one's global self (e.g., global self-determination; why one does things in one's life in general), whereas others are more flexible, such as the contextual (e.g., academic, work) and situational (e.g., present moment). Majority of the research conducted in solidifying this theory has mainly focused on situational factors on intrinsic motivation and contextual factors on motivation towards certain life contexts (Vallerand, 1997). Although, less attention has been paid to research at the global (dispositional) level, the research that has been conducted has generally focused on global assessments of intrinsic, extrinsic, and amotivation and adjustment outcomes (Vallerand, 1997). For instance, being globally self-determined (i.e., autonomously motivated) has been

associated with high levels of self-esteem and life satisfaction, and low levels of anxiety (Deci & Ryan, 1985; Hodgins & Kneen, 2002).

This notion of global traits acting as a stable resource has been referred to in the transactional model of stress and coping (Lazarus, 1991; Lazarus & Folkman, 1984), and is grounded in the idea that personality dispositions (i.e., global self-components) can act as stable resources that individuals can draw from in stressful situations. It is with this focus that the present studies intend to determine whether and to what extent a global/dispositional autonomous motivation can act as a stable resource when facing challenging life circumstances and can facilitate the process of posttraumatic growth in the aftermath of these events. Theoretically, to be autonomously motivated (i.e., self-determined) is to have an increased awareness of one's needs (Deci & Ryan, 1985), preferences, desires, and goals (Skinner & Edge, 2002). Research has supported these claims as autonomy has been shown to correlate positively with self-evaluation, self-awareness, self-actualization and ego-development (Deci & Ryan, 1985). In times of stress, these characteristics allow autonomously motivated individuals to maintain access to their goals and to continue to act on their genuine priorities (Skinner & Edge, 2002). In addition, having a growth orientation, autonomously motivated individuals are argued to have an increased sense of openness to experience. The idea that an integrating self underlies self-determination implies that novel experiences will be approached in an honest and authentic way with a willingness to integrate experiences into self-structures (Skinner & Edge, 2002; Weinstein, Przybylski, & Ryan, 2013). This appears to be the case as Weinstein, Deci, and Ryan (2011) found that being autonomously motivated helped facilitate the integration of negative (i.e., shaming or regretful major life events) and positive (i.e., happy and contented major life events) past identity experiences, whereas controlled motivation thwarted integration. It may be

that autonomously motivated individuals may have a higher tolerance for reflecting on their emotional experience without feeling the need to defend against it. In other words, being more autonomously motivated should result in less cognitive defensiveness and a movement toward experiencing emotions (negative or positive) in the moment for what they are (Hodgins & Knee, 2002). Support for low cognitive defensiveness comes from research conducted by Knee and Zuckerman (1996), where participants engaged in a task manipulated to produce success or failure. They found that autonomously motivated individuals made the fewest self-enhancing attributions for success and fewer defensive attributions for failure. They also did not vary their attributions to the favorability of the performance feedback they received. This openness to experiencing and processing emotions should help autonomously motivated individuals integrate stressful and non-stressful experiences into their sense of self. In essence, autonomously motivated individuals may be considered to be more likely to accommodate rather than simply assimilate experiences into an existing self-schema. Accommodation is a critical part of adaptation to uncontrollable events (Joseph & Linley, 2005). This process allows people to move beyond self pity, and bitterness, to an orientation of acceptance of current constraints, where individuals stop focusing on the past and assigning blame and to begin focusing on the future and accepting responsibility. This also generates the creation of fresh perspectives, such as focusing on the positives. Thus, self-determination or being more autonomously motivated can provide key motivational resources in times of stress following negative events and acting as a source of energy and direction for behaviour, emotion, and orientation (Hodgins & Knee, 2002). In general, when people have access to motivational resources the regulation of their action is more adaptive, more flexible, and open to internal and external information (Hodgins & Knee, 2002).

## **Self-Determination Theory and Coping**

Stemming from work conducted by Lazarus and Folkman (1984), coping has been defined as the cognitive and behavioural actions that one employs in order to manage internal and external demands during a stressful encounter or event (Lazarus, 1993; Skinner, Edge, Altman, & Sherwood, 2003, for a review). There have been previous attempts at categorizing coping into various dimensions (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001; Lazarus & Folkman, 1984). The problem-focused coping dimension includes strategies that focus on altering the source of stress such as planning and seeking advice from others. The other dimension is referred to as emotion-focused coping where the individual aims to reduce the negative emotions or change the meaning of the stressful situation (e.g., positive reinterpretation, acceptance). These two dimensions can be re-grouped into a higher-order coping category called task-oriented coping because both dimensions have been shown to lead to more positive outcomes in times of stress (see Skinner et al., 2003). Researchers have also created another higher-order dimension called disengagement-oriented coping and includes strategies aimed at disengaging oneself from the event and focusing on event-unrelated cues. The strategies employed for this dimension include such things as mental and behavioural disengagement, and denial (Skinner et al., 2003). Lazarus and Folkman (1984) emphasized that no single coping strategy is better than another because the strategies one uses are dependent on a fit between situational factors (i.e., level of control), cognitive appraisals of the situation, and the choice of coping strategy employed. In general, task-oriented coping has been linked to several positive outcomes such as illness remission, better quality of life and mental health (Aldwin, 2000) and positive adjustment to stressors (Holland & Holahan, 2003). However, turning to disengagement-

oriented strategies have been found to exacerbate the effects of stress and are frequently considered to be maladaptive (Compas, et al., 2001).

According to Lazarus's (1991) Cognitive-Motivational-Relational Theory (CMRT), motivation is vital to better understand both cognitive appraisals of the situation and coping responses in stressful person-environment relationships. Surprisingly, a small amount of research has investigated how self-determined motivation and coping interrelate in stressful contexts.

Theoretically, more autonomously motivated (i.e., self-determined) individuals have better access to motivational resources during stressful periods, which should help them choose more adaptive action tendencies by coping more effectively with environmental demands (Hodgins & Knee, 2002; Skinner & Edge, 2002). As self-determined individuals feel more autonomous in their choices and competent in their ability to handle adversity, during times of stress or transition this autonomous orientation is thought to create a buffer around those events, within which the individual maintains the psychological space to willfully decide how to respond to external pressure (Hodgins & Knee, 2002; Skinner & Edge, 2002).

Growing empirical evidence supports the association between autonomous motivation and coping in stressful contexts. Knee and Zuckerman (1998) investigated participants during their first semester of university and found that autonomous motivation was negatively associated with disengagement-oriented forms of coping such as denial, behavioural and mental disengagement, and positively associated with more adaptive task-oriented strategies (i.e., planning, search for instrumental social support). On the other hand, controlled motivation was associated with a greater use of less adaptive disengagement-oriented coping. Similar results have been obtained by studies conducted in the context of stressful sport competition and during exams in a university setting (Amiot, Gaudreau, & Blanchard, 2004; Thompson & Gaudreau,

2008). In the context of a stressful argument with one's romantic partner autonomous motivation was associated with adaptive forms of coping including positive reinterpretation, planning, and seeking emotional support, whereas as controlled motivation was associated with venting of emotions and denial type coping strategies (Knee, Patrick, Vietor, Nanayakkara, & Neighbors, 2002). Only one known study has investigated the relationship between autonomous motivation and coping strategies using the Global Motivation Scale (Guay, Mageau, & Vallerand, 2003). This longitudinal study was conducted in the context of students experiencing the transition to university (Amiot et al., 2004). Results indicated that being more autonomously motivated was positively associated with greater use of task-oriented coping strategies and lesser use of disengagement-oriented coping.

The aforementioned studies indicate that in the context of stressful life circumstances, being autonomously motivated may help individuals continue to resonate with their goals and priorities, choose adaptive coping strategies, and prevent them from becoming destabilized in changing circumstances (Koestner, Bernieri, & Zuckerman, 1992). Having more autonomous action tendencies that emanate from an authentic self that work in a synergistic fashion help an individual to cope and integrate their experiences more effectively. This is because with more cognitive flexibility during stressful periods, autonomously motivated individuals can focus their energy on processing the experience, rather than having to use cognitive energy for self-awareness and conscious control (Kuhl, 1984).

### **Self-Determination Theory and Cognitive Appraisal**

Although there is a growing body of research linking autonomous motivation and task-oriented coping, and evidence that claims autonomous motivation and psychological need satisfaction lead to more positive outcomes (Vallerand, 1997), we are still unaware of the

mediatory process that facilitates the positive outcomes and the relationship between autonomous motivation and coping. We agree with other researchers that suggest cognitive appraisals play a fundamental role in mediating autonomous motivation and coping (Amiot et al., 2004; Blais, Sabourin, Boucher, & Vallerand, 1990; Ntoumanis, Edmunds, & Duda, 2009; Skinner & Edge, 2002).

As indicated by Lazarus and Folkman (1984), the perception of stress is shaped mutually by environmental demands, individuals' appraisals, and personal and social resources. Thus, stress does not appear to result from the events themselves, but rather from how we appraise them (Lazarus, 1998). Accordingly, Lazarus and Folkman (1984) identified two main appraisal processes, namely primary and secondary appraisal. When confronted with a stressor, individuals first utilize primary appraisal to judge the personal significance of the stressor as challenging, threatening, or irrelevant. Individuals then engage in secondary appraisal to evaluate the controllability of the stressor and whether or not they have the personal resources and social support to cope with the situation. Research has demonstrated that in general, appraising a stressful situation (i.e., primary appraisal) as a challenge to be overcome is associated with higher coping expectancies while threat appraisals are associated with lower coping expectancies (Skinner et al., 2003). In addition, appraisals of threat have been associated with negative emotional states (Tomaka, Blascovich, Kelsey, & Leitten, 1993; Tomaka, Blascovich, Kibler & Ernst, 1997) and emotional distress (Gall & Evans, 1987). Alternately, challenge and more positive appraisals have been associated with positive emotional states, and feelings of energy, vitality, and well-being (Gall & Evans, 1987; Tomaka et al., 1993).

Stress appraisals are thought to be influenced by the type of motivation individuals have going into a stressful situation (Amiot et al., 2004; Lazarus, 1991; Ntoumanis et al., 2009;

Skinner & Edge, 2002). This implies that autonomous motivation at a dispositional, contextual, or situational level should lead to more positive appraisals compared to more controlled motivation (Ntoumanis et al., 2009). Autonomous motivation is associated with less defensiveness in the face of stressful experiences (Knee & Zuckerman, 1998), and less anxiety (Vallerand, 1997). For these reasons it is suggested that autonomously motivated individuals will appraise stressful events as a challenge rather than threat, which will lead to more adaptive plans of action for coping with stress (Blais, Sabourin, Boucher, & Vallerand, 1990; Skinner & Edge, 2002). Moreover, if a situation is appraised as challenging because it is seen as capable of providing an opportunity for growth and mastery (Lazarus & Folkman, 1984) and if more autonomously motivated individuals have an authentic desire to learn, experience novelty and pursue challenges, it is reasonable to presume that these individuals would have an innate desire to view a stressful situation as a challenge. In fact, it has been suggested that the main reason autonomously motivated individuals engage in more advantageous, problem-focused coping strategies is because of cognitive appraisal of challenge (Amiot, Gaudreau, & Blanchard, 2004).

Autonomously motivated individuals experience greater levels of self-efficacy (Hodgins & Knee, 2002), which is important for secondary appraisal. Self-efficacy is an essential resource when dealing with stressful and uncontrollable events. An increased sense of self-efficacy is suggested to help individuals appraise situations as challenges to be overcome, and view oneself as having the ability to control desired outcomes and cope effectively with stressful situations (Skinner & Edge, 2002). On the other hand, lower self-efficacy is thought to lead to threat appraisals and result in a sense of helplessness and a lack of confidence in handling stressful situations (Skinner & Edge, 2002). Moreover, research indicates that perceived control is a

robust predictor of problem-solving, active, and approach coping across the lifespan (Skinner, 1995).

In essence, being autonomously motivated should help individuals face adversity in more adaptive ways, through cognitive appraisal and utilization of more adaptive coping strategies when faced with negative life events. These individuals will choose a course of action that will help them create a coherent narrative of their experiences that will be integrated into their sense of self, which will be congruent with their genuine preferences, values, and priorities.

### **Contribution and Goals of the Present Dissertation**

Our review of the literature reveals that there are no published studies investigating the role of motivational (i.e., self-determination theory) constructs and posttraumatic growth. As outlined in the introduction, global/dispositional types of motivation have a significant impact on one's cognitive appraisals, coping strategies, and psychological adjustment. Given that dispositional autonomous motivation may provide a stable resource that individuals can draw from when adapting to negative life events, it seems vital to determine whether, to what extent and how autonomous motivation is linked to PTG. Thus, it is important to determine the mediating factors that may help explain the relationship between motivation and PTG. The following three manuscripts are the first to investigate the relationships between dispositional autonomous and controlled motivation orientations and posttraumatic growth following the experience of various negative life events (Manuscript 1), relationship dissolution/breakups (Manuscript 2), and death of a loved one/bereavement (Manuscript 3). The findings from the three manuscripts intend to significantly contribute to our understanding of motivational, cognitive appraisal, and coping factors involved in the facilitating posttraumatic growth. Moreover, it is our intention that these findings will inspire future researchers to incorporate

motivational constructs into models of PTG and help practitioners better recognize who may be more, or less, prone to experience growth and the motivation, cognitive appraisal, and coping factors that may help facilitate PTG following negative life events.

Manuscript 1 included two cross-sectional studies, where university students completed an online survey. Participants were included if they experienced a significant negative life event within the past year. Participants indicated their most significant negative life event in the past year (e.g., death of a loved one) and responded to subsequent questionnaires with this event in mind. Thus, Manuscript 1 focused on the experience of PTG collapsed across various negative life events. In Study 1, the goals included: 1) To investigate correlations between motivation, previously researched constructs in the literature, and PTG; 2) To investigate the statistical predictive power of dispositional autonomous motivation in explaining PTG following a negative life event, after accounting for the variance in dispositional controlled motivation and previously researched correlates of PTG, including: gender, time since negative life event, perceived stress at occurrence of event, current perceived stress and current distress (PTSD symptoms) associated with the event, depressive symptoms, psychological well-being and the number of positive and negative life events experienced in the past year. In study 2, the goals included: 1) To further investigate the associations found between autonomous and controlled motivation and PTG, along with previously researched correlates; 2) To explore cognitive appraisal and coping factors that may explain the relationships between autonomous and controlled motivation and PTG. More specifically, using multiple mediator analyses (Parallel and Serial models), we investigated the role of primary appraisal, secondary appraisal, task oriented coping, and disengagement oriented coping in the relationship between dispositional autonomous and controlled motivation and PTG.

Manuscript 2 included the same design and procedure as Manuscript 1. However, Manuscript 2 comprised of subsamples of data (i.e., secondary use of data) taken from the two larger studies (first study data collected in 2010-2011; second study data collected in 2012-2013) in Manuscript 1 on posttraumatic growth following various negative life events. The subsamples for Manuscript 2 included all participants having listed *relationship dissolution/breakup* as their most significant negative life event in the past year. Thus, this manuscript focused on the experience of PTG following pre-marital relationship dissolution. In Study 1, the goals included:

- 1) To investigate correlations between motivation, previously researched correlates in the breakup literature, and PTG; 2) To investigate the statistical predictive power of dispositional autonomous motivation in explaining PTG following a breakup, after accounting for the variance in dispositional controlled motivation and previously researched correlates of PTG, including: gender, time since negative life event, perceived stress at occurrence of event, current perceived stress and current distress (PTSD symptoms) associated with the event, depressive symptoms, and psychological well-being.

In study 2, the goals included: 1) To further investigate the associations found between autonomous and controlled motivation and PTG, along with previously researched correlates; 2) To explore cognitive appraisal and coping factors that may explain the relationships between autonomous and controlled motivation and PTG. More specifically, using parallel multiple mediator analyses, we investigated the role of primary appraisal, secondary appraisal, task oriented coping, and disengagement oriented coping in the relationship between global autonomous and controlled motivation and PTG.

Manuscript 3 included the same design and procedure as Manuscript 1 and 2. Manuscript 3 comprised of subsamples of data (i.e., secondary use of data) taken from the two larger studies (first study data collected in 2010-2011; second study data collected in 2012-2013) in

Manuscript 1 on posttraumatic growth following various negative life events. The subsamples for Manuscript 3 include all participants having listed *death of a loved one/bereavement* as their most significant negative life event in the past year. Thus, this manuscript focused on the experience of PTG following bereavement. In Study 1, the goals included: 1) To investigate correlations between motivation, previously researched correlates in the bereavement literature, and PTG; 2) To investigate the statistical predictive power of dispositional autonomous motivation in explaining PTG following bereavement, after accounting for the variance in dispositional controlled motivation and previously researched correlates of PTG, including: gender, time since negative life event, perceived stress at occurrence of event, current perceived stress and current distress (PTSD symptoms) associated with the event, depressive symptoms, and psychological well-being. In study 2, the goals included: 1) To further investigate the associations found between autonomous and controlled motivation and PTG, along with previously researched correlates; 2) To explore the relationships between predictor variables and the five domains of PTG, as assessed by the Posttraumatic Growth Inventory; 3) To explore cognitive appraisal and coping factors that may explain the relationships between autonomous and controlled motivation and PTG. More specifically, using parallel multiple mediator analyses, we investigated the role of primary appraisal, secondary appraisal, task oriented coping, and disengagement oriented coping in the relationship between dispositional autonomous and controlled motivation and PTG.

These three manuscripts are included in the next sections of the dissertation followed by a General Discussion of their findings including research and clinical implications.

Running Head: MOTIVATION AND POSTTRAUMATIC GROWTH

Facilitating Posttraumatic Growth: The Role of Autonomous Motivation

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### Abstract

Research on Self-Determination Theory (SDT; Ryan & Deci, 2002) has not investigated how its constructs can help facilitate posttraumatic growth (Tedeschi & Calhoun, 2004) following a negative life event. In two cross-sectional studies, university students completed an online survey. In Study 1, we investigated the contribution of dispositional autonomous and controlled motivation in statistically predicting posttraumatic growth above and beyond other known correlates. In Study 2, we explored the mediating role of cognitive appraisals and coping in explaining the relationship between dispositional motivation orientations and posttraumatic growth. In both studies, in comparison to controlled motivation, autonomous motivation was positively associated with posttraumatic growth. Mediation results indicated an indirect effect of global autonomous motivation on posttraumatic growth through primary cognitive appraisal and task-oriented coping. Controlled motivation was indirectly related to posttraumatic growth through disengagement coping. Collectively, these findings highlight the importance of incorporating motivation orientations into models of posttraumatic growth.

*Keywords:* posttraumatic growth, relationship dissolution, self-determination theory, cognitive appraisal, coping, integration, autonomous motivation.

### Facilitating Posttraumatic Growth: The Role of Autonomous Motivation

There is now extensive evidence that in the aftermath of stressful and negative life events, there is the potential for individuals to experience posttraumatic growth (PTG; Calhoun & Tedeschi, 2006; Tedeschi & Calhoun, 1996, 2004). Posttraumatic growth can be defined as the positive life changes occurring as a consequence of struggling with stressful and challenging life events (Tedeschi & Calhoun, 1996, 2004). PTG has been linked to a broad array of negative life events (Helgeson, Reynolds & Tomich, 2006; Park, Cohen, & Murch, 1996; Tedeschi, Park, Calhoun, 1998; Tashiro & Frazier, 2003). Posttraumatic growth across various negative life events has been predicted by dispositional characteristics (e.g. being female; extraversion, openness to experience, agreeableness, and conscientiousness; high self-esteem; Linley & Joseph, 2004), coping strategies (e.g., acceptance, positive reinterpretation, social support; Linley & Joseph, 2004; Park et al., 1996), types of cognitive processing (e.g., rumination, intrusive thoughts, avoidance; Linley & Joseph, 2004), and affect (i.e., positive and negative affect; Abraido-Lanza, Guier, & Colon, 1998; King, Scollon, Ramsey, & Williams, 2000). Moreover, in university samples, predictors of growth have included positive reinterpretation coping, acceptance coping, number of positive life events, intrinsic religiousness, initial stressfulness of the event, and social support satisfaction (Armeli et al., 2001; Park et al., 1996). Theoretical models also posit that cognitive appraisals of the event predict PTG (Shaefer & Moos, 1998; Tedeschi & Calhoun, 1996), which has been empirically supported in university samples. For instance, high event stress has been positively linked with PTG (Park et al., 1996), and when individuals appraise an event as highly threatening or as an important loss, and report having many social resources and a good coping ability, they experience higher levels of PTG (Armeli et al., 2001).

However, no research has investigated the role that motivation plays in facilitating PTG or the interrelationships between motivation, cognitive appraisals, and coping in explaining PTG following a negative life event.

Self-Determination Theory (SDT; Deci & Ryan, 1985), a macro-theory of motivation, is grounded in an organismic perspective on human flourishing, seeing human beings as innately active and oriented towards growth and self-actualization (Ryan & Deci, 2002; Sheldon & Ryan, 2011). SDT has conceptualized motivation as a propensity that varies in degrees of self-determination and integration (Deci & Ryan, 2000). According to SDT, individuals can engage in behaviours based on more *autonomous* or *controlled* types of motivation (Deci & Ryan, 2000). Autonomous motivation (i.e., choiceful responding) refers to a tendency to initiate behaviours for the inherent pleasure and interest that one finds in a given activity (intrinsic motivation), because it is an integral part of a person's self-identity (integrated regulation), or because the behaviour is consistent with one's values (identified regulation). In contrast, controlled motivation (i.e., pressured responding) refers to initiating behaviours with the aim of escaping negative feelings or attaining ego-related rewards (introjected regulation), or based on externally administered punishments and rewards (external regulation; Deci & Ryan, 2000). Pertaining to cognitive, behavioural, and affective outcomes, previous research suggests that autonomous motivation tends to favour positive outcomes while controlled motivation will more often lead to negative outcomes (see Deci & Ryan, 2000 and Vallerand, 1997, for reviews).

Motivation is vital to better understand cognitive appraisals of the situation and coping responses in stressful person-environment relationships (Amiot et al., 2004; Lazarus, 1991; Ntoumanis et al., 2009; Skinner & Edge, 2002). Autonomously motivated individuals experience a greater sense of self-efficacy (Hodgins & Knee, 2002), less defensiveness in the face of stress

(Knee & Zuckerman, 1998), and more interest-taking in their emotional experience (Weinstein & Ryan, 2011). These are key factors that should help them maintain a sense of openness and honesty regarding an events' personal relevance (i.e., primary appraisal) and have confidence in their ability to cope (i.e., secondary appraisal; Skinner & Edge, 2002). Previous research indicates that autonomous motivation is positively associated with task oriented-coping strategies (e.g., planning, search for instrumental social support). Conversely, controlled motivation is associated with less adaptive disengagement-oriented coping strategies (see Amiot, et al., 2004; Knee & Zuckerman, 1998).

Although, there are theoretical arguments for autonomous motivation's role in personal growth (Deci & Ryan, 1985, 2000; Skinner & Edge, 2002), whether autonomous motivation can help facilitate personal growth following a negative life event has not been investigated. Given SDT's conceptual framework, its link with indices of well-being (Ryan & Deci, 2000), and the frequent occurrence of negative life events across the lifespan (e.g., death of loved one, illness; Tedeschi & Calhoun, 2004), this research will contribute greatly to furthering our understanding of how people can grow following such events.

In the aftermath of negative life events, individuals often face the challenge of integrating their experience and incorporating new information into their existing self-schemas. Through this process of integration, individuals are thought to become better able to regulate their emotions, act more consistently with their values and needs, adapt to stress more effectively, and experience higher levels of well-being and growth (Ryan & Deci, 2000; Weinstein, Deci, & Ryan, 2011; Weinstein, Przybylski, & Ryan, 2013). However, whether and to what extent individuals integrate experiences is dependent on their current motivations (Deci & Ryan, 1985).

The idea that an integrating self underlies self-determination (i.e., autonomous motivation) implies that novel experiences will be approached in an honest and authentic way with a willingness to integrate experiences into self-structures (Skinner & Edge, 2002). This approach allows autonomously motivated individuals to have a higher tolerance for stressful encounters without feeling the need to defend against them. In other words, being autonomously motivated should result in less cognitive defensiveness and a movement toward experiencing emotions (negative or positive) in the moment for what they are (Hodgins & Knee, 2002). Evidence indicates this is in fact what happens, as autonomously motivated individuals tend to respond less defensively when thinking about their past negative identities, whereas those higher in controlled motivation respond more defensively (Weinstein et al., 2011). In addition, autonomous individuals appear to better tolerate difficult emotions associated with negative experiences, which may help them find meaning, furthering their potential for growth (Weinstein et al., 2011). For control motivated individuals, their defensiveness may be a result of wanting to maintain an appealing self-image, which may discourage self-reflection and growth (Deci & Ryan, 1995). On the other hand, autonomous individuals' non-defensive reflection on their negative experiences may help them be more open to new self-relevant material and incorporate it into their changing self-concepts.

Furthermore, in a stressful situation where demands exceed resources and where all goals cannot be maintained, possessing dispositional autonomous motivation should help individuals stay connected to their true objectives and enhance their ability to focus on what is most important in their lives (Skinner & Edge, 2002). In general, the aforementioned theoretical assumptions and research findings highlight the relevance of investigating the nature of the relationship between autonomous motivation and PTG. It is therefore suggested that

global/dispositional autonomous motivation should represent a valuable personal resource in helping an individual integrate negative life experiences in a way that allows for personal growth.

### **Overview of Studies and Hypotheses**

Self-Determination Theory is proposed as a useful framework for understanding individual differences in appraising and coping with stressful and negative life events as well as directly predicting PTG. Therefore, in two studies we investigated the role that global autonomous motivation plays in facilitating PTG following negative life experiences.

In Study 1, we examined two main hypotheses: First, autonomous motivation would relate positively to PTG, whereas controlled motivation would relate negatively to PTG (H1). Second, autonomous motivation would statistically predict an additional portion of the variance in PTG after accounting for controlled motivation and previously studied correlates of growth (H2).

In Study 2, utilizing mediation analysis, we explored factors that could explain the relationship between autonomous and controlled motivation orientations and PTG, namely, cognitive appraisals and coping strategies. We hypothesized that autonomous motivation would relate positively to PTG, whereas controlled motivation would relate negatively to PTG (H1). Autonomous motivation would relate positively to primary appraisal (level of relevance) and secondary appraisal (level of coping ability and resources) and to task-oriented coping. Controlled motivation would be negatively associated with primary and secondary appraisal, yet positively related to disengagement oriented coping (H2). Primary appraisal and task oriented coping strategies should be positively associated with PTG (H3).

## **Study 1**

This study investigated the statistical contribution of dispositional autonomous motivation in explaining PTG following a negative life event, after controlling for global controlled motivation and previously researched correlates of PTG, including: gender, time since negative life event, perceived stress at occurrence of event, current perceived stress and current distress (PTSD symptoms) associated with the event, depressive symptoms, psychological well-being and the number of positive and negative life events experienced in the past year. Of particular importance in the current study is the statistical contribution of dispositional autonomous motivation in explaining PTG given the gap in the literature.

## **Methodology**

### **Research Design and Participants**

Using a cross-sectional design, the sample consisted of students from an undergraduate psychology course at the University of Ottawa who reported experiencing a significant negative life event in the past year. From the initial 429 participants, 57 were excluded from the analyses (i.e., less than 50% of survey completed; duplicate surveys; repetitive responses across questionnaires). The final sample consisted of 372 participants (278 females, 94 males), aged between 17 and 56 years old ( $M = 19.36$ ,  $SD = 2.13$ ) and reporting their ethnicity as Caucasian (72.6%), Asian (8.9%), African American (6.6%), and other (11.9%; e.g., Turkish). Sixty-nine percent of participants were in their first year of university, 18% in their second year, 7% in their third year, and 6% in their fourth year.

### **Procedures**

Ethics approval was obtained from the University of Ottawa Research Ethics Board. Data was collected using an online self-report survey. Once participants accessed the survey, they

were asked “Have you experienced a significant negative life event in the past 1 year?”

Participants who responded “yes” to this question were included in this study. Participants first indicated their most significant negative life event in the past year (e.g., death of a loved one) and responded to subsequent questionnaires with this event in mind. It took 30 minutes to fill out the survey.

## Measures

**General Information Questionnaire.** This questionnaire collected information on the participants’ gender, age, ethnicity, and academic year. Participants described their most significant negative life event in the past year, and answered questions regarding the time since the event, perceived stress at the event’s occurrence and current stress based on the negative life event using a 7-point Likert scale. Participants also indicated the number of positive and negative life events experienced in the past year.

**Posttraumatic Growth Inventory (PTGI;** Tedeschi & Calhoun, 1996). This 21-item measure assesses positive outcomes following the experience of negative life events and is composed of 5 subscales: New Possibilities, Relating to Others, Personal Strength, Spiritual Change, and Appreciation of Life. We modified the instructions to have participants indicate the degree of life change experienced “*as a result of the negative life event.*” This measure has been shown to have good reliability at .89 and validity (Tashiro & Frazier, 2003; Tedeschi & Calhoun, 1996). Internal consistency in our study was .91.

**Global Motivation Scale (GMS;** Guay, Mageau, & Vallerand, 2003; Pelletier, Blanchard, Dion, Sharp, & Otis, 2003). This 18-item scale based on the six motivational constructs conceptualized by Deci and Ryan (1985, 2000) was used to assess dispositional motivation orientations. Participants rated the extent to which each of the items corresponds to

the reasons why they do things in general. Items are divided into six subscales, including intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation, and amotivation. The GMS possesses acceptable levels of reliability, validity, and internal consistency (Guay et al., 2003).

Based on previous research, five of the subscales were combined into two global motivation scales: Autonomous Motivation (comprised of the intrinsic motivation, integrated regulation and identified regulation subscales) and Controlled Motivation (comprised of the introjected and external regulation subscales; Chemolli & Gagne, 2014; Deci & Ryan, 2008; Koestner & Losier, 2003). It is the scores obtained on these two scales that were used in all analyses. The internal consistency of these scales in the current study is acceptable with a Cronbach's alpha of .89 (Autonomous Motivation) and .80 (Controlled Motivation).

**Impact of Events Scale-Revised (IES-R;** Weiss & Marmar, 1997). This 22-item measure assesses current subjective distress (PTSD symptoms) for any specific life event. The measure has been shown to have high internal consistency (Cronbach =.96; Creamer, Bell, & Failla, 2003). Internal consistency using the total score in the current study was .93.

**Scales of Psychological Well-Being** (Ryff & Keyes, 1995). This 18-item measure assesses psychological well-being. The use of these scales is supported by previous research indicating their independence from other measures of subjective well-being (Ryff & Keyes, 1995). Internal consistency using the total score in the current study was .92.

**Depressive Symptoms.** The Center for Epidemiologic Studies-Depression Scale (CES-D; Radloff, 1977) was used to measure the frequency of depressive symptoms. Internal consistency estimates from .80 to .90 are reported for the CES-D (Radloff, 1977). Internal consistency in the current study was .92.

## **Analytic Plan**

Data screening and analysis was conducted with the Statistical Package for the Social Sciences (SPSS, Version 18). Procedures for screening data described by Tabachnick and Fidell (2007) were employed prior to analyzing the data. Prior to analysis, all variables were examined for accuracy of data entry and fit between their distributions and the assumptions of univariate and multivariate analysis. All data was reviewed via “maximum and minimum” statistics in the SPSS “Descriptives” to make sure values were in their intended ranges. Skewness and kurtosis values were in satisfactory ranges. No variable had greater than 5% missing data, thus there was no need to replace missing values. Univariate outliers on all variables were assessed using histograms and standardized values, which revealed no standardized scores greater than 3.29 standard deviations above and below the mean (Tabachnik & Fidell, 2007). There were no cases identified through Mahalanobis distance as multivariate outliers with  $p < .001$ . In addition, assumptions for linearity and homoscedasticity were met by investigating all pairs of continuous variables using scatter/dot plots and Levene’s test.

## **Results**

### **Negative Life Event Characteristics**

Table 1 provides a list of the most significant negative life events experienced by participants in the past year and their prevalence rates. The two most frequently reported significant negative life events were death of a loved one (27%) and end of a romantic relationship (15%). On average, participant’s most significant negative life event occurred approximately 5 months prior to data collection ( $M = 22.18$  weeks;  $SD = 16.71$ ). Participants reported an average of 2.04 ( $SD = 1.22$ ) negative life events experienced in the past year, and an average of 2.82 ( $SD = 1.35$ ) positive life events.

## Correlation Analysis

Table 2 presents the means and standards deviations for each variable as well as their correlations. These bivariate correlation results reveal that global autonomous and controlled motivations were positively associated with PTG<sup>1</sup>. Stress at occurrence, current distress, and psychological well-being were also positively associated with PTG. In addition, the more positive life events participants experienced in the past year, the more PTG they experienced.

Autonomous motivation was positively associated with psychological well-being and the number of positive life events experienced in the past year. Controlled motivation was positively associated with current distress and depressive symptoms, and negatively associated with psychological well-being.

## Hierarchical Regression Predicting PTG

A hierarchical regression was performed to determine if a dispositional autonomous motivation orientation was statistically predictive of PTG after controlling for dispositional controlled motivation and some previously investigated correlates of PTG (gender, time since the event, initial stressfulness of the event, current stress and current distress associated with the event, depressive symptoms, psychological well-being, and number of positive life events and number of negative life events experienced in the past year). PTG was entered as the dependent variable and, the control variables were entered in the first block (Model 1). Autonomous motivation was added in the second block (Model 2).

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<sup>1</sup> Partial correlations reveal that when controlling for autonomous motivation, controlled motivation is no longer significantly related to PTG ( $r = .017, p = .746$ ). The partial correlation between autonomous motivation and PTG remains significant after controlling for controlled motivation ( $r = .363, p < .001$ ).

The ANOVA results indicate that the two models were significant. In Model 1, adjusted  $R^2 = .145$ ,  $F(10,304) = 6.15$ ,  $p < .001$ . In Model 2, adjusted  $R^2 = .198$ ,  $F(11,304) = 7.81$ ,  $p < .001$ . In Model 1, the significant statistical predictors of PTG were stress at the event's occurrence ( $t = 2.60$ ,  $p = .010$ ), current stress associated with the event ( $t = -3.18$ ,  $p = .002$ ), current distress ( $t = 3.54$ ,  $p < .001$ ), psychological well-being ( $t = 3.96$ ,  $p < .001$ ), and number of positive life events in the past year ( $t = 2.31$ ,  $p = .021$ ). After controlling for the variables entered in Model 1, autonomous motivation ( $t = 4.51$ ,  $p < .001$ ) emerged as a significant statistical predictor of PTG in Model 2.

In the first model, results revealed that experiencing more stress at the time of the event ( $B = 2.18$ ,  $p = .010$ ), experiencing more current distress linked to the event (i.e., PTSD symptoms;  $B = 0.289$ ,  $p < .001$ ), experiencing higher psychological well-being ( $B = 0.414$ ,  $p < .001$ ), experiencing a higher number of positive life events in the past year ( $B = 2.27$ ,  $p = .021$ ), and presently experiencing less stress associated with the event ( $B = -2.55$ ,  $p = .002$ ) all statistically predicted increases in PTG. In the second model, being more autonomously motivated ( $B = 5.53$ ,  $p < .001$ ) statistically predicted higher levels of PTG.

The adjusted  $R^2$  value for Model 1 indicates that the significant statistical predictors accounted for 14.5% of the variance in PTG. After controlling variables in Model 1, autonomous motivation uniquely accounted for an additional 5.4% of the variance in PTG in Model 2 ( $R^2$  change value). Globally, the adjusted  $R^2$  value for the second model indicates that it accounts for a total of 19.8% of the variance in PTG. Details of the hierarchical analysis are presented in Table 3.

### **Study 1 Discussion**

H1 was supported in that autonomous motivation was positively associated with PTG in the correlation analysis. H2 was supported, as autonomous motivation statistically predicted PTG above and beyond previously researched correlates. In line with previous research documenting a relationship between autonomous motivation and indices of well-being (Deci & Ryan, 2000; Ryan & Deci, 2002), the current research shows that above and beyond previously researched correlates of PTG, a motivational trait-level factor (autonomous motivation) can act as a stable resource that individuals can utilize in the aftermath of a significant negative life event in order to help them adapt and experience personal growth. Controlled motivation was also related to PTG in the bivariate correlation analyses. However, in the partial correlation and regression analysis, the relationship between controlled motivation and PTG became non-significant. Thus, it appears that the common variance between both global motivation orientations as well as their relationship with PTG is most strongly accounted for by autonomous motivation. Additional findings revealed that increases in stress at event occurrence, distress, psychological well-being, and number of positive life events were associated with increases in PTG. The role of increased stress at the event's occurrence and of current distress is consistent with Tedeschi and Calhoun's (2004) view that PTG arises from the psychological struggle associated with a life crisis. PTG's positive association with positive life events experienced within the past year is also consistent with research indicating that positive life events can serve as a protective factor in the face of negative life events (Cohen, Burt, & Bjork, 1987).

In sum, this study is the first to investigate the contribution of motivation to the understanding of PTG. Findings indicate that autonomous motivation appears to be an important resource contributing to the psychological growth process after a negative life event.

## Study 2

One objective of the second study was to replicate the significant positive relationship found in Study 1 between dispositional autonomous motivation and PTG. It also expanded on the first study by exploring factors that may explain the relationship between motivation orientations and PTG, as we are still unaware of the processes that facilitate this relationship. More specifically, using a multiple mediator analysis, we investigated the role of primary appraisal, secondary appraisal, task oriented coping, and disengagement oriented coping in the relationship between global autonomous motivation and PTG.

## Methodology

### Research Design and Participants

The sample consisted of students from an undergraduate psychology course at University of Ottawa who reported experiencing a significant negative life event in the past year. From the initial 595 participants, 61 were excluded from the analyses (i.e., less than 50% of survey completed; duplicate surveys; repetitive responses across questionnaires). The final sample consisted of 534 participants (404 females, 130 males) aged between 17 and 60 years old ( $M = 19.48$ ,  $SD = 3.43$ ) and reporting their ethnicity as Caucasian (63.5%), Asian (12.2%), African American (6.2%), Middle Eastern (1.5%) and other (13%; e.g., Somali). Sixty-five percent of participants were in their first year of university, 22% in their second year, 8% in their third year, and 5% in their fourth year.

### Procedures

Ethics approval was obtained from the University of Ottawa Research Ethics Board. Except for what is mentioned below, this study used the same procedure as in Study 1. The online survey took 30 minutes to fill out.

## Measures

Similar to Study 1, participants completed online versions of a General Information Questionnaire, the Posttraumatic Growth Inventory ( $\alpha$  in the current study = .91), and the Global Motivation Scale ( $\alpha$  in the current study was .80 for Autonomous Motivation and .75 for Controlled Motivation). Contrary to Study 1, the Global Motivation Scale was filled out approximately 2 months prior to the rest of the survey. It was included as a “prescreen questionnaire” that all students in the first-year psychology course completed. The following two measures were added in the current study:

***Coping Strategies*** (COPE; Carver, Scheier & Weintraub, 1989). This measure assessed the coping strategies participants used to deal with the aftermath of their negative life event. Participants were instructed to rate the extent to which they used each coping strategy to deal with their negative life event. Task-Oriented coping was assessed using the COPE subscales pertaining to *active coping*, *planning*, *seeking of social support for instrumental reasons*, *acceptance*, and *positive reinterpretation* (Amiot et al., 2008). Disengagement-Oriented coping was assessed using the COPE subscales *denial* and *mental disengagement* (Amiot et al., 2008). Denial and mental disengagement subscales were chosen because of previous research and evidence of their relationships with PTG (Collins et al., 1990; Helgeson et al., 2006; Rajandram et al., 2011). Alpha reliabilities for the total measure are adequate, and test-retest correlations over 6 weeks have ranged from 0.56 to 0.89 (Carver et al., 1989). Internal consistency of the two scales in the current study was good with a Cronbach’s alpha of .86 (Task Oriented Coping) and .70 (Disengagement Oriented Coping).

***Cognitive Appraisal***. Previous research typically has measured appraisals with single items (Smith & Ellsworth, 1985; Tong et al., 2009). However, to create the current measure we

obtained items from several sources including: 1) Peacock and Wong's (1990) Stress Appraisal Measure; 2) Horowitz, Wilner, and Alvarez's (1979) Impact of Event Scale; and 3) Armeli et al.'s (2001) list of stressor appraisal items. In the current study, we created two appraisal dimensions: *Primary Appraisal*, consisting of 8 items [loss (2 items), threat (1 item), challenge (1 item), stress (1 item), severity (3 items)]; and *Secondary Appraisal*, consisting of 9 items [previous experience (2 items), predictability (2 items), controllability (2 items), coping ability (3 items)]. Internal consistency of the two scales in the current study is good with a Cronbach's alpha of .77 (Primary Appraisal) and .72 (Secondary Appraisal).

### **Analytic Plan**

Data screening and analysis was conducted with the Statistical Package for the Social Sciences (SPSS, Version 18). Procedures for screening data described by Tabachnick and Fidell (2007) were employed prior to analyzing the data. Prior to analysis, all variables in analyses were examined for accuracy of data entry and fit between their distributions and the assumptions of univariate and multivariate analysis. All data was reviewed via "maximum and minimum" statistics in the SPSS "Descriptives" to make sure values were in their intended ranges. Skewness and kurtosis values were in satisfactory ranges. All variables had less than 5% missing data, except for Autonomous and Controlled Motivation variables, which had 11% (61 participants) missing data. We did not believe it was appropriate to impute scores for 61 participants across 18-items on the GMS, thus we did not replace missing values on these variables. Five univariate outliers were found on the Primary Appraisal scale, which were brought into acceptable ranges ( $<3.29$  standard deviations). There were no cases identified through Mahalanobis distance as multivariate outliers with  $p < .001$ . In addition, assumptions for

linearity and homoscedasticity were met by investigating all pairs of continuous variables using scatter/dot plots and Levene's test.

## **Results**

### **Event Characteristics**

Table 4 provides a list of the most significant negative life events experienced by participants in the past year and their prevalence rates. As in Study 1, the two most frequently reported significant negative life events were death of a loved one (25%) and end of a romantic relationship (20%). Participants had experienced the significant negative life event on average 21.45 weeks prior to participation ( $SD = 16.04$ ).

### **Correlation Analyses**

Table 5 presents the means, standard deviations and correlations for all variables. The results indicate that as expected, autonomous motivation was associated positively with primary cognitive appraisal, task oriented coping and posttraumatic growth. Controlled motivation was positively associated with disengagement oriented coping and negatively associated with secondary cognitive appraisal. Primary appraisal was positively related to PTG and to both types of coping strategies (i.e., Task and Disengagement). Secondary appraisal was positively related to task oriented coping; however, it was negatively related to disengagement coping strategies. Both task and disengagement coping strategies were positively associated with PTG.

### **Mediation Analysis / Indirect Effects**

Mediation analyses were conducted to explore the role of four potential mediating variables (a) Primary Cognitive Appraisal, (b) Secondary Cognitive Appraisal, (c) Task Oriented Coping, and (d) Disengagement Oriented Coping, in the relationship between dispositional autonomous motivation and PTG as well as between dispositional controlled motivation and

PTG. The mediation analyses in this study were conducted according to the bootstrapping method outlined by Hayes (2012, 2013). Bootstrapping has been recommended over other methods (i.e. Baron and Kenny's causal step approach and the Sobel test; see Hayes, 2009) and its benefits include higher power and lower rates of Type 1 error since the number of inferential tests is minimized and it does not rely on the assumption of a normal sampling distribution (MacKinnon, Lockwood, & Williams, 2004). It was beneficial to use the bootstrapping method in the current study since it allowed us to enter all four proposed mediators simultaneously, and to test the existence of an overall indirect effect, as well as each mediator's specific indirect effect after controlling for the other mediators (Preacher & Hayes, 2008).

The SPSS macro developed by Hayes (2012, 2013; PROCESS, version 2.11) was used to test the parallel multiple mediator models outlined in Figure 1 and Figure 2, and the serial multiple mediator model in Figure 3.

### **Mediation Model 1 (Parallel Mediation)**

In the first mediation model (Figure 1), bootstrap analyses (10,000 iterations) were performed to estimate the indirect effect of global autonomous motivation on PTG through the four proposed mediators, while controlling for dispositional controlled motivation (covariate). The results indicate that the total effect of autonomous motivation on PTG was significant, and that the direct effect of this variable remained significant after including the four mediators in the model. The total indirect effect – the difference between the total effect and the direct effect – of autonomous motivation on PTG through the four mediators was significant (see Figure 1 for all path coefficients and *p* values).

Turning to the specific indirect effects of the four proposed mediators, the bootstrapping results (see Table 6 for point estimates of indirect effects and paired comparisons) indicate that

there was an indirect effect of autonomous motivation through primary appraisal and task-oriented coping. The two other proposed mediators (secondary appraisal and disengagement-oriented coping) did not contribute significantly to the proposed model. In order to determine the relative strength of the indirect effects, PROCESS (Hayes, 2012, 2013; version 2.11) includes specific indirect effect comparisons (primary appraisal minus task oriented coping). The results indicated that task oriented coping was a stronger contributor to the proposed model. Thus, this analysis suggests that increases in autonomous motivation leads to increases in PTG; however, looking at the specific indirect effects we observe that increases in autonomous motivation lead to increases in primary appraisal of the negative life event (e.g., seeing the event as threatening, stressful, severe, as a loss, and challenging), which in turn leads to increases in PTG. In addition, increases in autonomous motivation lead to increases in task oriented coping strategies, which in turn leads to PTG. Moreover, task oriented coping appears to be the strongest mediator in this proposed model.

### **Mediation Model 2 (Parallel Mediation)**

In the second mediation model (Figure 2), bootstrap analyses (10,000 iterations) were performed to estimate the indirect effect of dispositional controlled motivation on PTG through the four proposed mediators, while controlling for dispositional autonomous motivation (covariate). The results indicate that after controlling for autonomous motivation, controlled motivation had no total effect, direct effect, or total indirect effect on PTG (all 95% BCa confidence intervals included 0; see Figure 2 for all path coefficients and *p* values). Turning to the specific indirect effects of the four proposed mediators (see Table 7 for point estimates of indirect effects and paired comparisons), the bootstrapping results indicate that there was one indirect effect, namely disengagement oriented coping. The other three proposed mediators (task

oriented coping, primary appraisal, secondary appraisal) did not contribute significantly to the proposed model. Thus, the results indicate that after controlling for autonomous motivation, controlled motivation had an indirect effect on PTG through disengagement oriented coping. In other words, after a negative life event, increases in controlled motivation lead to increases in disengagement coping strategies, which in turn lead to greater PTG.

### **Mediation Model 3 (Serial Mediation)**

In parallel mediation Model 1, the results showed that autonomous motivation was directly related to both primary appraisal and task-oriented coping and that it also had an indirect effect on PTG through these variables. Given these findings, along with theoretical hypotheses drawing the link between motivation, cognitive appraisals, and coping (Lazarus & Folkman, 1984; Lazarus, 1991; Skinner & Edge, 2002), we decided to explore the serial mediation model presented in Figure 3.

For this serial mediation model, bootstrap analyses (10,000 iterations) were performed to estimate the indirect effect of dispositional autonomous motivation on PTG through the three proposed mediators (primary appraisal, task oriented coping, and the pathway through primary appraisal and task-oriented coping), while controlling for dispositional controlled motivation (covariate).

The results indicate that the total effect of autonomous motivation on PTG was significant, and that the direct effect of this variable remained significant after including the three mediators in the model. The total indirect effect – the difference between the total effect and the direct effect – of autonomous motivation on PTG through the three mediators was also significant (see Figure 3 for all path coefficients and *p* values).

Turning to the specific indirect effects of the three proposed mediators, the bootstrapping results (see Table 8 for point estimates of indirect effects and paired comparisons) indicate that there was an indirect effect of autonomous motivation through all three mediators. Pairwise comparisons of the relative strength of the indirect effects indicated that task-oriented coping was once again a stronger contributor to the proposed model compared to primary appraisal. Task oriented coping taken separately was also a stronger contributor to the proposed model than the primary appraisal to task-oriented coping pathway.

This suggests that increases in autonomous motivation lead to increases in PTG and that this relationship is indirectly effected by primary appraisal, task oriented coping, and the pathway from primary appraisal to task-oriented coping. Looking at the specific indirect effects we observe that increases in autonomous motivation lead to increases in primary appraisal of the negative life event (e.g., seeing the event as threatening, stressful, severe, as a loss, and challenging), which in turn leads to increases in PTG. Increases in autonomous motivation lead to increases in task oriented coping strategies, which in turn leads to PTG; and, increases in autonomous motivation lead to increases in primary appraisal, which lead to increases in task-oriented coping strategies, which in turn lead to PTG. Moreover, when we compared the relative strength of all indirect effects, we found that task oriented coping was the strongest contributor to the proposed model.

### **Discussion: Study 2**

H1 was supported as global autonomous motivation was positively associated with PTG. Results from Study 2 replicate those of Study 1 and provide additional evidence for the importance of dispositional autonomous motivation in statistically predicting PTG after a negative life event. On the other hand, controlled motivation was unrelated to PTG in the

correlation analyses in this study. H2 was partially supported: autonomous motivation was positively associated with primary appraisal and task-oriented coping and controlled motivation was positively associated with disengagement-oriented coping. This is coherent with previous research linking different types of motivation and coping strategies (Amiot, et al., 2004; Knee & Zuckerman, 1998). H3 was supported in that both primary appraisal and task-oriented coping were positively associated with PTG. This is consistent with findings using university samples linking task-oriented coping strategies (e.g., positive reinterpretation) and primary appraisals (e.g., high threat and loss) to PTG (Armeli et al., 2001; Park et al., 1996).

The first parallel mediation analysis indicated that primary and task-oriented coping had a significant indirect effect in the relationship between autonomous motivation and PTG. Conversely, in the second parallel mediation analysis, controlled motivation was indirectly related to PTG through disengagement-oriented coping. Disengagement types of coping have previously been associated with PTG following negative life events (Armeli et al., 2001; Helgeson et al., 2006). Overall, the serial mediation model showed that young adults who generally act on autonomous motives will be more likely to confer significance to past negative life events (i.e., threat, stress, loss, severity), leading to task-oriented coping strategies, which in turn will lead to more PTG. However, it appears that task-oriented types of coping strategies are the strongest mediator in explaining the relationship between autonomous motivation and PTG.

### **Summary and General Discussion**

In two studies, we investigated the relationship between dispositional autonomous and controlled motivation and posttraumatic growth following the experience of a negative life event. Drawing from Self-Determination Theory (Deci & Ryan, 2000; Hodgins, Yacko, & Gottlieb, 2006; Skinner & Edge, 2002), we hypothesized that dispositional autonomous motivation would

play an essential role in determining the extent to which young adults experience growth following negative life events.

Results from both studies revealed a strong relationship between autonomous motivation and PTG following a negative life event. Mediation analyses revealed that increases in retrospective primary appraisal of the negative life event and the use of task-oriented coping strategies were significant mediators in the relationship between autonomous motivation and PTG. Mediation analyses also revealed that controlled motivation was indirectly related to PTG through disengagement-oriented coping strategies.

These findings provide further support to theoretical assumptions and research indicating that autonomous motivation facilitates integration of negative life experiences, which increases the likelihood of experiencing personal growth (Ryan & Deci, 2001; Weinstein et al., 2011). It has been postulated that when individuals are autonomously motivated, they have a high level of self-awareness, which in times of stress can help them maintain focus on their values and genuine priorities (Deci & Ryan, 1985; Skinner & Edge, 2002). Given increased self-awareness, along with less defensiveness and openness to their emotional experience, it is suggested that autonomously motivated individuals appear more willing to integrate and assimilate their experiences into their existing self-schema (Hodgins & Knee, 2002; Hodgins, Weibust, Weinstein, Shiffman, Miller, Coombs, et al., 2010; Weinstein et al., 2011). We propose that it is these characteristics and flexibility that facilitates PTG. Being autonomously motivated may be a buffer in times of stress, which is vital, especially since several of these negative life events (i.e., death of loved one, breakups) can be related to a variety of negative mental health outcomes and changes in one's self-concept clarity (Slotter, Gardner, & Finkel, 2010). This motivational buffer also seems congruent with views held by the organismic valuing model of PTG, as

autonomously motivated individuals maintain a focus on their genuine priorities, engage in value-congruent behaviours, and are motivated to move in a direction of personal growth in the face of adversity (Joseph & Linley, 2005).

In Study 2, autonomous motivation was positively related to primary appraisal and not related to secondary appraisal. Given that autonomously motivated individuals have been shown to experience a greater sense of self-efficacy (Hodgins & Knee, 2002), it was unexpected to see this type of motivation unrelated to secondary appraisal. However, autonomous motivation's positive link with primary appraisal suggests that in the aftermath of a negative life event, their openness to their emotional experience and less cognitive defensiveness may allow them to be honest regarding the personal relevance of these events (i.e., how threatening, stressful, challenging, severe). Nevertheless, it appears from the findings that when contrasted with appraisal of the event, task-oriented types of coping seem to be the strongest variable explaining the link between autonomous motivation and PTG. This suggests that regardless of how threatening, challenging, or stressful these events may be perceived, autonomously motivated individuals will maintain a focus on psychologically fulfilling goals and choose adaptive forms of coping to facilitate growth. In contrast, controlled motivation was not related to primary appraisal and negatively related to secondary appraisal. This suggests that individuals with a controlled motivation orientation appear to perceive less control and less ability to cope with negative events (i.e., secondary appraisal). Consistent with the literature, they also use disengagement types of coping strategies when dealing with stressful life events (e.g., Amiot et al., 2004). Study 2 found that although controlled motivation was not directly related to PTG, controlled motivation was indirectly related to PTG through disengagement-oriented coping strategies. As stated by Hayes (2009), it is possible for an independent variable (e.g., controlled

motivation) to exert an indirect effect on a dependent variable (e.g., PTG) through a mediating variable (e.g., disengagement-oriented coping) in the absence of an association between the independent and dependent variable. This finding is interesting and consistent with research indicating that control motivated individuals are more likely to use disengagement-oriented coping strategies (Amiot, et al., 2004; Knee & Zuckerman, 1998), and separately, that these types of coping strategies are related to PTG in some studies (Amiot et al., 2004). Future research is needed to determine the reliability and validity of this finding and further explore the pathways to PTG via different dispositional types of motivation.

Our findings indicate that autonomous motivation is a vital component to the recovery process and has relevant implications for mental health practice. Meta-analytic findings show that interventions designed to fulfill basic psychological needs result in enhanced physical and mental health outcomes (Ng et al., 2012). These psychological needs include autonomy (i.e., feeling one's actions are based on self-choice and acting in accordance with one's integrated values), competence (i.e., feeling effective in one's abilities and interactions with their environment), and relatedness (i.e., feeling connected to others; Ryan & Deci, 2000). Satisfaction of these needs is the central process by which autonomous motivation is facilitated (Deci & Vansteenkiste, 2004). Thus, instilling a sense of autonomy, competence, and relatedness in clinical practice may foster autonomous motivation, which may in turn help individuals recover by being better equipped to positively accommodate/integrate negative life event related information (Mancini, 2008) and adopt constructive task-oriented coping strategies.

A significant limitation of the current studies is that they were correlational in nature, meaning that we cannot conclude to a causal link based on the findings. However, they provide a first step in better understanding motivation's role in facilitating PTG. To clarify the

directionality of the findings, future research should adopt a prospective design and measure participants at several points in time prior to and following negative life events.

We consider combining conceptually related cognitive appraisal items into subscales (i.e., primary and secondary appraisal) one of the strengths of the current study; however, it may be viewed as another limitation to the current research given that previous studies typically have measured cognitive appraisals with single items (Smith & Ellsworth, 1985; Tong et al., 2009). It appears inconsistent in the literature on how best to measure cognitive appraisals and represent them in statistical analyses. Future research is needed to determine the most robust way to measure and statistically evaluate cognitive appraisals (i.e., single item or multiple items) in order to draw valid and reliable conclusions across studies.

## **Conclusion**

In summary, SDT appears as a promising framework for understanding individual differences in appraising and coping with negative life events as well as directly predicting PTG. This study offers a valuable contribution to both the self-determination and posttraumatic growth literatures. It is hoped that it will inspire other researchers to incorporate motivational constructs into models of PTG following negative life events.

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Table 1

*Study 1, Prevalence of most significant negative life event in past year (N = 364)*

| Event                                                | n  | %    |
|------------------------------------------------------|----|------|
| Death of a loved one (e.g., family member, friend)   | 98 | 27.0 |
| Pre-marital romantic breakup                         | 56 | 15.0 |
| Personal health problem (e.g., STI, MS)              | 23 | 6.0  |
| Living on own/moving out/coming to university        | 22 | 6.0  |
| Failing course/exam/or poor grades                   | 18 | 5.0  |
| Health problem of loved one (e.g., cancer)           | 17 | 4.7  |
| Mental health difficulty (e.g., depression)          | 17 | 4.7  |
| Romantic relationship problem (e.g., conflict)       | 16 | 4.4  |
| Family problems (e.g., conflict with parents)        | 15 | 4.1  |
| Serious accident/injury to self or other (e.g., car) | 14 | 3.8  |
| Relationship problems with friend (e.g., conflict)   | 13 | 3.6  |
| Separation/divorce of parents                        | 11 | 3.0  |
| Sexual assault/physical abuse                        | 8  | 2.2  |
| Surgery (e.g., back, shoulder)                       | 6  | 1.6  |
| Other (e.g., natural disaster, job loss, debt)       | 30 | 8.0  |

*Note:* Participants could report more than one negative life event.

Table 2

Study 1, Correlations and Descriptive Statistics of Variables Used in Regression Analysis

| Variable   | 1 | 2     | 3     | 4    | 5     | 6     | 7     | 8      | 9     | 10    | 11    | M     | SD    |
|------------|---|-------|-------|------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1. PTGI    | - | .38** | .15** | .10  | .16** | .16** | .07   | .19**  | -.10  | .15** | .00   | 73.72 | 22.57 |
| 2. Auto    |   | -     | .29** | -.00 | -.03  | .07   | -.04  | .41**  | -.05  | .15** | .00   | 4.91  | 1.16  |
| 3. Control |   |       | -     | .02  | .05   | .23** | .18** | -.18** | -.00  | -.00  | .01   | 3.95  | 1.24  |
| 4. TSE     |   |       |       | -    | .07   | -.00  | -.06  | .09    | -.08  | -.04  | -.08  | 22.04 | 16.63 |
| 5. SAO     |   |       |       |      | -     | .18** | .09   | .01    | .25** | .10   | .05   | 5.98  | 1.50  |
| 6. IES-R   |   |       |       |      |       | -     | .37** | -.21** | .46** | -.04  | .16** | 35.23 | 18.04 |
| 7. CES-D   |   |       |       |      |       |       | -     | -.39** | .18** | -.11  | .20** | 23.56 | 7.81  |
| 8. PWB     |   |       |       |      |       |       |       | -      | -.13* | .11*  | -.07  | 77.59 | 12.56 |
| 9. CS      |   |       |       |      |       |       |       |        | -     | -.06  | .13*  | 3.95  | 1.74  |
| 10. PLE    |   |       |       |      |       |       |       |        |       | -     | .35** | 2.82  | 1.35  |
| 11. NLE    |   |       |       |      |       |       |       |        |       |       | -     | 2.04  | 1.22  |

*Note:* Intercorrelations for participants (n =372) are presented above the diagonal. Means and standard deviations for the participants are presented in the horizontal rows for each variable. For all scales, higher scores are indicative of more extreme responding in the direction of the construct assessed. Correlation is significant at the \* .05 or \*\* .01 level (2-tailed). PTG = Posttraumatic Growth Inventory; Auto = Autonomous Motivation; Control = Controlled Motivation; TSE = Time Since Event; SAO = Stress at Occurrence; IES = Impact of Events Scale (current distress linked to event); CES-D = Centre for Epidemiologic Studies – Depression Scale; PWB = Ryff Scales of Psychological Well-being; CS = Current Stress linked to event; PLE = Number of Positive Life Events; NLE = Number of Negative Life Events;

Table 3

Study 1, Hierarchical Regression Predicting Posttraumatic Growth (N = 304)

| Step | Predictors                      | B       | $\beta$ | $\Delta R^2$<br>(Step) | Adjusted<br>R <sup>2</sup><br>(model) |
|------|---------------------------------|---------|---------|------------------------|---------------------------------------|
| 1    | Gender                          | 5.50    | .10     |                        |                                       |
|      | Time Since Event                | .05     | .04     |                        |                                       |
|      | Stress at Occurrence            | 2.18*   | .15*    |                        |                                       |
|      | Current Stress                  | -2.55** | -.20**  |                        |                                       |
|      | Distress (IES-R)                | .29**   | .23**   |                        |                                       |
|      | Psychological Well-Being (RYFF) | .41**   | .23**   |                        |                                       |
|      | Depression (CES-D)              | .26     | .09     |                        |                                       |
|      | #Positive Life Events           | 2.27*   | .14*    |                        |                                       |
|      | #Negative Life Events           | -1.50   | -.08    |                        |                                       |
|      | Controlled Motivation           | 1.75    | .10     |                        |                                       |
|      |                                 |         |         | .17**                  | .14                                   |
| 2    | Gender                          | 6.60*   | .12*    |                        |                                       |
|      | Time Since Event                | .06     | .05     |                        |                                       |
|      | Stress at Occurrence            | 2.54**  | .17**   |                        |                                       |
|      | Current Stress                  | -2.52** | -.19**  |                        |                                       |
|      | Distress (IES-R)                | .24*    | .19*    |                        |                                       |
|      | Psychological Well-Being (RYFF) | .17     | .10     |                        |                                       |
|      | Depression (CES-D)              | .20     | .07     |                        |                                       |
|      | #Positive Life Events           | 1.54    | .09     |                        |                                       |
|      | #Negative Life Events           | -1.16   | -.06    |                        |                                       |
|      | Controlled Motivation           | -.04    | -.00    |                        |                                       |
|      | Autonomous Motivation           | 5.53    | .28**   |                        |                                       |
|      |                                 |         |         | .05**                  | .198                                  |

\*  $p < .05$ \*\*  $p < .01$

Table 4

Study 2, Prevalence of most significant negative life event in past year (N = 531)

| Event                                                | n   | %    |
|------------------------------------------------------|-----|------|
| Death of a loved one (e.g., family member, friend)   | 134 | 25.0 |
| Pre-marital romantic breakup                         | 106 | 20.0 |
| Health problem of loved one (e.g., cancer)           | 50  | 9.4  |
| Failing course/exam/or poor grades                   | 36  | 6.8  |
| Family problems (e.g., conflict with parents)        | 30  | 5.6  |
| Mental health difficulty (e.g., depression)          | 27  | 5.1  |
| Losing a friend(s)                                   | 22  | 4.1  |
| Separation/divorce of parents                        | 21  | 4.0  |
| Living on own/moving out/coming to university        | 19  | 3.6  |
| Relationship problems with friend (e.g., conflict)   | 12  | 2.3  |
| Personal health problem (e.g., STI)                  | 11  | 2.0  |
| Infidelity                                           | 8   | 1.5  |
| Sexual assault/physical abuse                        | 7   | 1.3  |
| Romantic relationship problem (e.g., conflict)       | 6   | 1.1  |
| Serious accident/injury to self or other (e.g., car) | 6   | 1.1  |
| Financial Difficulties                               | 4   | 0.7  |
| Surgery                                              | 2   | 0.4  |
| Other (e.g., parent deployment, job loss)            | 30  | 6.0  |

*Note:* Participants could report more than one negative life event.

Table 5  
Study 2, Correlations and Descriptive Statistics of Variables Used in Mediation Analyses

| Variable          | 2     | 3     | 4     | 5      | 6     | 7      | M     | SD    |
|-------------------|-------|-------|-------|--------|-------|--------|-------|-------|
| 1. PTGI           | .25** | .00   | .24** | -.01   | .52** | .18**  | 73.19 | 21.36 |
| 2. Autonomous     | -     | .23** | .11*  | .01    | .21** | .07    | 4.98  | 0.77  |
| 3. Controlled     |       | -     | .04   | -.10*  | .01   | .20**  | 4.24  | 1.04  |
| 4. Primary App.   |       |       | -     | -.32** | .18** | .16**  | 5.74  | 0.93  |
| 5. Secondary App. |       |       |       | -      | .09*  | -.14** | 3.45  | 1.14  |
| 6. Task Coping    |       |       |       |        | -     | .07    | 2.53  | 0.52  |
| 7. Diseng. Coping |       |       |       |        |       | -      | 2.08  | 0.58  |

*Note:* Intercorrelations for participants (i.e., N = 534 for all correlations except for ones with Controlled and Autonomous variables where the N = 473) are presented above the diagonal. Means and standard deviations for the participants are presented in the horizontal rows for each variable. For all scales, higher scores are indicative of more extreme responding in the direction of the construct assessed. Correlation is significant at the \* .05 or \*\* .01 level (2-tailed). PTGI = Posttraumatic Growth Inventory; Autonomous = Autonomous Motivation; Controlled = Controlled Motivation; Primary App. = Primary Appraisal; Secondary App. = Secondary Appraisal; Task Coping = Task Oriented Coping; Diseng. Coping = Disengagement Coping.

Table 6

*Study 2, Mediation Model 1 (Parallel): Bootstrap analyses of the indirect effect of dispositional autonomous motivation on posttraumatic growth through the four proposed mediators, with dispositional controlled motivation as covariate (N = 473).*

|                                                         | Point Estimate of the Indirect Effect |                   |               |
|---------------------------------------------------------|---------------------------------------|-------------------|---------------|
|                                                         | Effect                                | 95% <i>BCa</i> CI |               |
|                                                         |                                       | Lower             | Upper         |
| Total                                                   | <b>3.240</b>                          | <b>1.963</b>      | <b>4.658</b>  |
| $M_1$ (Primary Appraisal)                               | <b>0.372</b>                          | <b>0.046</b>      | <b>0.970</b>  |
| $M_2$ (Secondary Appraisal)                             | 0.011                                 | -0.073            | 0.229         |
| $M_3$ (Task Oriented Coping)                            | <b>2.777</b>                          | <b>1.674</b>      | <b>4.095</b>  |
| $M_4$ (Disengage. Oriented Coping)                      | 0.080                                 | -0.237            | 0.504         |
| Specific indirect effect paired comparison: $M_1 - M_3$ | <b>-2.405</b>                         | <b>-3.788</b>     | <b>-1.180</b> |

*Note:* *BCa* CI = bias-corrected and accelerated confidence interval. Intervals in bold do not include zero, indicating that the effect is significantly different from 0 at  $p < .05$  (two-tailed).

Table 7

*Study 2, Mediation Model 2 (Parallel): Bootstrap analyses of the indirect effect of dispositional controlled motivation on posttraumatic growth through the four proposed mediators, with dispositional autonomous motivation as covariate ( $N = 473$ ).*

| Point Estimate of the Indirect Effect |              |                   |              |  |
|---------------------------------------|--------------|-------------------|--------------|--|
|                                       | Effect       | 95% <i>BCa CI</i> |              |  |
|                                       |              | Lower             | Upper        |  |
| Total                                 | 0.155        | −0.868            | 1.142        |  |
| $M_1$ (Primary Appraisal)             | 0.051        | −0.195            | 0.342        |  |
| $M_2$ (Secondary Appraisal)           | −0.025       | −0.265            | 0.136        |  |
| $M_3$ (Task Oriented Coping)          | −0.409       | −1.266            | 0.392        |  |
| $M_4$ (Disengage. Oriented Coping)    | <b>0.537</b> | <b>0.219</b>      | <b>1.007</b> |  |

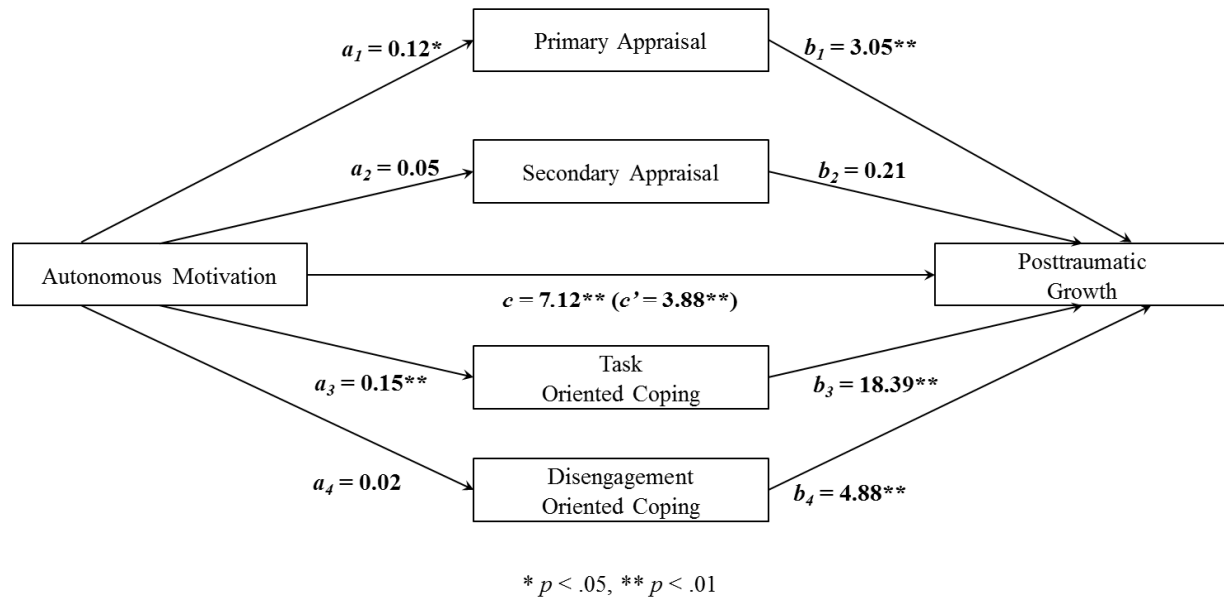
*Note:* *BCa CI* = bias-corrected and accelerated confidence interval. Intervals in bold do not include zero, indicating that the effect is significantly different from 0 at  $p < .05$  (two-tailed).

Table 8

*Study 2, Mediation Model 3 (Serial): Bootstrap analyses of the indirect effect of dispositional autonomous motivation on posttraumatic growth through the three proposed mediators, with dispositional controlled motivation as covariate ( $N = 473$ ).*

|                                                              | Point Estimate of the Indirect Effect |                   |               |
|--------------------------------------------------------------|---------------------------------------|-------------------|---------------|
|                                                              | Effect                                | 95% <i>BCa</i> CI |               |
|                                                              |                                       | Lower             | Upper         |
| Total                                                        | <b>3.247</b>                          | <b>2.024</b>      | <b>4.697</b>  |
| $M_1$ (Primary Appraisal)                                    | <b>0.407</b>                          | <b>0.055</b>      | <b>1.018</b>  |
| $M_2$ (Task Oriented Coping)                                 | <b>2.657</b>                          | <b>1.489</b>      | <b>3.985</b>  |
| $M_3$ (Primary Appraisal $\rightarrow$ Task Oriented Coping) | <b>0.183</b>                          | <b>0.024</b>      | <b>0.471</b>  |
| Specific indirect effect paired comparison: $M_1 - M_2$      | <b>-2.250</b>                         | <b>-3.665</b>     | <b>-0.912</b> |
| Specific indirect effect paired comparison: $M_1 - M_3$      | 0.223                                 | -0.013            | 0.738         |
| Specific indirect effect paired comparison: $M_3 - M_2$      | <b>-2.473</b>                         | <b>-3.815</b>     | <b>-1.259</b> |

*Note:* *BCa* CI = bias-corrected and accelerated confidence interval. Intervals in bold do not include zero, indicating that the effect is significantly different from 0 at  $p < .05$  (two-tailed).



*Figure 1.* Study 2 parallel mediation model 1 of the relationship between autonomous motivation and PTG with primary appraisal, secondary appraisal, task oriented coping, and disengagement oriented coping as mediators ( $N = 473$ );  $a$  and  $b$  path values represent non-standardized regression coefficients. The  $c$  path values for the relationship between autonomous motivation and PTG represent the total effect ( $c$ ) of autonomous motivation on PTG before inclusion of the three mediating variables, and the  $c'$  path value represents the direct effect of autonomous motivation on PTG, computed through bootstrapping analyses after entering the mediators.

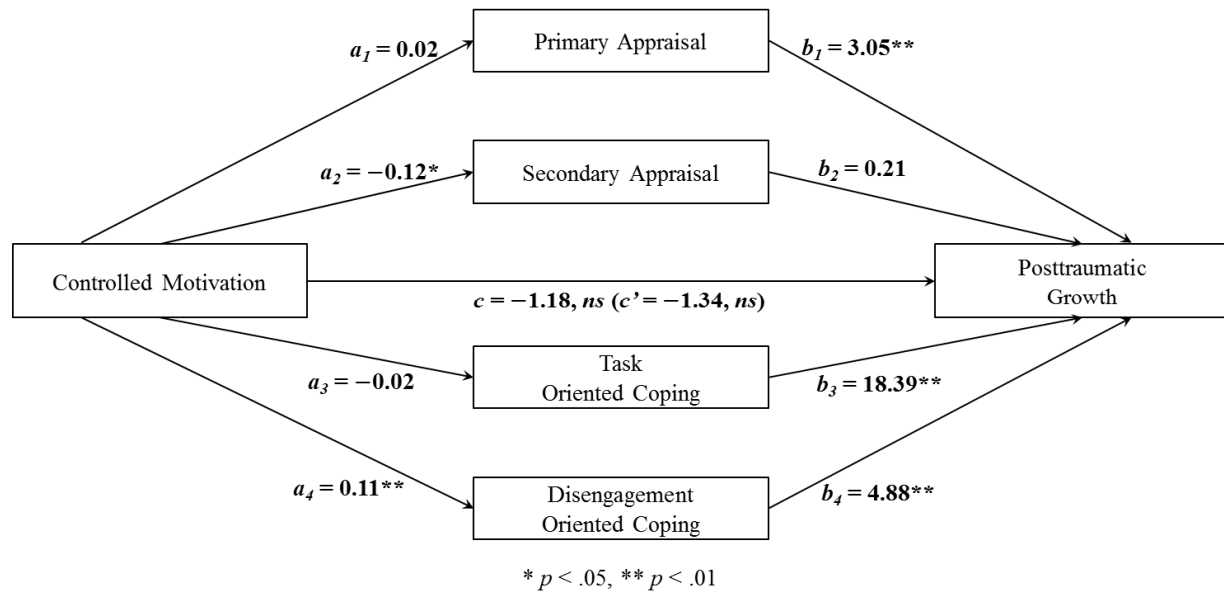
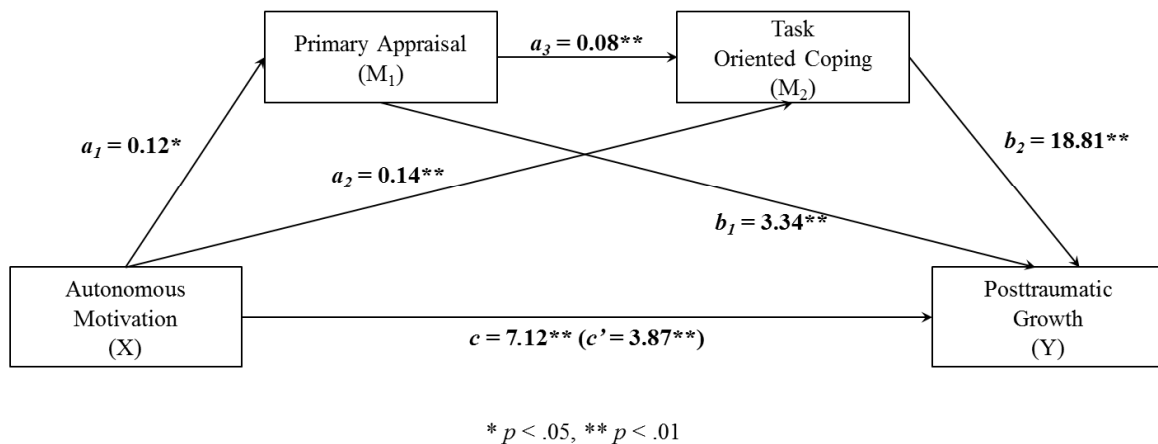


Figure 2. Study 2 parallel mediation model 2 of the relationship between controlled motivation and PTG with primary appraisal, secondary appraisal, task oriented coping, and disengagement oriented coping as mediators ( $N = 473$ ); a and b path values represent non-standardized regression coefficients. The c path values for the relationship between controlled motivation and PTG represent the total effect (c) of controlled motivation on PTG before inclusion of the three mediating variables, and the c' path value represents the direct effect of controlled motivation on PTG, computed through bootstrapping analyses after entering the mediators.



*Figure 3.* Study 2 serial mediation model 3 of the relationship between autonomous motivation and PTG with primary appraisal, task oriented coping, and the pathway of primary appraisal and task oriented coping as mediators ( $N = 473$ );  $a$  and  $b$  path values represent non-standardized regression coefficients. The  $c$  path values for the relationship between autonomous motivation and PTG represent the total effect ( $c$ ) of autonomous motivation on PTG before inclusion of the three mediating variables, and the  $c'$  path value represents the direct effect of autonomous motivation on PTG, computed through bootstrapping analyses after entering the mediators.

Running Head: POSTTRAUMATIC GROWTH AFTER A BREAKUP

Posttraumatic Growth Following a Romantic Breakup:

The Contribution of Self-Determination Theory

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This manuscript is based on data obtained for Andrew B. Lumb's doctoral dissertation. This manuscript is comprised of subsamples of data (secondary use of data) taken from two larger studies (first study data collected in 2010-2011; second study data collected in 2012-2013) on posttraumatic growth following various negative life events. The subsamples for this manuscript include all participants having listed relationship dissolution as their most significant negative life event in the past year. This research was supported by the Joseph-Armand Bombardier Canada Graduate Scholarship, Social Sciences and Humanities Research Council awarded to Andrew B. Lumb.

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### Abstract

Research on Self-Determination Theory (SDT; Ryan & Deci, 2002) has not investigated how its constructs can help facilitate posttraumatic growth (Tedeschi & Calhoun, 2004) following a nonmarital breakup. In two cross-sectional studies, university students completed an online survey. In Study 1, we investigated the contribution of dispositional autonomous and controlled motivation in statistically predicting posttraumatic growth above and beyond other known correlates. In Study 2, we aimed to replicate findings from Study 1 and we explored the mediating role of cognitive appraisals and coping in explaining the relationship between dispositional motivation orientations and posttraumatic growth. In both studies, in comparison to controlled motivation, autonomous motivation directly predicted posttraumatic growth, even after controlling for previously researched correlates. Mediation results indicated an indirect effect of dispositional autonomous motivation on posttraumatic growth through task-oriented coping. Collectively, these findings highlight the importance of incorporating motivation into models of posttraumatic growth.

*Keywords:* posttraumatic growth, relationship dissolution, romantic breakup, self-determination theory, cognitive appraisal, coping, integration, autonomous motivation.

### Posttraumatic Growth Following a Breakup: The Contribution of Self-Determination Theory

Among university students, nonmarital relationship dissolution is one of the most common types of negative life events (Anders, Frazier, & Shallcross, 2012; Armeli, Gunthert, & Cohen, 2001; Bergman, Tashiro, & Frazier, 2008; Frazier & Schauben, 1994; Park, Cohen, & Murch, 1996). The detrimental impact of breaking up on an individual's well-being is well documented (e.g., loneliness, depressive and anxiety symptoms, PTSD symptoms, sleeping difficulties; Chung et al., 2002; Field, Diego, Pelaez, Deeds, & Delgado, 2009; Lewandowski & Radice, 2012; Sprecher, 1994). However, the recovery period following a breakup will often be an opportunity for individuals to see themselves in a new light, adjust their priorities in life, and appreciate more deeply the value of friendships and family. These changes are part of a phenomenon known as *Posttraumatic Growth* (PTG; Tedeschi & Calhoun, 2004).

Posttraumatic Growth (PTG) is “the experience of positive changes that occur as a result of the struggle with highly challenging life crises” (Tedeschi & Calhoun, 2004, p.1). Posttraumatic growth has been studied relative to a broad range of negative life events (Helgeson, Reynolds & Tomich, 2006; Park et al., 1996; Tedeschi, Park, Calhoun, 1998) and to romantic breakups in particular (Bergman, Tashiro, & Frazier, 2008; Lewandowski & Bizzoco, 2007; Marshall, 2012; Marshall, Bejanyan, & Ferenczi, 2013; Tashiro & Frazier, 2003; Tashiro, Frazier, & Berman, 2006). PTG after a breakup has been linked to dispositional factors (e.g. being female; agreeableness, self-esteem, attachment style; Helgeson, 1994; Tashiro & Frazier, 2003); distress at the time of the breakup (Marshall, 2012, Marshall, et al., 2013), depression (Samios et al., 2014); positive affect and satisfaction with life (Samios, Henson, & Simpson, 2014); environmental causal attributions (Tashiro & Frazier, 2003); positive reinterpretation and acceptance coping, and experiencing rediscovery of the self and positive emotion after the end

of a low-quality relationship (Lewandowski & Bizzoco, 2007). Conducting more research to further understand the role of individual differences would advance knowledge in this field. We suggest exploring the role that motivation plays in facilitating PTG and the interrelationships between motivation, cognitive appraisals, and coping in explaining PTG following a breakup.

In line with positive psychology, Self-Determination Theory (SDT; Deci & Ryan, 1985) is a theory of motivation that views human beings as innately active and oriented towards growth and self-actualization (Ryan & Deci, 2002; Sheldon & Ryan, 2011). Theoretical arguments for the role of motivation in personal growth in general (Deci & Ryan, 1985, 2000; Skinner & Edge, 2002) is available, but no research within the SDT paradigm (Friendly & Grolnick, 2008; Philippe, Koestner & Lekes, 2013; Slotter & Finkel, 2009) has investigated ex-partners post-breakup experience in general, or even more specifically, how motivation can help facilitate personal growth following the end of a relationship.

Following a breakup, aspects of one's self-concept can greatly change or be lost (Slotter, Gardner, & Finkel, 2010), especially since the selves of romantic partners often become intertwined. Individuals may face the challenge of integrating the negative breakup experience into a coherent sense of self. Through the process of integration, individuals are thought to become more able to regulate their emotions, act more consistently with their values and needs, and experience higher levels of well-being and growth (Ryan & Deci, 2000; Weinstein, Deci, & Ryan, 2011). However, whether individuals integrate experiences is dependent on their current motivations (Deci & Ryan, 1985).

SDT defines motivation as a propensity that varies in its degree of self-determination and integration (Deci & Ryan, 2000). According to SDT, individuals can engage in behaviours based on more *autonomous* or *controlled* reasons (Deci & Ryan, 2000). Autonomous motivation (i.e.,

choiceful responding) refers to a tendency to initiate behaviour for the inherent pleasure and interest that one finds in a given activity (intrinsic motivation), because it is an integral part of a person's self-identity (integrated regulation), or because the behaviour is consistent with one's values (identified regulation). In contrast, controlled motivation (i.e., pressured responding) refers to initiating behaviours with the aim of escaping negative feelings or at attaining ego-related rewards (introjected regulation), or based on externally administered punishments and rewards (external regulation; Deci & Ryan, 2000). In regard to cognitive, behavioural, and affective outcomes, research has supported the hypotheses that autonomous motivation typically leads to positive outcomes and controlled motivation typically leads to negative outcomes (Deci & Ryan, 2000; Vallerand, 1997, for reviews).

Under stressful circumstances, autonomous motivation is positively associated with task-oriented coping strategies (e.g., planning, search for instrumental social support; Amiot, Gaudreau, & Blanchard, 2004; Knee & Zuckerman, 1998), whereas controlled motivation is positively associated with use of less adaptive disengagement-oriented coping strategies (Amiot, et al., 2004; Knee & Zuckerman, 1998).

Cognitive appraisals of events (e.g., stress appraisal) are also thought to be influenced by type of motivation (Amiot et al., 2004; Lazarus, 1991; Ntoumanis et al., 2009; Skinner & Edge, 2002). Research indicates that autonomous motivation is associated with less defensiveness (Hodgins, Yacko, & Gottlieb, 2006; Knee, Lonsbary, Canevello, & Patrick, 2005; Knee & Zuckerman, 1998; Weinstein et al., 2011), and more interest-taking in one's emotional experience (Weinstein & Ryan, 2011). It is suggested that autonomously motivated individuals will be honest in appraising stressful events as personally relevant and perceive that they have the personal resources to cope due to a greater sense of self-efficacy (i.e., primary and secondary

appraisal), which will lead to more adaptive plans of action for coping with stress, thus providing an opportunity for growth (Skinner & Edge, 2002). Conversely, individuals higher in controlled motivation have a more defensive response style (Weinstein et al., 2011). For control motivated individuals, this defense may be a result of wanting to maintain an appealing self-image, which may hinder true and genuine self-reflection and growth (Deci & Ryan, 1995).

In the stressful aftermath of a breakup where demands may exceed resources and where all goals cannot be maintained (e.g., marriage), dispositional autonomous motivation should represent a valuable personal resource. This resource should help an individual maintain a sense of what is most important in their lives, move toward psychologically fulfilling goals, remain open to their experience, and better tolerate negative experiences (Ryan & Deci, 2000; Skinner & Edge, 2002). This should aid in integration and personal growth following a romantic breakup.

### **Overview of Studies and Hypotheses**

In light of the contributions reviewed above, Self-Determination Theory is a highly relevant framework for understanding individual differences in appraising and coping with negative life events as well as directly predicting PTG. Therefore, in two studies we investigated the role that global autonomous motivation plays in facilitating PTG following a breakup. In Study 1, we examined the statistical contribution of dispositional autonomous motivation after controlling for dispositional controlled motivation and accounting for variance of previously studied correlates of growth. We hypothesized that autonomous motivation would relate positively to PTG, whereas controlled motivation would relate negatively to PTG (Hypothesis 1). Secondly, autonomous motivation would statistically predict an additional portion of the variance in PTG after controlling for controlled motivation and previously studied correlates of growth (Hypothesis 2). In Study 2, based on the aforementioned research evidence associating

cognitive appraisals and coping strategies with PTG and autonomous motivation, we conducted mediation analyses to examine their role in the relationship between autonomous motivation and PTG. We hypothesized that autonomous motivation would relate positively to PTG, whereas controlled motivation would relate negatively to PTG (Hypothesis 1). Autonomous motivation would relate positively to primary and secondary appraisals and to task-oriented coping. Controlled motivation would be negatively associated with primary and secondary appraisal, yet positively related to disengagement oriented coping (Hypothesis 2). PTG would also be positively associated with primary appraisal and task-oriented coping strategies (Hypothesis 3). No hypotheses were specified for the indirect effects in the mediation analyses.

## **STUDY 1**

The first study investigated the statistical contribution of dispositional autonomous motivation, after controlling for dispositional controlled motivation and previously researched correlates of PTG—gender, time since the negative life event, perceived stress at occurrence of event, current perceived stress linked to the event, current distress (PTSD symptoms), depressive symptoms, and psychological well-being—in explaining PTG following a romantic breakup. Of particular importance is the statistical contribution of dispositional autonomous motivation in explaining PTG given the gap in the literature.

## **Methods**

### **Research Design and Participants**

This cross-sectional study is based on a sample of 58 students (45 females) enlisted in an introductory psychology course at University of Ottawa. They were awarded one percent to their final grade for participating in the study. Participants were aged between 17 and 29 years old ( $M = 19.36$ ,  $SD = 2.13$ ) and reported being Caucasian (75.9%), Asian (5.2%), African American

(6.9%), Arabic (3.4%), and other (8.6%; e.g., Turkish). Participants were in their first (63.8%), second (17.2%), third (8.6%), or fourth (8.6%) year of university. Of note, the data in this study is based on secondary data. The 58 participants consist of a subsample of data taken from Study 1 in Article 1 of this dissertation (data collected in 2010-2011) on PTG following various negative life events and include all participants having listed relationship dissolution as their most significant negative life event in the past year.

## **Procedures**

Ethics approval was obtained from the University of Ottawa Research Ethics Board. Data was collected online using a self-report survey. Once participants accessed the online survey, they were asked “*Have you experienced a significant negative life event in the past 1 year?*” Participants who responded *yes* to this question were included in the study. At the start of the survey, participants indicated their most significant negative life event in the past year (e.g., relationship breakup) and responded to subsequent questionnaires with this event in mind. The entire survey took an average of 30 minutes to fill out.

## **Measures**

***General Information Questionnaire.*** This questionnaire collected information on the participants’ gender, age, ethnicity, and academic year. Participants described their most significant negative life event in the past year, and answered questions regarding the time since the event, perceived stress at the event’s occurrence and current stress based on the negative life event using a 7-point Likert scale.

***Posttraumatic Growth Inventory*** (PTGI; Tedeschi & Calhoun, 1996). This measure assesses positive outcomes following the experience of negative life events. This 21-item measure is composed of 5 subscales: New Possibilities, Relating to Others, Personal Strength,

Spiritual Change, and Appreciation of Life. Original instructions were changed to ask participants to indicate the degree of life change they experienced “*as a result of the negative life event*” in the present study. The PTGI has been shown to have good reliability at .89 as well as validity (Tashiro & Frazier, 2003; Tedeschi & Calhoun, 1996). Internal consistency in the current study is .88 (Cronbach’s alpha).

**Global Motivation Scale** (GMS; Guay, Mageau, & Vallerand, 2003; Pelletier, Blanchard, Dion, Sharp, & Otis, 2003). To assess global motivation orientations, this study used the 18-item Global Motivation Scale to measure the six motivational constructs conceptualized by Deci and Ryan (1985, 2000). Participants rated how much each statement reflects the reasons why he or she does things in general. Items are divided into six subscales: intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation, and amotivation. Previous research undertaken by Guay, Mageau and Vallerand (2003) has shown that the reliability, validity and internal consistency of this scale are at acceptable levels.

Based on previous evidence showing it is more meaningful to look at autonomous versus controlled motivation (Deci & Ryan, 2008), the current study combined five of the subscales into two global motivation scales: Autonomous Motivation (intrinsic motivation, integrated regulation and identified regulation subscales) and Controlled Motivation (introjected and external regulation subscales). The scores obtained on these two scales will be used in all analyses. The internal consistency of these two scales in the current study is acceptable with a Cronbach’s alpha of .89 (Autonomous Motivation) and .72 (Controlled Motivation).

**Impact of Events Scale-Revised** (IES-R; Weiss & Marmar, 1997). This revised version is comprised of 22 items. It measured current subjective distress (PTSD symptoms) associated with the negative life event (i.e., breakup). Previous research (Creamer, Bell, & Failla, 2003) has

shown that this scale provides high reliability (Cronbach = .96). The internal consistency for this measure in the current study is excellent with an alpha of .93.

***Depressive Symptoms.*** The 20-item Center for Epidemiologic Studies-Depression Scale (CES-D; Radloff, 1977) was used to measure the frequency of depressive symptoms. Research using this scale shows that the internal consistency ranges from .80 to .90 (Radloff, 1977). Internal consistency for this scale in the current study is good (Cronbach = .78).

***Scales of Psychological Well-Being*** (Ryff & Keyes, 1995). This 18-item measure evaluates psychological well-being. The use of these scales is supported by previous research indicating their independence from measures of subjective well-being (Ryff & Keyes, 1995). The internal consistency of this measure in the current study is .72.

### **Analytic Plan**

All analyses for this study were performed using IBM's Statistical Package for the Social Sciences (SPSS, Version 21). Data was screened using the procedures outlined by Tabachnick and Fidell (2007) before performing the analyses.

All variables had less than 5% missing data, except for the time since the event variable, which had 8.6% missing data. Data for this variable was imputed using the expectation maximization (EM) method in SPSS. Verification of each variable was then carried out to ensure that data entry was accurate, that all data were in the expected ranges, and that the distributions conformed to the assumptions of univariate and multivariate analysis. All distributions had acceptable skewness and kurtosis values except for the Stressfulness of the Event variable, which had a negative skew of -2.36 and a kurtosis value of 7.04. These extreme values were due to a very high mean score reported by the participants for the initial stressfulness of the most negative life event they had experienced in the past year (6.23 on a scale of 7). In order to correct for this,

we first tried conducting a square root transformation and then a log 10 transformation, but the values were still not within acceptable limits. The next step would have been to try an inverted transformation, but this would have created concerns regarding the interpretability of the data. The other option would have been to exclude the variable from the analyses. However, because of this variable's relevance for the present study, and because a high mean was expected given that participants were rating the stressfulness of their "*most negative/stressful life event*" in the past year, we considered that the distribution is an accurate representation of the participants' experience and that it was best to keep the variable as is in spite of its unusual characteristics. Caution will be adopted nonetheless in the interpretation of the results.

## **Results**

### **Event Characteristics and Correlations**

Participants had experienced a romantic break-up on average 18.26 weeks prior to participation ( $SD = 14.96$ ). Table 1 presents the means and standards deviations for each variable as well as their inter-correlations for all 58 participants. Results indicate that, as expected, autonomous motivation was associated positively with PTG, with the correlation being of moderate strength. Controlled motivation was not significantly related to PTG. Controlled motivation was positively associated with current distress (PTSD symptoms) linked to the event. Of note, current stress associated with the event was negatively and moderately correlated with PTG, but stressfulness of the event at the time of occurrence, current depressive symptoms, psychological well-being, time since the event, and current distress (PTSD symptoms) associated with the event were not correlated with PTG.

### **Hierarchical Regression Analysis**

A hierarchical regression (Table 2) was performed to determine if dispositional autonomous motivation was statistically predictive of PTG while accounting for the variance of the same predictors of PTG as included in the correlation analysis. With PTG as the dependent variable, the statistical predictors and correlates of PTG were entered in the first block (Model 1) and autonomous motivation was added in the second block (Model 2) after controlling for variables in Model 1.

The ANOVA results indicate that the two models were significant. In Model 1, adjusted  $R^2 = .19$ ,  $F(8,54) = 2.59$ ,  $p = .020$ . In Model 2, adjusted  $R^2 = .31$ ,  $F(9,54) = 3.68$ ,  $p = .002$ . In Model 1, the significant statistical predictors of PTG were current stress associated with the event ( $t = -3.03$ ,  $p = .004$ ) and psychological well-being ( $t = 2.48$ ,  $p = .017$ ). After accounting for the variance of the variables entered in Model 1, autonomous motivation ( $t = 2.98$ ,  $p = .005$ ) emerged as a significant statistical predictor of PTG in Model 2.

In the first model, currently experiencing less stress associated with the breakup ( $B = -5.071$ ,  $p = .004$ ) and higher psychological well-being ( $B = 0.658$ ,  $p = .017$ ) statistically predicted increases in posttraumatic growth. In the second model, being more autonomously motivated ( $B = 7.327$ ,  $p = .005$ ) statistically predicted higher levels of PTG following a breakup.

The adjusted  $R^2$  value for Model 1 indicates that current stress linked to the breakup and current psychological well-being together accounted for 19% of the variance in PTG. Squared semi-partial correlations indicated that current stress uniquely accounted for 13.7% of the variability in PTG, whereas psychological well-being uniquely accounted for 9% of the variability in PTG. After controlling for the variables entered in the first model, autonomous motivation uniquely accounted for an additional 11% of the variance in PTG in Model 2.

( $R^2$  change value). Globally, Model 2 accounted for a total of 31% of the variance in PTG (adjusted  $R^2$ ).

### **Discussion: Study 1**

Hypothesis 1 was partially supported in that autonomous motivation was positively associated with PTG, whereas controlled motivation was not associated with PTG. Hypothesis 2 was supported, as global autonomous motivation significantly contributed to the variance in PTG after controlling for controlled motivation and previously studied correlates of PTG. In the aftermath of a romantic breakup, increases in autonomous motivation contribute to the experience of growth. This is in line with theoretical assumptions taken from SDT (Hodgins & Knee, 2002; Skinner & Edge, 2002) positing that autonomous motivation should help a person be more open to their experience, better integrate their experiences into their sense of self, and have a better sense of what is truly important to him or her. They also echo studies investigating the role of motivation in romantic relationships (Hodgins et al., 2006; Knee et al., 2002; Knee et al., 2005; Knee & Zuckerman, 1998). Other findings revealed that higher levels of psychological well-being was associated with higher levels of PTG (regression analysis), and lower levels of current stress associated with the breakup were related to higher levels of PTG (correlation and regression analysis).

This study is the first to investigate the contribution of SDT to the understanding of post-breakup posttraumatic growth. Autonomous motivation appears to be an important resource contributing to the psychological growth process after a romantic breakup.

## STUDY 2

Using a cross-sectional design, the second study aimed to replicate the significant positive relationship found in Study 1 between dispositional autonomous motivation and PTG. It also expanded on the first study by exploring factors that may explain the relationship between motivation orientations and PTG. More specifically, we investigated the role that primary appraisal, secondary appraisal, task-oriented coping, and disengagement oriented coping may play in explaining the relationship between dispositional motivation orientations and PTG.

### Methods

#### Research Design and Participants

This study is based on a sample of 106 students (82 females) enlisted in an introductory psychology course at the University of Ottawa. Of note, the data in this study is based on secondary data. The participants consist of a subsample of data taken from Study 2 in Article 1 of this dissertation (data collected in 2012-2013). The present sample includes all participants having listed relationship dissolution as their most significant negative life event in the past year.

Participants were aged between 17 and 33 years old ( $M = 19.81$ ,  $SD = 2.63$ ) and reported being Caucasian (64%), Asian (8.5%), African American (6.6%), Middle Eastern (6.6%), Arabic (4.7%), and other (9.6%; e.g., First Nations). Participants were in their first (56.2%), second (28.6%), third (7.6%), or fourth (7.6%) year of university.

#### Procedures

Ethics approval was obtained from the University of Ottawa Research Ethics Board. The procedure is the same as the one used in Study 1.

## Measures

Like in Study 1, participants completed online versions of a General Information Questionnaire, Posttraumatic Growth Inventory ( $\alpha$  in the current study = .92), and Global Motivation Scale ( $\alpha$  in the current study was .83 for Autonomous Motivation and .81 for Controlled Motivation). The following two measures were also included in the current study:

***Cognitive Appraisal.*** Previous research has typically measured appraisals with single items (Smith & Ellsworth, 1985; Tong et al., 2009). However, to create the current measure we have obtained items from several sources, namely: 1) Peacock and Wong's (1990) Stress Appraisal Measure; 2) Horowitz, Wilner, and Alvarez's (1979) Impact of Event Scale; 3) Armeli et al.'s (2001) list of stressor appraisal items. In the current study we created two appraisal dimensions: *Primary Appraisal*, consisting of 8 items [loss (2 items), threat (1 item), challenge (1 item), stress (1 item), severity (3 items)]; and *Secondary Appraisal*, consisting of 9 items [previous experience (2 items), predictability (2 items), controllability (2 items), coping ability (3 items)]. Internal consistency of the two scales in the current study is good with a Cronbach's alpha of .82 (Primary Appraisal) and .75 (Secondary Appraisal).

***Coping Strategies*** (COPE; Carver, Scheier & Weintraub, 1989). This measure assessed the coping strategies participants used to deal with the aftermath of their relationship breakup. The COPE subscales pertaining to *active coping*, *planning*, *seeking of social support for instrumental reasons*, *acceptance*, and *positive reinterpretation* were used to assess Task-Oriented coping (Amiot et al., 2008). The COPE subscale *denial* was used to assess Disengagement-Oriented coping (Amiot, Blanchard, & Gaudreau, 2008). Denial is one of the most common maladaptive strategies used in the benefit finding literature (Helgeson et al., 2006) and has been previously investigated in the domain of breakups (Lewandowski & Bizzoco, 2007). Alpha reliabilities for

this measure are adequate, and test-retest correlations over 6 weeks ranged from 0.56 to 0.89 (Carver et al., 1989). Internal consistency of the two scales in the current study is good with alphas of .84 (Task-oriented coping) and .78 (Disengagement-Oriented Coping).

### **Analytic Plan**

Data screening and analysis was conducted with the Statistical Package for the Social Sciences (SPSS, Version 21). Procedures for screening data described by Tabachnick and Fidell (2007) were employed prior to analyzing the data. Prior to analysis, all variables in the proposed statistical analyses were examined for accuracy of data entry and fit between their distributions and the assumptions of univariate and multivariate analysis. All variables were reviewed via “maximum and minimum” statistics in the SPSS “Descriptives” to make sure values were in their intended ranges. Skewness and kurtosis values were in satisfactory ranges. No variable had greater than 5% missing data, thus there was no need to replace missing values. Univariate outliers on all variables were assessed using histograms and standardized values, which revealed no standardized scores greater than 3.29 standard deviations above and below the mean (Tabachnik & Fidell, 2007). There were no cases identified through Mahalanobis distance as multivariate outliers with  $p < .001$ . In addition, assumptions for linearity and homoscedasticity were met by investigating all pairs of continuous variables using scatter/dot plots and Levene’s test.

## **Results**

### **Event Characteristics and Correlation Analyses**

Participants had experienced a romantic break-up on average 21.70 weeks prior to participation ( $SD = 15.30$ ). Table 3 presents the means, standards deviations and inter-correlations for all variables. Results indicated that autonomous motivation was associated

positively with task-oriented coping and posttraumatic growth. Opposite to what was hypothesized, controlled motivation was significantly (positive) related to PTG. Controlled motivation was also positively associated with both task oriented and disengagement oriented (denial) coping. Finally, task-oriented coping was positively related to PTG, and secondary appraisal was negatively associated with both primary appraisal and disengagement oriented coping (denial).

### **Mediation Analysis**

Mediation analyses were conducted to explore the role of four potential mediating variables (a) Primary Cognitive Appraisal, (b) Secondary Cognitive Appraisal, (c) Task-oriented coping, and (d) Disengagement Oriented Coping, in investigating the link between dispositional autonomous motivation and PTG and dispositional controlled motivation and PTG. The mediation analysis in this study was conducted according to the bootstrapping method outlined by Hayes (2012, 2013). Bootstrapping has been recommended over other methods (i.e. Baron and Kenny's causal step approach and the Sobel test; see Hayes, 2009), and its benefits include higher power, lower rates of Type 1 error since the number of inferential tests is minimized and it does not rely on the assumption of a normal sampling distribution (Mackinnon, Lockwood & Williams, 2004). The bootstrapping method allowed us to enter all four proposed mediators simultaneously and to test whether an overall indirect effect existed and each mediator's specific indirect effect after controlling for the other mediators (Preacher & Hayes, 2008).

### **Mediation Model 1**

In the first mediation model (Figure 1), bootstrap analyses (10,000 iterations) were performed to estimate the indirect effect of dispositional autonomous motivation on PTG through the four proposed mediators, while controlling for dispositional controlled motivation

(covariate). The results indicate that the total effect of autonomous motivation on PTG was significant (total effect = 8.54,  $p = .0007$ ), and that the direct effect of this variable became not significant after including the four mediators in the model (direct effect = 2.38,  $p = .3348$ ). The total indirect effect – the difference between the total effect and the direct effect – of autonomous motivation on PTG through the four mediators was significant, with a point estimate of 6.16 and a 95% BCa (bias-corrected and accelerated) confidence interval of 2.901 to 10.481. Since 0 does not lie within this confidence interval, we can conclude that the total indirect effect was significantly different from 0 at  $p < .05$  (two-tailed).

Turning to the specific indirect effects of the four proposed mediators, the bootstrapping results indicate that there was an indirect effect of autonomous motivation through task-oriented coping, the point estimate of this effect being 6.40, and its 95% BCa confidence interval, from 3.290 to 10.548. That 0 did not lie within this confidence interval indicates that the indirect effect was significantly different from 0 at  $p < .05$  (two-tailed). The three other proposed mediators did not contribute significantly to the proposed model (the 95% BCa confidence interval for each specific indirect effect included 0). The results indicate that even after accounting for the variance of controlled motivation, higher levels of autonomous motivation lead to higher PTG. In addition, looking at the specific indirect effects we observe that higher levels of autonomous motivation lead to higher levels of task-oriented coping strategies, which in turn leads to PTG. Details of the mediation analysis results are presented in Figure 1.

### **Mediation Model 2**

In the second mediation model (Figure 2), bootstrap analyses (10,000 iterations) were performed to estimate the indirect effect of global controlled motivation on PTG through the four proposed mediators, while controlling for global autonomous motivation (covariate). The results

indicate that after controlling for autonomous motivation, controlled motivation had no total effect, direct effect, or total indirect effect on PTG, and that this relationship was not indirectly effected by any of the proposed mediators (95% BCa confidence intervals for all specific indirect effects included 0). Details of the mediation analysis results are presented in Figure 2.

### **Discussion: Study 2**

Hypothesis 1 was partially supported as dispositional autonomous motivation was positively associated with PTG. Similar to Study 1 the results from Study 2 highlighted the importance of dispositional autonomous motivation in statistically predicting PTG after a romantic breakup. Controlled motivation was also related to PTG in the correlation analyses of this second study. However, when controlling for autonomous motivation in the second mediation model, the relationship between controlled motivation and PTG became non-significant. It appears that the common variance between both global motivation orientations as well their relationship with PTG is most strongly accounted for by autonomous motivation. Hypothesis 2 was partially supported: autonomous motivation was positively associated with task-oriented coping and controlled motivation was positively associated with disengagement oriented coping. This is coherent with previous research linking different types of motivation and coping strategies (Amiot, et al., 2004; Knee & Zuckerman, 1998). Hypothesis 3 was partially supported in that task-oriented coping was positively associated with PTG. Taking this association further, the first mediation analysis indicated task-oriented coping as being a significant mediator, so much so that the direct relationship between autonomous motivation and PTG became non-significant when including task-oriented coping in the model. However, primary and secondary appraisals as well as disengagement oriented coping (denial) did not contribute to the relationship between autonomous motivation and PTG. In summary, individuals

who generally act on autonomous motives will be more likely to use task-oriented coping strategies, which in turn will lead to more PTG following a breakup. This is in line with previous findings from Lewandowski and Bizzoco (2007) who found that growth was significantly related to positive reinterpretation and acceptance coping but not to denial.

### **General Discussion**

Two studies investigated the relationship between dispositional autonomous and controlled motivational orientations and posttraumatic growth following a romantic breakup. Drawing from Self-Determination Theory (Deci & Ryan, 2000; Hodgins et al., 2006; Skinner & Edge, 2002), we hypothesized that dispositional autonomous motivation would play an essential role in determining how young adults experience growth following this common and stressful life event.

Results from both studies revealed that in comparison to controlled motivated individuals, autonomously motivated individuals were more likely to experience PTG following a breakup. Moreover, mediation analysis revealed that task-oriented coping (active coping, planning, seeking of social support for instrumental reasons, acceptance, and positive reinterpretation) was a significant mediator in the relationship between autonomous motivation and PTG.

The present results are coherent with theoretical assumptions and research evidence linking autonomous motivation to greater openness to experience and decreased defensiveness in the face of stress and past negative experiences (Hodgins & Knee, 2002; Knee et al., 2002; Knee et al., 2005; Knee & Zuckerman, 1998; Skinner & Edge, 2002; Weinstein et al., 2011). It is also consistent with studies showing that dispositional autonomous motivation is related to more constructive coping behaviours (Amiot et al., 2004; Knee & Zuckerman, 1998). We suggest that autonomously motivated individual's high level of self-awareness, and a focus on living life

consistent with personal values, may be helping them choose more adaptive and flexible action tendencies such as acceptance following a breakup.

Moreover, their openness to experiencing their emotions and their self-reflection tendencies, help autonomously motivated individuals integrate negative experiences into their existing self-schema (Hodgins & Knee, 2002; Hodgins, Weibust, Weinstein, Shiffman, Miller, Coombs, et al., 2010; Weinstein et al., 2011). This is vital, especially since breaking up is a distressing experience that can be related to changes in the content and structure of one's self-concept. In particular, breakups have been related to a reduction in one's clarity of self-concept, which is strongly associated with experiencing more distress post-breakup (Slotter et al., 2010). We suggest that autonomously motivated individuals may not experience such a detrimental impact on their self-concepts following a breakup due to several factors. These include, a stable sense of self-esteem that is not contingent on desired outcomes (Deci & Ryan, 1995), living life congruent with one's values (Deci & Ryan, 2000), and more effectively processing stressful events (Weinstein & Hodgins, 2009). However, future research is needed to explore these hypotheses further.

Contrary to expectations in Study 2, primary and secondary cognitive appraisals of the breakup were not related to either type of motivation. This is inconsistent with the suggestion that autonomously motivated individuals will appraise stressful events as challenges, whereas controlled motivated individuals will appraise similar events as threats (Skinner & Edge, 2002). Findings from the current study indicate that it is not so much about how one appraises the significance of the breakup, but rather how one copes in the aftermath that leads to PTG. Cognitive appraisals were not related to PTG, which is also inconsistent with previous research using university samples (Park et al., 1996). Given this is the first study to investigate the

relationships between motivation, cognitive appraisals, and coping strategies following the experience of a breakup, future studies are needed to clarify these relationships.

### **Limitations and Future Directions**

The findings in this article were based on secondary data, meaning that the participants consisted of a subsample taken from two larger studies (i.e., Article 1) in this dissertation. Additionally, both studies were correlational in nature, which means that we cannot conclude any causal link based on their findings. However, they provide a first step in better understanding motivations role in facilitating PTG. To clarify the directionality of the findings, future research should adopt a prospective design and measure participants at several points in time prior to and following relationship dissolution. Future research should also further examine the role of motivation while also including measures of relationship specific factors (e.g., quality and satisfaction of past relationship, length of relationship, initiator status, motivation for being in the relationship). Future studies should include this as it will help differentiate between two pathways to growth after relationship dissolution that have been identified in the literature and in which the relationship between motivation and PTG could be playing out differently (the stress-relief pathway and the crisis-growth pathway; Tashiro and Frazier, 2006).

According to SDT, autonomous motivation acts to guide people towards life choices that are more need fulfilling (Weinstein et al., 2011). The fulfillment of one psychological need in particular, namely that of relatedness (i.e., feeling connected to others; Deci & Ryan, 2000) may be particularly relevant following a breakup. Future research may wish to explore a relatedness-restoration process that may be playing out following a breakup. The process by which a situational deficit in one need can serve as a motivational force prompting one to restore fulfillment of this particular need has been a growing focus of research on SDT (Sheldon &

Gunz, 2009; Radel, Pelletier, Sarrazin, & Milyavskaya, 2011). Breaking-up represents the loss of a significant social and affective partner and by definition leaves the person with a relational void. However, after the breakup (i.e., relatedness-thwarting event), autonomously motivated individuals may be more likely to pursue the fulfillment of this thwarted need by connecting with others, a strategy that would in turn help them grow from the experience.

## **Conclusion**

In summary, SDT is one framework for understanding individual differences in appraising and coping with negative life events as well as directly predicting PTG. This study offers a valuable contribution to the PTG, relationship dissolution and, Self-Determination Theory literatures. It is hoped that it will inspire other researchers to incorporate motivational constructs into models of PTG following negative life events.

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Table 1

*Study 1: Correlations and Descriptive Statistics of Variables Used in Regression Analyses*

| Variable      | 2   | 3   | 4     | 5     | 6    | 7      | 8     | 9    | M     | SD    |
|---------------|-----|-----|-------|-------|------|--------|-------|------|-------|-------|
| 1. PTGI       | .00 | .16 | -.31* | -.01  | .08  | .21    | .37** | .12  | 77.38 | 18.74 |
| 2. TSE        |     | .14 | -.18  | .10   | .01  | .05    | -.22  | .25  | 18.26 | 14.29 |
| 3. SAO        |     |     | .01   | .01   | .11  | .09    | .05   | .12  | 6.23  | 1.17  |
| 4. CS         |     |     |       | .51** | .10  | -.03   | .19   | .05  | 3.76  | 1.73  |
| 5. IES-R      |     |     |       |       | .32* | -.11   | .23   | .27* | 38.78 | 18.50 |
| 6. CES-D      |     |     |       |       |      | -.52** | -.08  | .08  | 25.60 | 7.92  |
| 7. RYFF       |     |     |       |       |      |        | .23   | -.17 | 76.12 | 10.62 |
| 8. Autonomous |     |     |       |       |      |        |       | .29* | 4.96  | 1.08  |
| 9. Controlled |     |     |       |       |      |        |       |      | 3.99  | 1.12  |

*Note:* Intercorrelations for participants (N =58) are presented above the diagonal. Means and standard deviations for the participants are presented in the horizontal rows for each variable. For all scales, higher scores are indicative of more extreme responding in the direction of the construct assessed. Correlation is significant at the \* .05 or \*\* .01 level (2-tailed). PTGI = Posttraumatic Growth Inventory; TSE = Time Since Event (with EM correction); SAO = Stress at Breakup Occurrence; CS = Current Stress Associated with the Breakup; IES-R = Impact of Events Scale; CES-D = Centre for Epidemiologic Studies – Depression Scale; RYFF = Psychological Well-Being; Autonomous = Autonomous Motivation; Controlled = Controlled Motivation.

Table 2

*Study 1: Hierarchical Regression Predicting Posttraumatic Growth (N = 54)*

| Step | Predictors                      | B       | $\beta$ | $\Delta R^2$<br>(Step) | Adjusted<br>R <sup>2</sup><br>(model) |
|------|---------------------------------|---------|---------|------------------------|---------------------------------------|
| 1    | Gender                          | 8.52    | .19     |                        |                                       |
|      | Time Since Event                | -.31    | -.22    |                        |                                       |
|      | Stress at Occurrence            | 1.87    | .12     |                        |                                       |
|      | Current Stress                  | -5.07** | -.45**  |                        |                                       |
|      | Distress (IES-R)                | .16     | .15     |                        |                                       |
|      | Psychological Well-Being (RYFF) | .66*    | .36*    |                        |                                       |
|      | Depression (CES-D)              | .49     | .20     |                        |                                       |
|      | Controlled Motivation           | 3.60    | .21     |                        |                                       |
|      |                                 |         |         | .31*                   | .19                                   |
| 2    | Gender                          | 11.62   | .26     |                        |                                       |
|      | Time Since Event                | -.11    | -.08    |                        |                                       |
|      | Stress at Occurrence            | 1.91    | .12     |                        |                                       |
|      | Current Stress                  | -5.29** | -.46**  |                        |                                       |
|      | Distress (IES-R)                | .10     | .09     |                        |                                       |
|      | Psychological Well-Being (RYFF) | .41     | .23     |                        |                                       |
|      | Depression (CES-D)              | .45     | .19     |                        |                                       |
|      | Controlled Motivation           | .89     | .05     |                        |                                       |
|      | Autonomous Motivation           | 7.33**  | .42**   |                        |                                       |
|      |                                 |         |         | .11**                  | .31                                   |

\*  $p < .05$

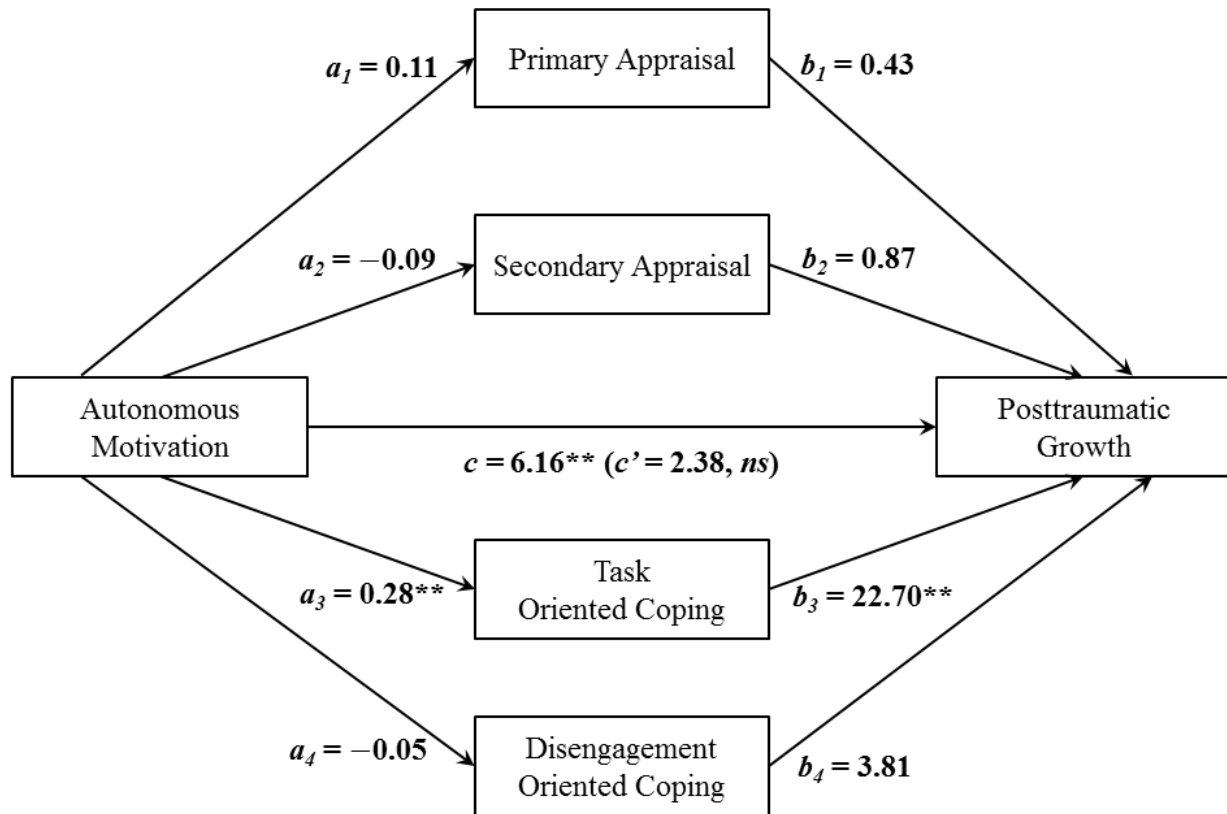
\*\*  $p < .01$

Table 3

*Study 2: Correlations and Descriptive Statistics of Variables Used in Mediation Analyses*

| Variable          | 2     | 3     | 4   | 5      | 6     | 7      | M     | SD    |
|-------------------|-------|-------|-----|--------|-------|--------|-------|-------|
| 1. PTGI           | .38** | .21*  | .16 | -.02   | .56** | .04    | 76.29 | 21.51 |
| 2. Autonomous     |       | .45** | .16 | -.06   | .50** | .11    | 4.99  | 0.90  |
| 3. Controlled     |       |       | .17 | -.02   | .21*  | .36**  | 4.14  | 1.19  |
| 4. Primary App.   |       |       |     | -.50** | .19   | .22*   | 5.71  | 0.95  |
| 5. Secondary App. |       |       |     |        | .04   | -.33** | 3.70  | 1.16  |
| 6. Task Coping    |       |       |     |        |       | -.16   | 2.60  | 0.50  |
| 7. Diseng. Coping |       |       |     |        |       |        | 1.72  | 0.73  |

*Note:* Intercorrelations for participants (N = 106) are presented above the diagonal. Means and standard deviations for the participants are presented in the horizontal rows for each variable. For all scales, higher scores are indicative of more extreme responding in the direction of the construct assessed. Correlation is significant at the \* .05 or \*\* .01 level (2-tailed). PTGI = Posttraumatic Growth Inventory; Autonomous = Autonomous Motivation; Controlled = Controlled Motivation; Primary App. = Primary Appraisal; Secondary App. = Secondary Appraisal; Task Coping = Task-oriented coping; Diseng. Coping = Disengagement Coping.



$^{**} p < .01$

Figure 1. Mediation Model 1 (Study 2): Relationship between autonomous motivation and PTG with primary appraisal, secondary appraisal, task-oriented coping, and disengagement-oriented coping as mediators; a and b path values represent non-standardized regression coefficients. The c path values for the relationship between autonomous motivation and PTG represent the total effect (c) of autonomous motivation on PTG before inclusion of the three mediating variables, and the c' path value represents the direct effect of autonomous motivation on PTG, computed through bootstrapping analyses after entering the mediators

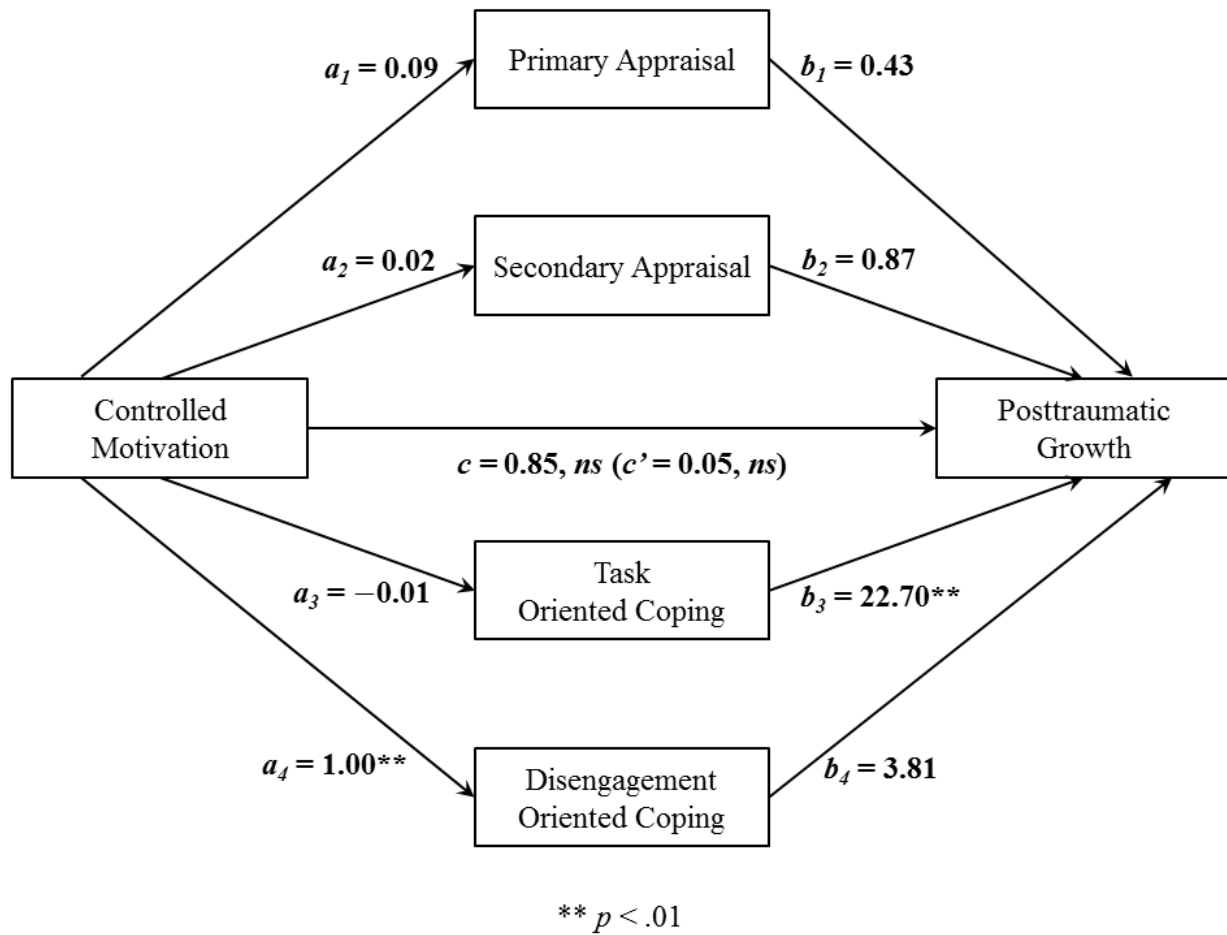


Figure 2. Mediation Model 2 (Study 2): Relationship between controlled motivation and PTG with primary appraisal, secondary appraisal, task-oriented coping, and disengagement-oriented coping as mediators; a and b path values represent non-standardized regression coefficients. The c path values for the relationship between controlled motivation and PTG represent the total effect (c) of controlled motivation on PTG before inclusion of the three mediating variables, and the c' path value represents the direct effect of controlled motivation on PTG, computed through bootstrapping analyses after entering the mediators

Running Head: POSTTRAUMATIC GROWTH AND BEREAVEMENT

Posttraumatic Growth and Bereavement: The Contribution of Self-Determination Theory

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Author Note

This manuscript is based on data obtained for Andrew B. Lumb's doctoral dissertation. This manuscript is comprised of subsamples of data (secondary use of data) taken from two larger studies (first study data collected in 2010-2011; second study data collected in 2012-2013) on posttraumatic growth following various negative life events. The subsamples for this manuscript include all participants having listed bereavement as their most significant negative life event in the past year. This research was supported by the Joseph-Armand Bombardier Canada Graduate Scholarship, Social Sciences and Humanities Research Council awarded to Andrew B. Lumb. Correspondence concerning this article should be addressed to Celine Blanchard, School of Psychology, University of Ottawa, Ontario, Canada, K1N 6N5. E-mail: [cblancha@uottawa.ca](mailto:cblancha@uottawa.ca)

### Abstract

No research drawing from Self-Determination Theory (SDT; Ryan & Deci, 2002) has investigated the bereavement experience of individuals or how motivation can help facilitate posttraumatic growth (Tedeschi & Calhoun, 2004) following the death of a loved one. In two cross-sectional studies, university students completed an online survey. Study 1 investigated the contribution of global autonomous and controlled motivation in statistically predicting posttraumatic growth above and beyond previously researched correlates. Study 2 explored the mediating role of cognitive appraisals and coping in explaining the relationship between global motivation orientations and posttraumatic growth. Results indicated that in comparison to controlled motivation, autonomous motivation was positively related posttraumatic growth, even after controlling for previously researched correlates. Mediation results indicated an indirect effect of global autonomous motivation on posttraumatic growth through task-oriented coping. Collectively, these findings suggest the importance of incorporating motivation into models of posttraumatic growth. Clinical implications of these findings are also discussed.

*Keywords:* posttraumatic growth, bereavement, self-determination theory, cognitive appraisal, coping, integration, autonomous motivation.

## Posttraumatic Growth and Bereavement: The Contribution of Self-Determination Theory

*“To live is to suffer, to survive is to find meaning in that suffering”  
-Frankl (1984, p. 9)*

Over the course of a lifetime, most individuals will experience the loss of a loved one through death. The pain and grief that can accompany this loss is an inevitable part of our common humanity. Prospective studies indicate there are individual differences in how people respond to the death of a loved one. For some, the overwhelming experience interferes in daily activities; others struggle for months and gradually recover, while others function well soon after the death (Bonnano, 2004). The detrimental impact of bereavement has been well documented in the literature (i.e., psychological and physical distress; Hogan & Schmidt, 2002; Murphy, Johnson, & Logan, 2002; Rubin & Malkinson, 2001). Nonetheless, in the aftermath of death, some individuals can experience significant positive life changes or posttraumatic growth (PTG; Tedeschi & Calhoun, 2004) that may co-exist with distress (Cadell, Regehr, & Hemsworth, 2003). These may include intrapersonal (e.g., increased personal strength, spirituality, appreciation of life, changes in life priorities) or interpersonal changes (e.g., increased appreciation of relationships). For instance, a quote from a participant in a study by Nolen-Hoeksema and Larson (1999) indicated a positive change in relationships as a result of the death of a loved one... *“I learned that when you love someone, the relationship is so important. It’s enhanced my relationship with other people because I realize that time is so important, and you can waste so much effort on small, insignificant events and feelings”* (pp. 145-150).

As Tedeschi and Calhoun (2004) have previously discussed, PTG does not occur because of the event itself, but rather as a consequence of the psychological struggle that accompanies its aftermath. In the context of bereavement, PTG is often a result of individuals attempting to cognitively process and regulate post-death affective experience, create meaning, and integrate

their experiences into a coherent understanding of their world and their place in it (Calhoun & Tedeschi, 2006; Neimeyer, 2006).

Determining who may, or may not, flourish from tragedy has long interested PTG researchers and, posttraumatic growth has been studied relative to a broad range of negative and traumatic life events (Helgeson, Reynolds & Tomich, 2006; Park, Cohen, & Murch, 1996; Tedeschi, Park, & Calhoun, 1998). Correlates of PTG following the death of a loved one have included greater intrusive and avoidant thoughts about the death (Hogan & Schmit, 2002); increased appraisal of death as severe, threatening, and stressful (Armstrong & Shakespeare-Finch, 2011; Wolchik, Coxe, Tein, Sandler, & Ayers, 2008); greater PTG soon after death rather than later on (Michael & Cooper, 2013); the use of active, avoidant, and social support coping strategies (Michael & Cooper, 2013; Wolchik et al., 2008). Noteworthy, a recent systematic review (Michael & Cooper, 2013) of fifteen studies identified themes of PTG following bereavement, namely personal transformation and reappraisal of life and priorities. A meta-analytic study that investigated statistical predictors of growth collapsed across various negative life events including bereavement found significant relationships between growth and being female, younger in age, being a minority compared to non-minority, an increased degree of severity, threat, or stress associated with the negative life event, positive reappraisal, acceptance, denial, and the dispositional characteristics of optimism and religiosity (Helgeson, et al., 2006).

In regard to dispositional/personality factors associated with PTG, fewer traits have been investigated within the context of bereavement. Certain dispositional characteristics have been shown to predispose individuals towards growth following bereavement, including four of the five NEO-PI personality factors (excluding neuroticism), optimism, and religious affiliation (Davis et al., 1998; Helgeson et al., 2006; Linley & Joseph, 2004; Michael & Cooper, 2013;

Milam, Ritt-Olson, & Unger, 2004; Park et al., 1996; Tedeschi & Calhoun, 1996). Although this list may not be exhaustive, it highlights the need to explore additional dispositional factors that can help us better understand PTG and refine the models within which we conceptualize this phenomenon (Bonnano et al., 2002). Given the likelihood of experiencing a death-related loss in one's lifetime, improving our ability to predict who, then, experiences PTG and under what circumstances seems justified. Why is it that some and not all individuals experience growth following adversity? What may account for such individual differences? Do some individuals have pre-existing personal resources that are associated with an increased likelihood of positive outcomes? By diversifying this list of dispositional constructs this can help us further identify protective and risk related factors for individuals experiencing bereavement, which would be useful in therapeutic interventions for bereaved individuals. Consequently, the present study investigated the role of global/dispositional autonomous motivation, a Self-Determination Theory (SDT; Deci & Ryan, 1985) construct. SDT's theory of motivation views human beings as innately active and oriented towards growth and self-actualization (Ryan & Deci, 2002; Sheldon & Ryan, 2011). Theoretical arguments for the role of motivation in personal growth (Deci & Ryan, 1985, 2000; Skinner & Edge, 2002) is available, but no research within the SDT paradigm has investigated the bereavement experience of individuals, nor how motivation can help facilitate personal growth following the death of a loved one.

How then, might the specific person-characteristic of dispositional motivation influence the development and facilitation of PTG? Following the loss of a loved one, an individual may experience a rupture in their beliefs about the world and his or her place in it, forcing the reconstruction of an assumptive world so it can be brought into line with what one has experienced (Tedeschi & Calhoun, 2004). Essentially, bereavement is a process of reconstructing

a world of meaning that has been challenged by loss. The resolution to this incongruence can involve individual's engaging in a meaning-making process that includes the integration of the loss experience into a coherent sense of self. From an SDT point of view, the self is intrinsically attuned to integrate new elements (Deci & Ryan, 2000). Integrating new information or experiences allows individuals to perceive themselves as being more authentic, an experience that increases well-being (Weinstein, Deci, & Ryan, 2011). Through the process of integration, individuals are thought to become more able to regulate their emotions, act more consistently with their values and needs, and experience higher levels of well-being and growth (Ryan & Deci, 2000; Weinstein, et al., 2011). However, whether individuals integrate experiences is dependent on their current motivations (Deci & Ryan, 1985).

SDT defines motivation as a propensity that varies in its degree of self-determination and integration (Deci & Ryan, 2000). According to SDT, individuals can engage in behaviours based on more *autonomous* or *controlled* reasons (Deci & Ryan, 2000). Autonomous motivation (i.e., choiceful responding) refers to a tendency to initiate behaviour for the inherent pleasure and interest that one finds in a given activity (intrinsic motivation), because it is an integral part of a person's self-identity (integrated regulation), or because the behaviour is consistent with one's values (identified regulation). In contrast, controlled motivation (i.e., pressured responding) refers to initiating behaviours with the aim of escaping negative feelings or at attaining ego-related rewards (introjected regulation), or based on externally administered punishments and rewards (external regulation; Deci & Ryan, 2000). In regard to cognitive, behavioural, and affective outcomes, research has supported the hypotheses that autonomous motivation typically leads to positive outcomes and controlled motivation typically leads to negative outcomes (Deci & Ryan, 2000; Vallerand, 1997, for reviews).

Under stressful circumstances, autonomous motivation is positively associated with task-oriented coping strategies (e.g., planning, search for instrumental social support; Amiot, Gaudreau, & Blanchard, 2004; Knee & Zuckerman, 1998), whereas controlled motivation is associated with the use of disengagement-oriented coping strategies (Amiot, et al., 2004; Knee & Zuckerman, 1998).

Cognitive appraisals of events (e.g., threat appraisal) are also thought to be influenced by type of motivation (Amiot et al., 2004; Lazarus, 1991; Ntoumanis et al., 2009; Skinner & Edge, 2002). Research indicates autonomous motivation is associated with less defensiveness (Hodgins, Yacko, & Gottlieb, 2006; Knee, Lonsbary, Canevello, & Patrick, 2005; Knee & Zuckerman, 1998; Weinstein et al., 2011), and more interest-taking in one's emotional experience (Weinstein & Ryan, 2011). For these reasons it has been suggested that autonomously motivated individuals will appraise stressful events as a challenge rather than threat, which will lead to more adaptive plans of action for coping with stress (Blais, Sabourin, Boucher, & Vallerand, 1990; Skinner & Edge, 2002). However, we suggest that autonomously motivated individuals' less defensiveness and increased openness to their emotional experience will translate into them being more honest in appraising stressful events (i.e., primary appraisal) for what they are, be it challenging, threatening, or both. In either case, we see autonomously motivated individuals taking the opportunity to authentically appraise and learn from their experience. Moreover, autonomously motivated individuals experience greater levels of self-efficacy (Hodgins & Knee, 2002), which is important for secondary appraisal. An increased sense of self-efficacy is suggested to help individuals view themselves as having the personal resources to cope, which will lead to more adaptive plans of action for coping with stress, providing an opportunity for growth (Skinner & Edge, 2002).

Conversely, individuals higher in controlled motivation have a more defensive response style (Weinstein et al., 2011). For control motivated individuals, this defense may be a result of wanting to maintain an appealing self-image, which may hinder integration and genuine self-reflection and growth (Deci & Ryan, 1995; Weinstein, et al., 2011). In addition, control motivated individuals' lower sense of competence and self-efficacy may result in a lack of confidence in handling stressful situations (i.e., secondary appraisal; Skinner & Edge, 2002).

In the stressful aftermath of bereavement where demands may exceed resources and where all goals cannot be maintained (e.g., sharing future life experiences with the deceased), being globally autonomously motivated (i.e., dispositional/trait) may allow better access to adaptive motivational resources, which should help individuals choose more adaptive action tendencies. This valuable personal resource should help an individual choose the path of action that meets their true needs, maintain a sense of what is most important in their lives, move toward psychologically fulfilling goals, remain open to their experience, better tolerate negative experiences, and potentially transform the negative into positive (Ryan & Deci, 2000; Skinner & Edge, 2002). For these reasons, being more autonomously motivated should allow for the psychological space necessary to focus one's energy on processing and integrating experience, which should lead to personal growth following the death of a loved one.

### **Overview of Studies and Hypotheses**

In light of the contributions reviewed above, Self-Determination Theory is a highly relevant framework for understanding individual differences in appraising and coping with the death of a loved one as well as directly predicting PTG. Therefore, in two studies we investigated the role that global autonomous motivation plays in facilitating PTG following the death of a loved one. In Study 1, we hypothesized that autonomous motivation would be positively

correlated with PTG, whereas controlled motivation would relate negatively to PTG (Hypothesis 1). Secondly, autonomous motivation would contribute an additional portion of the variance in PTG after accounting for controlled motivation and previously studied correlates of PTG (Hypothesis 2). The correlates that acted as control variables included, gender, perceived stressfulness at the time of the event, time since the negative life event, current stress, depressive symptoms, current distress (PTSD symptoms), and psychological well-being (Helgeson et al., 2006; Park et al., 1996; Tedeschi & Calhoun, 2004). In Study 2, based on the aforementioned research evidence associating cognitive appraisals and coping strategies with PTG and autonomous motivation, we conducted mediation analyses to explore their role in the relationship between autonomous motivation and PTG. We hypothesized that the correlation between autonomous motivation and PTG would be positive, whereas controlled motivation would relate negatively to PTG (Hypothesis 1). Autonomous motivation would be positively associated with primary and secondary appraisal and to task-oriented coping. Controlled motivation would be negatively associated with primary and secondary appraisal, yet positively associated with disengagement-oriented coping (Hypothesis 2). Primary appraisal and task oriented coping strategies would also be positively associated with PTG (Hypothesis 3).

In considering that previous research has shown differentiated responses of growth within different domains of PTG (i.e., subscales of the Posttraumatic Growth Inventory; Tedeschi & Calhoun, 1996), research reporting on these dimensions of PTG is warranted. The second study conducted correlation analyses to explore the relationships between predictor variables and the five domains of PTG, as assessed by the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996).

## STUDY 1

The first study investigated the statistical contribution of global autonomous motivation, after accounting for the variance of global controlled motivation and previously researched correlates of PTG - gender, time since the negative life event, perceived stress at occurrence of event, current perceived stress linked to the event, current distress (PTSD symptoms), depressive symptoms, and psychological well-being - in explaining PTG following the death of a loved one. Of particular importance is the statistical contribution of global autonomous motivation in explaining PTG given the gap in the literature.

## Methods

### Research Design and Participants

This cross-sectional study is based on a sample of 98 students (79 females) enlisted in an introductory psychology course at University of Ottawa. They were awarded one percent to their final grade for participating in the study. Participants were aged between 17 and 36 years old ( $M = 19.48$ ,  $SD = 3.11$ ) and reported being Caucasian (80.6%), African American (8.2%), and other (11.2%; e.g., Asian, Hispanic, First Nations). Participants were in their first (67%), second (19.6%), third (8.2%), or fourth (5.2%) year of university. Of note, the data in this study is based on secondary data. The 98 participants consist of a subsample of data taken from Study 1 in Article 1 of this dissertation (data collected in 2010-2011) on PTG following various negative life events and include all participants having listed bereavement as their most significant negative life event in the past year.

### Procedures

Ethics approval was obtained from the University of Ottawa Research Ethics Board. Data was collected online using a self-report survey. Once participants accessed the online survey, they were asked “*Have you experienced a significant negative life event in the past 1 year?*”

Participants who responded *yes* to this question were included in the study. At the start of the survey, participants described their most significant negative life event in the past year (e.g., death of loved one) and responded to subsequent questionnaires with this event in mind. The entire survey took an average of 30 minutes to fill out.

## Measures

***General Information Questionnaire.*** This questionnaire collected information on the participants' gender, age, ethnicity, and academic year. Participants described their most significant negative life event in the past year, and answered questions regarding the time since the event, perceived stress at the event's occurrence and current stress based on the negative life event using a 7-point Likert scale.

***Posttraumatic Growth Inventory*** (PTGI; Tedeschi & Calhoun, 1996). This measure assesses positive outcomes following the experience of negative life events. This 21-item measure is composed of 5 subscales: New Possibilities, Relating to Others, Personal Strength, Spiritual Change, and Appreciation of Life. Original instructions were changed to ask participants to indicate the degree of life change they experienced "*as a result of the negative life event*" in the present study. The PTGI has been shown to have good reliability at .89 as well as validity (Tashiro & Frazier, 2003; Tedeschi & Calhoun, 1996). Internal consistency in the current study is .91 (Cronbach's alpha).

***Global Motivation Scale*** (GMS; Guay, Mageau, & Vallerand, 2003; Pelletier, Blanchard, Dion, Sharp, & Otis, 2003). To assess global motivation orientations, this study used the 18-item Global Motivation Scale to measure the six motivational constructs conceptualized by Deci and Ryan (1985, 2000). Participants rated how much each statement reflects the reasons why he or she does things in general. Items are divided into six subscales: intrinsic motivation, integrated

regulation, identified regulation, introjected regulation, external regulation, and amotivation.

Previous research undertaken by Guay, Mageau and Vallerand (2003) has shown that the validity and internal consistency of this scale are at acceptable levels.

Based on previous evidence showing it is more meaningful to look at autonomous versus controlled motivation (Deci & Ryan, 2008), the current study combined five of the subscales into two global motivation scales: Autonomous Motivation (intrinsic motivation, integrated regulation and identified regulation subscales) and Controlled Motivation (introjected and external regulation subscales). The scores obtained on these two scales will be used in all analyses. The internal consistency of these two scales in the current study is acceptable with a Cronbach's alpha of .87 (Autonomous Motivation) and .82 (Controlled Motivation).

***Impact of Events Scale-Revised*** (IES-R; Weiss & Marmar, 1997). This revised version is comprised of 22 items. It measured current subjective distress (PTSD symptoms) associated with the negative life event (i.e., death of a loved one). Previous research (Creamer, Bell, & Failla, 2003) has shown that this scale provides high internal consistency (Cronbach = .96). Internal consistency in the current study is excellent with an alpha of .92.

***Depressive Symptoms.*** The 20-item Center for Epidemiologic Studies-Depression Scale (CES-D; Radloff, 1977) was used to measure the frequency of depressive symptoms. Research using this scale shows that the internal consistency ranges from .80 to .90 (Radloff, 1977). Internal consistency for this scale in the current study is excellent (Cronbach = .90).

***Scales of Psychological Well-Being*** (Ryff & Keyes, 1995). This 18-item measure evaluates psychological well-being. The use of the RYFF scales is supported by previous research (Ryff & Keyes, 1995). The internal consistency of this measure in the current study is .85.

## Analytic Plan

All analyses for this study were performed using IBM's Statistical Package for the Social Sciences (SPSS, Version 21). Data was screened using the procedures outlined by Tabachnick and Fidell (2007) before performing the analyses.

All variables had less than 5% missing data, except for the time since the event variable (13%), and number of positive life events in the past year (11%). Data for these variables was imputed using the expectation maximization (EM) method in SPSS. Verification of each variable was then carried out to ensure that data entry was accurate, that all data were in the expected ranges, and that the distributions conformed to the assumptions of univariate and multivariate analysis. All distributions had acceptable skewness and kurtosis values except for the variable, Stressfulness at the Occurrence of the Event, which had a negative skew of -1.50 and a kurtosis value of 1.50. These values were due to a very high mean score reported by the participants for the initial stressfulness of the most negative life event they had experienced in the past year (5.76 on a scale of 7). In order to correct for this, we first tried conducting a square root transformation, but the values were still not within acceptable limits. The next step would have been to try a log10 transformation, but this would have created concerns regarding the interpretability of the data. The other option would have been to exclude the variable from the analyses. However, because of this variable's relevance for the present study, and because a high mean was expected given that participants were rating the stressfulness of their "*most negative/stressful life event*" in the past year, we considered that the distribution is an accurate representation of the participants' experience and that it was best to keep the variable as is in spite of its unusual characteristics. Caution will be adopted nonetheless in the interpretation of the results. Univariate outliers on all variables were assessed using histograms and standardized

values, which revealed no standardized scores greater than 3.29 standard deviations above and below the mean (Tabachnik & Fidell, 2007). There were no cases identified through Mahalanobis distance as multivariate outliers with  $p < .001$ . In addition, assumptions for linearity and homoscedasticity were met by investigating all pairs of continuous variables using scatter/dot plots and Levene's test.

## **Results**

### **Event Characteristics and Correlations**

Participants had experienced the death of a loved one on average 25.09 weeks prior to participation ( $SD = 15.74$ ). Table 1 presents the characteristics of bereavement (i.e., circumstance of death and relationship to the deceased). Table 2 presents the means and standards deviations for each variable as well as their correlations. Bivariate correlation results revealed that global autonomous and controlled motivations were positively associated with PTG<sup>2</sup>. Other positive correlates of PTG included psychological well-being and current distress (PTSD symptoms). Autonomous motivation was positively associated with psychological well-being and negatively related to depressive symptoms. Controlled motivation was positively associated with current distress (PTSD symptoms) linked to the event. Current distress was also positively associated with depressive symptoms and current stress associated with the death of a loved one.

### **Hierarchical Regression Analysis**

A hierarchical regression (Table 3) was performed to determine if global autonomous motivation was statistically predictive of PTG after accounting for the variance of controlled motivation and the same correlates of PTG as included in the correlation analysis. With PTG as

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<sup>2</sup> Partial correlations reveal that when controlling for autonomous motivation, controlled motivation is no longer significantly related to PTG ( $r = .108, p = .294$ ). The partial correlation between autonomous motivation and PTG remains significant after controlling for controlled motivation ( $r = .371, p = .000$ ).

the dependent variable, controlled motivation and the other correlates of PTG were entered in the first block (Model 1) and autonomous motivation was added in the second block (Model 2).

The ANOVA results indicate that the two models were significant. In Model 1, adjusted  $R^2 = .31$ ,  $F(8,94) = 6.15$ ,  $p < .001$ . In Model 2, adjusted  $R^2 = .35$ ,  $F(9,94) = 6.68$ ,  $p < .001$ . In Model 1, the significant statistical predictors of PTG were current distress (PTSD symptoms) associated with the event ( $t = 5.29$ ,  $p < .001$ ) and psychological well-being ( $t = 2.34$ ,  $p = .022$ ). After accounting for the variance of the variables entered in Model 1, autonomous motivation ( $t = 2.70$ ,  $p = .008$ ) emerged as a significant statistical predictor of PTG in Model 2.

In the first model, currently experiencing more distress (symptoms of intrusive thoughts, avoidance, hyperarousal) associated with the death ( $B = 0.652$ ,  $p < .001$ ) and higher psychological well-being ( $B = 0.420$ ,  $p = .022$ ) statistically predicted increases in posttraumatic growth. In the second model, being more autonomously motivated ( $B = 5.254$ ,  $p = .008$ ) statistically predicted higher levels of PTG following the death of a loved one.

The adjusted  $R^2$  value for Model 1 indicates that current distress linked to the death and current psychological well-being together accounted for 30.5% of the variance in PTG. Squared semi-partial correlations indicated that current distress uniquely accounted for 24.5% of the variability in PTG, whereas psychological well-being uniquely accounted for 5.95% of the variability in PTG. After accounting for the variance of the variables entered in the first model, autonomous motivation uniquely accounted for an additional 5% of the variance in PTG in Model 2 ( $R^2$  change value). Globally, Model 2 accounted for a total of 35% of the variance in PTG (adjusted  $R^2$ ).

### **Discussion: Study 1**

Hypothesis 1 was partially supported in that autonomous motivation was positively correlated with PTG. Controlled motivation was also related to PTG in the bivariate correlation analysis. However, after accounting for autonomous motivation in the partial correlation and regression analysis, the relationship between controlled motivation and PTG became non-significant. Thus, it appears that the common variance between both global motivation orientations as well their relationship with PTG is most strongly accounted for by autonomous motivation. Hypothesis 2 was supported, as global autonomous motivation significantly contributed to the statistical prediction of PTG after controlling for controlled motivation and some previously studied correlates of PTG. Following the death of a loved one, being globally autonomously motivated uniquely contributes to positive life changes following the death of a loved one. This is in line with theoretical assumptions taken from SDT (Hodgins & Knee, 2002; Skinner & Edge, 2002), whereby autonomous motivation acts as a resource that aids individuals in being more open to their experiences and emotions, which may help to facilitate the meaning making process and integration of the loss experience into a coherent sense of self.

Psychological well-being was associated with higher levels of PTG in both correlation and regression analyses. This is consistent with findings showing a positive link between indices of positive well-being and growth (Helgeson et al., 2006). Current distress related to the death (symptoms of intrusive thoughts, avoidance of thoughts and images, and hyperarousal) was significantly related to PTG. In the regression analysis, it uniquely accounted for 24.5 percent of the variance in explaining PTG. This positive relationship is consistent with some findings in the literature (Cadell, et al., 2003; Helgeson et al., 2006; Hogan & Schmit, 2002). As previously discussed by Helgeson and colleagues (2006), experiencing intrusive thoughts for instance, may

be a sign that individuals are working through and beginning to cognitively process the impact of the event rather than as a sign of mental health difficulties in this context. This is also consistent with Tedeschi and Calhoun's (1998) view that PTG results from a psychological struggle where enduring distress and positive outcomes can co-exist.

This study is the first to investigate the contribution of SDT to the understanding of post-death posttraumatic growth, and to our knowledge, to the experience of bereavement itself. Global autonomous motivation appears to be an important resource contributing to the psychological growth process following the death of a loved one.

## **STUDY 2**

Using a cross-sectional design, the second study aimed to further investigate the significant positive relationship found in Study 1 between global autonomous motivation and PTG. It also expanded on the first study by exploring factors that may explain the relationship between autonomous motivation and PTG. More specifically, using a multiple mediator analysis, we investigated the role that primary appraisal, secondary appraisal, task-oriented coping, and disengagement-oriented coping may play in explaining the relationship between global autonomous motivation and PTG. We also conducted correlation analyses to explore the relationships between motivation, cognitive appraisal, and coping variables and the five domains of the PTGI.

## **Methods**

### **Research Design and Participants**

This study is based on a sample of 133 students (105 females) enlisted in an introductory psychology course at the University of Ottawa. Of note, the data in this study is based on secondary data. The 133 participants consist of a subsample of data taken from Study 2 in Article

1 of this dissertation (data collected in 2012-2013) on PTG following various negative life events and include all participants having listed bereavement as their most significant negative life event in the past year.

Participants were aged between 17 and 60 years old ( $M = 19.62$ ,  $SD = 4.49$ ) and reported being Caucasian (67.7%), Asian (14.3%), Middle Eastern (10.5%), African American (2.2%), and other (5.3%; e.g., First Nations). Participants were in their first (63.9%), second (21.8%), third (9.8%), or fourth (4.5%) year of university.

## **Procedures**

Ethics approval was obtained from the University of Ottawa Research Ethics Board. The procedure is the same as the one used in Study 1.

## **Measures**

Like in Study 1, participants completed online versions of a General Information Questionnaire, Posttraumatic Growth Inventory ( $\alpha$  in the current study = .92), and Global Motivation Scale ( $\alpha$  in the current study was .82 for Autonomous Motivation and .81 for Controlled Motivation). Contrary to Study 1, the Global Motivation Scale was filled out approximately 2 months prior to the rest of the survey as it was included as a “prescreen questionnaire” that all students in the first-year psychology course completed. The following two measures were also included in the current study:

***Cognitive Appraisal.*** Previous research has typically measured appraisals with single items (Smith & Ellsworth, 1985; Tong et al., 2009). However, to create the current measure we have obtained items from several sources, namely: 1) Peacock and Wong’s (1990) Stress Appraisal Measure; 2) Horowitz, Wilner, and Alvarez’s (1979) Impact of Event Scale; 3) Armeli, Gunthert, & Cohen’s (2001) list of stressor appraisal items. In the current study we created two appraisal

dimensions: *Primary Appraisal*, consisting of 8 items [loss (2 items), threat (1 item), challenge (1 item), stress (1 item), severity (3 items)]; and *Secondary Appraisal*, consisting of 8 items [previous experience (2 items), predictability (2 items), controllability (1 item), coping ability (3 items)]. Internal consistency of the two scales in the current study is good with a Cronbach's alpha of .77 (Primary Appraisal) and .70 (Secondary Appraisal).

***Coping Strategies*** (COPE; Carver, Scheier & Weintraub, 1989). This measure assessed the coping strategies participants used to deal with the aftermath of the death of their loved one. The COPE subscales pertaining to *active coping, planning, seeking of social support for instrumental reasons, acceptance, and positive reinterpretation* were used to assess Task-Oriented coping (Amiot et al., 2008). Disengagement-Oriented coping was assessed using the COPE subscales *denial* and *mental disengagement* (Amiot et al., 2008). Denial and mental disengagement subscales were chosen because of previous research and evidence of their relationships with PTG (Collins et al., 1990; Hegleson et al., 2006; Rajandram et al., 2011). Alpha reliabilities for this measure are adequate, and test-retest correlations over 6 weeks ranged from 0.56 to 0.89 (Carver et al., 1989). Internal consistency of the two scales in the current study is good with Cronbach alphas of .85 (Task-Oriented Coping) and .72 (Disengagement-Oriented Coping).

### **Analytic Plan**

Data screening and analysis was conducted with the Statistical Package for the Social Sciences (SPSS, Version 21). Procedures for screening data described by Tabachnick and Fidell (2007) were employed prior to analyzing the data. Prior to analysis, all variables in the proposed analyses were examined for accuracy of data entry and fit between their distributions and the assumptions of univariate and multivariate analysis. All data was reviewed via “maximum and minimum” statistics in the SPSS “Descriptives” to make sure values were in their intended

ranges. Skewness and kurtosis values were in satisfactory ranges. All variables had less than 5% missing data, except for Autonomous and Controlled Motivation variables, which had 14% (19 participants) missing data. We did not believe it was appropriate to impute scores for 19 participants across 18-items on the GMS, thus we did not replace missing values on these variables. Two univariate outliers were found on the Primary Appraisal scale, which were brought into acceptable ranges ( $<3.29$  standard deviations). There were no cases identified through Mahalanobis distance as multivariate outliers with  $p < .001$ . In addition, assumptions for linearity and homoscedasticity were met by investigating all pairs of continuous variables using scatter/dot plots and Levene's test.

## **Results**

### **Event Characteristics and Correlation Analyses**

Participants had experienced the death of a loved one on average 23.45 weeks prior to participation ( $SD = 16.18$ ). Table 4 presents the characteristics of bereavement (i.e., circumstance of death and relationship to the deceased). Table 5 presents the means, standards deviations and bivariate correlations for all variables. Results indicate posttraumatic growth was positively associated with autonomous motivation, primary appraisal, task-oriented coping, and disengagement-oriented coping. Autonomous motivation was also positively related to task-oriented coping. Controlled motivation was negatively associated with secondary appraisal. Finally, disengagement-oriented coping was positively related to primary appraisal, but negatively related to secondary appraisal.

### **Correlations between PTGI Outcomes and Predictor Variables**

Autonomous motivation was positively associated with three subscales of the PTGI, namely, Relating to Others, New Possibilities, and Appreciation of Life. Increases in primary

appraisal were also positively related to the same three PTGI scales as Autonomous motivation. Secondary appraisal was negatively related to the Appreciation of Life scale of the PTGI. Of note, task-oriented coping was positively related to all five domains of PTG, whereas disengagement-oriented coping was positively associated with the subscale New Possibilities. Interestingly, controlled motivation was unrelated to all five scales of the PTGI (see Table 6 for correlations).

### **Mediation Analysis**

Mediation analyses were conducted to explore the role of four potential mediating variables (a) Primary Cognitive Appraisal, (b) Secondary Cognitive Appraisal, (c) Task-Oriented Coping, and (d) Disengagement-Oriented Coping, in investigating the link between global autonomous motivation and PTG and global controlled motivation and PTG. The mediation analysis in this study was conducted according to the bootstrapping method outlined by Hayes (2012, 2013). Bootstrapping has been recommended over other methods (i.e. Baron and Kenny's causal step approach and the Sobel test; see Hayes, 2009), and its benefits include higher power, lower rates of Type 1 error since the number of inferential tests is minimized and it does not rely on the assumption of a normal sampling distribution (Mackinnon, Lockwood & Williams, 2004). The bootstrapping method allowed us to enter all four proposed mediators simultaneously in order to test whether an overall indirect effect existed as well as each mediator's specific indirect effect after controlling for the other mediators (Preacher & Hayes, 2008).

### **Parallel Mediation Model 1**

In the first mediation model (Figure 1), bootstrap analyses (10,000 iterations) were performed to estimate the indirect effect of global autonomous motivation on PTG through the four proposed mediators, while controlling for global controlled motivation (covariate). The

results indicate that the total effect of autonomous motivation on PTG was significant (total effect = 6.38,  $p = .007$ ), and that the direct effect of this variable became not significant after including the four mediators in the model (direct effect = 3.47,  $p = .108$ ). The total indirect effect – the difference between the total effect and the direct effect – of autonomous motivation on PTG through the four mediators was significant, with a point estimate of 2.91 and a 95% BCa (bias-corrected and accelerated) confidence interval of .443 to 6.066. Since 0 does not lie within this confidence interval, we can conclude that the total indirect effect was significantly different from 0 at  $p < .05$  (two-tailed).

Turning to the specific indirect effects of the four proposed mediators, the bootstrapping results indicate that there was an indirect effect of autonomous motivation through task-oriented coping, the point estimate of this effect being 3.12, and its 95% BCa confidence interval, from 1.146 to 6.080. That 0 did not lie within this confidence interval indicates that the indirect effect was significantly different from 0 at  $p < .05$  (two-tailed). The three other proposed mediators did not contribute significantly to the proposed model (the 95% BCa confidence interval for each specific indirect effect included 0). The results indicate that even after accounting for the variance of controlled motivation, autonomous motivation leads to PTG, and that task-oriented coping is a central mechanism in this relationship. When the mediators are included in the model, the direct effect between autonomous motivation and PTG becomes non-significant. Looking at the specific indirect effects we observe that higher levels of autonomous motivation lead to higher levels of task-oriented coping strategies, which in turn leads to PTG. Details of the mediation analysis results are presented in Figure 1.

### **Parallel Mediation Model 2**

In the second mediation model (Figure 2), bootstrap analyses (10,000 iterations) were performed to estimate the indirect effect of global controlled motivation on PTG through the four proposed mediators, while controlling for global autonomous motivation (covariate). The results indicate that after controlling for autonomous motivation, controlled motivation had no total effect, direct effect, or total indirect effect on PTG, and that this relationship was not indirectly effected by any of the proposed mediators (95% BCa confidence intervals for all specific indirect effects included 0). Details of the mediation analysis results are presented in Figure 2.

### **Discussion: Study 2**

Hypothesis 1 was partially supported as global autonomous motivation was positively associated with PTG in both correlation and mediation analyses, whereas controlled motivation was not related to PTG. Results from Study 2 replicated those of Study 1 and provide additional evidence for the positive global autonomous motivation and PTG link following the death of a loved one. Hypothesis 2 was partially supported as autonomous motivation was positively associated with task-oriented coping and controlled motivation was negatively associated with secondary appraisal. This is coherent with previous research linking autonomous motivation and task-oriented coping strategies (Amiot, et al., 2004; Knee & Zuckerman, 1998). Contrary to expectations, autonomous motivation was unrelated to both primary and secondary appraisal. As expected, controlled motivation was negatively related to secondary appraisal. This is in part consistent with theoretical assumptions that cognitive appraisals are thought to be influenced by types of motivation (Amiot et al., 2004; Lazarus, 1991; Ntoumanis et al., 2009; Skinner & Edge, 2002). Hypothesis 3 was supported, and was consistent with previous research showing a positive link between PTG and primary types of appraisal (e.g., threat, loss; Armeli, et al., 2001;

Park et al., 1996) and task-oriented coping (e.g., positive reinterpretation; Helgeson et al., 2006). Results from the mediation analyses indicated task-oriented coping as being a significant mediator, where the direct relationship between autonomous motivation and PTG became non-significant when including task-oriented coping in the model. Disengagement-oriented coping, primary and secondary appraisals did not contribute to the relationship between autonomous motivation and PTG. In summary, individuals who generally act on autonomous motives appear to be more likely to use task-oriented coping strategies, which in turn will lead to more PTG following the death of a loved one. Exploring these relationships further, the correlations between the study correlates and PTGI subscales indicated that being autonomously motivated is a resource that facilitates a sense of connectedness with others, recognition of new possibilities and paths for one's life, and a greater appreciation for life. The correlation results also indicated that task-oriented coping strategies had positive relationships with all five domains of PTG. This speaks to the importance of engaging in strategies such as acceptance and positive reappraisal in order to experience PTG following the death of a loved one.

### **General Discussion**

Two studies investigated the relationship between global/dispositional autonomous and controlled motivation and posttraumatic growth following the death of a loved one. Drawing from Self-Determination Theory (Deci & Ryan, 2000; Hodgins, et al., 2006; Skinner & Edge, 2002), we hypothesized that global autonomous motivation would play an essential role in determining the extent to which young adults experience growth following the death of a loved one.

Results from both cross-sectional studies revealed that autonomously motivated individuals were more likely to experience PTG following the death of a loved one, in

comparison to individuals with a controlled motivation orientation. Unexpectedly, controlled motivation was unrelated to PTG. We expected there to be a negative relationship given that individuals with a controlled motivation orientation are more likely to be defensive in their response style (Weinstein et al., 2011), which may lead them to be reluctant to take an honest look at their experience and qualities of the self, negating attempts at making meaning and experiencing growth following the death of a loved one. In Study 1, correlation analysis revealed a positive relationship between controlled motivation and PTG (not significant once accounting for autonomous motivation in partial correlation), suggesting that some control motivated individuals are reporting growth experiences. Future studies should investigate what characteristics may account for this unexpected relationship. For instance, we speculate that control motivated individuals who report PTG may be engaging in some kind of ego-protection mechanism in an attempt to convey an enhanced view of one's self to maintain self-esteem and avoid the negative feelings related to the death. Future research is needed to verify this assumption and investigate other possible moderating variables that could better explain these findings. On the other hand, our findings suggest that autonomously motivated individuals who are oriented towards growth, learning and development, are intrinsically motivated to integrate new elements open and honestly (Deci & Ryan, 2001; Knee & Zuckerman, 1998).

Mediation analyses revealed that task-oriented coping (active coping, planning, seeking of social support for instrumental reasons, acceptance, and positive reinterpretation) is a central mechanism at play in the relationship between autonomous motivation and PTG. Task-oriented coping was positively related to all five domains of the PTGI, which suggests that this type of coping strategy is conducive to all types of growth following the loss of a loved one.

These findings provide further support to theoretical assumptions and research indicating that autonomous motivation facilitates the meaning making process and integration of negative life experiences, which increases the likelihood of experiencing personal growth (Ryan & Deci, 2001; Weinstein et al., 2011). Autonomously motivated individuals' ability to be self-reflective and open to their emotional experience may help them adopt constructive, task-oriented coping strategies that facilitate a meaning making process and the integration of the loss experience into a coherent sense of self. Thus, an autonomous motivation orientation may allow individuals to react proactively in the face of adversity and act in line with their values and genuine priorities, which makes them in return better able to adapt their view of themselves, their life and their relationships to the loss of a loved one.

Contrary to expectations in Study 2, autonomous motivation was unrelated to primary and secondary cognitive appraisals of the death. In addition, primary and secondary cognitive appraisals in the mediation analysis were not related to PTG, which is also inconsistent with previous research using university samples (Park et al., 1996). In general, these findings suggest it is not so much how one appraises the significance of the death, but rather how one copes in the aftermath that leads to PTG.

Although the findings are preliminary and require further validation, we would like to suggest some potential clinical implications based on the results. Practitioners should first be mindful that experiencing a negative life event or death of a loved one is not a pre-requisite for growth, and that only some individuals may experience posttraumatic growth following the death of a loved one. Therefore, it is important to know what factors may help facilitate PTG and who may be more, or less, prone to experience growth. Calhoun and Tedeschi (2008) remind practitioners to conceptualize growth as a consequence of working through the negative life

experience rather than a result of the event itself. Thus, practitioners should be sensitive to facilitating an atmosphere that is conducive to exploration, integration, and meaning construction (Tedeschi & Calhoun, 2006). Research indicates that therapies that promote narratives or meaning making following bereavement can be effective (Holland et al., 2006). However, integrating negative life experiences into a coherent sense of self requires a supportive environment that satisfies one's basic psychological needs for autonomy (i.e., feeling one's actions are based on self-choice and acting in accordance with one's values), competence (i.e., feeling effective in one's actions and interactions with their environment), and relatedness (i.e., feeling connected to others; Joseph & Linley, 2005; Ryan & Deci, 2000). Meta-analytic findings reveal that interventions designed to fulfill psychological needs result in enhanced physical and mental health outcomes (Ng et al., 2012). It is the satisfaction of these needs that is also the central process by which autonomous motivation is created (Deci & Vansteenkiste, 2004). Thus, instilling a sense of autonomy, competence, and relatedness in clientele may foster autonomous motivation, which may help recovery by promoting integration of negative life event related information (Mancini, 2008) and the adoption of constructive task-oriented coping strategies. Moreover, our findings suggest that practitioners may want to promote the use of task-oriented coping strategies such as acceptance and positive re-interpretation in therapy, as it may benefit clients in the process of meaning making and growth (Michael & Cooper, 2013).

A notable limitation of the current studies is that the samples consisted of secondary data taken from two larger studies (i.e., Article 1 of this dissertation). Additionally, the studies were correlational in nature, meaning that we cannot conclude a causal link based on the findings. However, they provide a first step in better understanding motivation's role in facilitating PTG. To clarify the directionality of the findings, future research should adopt a prospective design

and measure participants at several points in time prior to and following the death of a loved one. Due to the small sample size, this study was unable to analyze the differential role of motivation across categories of bereavement (i.e., first degree relative, second degree, and friends). It is suggested that if this avenue was to be pursued, consideration of the level of connection or bond between the participant and the deceased would be essential, as proximity does not always mean closeness (Weiss, 2001). Finally, examining these questions with other populations (older adults, non students) would contribute to better understanding the relationship between motivation and PTG across the lifespan and in groups with diverse life experiences.

### **Conclusion**

In summary, SDT appears as a promising framework for understanding individual differences in appraising and coping with the death of a loved one as well as directly predicting PTG. This study offers a valuable contribution to the self-determination and posttraumatic growth literatures, and it is hoped that it will inspire researchers to incorporate motivational constructs into models of PTG following bereavement. It is also hoped that these findings will help practitioners to better recognize the importance of motivational factors in facilitating posttraumatic growth.

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Table 1

*Study 1 Characteristics of Bereavement (N = 98)*

|                                 | <b>n</b> | <b>%</b> |
|---------------------------------|----------|----------|
| <b>Circumstance</b>             |          |          |
| Illness                         | 8        | 8.8      |
| Accident                        | 8        | 8.8      |
| Suicide                         | 8        | 8.8      |
| Not specified                   | 74       | 75.5     |
| <b>Relationship to Deceased</b> |          |          |
| Nuclear Family                  | 11       | 11.2     |
| Extended Family                 | 51       | 52.0     |
| Friend                          | 24       | 24.5     |
| Other (e.g., pet)               | 14       | 12.2     |

Table 2

Study 1: Correlations and Descriptive Statistics of Variables Used in Regression Analyses

| Variable      | 2   | 3   | 4     | 5     | 6     | 7      | 8     | 9     | M     | SD    |
|---------------|-----|-----|-------|-------|-------|--------|-------|-------|-------|-------|
| 1. PTGI       | .11 | .14 | .13   | .46** | .02   | .25*   | .41** | .22*  | 72.19 | 20.56 |
| 2. TSE        |     | .08 | -.02  | .00   | -.09  | .04    | .01   | -.11  | 25.09 | 15.74 |
| 3. SAO        |     |     | .37** | .19   | .03   | .16    | -.04  | .00   | 5.76  | 1.59  |
| 4. CS         |     |     |       | .43** | .20   | -.02   | -.04  | .05   | 3.84  | 1.45  |
| 5. IES-R      |     |     |       |       | .37** | -.12   | .04   | .24*  | 35.53 | 17.16 |
| 6. CES-D      |     |     |       |       |       | -.52** | -.25* | .13   | 17.86 | 10.51 |
| 7. RYFF       |     |     |       |       |       |        | .53** | -.02  | 80.09 | 11.96 |
| 8. Autonomous |     |     |       |       |       |        |       | .31** | 4.77  | 1.12  |
| 9. Controlled |     |     |       |       |       |        |       |       | 3.89  | 1.19  |

Note: Pearson correlations for participants (N =98) are presented above the diagonal. Means and standard deviations for the participants are presented in the horizontal rows for each variable. For all scales, higher scores are indicative of more extreme responding in the direction of the construct assessed. Correlation is significant at the \* .05 or \*\* .01 level (2-tailed). PTGI = Posttraumatic Growth Inventory; TSE = Time Since Event (with EM correction); SAO = Stress at Event Occurrence; CS = Current Stress Associated with the Event; IES-R = Impact of Events Scale; CES-D = Centre for Epidemiologic Studies – Depression Scale; RYFF = Psychological Well-Being; Autonomous = Autonomous Motivation; Controlled = Controlled Motivation.

Table 3

*Study 1: Hierarchical Regression Predicting Posttraumatic Growth (N = 94)*

| Step | Predictors                      | B     | $\beta$ | $\Delta R^2$<br>(Step) | Adjusted<br>R <sup>2</sup><br>(model) |
|------|---------------------------------|-------|---------|------------------------|---------------------------------------|
| 1    | Gender                          | 7.23  | .14     |                        |                                       |
|      | Time Since Event                | .11   | .08     |                        |                                       |
|      | Stress at Occurrence            | -.24  | -.02    |                        |                                       |
|      | Current Stress                  | -1.61 | -.11    |                        |                                       |
|      | Distress (IES-R)                | .65** | .55**   |                        |                                       |
|      | Psychological Well-Being (RYFF) | .42*  | .25*    |                        |                                       |
|      | Depression (CES-D)              | -.07  | -.04    |                        |                                       |
|      | Controlled Motivation           | 1.89  | .11     |                        |                                       |
|      |                                 |       |         | .36**                  | .30                                   |
| 2    | Gender                          | 6.41  | .12     |                        |                                       |
|      | Time Since Event                | .10   | .07     |                        |                                       |
|      | Stress at Occurrence            | .35   | .03     |                        |                                       |
|      | Current Stress                  | -1.50 | -.11    |                        |                                       |
|      | Distress (IES-R)                | .62** | .52**   |                        |                                       |
|      | Psychological Well-Being (RYFF) | .16   | .10     |                        |                                       |
|      | Depression (CES-D)              | -.05  | -.03    |                        |                                       |
|      | Controlled Motivation           | .45   | .03     |                        |                                       |
|      | Autonomous Motivation           | 5.25* | .28*    |                        |                                       |
|      |                                 |       |         | .05*                   | .35                                   |

\*  $p < .05$ \*\*  $p < .01$

Table 4

*Study 2 Characteristics of Bereavement (N = 133)*

| <b>Circumstance</b>             | <b>n</b> | <b>%</b> |
|---------------------------------|----------|----------|
| Illness                         | 14       | 10.5     |
| Accident                        | 8        | 6.0      |
| Suicide                         | 9        | 6.8      |
| Not specified                   | 102      | 77.0     |
| <b>Relationship to Deceased</b> |          |          |
| Nuclear Family                  | 7        | 5.3      |
| Extended Family                 | 81       | 60.9     |
| Friend                          | 24       | 18.0     |
| Other (e.g., pet)               | 21       | 15.8     |

Table 5

Study 2: Correlations and Descriptive Statistics of Variables Used in Mediation Analysis

| Variable          | 2                | 3                  | 4                 | 5                 | 6                 | 7                  | M     | SD    |
|-------------------|------------------|--------------------|-------------------|-------------------|-------------------|--------------------|-------|-------|
| 1. PTGI           | .24 <sup>*</sup> | -.04 <sup>**</sup> | .24 <sup>**</sup> | -.08              | .54 <sup>**</sup> | .18 <sup>*</sup>   | 73.24 | 19.90 |
| 2. Autonomous     |                  | .24 <sup>**</sup>  | .01               | .02               | .24 <sup>**</sup> | -.07               | 4.97  | 0.80  |
| 3. Controlled     |                  |                    | -.02              | -.19 <sup>*</sup> | -.07              | .11                | 4.24  | 1.14  |
| 4. Primary App.   |                  |                    |                   | -.16              | .15               | .34 <sup>**</sup>  | 5.88  | 0.83  |
| 5. Secondary App. |                  |                    |                   |                   | .01               | -.22 <sup>**</sup> | 3.26  | 1.12  |
| 6. Task Coping    |                  |                    |                   |                   |                   | .08                | 2.36  | 0.49  |
| 7. Diseng. Coping |                  |                    |                   |                   |                   |                    | 2.10  | 0.59  |

*Note:* Pearson correlations for participants (i.e., N = 133 for all correlations except for ones with Controlled and Autonomous variables where the N = 114) are presented above the diagonal. Means and standard deviations for the participants are presented in the horizontal rows for each variable. For all scales, higher scores are indicative of more extreme responding in the direction of the construct assessed. Correlation is significant at the <sup>\*</sup>.05 or <sup>\*\*</sup>.01 level (2-tailed). PTGI = Posttraumatic Growth Inventory; Autonomous = Autonomous Motivation; Controlled = Controlled Motivation; Primary App. = Primary Appraisal; Secondary App. = Secondary Appraisal; Task Coping = Task Oriented Coping; Diseng. Coping = Disengagement Coping.

Table 6

*Study 2: Correlations between PTGI outcomes and predictor variables*

| Variable                      | Relating to Others | New Possibilities | Personal Strength | Spiritual Change | Appreciation of Life |
|-------------------------------|--------------------|-------------------|-------------------|------------------|----------------------|
| Autonomous Motivation         | .20*               | .22*              | .12               | .14              | .21*                 |
| Controlled Motivation         | -.05               | .03               | -.03              | -.14             | -.02                 |
| Primary Appraisal             | .21*               | .23**             | .15               | .10              | .19*                 |
| Secondary Appraisal           | -.11               | .04               | .07               | -.05             | -.22*                |
| Task-Oriented Coping          | .46**              | .49**             | .44**             | .26**            | .35**                |
| Disengagement-Oriented Coping | .09                | .22*              | .14               | .03              | .14                  |

*Note:* Pearson correlations for participants (i.e., N = 133 for all correlations except for ones with Controlled and Autonomous variables where the N = 114). For all scales, higher scores are indicative of more extreme responding in the direction of the construct assessed. Correlation is significant at the \* .05 or \*\* .01 level (2-tailed).

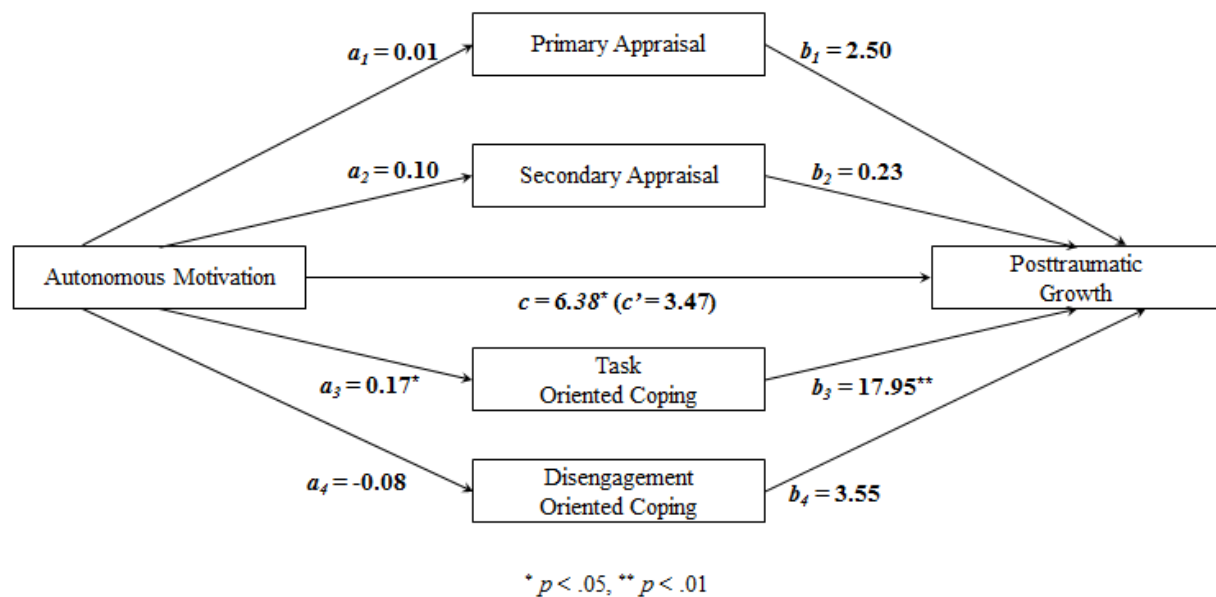


Figure 1. Parallel Mediation Model 1 (Study 2): Relationship between autonomous motivation and PTG with primary appraisal, secondary appraisal, task-oriented coping, and disengagement-oriented coping as mediators; a and b path values represent non-standardized regression coefficients. The c path values for the relationship between Autonomous Motivation and Posttraumatic Growth represent the total effect (c) of Autonomous Motivation on PTG before inclusion of the three mediating variables, and the c' path value represents the direct effect of Autonomous Motivation on PTG, computed through bootstrapping analyses after entering the mediators

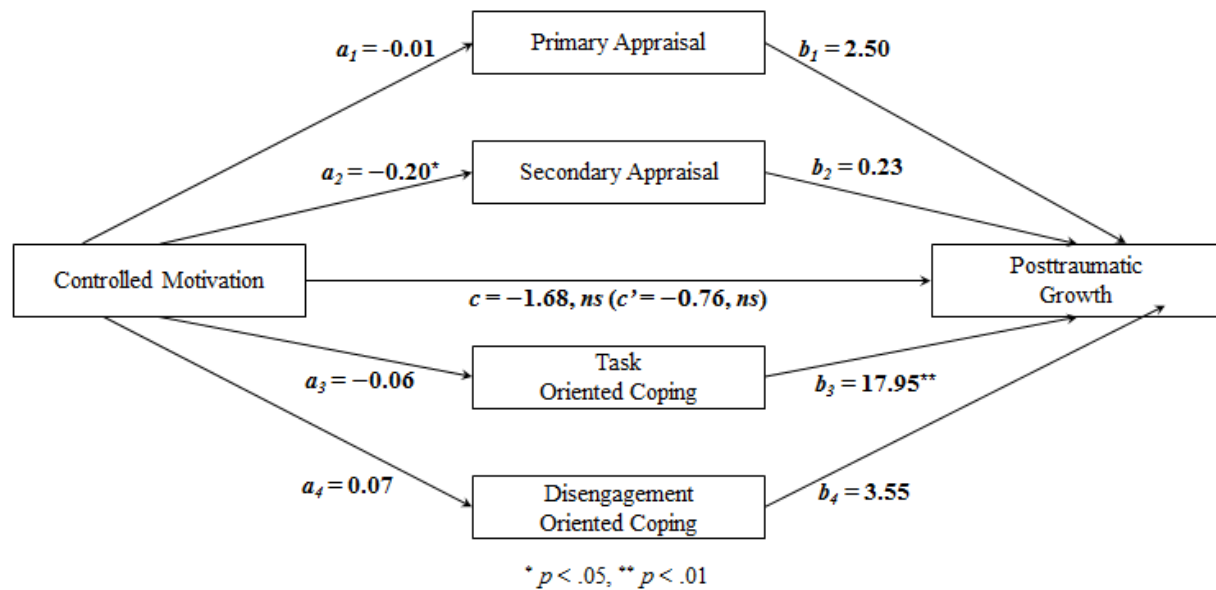


Figure 2. Parallel Mediation Model 2 (Study 2): Relationship between controlled motivation and PTG with primary appraisal, secondary appraisal, task-oriented coping, and disengagement-oriented coping as mediators; a and b path values represent non-standardized regression coefficients. The c path values for the relationship between Controlled Motivation and Posttraumatic Growth represent the total effect (c) of Controlled Motivation on PTG before inclusion of the three mediating variables, and the c' path value represents the direct effect of Controlled Motivation on PTG, computed through bootstrapping analyses after entering the mediators

## GENERAL DISCUSSION

Since the beginning of the positive psychology movement in the late 1990's, there has been an increasing interest in investigating the extent to which people experience positive psychological changes in the face of stressful and traumatic experiences. For some individuals, experiencing negative life events, although unfortunate, are thought to act as catalysts to meaningful transformations in the ways people think, feel, and behave, as 50-83% of individuals experiencing negative life events report positive changes in at least one life domain (Linley & Joseph, 2004; Sears, Stanton, & Danoff-Burg, 2003). Even more so, it appears that some individuals are capable of more significant transformation as a result of negative life events. Thus, it continues to be essential to identify, individual differences, factors and conditions that may help facilitate PTG.

Grounded in self-determination theory (SDT; Deci & Ryan, 1985, 2000), the purpose of the present thesis was to investigate the role of global/dispositional motivation orientations (i.e., autonomous and controlled) in facilitating posttraumatic growth (PTG; Calhoun & Tedeschi, 2006; Tedeschi & Calhoun, 1996, 2004) following the experience of significant negative life events, relationship dissolution, and bereavement in two university student samples. There were three main objectives across the three manuscripts. First, we wanted to determine whether, how, and to what extent dispositional autonomous and controlled motivation orientations contributed to the experience of PTG following negative life events in young adults. Secondly, we wanted to investigate whether dispositional autonomous motivation would contribute to the explained variance in PTG above and beyond other previously researched correlates of PTG and dispositional controlled motivation. Lastly, following evidence of dispositional autonomous motivation's positive link with PTG, we were interested in exploring what factors may mediate

the relationship between dispositional motivation orientations and PTG. Given that motivation is vital to better understand cognitive appraisals of the situation and coping responses in stressful person-environment relationships (Amiot et al., 2004; Lazarus, 1991; Ntoumanis et al., 2009; Skinner & Edge, 2002), it seemed relevant and appropriate to investigate cognitive appraisals and coping strategies as potential mechanisms in explaining the motivation and PTG relationship.

To our knowledge these are the first studies to integrate self-determination theory and posttraumatic growth following the experience of negative life events. In fact, no research has investigated the role of motivation in predicting PTG. Autonomous and controlled types of motivation have been investigated in stressful contexts, such as transition to university and exams (Amio et al., 2004; Knee & Zuckerman, 1998), sport competition (Thompson & Gaudreau, 2008), and conflict with a romantic partner (Knee et al., 2002); however, these motivation constructs have never been researched as potential stable resources that individuals may draw from when adapting to negative life events. In other words, SDT motivational constructs have not been researched to determine whether, how, and to what extent they can contribute to recovery, psychological adjustment, and personal growth following the experience of negative life events. Given SDT's eudaimonic and organismic perspective on human flourishing, it seems highly salient to empirically test these relationships so that we may consider the relevance of integrating motivational constructs into conceptual models of posttraumatic growth. Thus, we chose to empirically test the relationships between self-determined motivation and PTG across a variety of negative life events and subsamples (e.g., death of a loved one; breakups) that appeared most salient for young adults. This research provided an opportunity to address the role and value of motivation's association with PTG across different research

literatures. Moreover, we believe the results of this research may have preliminary clinical implications in helping practitioners better recognize the motivational and coping factors that may help facilitate adaptation and growth during the recovery process related to areas such as breakups and bereavement in young adults.

Manuscript 1 (M1) included two cross-sectional studies, where university students completed an online survey. Participants were included if they experienced a significant negative life event within the past year. Participants indicated their most significant negative life event in the past year (e.g., death of a loved one) and responded to subsequent questionnaires with this event in mind. Thus, M1 focused on the experience of PTG collapsed across various negative life events. Manuscript 2 (M2) included the same design and procedure as M1. In M2, secondary use of data was used, as subsamples of data were taken from the two larger studies (first study data collected in 2010-2011; second study data collected in 2012-2013) in M1 on posttraumatic growth following various negative life events. The subsamples for M2 included all participants having listed *relationship dissolution/breakup* as their most significant negative life event in the past year. Thus, M2 focused on the experience of PTG following pre-marital relationship dissolution. Manuscript 3 (M3) included the same design and procedure as M1 and M2. Similarly, secondary data was analysed. Subsamples of data were taken from the two larger studies (first study data collected in 2010-2011; second study data collected in 2012-2013) in M1 on posttraumatic growth following various negative life events. The subsamples for M3 include all participants having listed *death of a loved one/bereavement* as their most significant negative life event in the past year. Thus, M3 focused on the experience of PTG following bereavement.

In Study 1 of M1, M2, and M3, we examined several hypotheses: First, it was hypothesized that autonomous motivation would relate positively to PTG, whereas controlled

motivation would relate negatively to PTG (H1). Second, autonomous motivation would predict an additional portion of the variance in PTG after accounting for controlled motivation and previously studied correlates of growth (H2).

In Study 2 of M1, we utilized *parallel* and *serial* mediation analyses to explore factors that could explain the relationship between motivation orientations and PTG, namely, cognitive appraisals and coping strategies. We used serial mediation analyses if there were significant indirect effects for both cognitive appraisal and coping variables in the parallel mediation analysis. We hypothesized that autonomous motivation would relate positively to PTG, whereas controlled motivation would relate negatively to PTG (H1). Autonomous motivation would relate positively to primary appraisal (level of relevance) and secondary appraisal (level of coping ability and resources) and to task-oriented coping. Controlled motivation would be negatively associated with primary and secondary appraisal, yet positively related to disengagement-oriented coping (H2). Primary appraisal and task-oriented coping strategies should be positively associated with PTG (H3). No hypotheses were specified for the indirect effects in the mediation analyses.

In Study 2 of M2 and M3, based on the research literature associating cognitive appraisals and coping strategies with PTG and motivation orientations, we conducted *parallel* mediation analyses to examine the role of cognitive appraisals and coping strategies in the relationship between motivation orientations and PTG. We proposed the same hypotheses (H1, H2, and H3) in Study 2 of M2 and M3 as in Study 2 in M1 above.

In Study 2 of M3, we conducted an additional correlation analysis not conducted in Study 2 of M1 and M2. Our rationale was based on the consideration that previous research has shown differentiated responses of growth within different domains of PTG (e.g., PTGI subscales;

Tedeschi & Calhoun, 1996), therefore, research reporting on these dimensions of PTG is warranted. In Study 2 of M3, we conducted correlation analyses to explore the relationships between motivation orientations, cognitive appraisal, and coping variables and the five domains of PTG, as assessed by the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996).

### **Summary of Findings**

Consistent with the overall hypotheses of the thesis, dispositional autonomous motivation was positively associated with posttraumatic growth across all three manuscripts. In addition, we found that dispositional autonomous motivation explained a significant and unique portion of the variance in explaining PTG, above and beyond previously researched correlates of PTG and dispositional controlled motivation. The robustness of these findings suggests that following the experience of negative life events, being more autonomously motivated may contribute to a meaning-making process, that includes the integration of new experiences in ones existing self-schema (Hodgins & Knee, 2002; Hodgins, Weibust, Weinstein, Shiffman, Miller, Coombs, et al., 2010; Weinstein et al., 2011). More specifically, consistent with organismic valuing theory of PTG (Joseph & Linley, 2005; Rogers, 1959), having a more autonomous motivation orientation may result in being more self-aware, self-reflective, less defensive, and more open to emotional experience, which may help individuals to maintain a focus on their genuine priorities, engage in value-congruent behaviours, and move in a direction of personal growth in the face of adversity (Joseph & Linley, 2005; Ryan & Deci, 2001; Weinstein et al., 2011). This is vital, as some of these negative life events (e.g., relationship dissolution; Slotter et al., 2010) can be related to changes in the content and structure of one's self-concept clarity (e.g., physical appearance, activities, social circle, future plans, and values).

Dispositional autonomous motivation was positively associated with task-oriented types of coping strategies (i.e., active coping, planning, seeking of social support for instrumental reasons, acceptance, and positive reinterpretation) across all three manuscripts. This is consistent with studies showing that dispositional autonomous motivation is related to more constructive coping behaviours (Amiot et al., 2004; Knee & Zuckerman, 1998). We suggest that autonomously motivated individual's high level of self-awareness, and a focus on living life consistent with personal values, may be helping them choose more adaptive and flexible action tendencies such as acceptance following the experience of negative life events. Consistent with research that has investigated coping and PTG, we found that task-oriented coping strategies were positively related to PTG. In fact, task-oriented coping strategies yielded the strongest indirect effect in Manuscript 1, and the only significant indirect effect in Manuscript 2 (i.e., relationship dissolution) and Manuscript 3 (i.e., bereavement) between dispositional autonomous motivation and PTG. Moreover, in the bereavement sample (Manuscript 3), task-oriented coping was positively related to all five domains of the Posttraumatic Growth Inventory, which suggests that this type of coping strategy is conducive to all types of growth following the loss of a loved one.

These were the first known studies to have found a positive link between psychological well-being (PWB) as measured by the Scales of Psychological Well-Being (Ryff & Keyes, 1995) and the Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996). Both scales are eudaimonic measures of well-being. Some have suggested that PTG is only an outcome of coping with negative life events, whereas others have considered PTG as a coping strategy only, rather than an outcome (Taylor 1983; Taylor & Armor 1996; Tedeschi & Calhoun, 2004). The latter would suggest that PWB as measured by the Scales of Psychological Well-being could be

an outcome of PTG, whereas in the current research we have put it as an antecedent to PTG. Tedeschi and Calhoun (2004) have suggested that PTG may be related to psychological adjustment in either direction. Many researchers support the idea that PTG may be both an outcome and a coping strategy, insinuating that growth outcomes may reflect a variety of processes (e.g., Helgeson et al., 2006). Joseph and Linley (2005) posit that PTG and psychological well-being are not distinct constructs, and actually measure the same phenomenon. However, the correlation between PTG and PWB across the current studies (i.e.,  $r = .19$  to  $.25$ ) suggest that at most, approximately six percent of the variance in PTG is explained by PWB. This is the opposite of what would be proposed by Joseph and Linley (2005), whereby these are constructs appear to be related, yet distinct. A fruitful avenue for future research is to conduct prospective longitudinal designs that will shed further light on the directionality of these findings. In regard to self-determination/autonomous motivation, past research indicates a positive association between self-determination and psychological adjustment (Phillipe & Vallerand, 2008), which is consistent with the current findings related to autonomous motivation and psychological well-being in Manuscript 1 (i.e., various negative life events) and Manuscript 3 (i.e., bereavement).

Distress, as measured by the Impact of Events Scale - Revised (IES-R; Weiss & Marmar, 1997) was a positive statistical predictor of PTG in Manuscript 1 (i.e., various negative life events) and Manuscript 3 (i.e., bereavement), but not Manuscript 2 (i.e., relationship dissolution). As previously discussed by Helgeson and colleagues (2006), experiencing intrusive thoughts for instance, may be a sign that individuals are working through and beginning to cognitively process the impact of the event rather than as a sign of mental health difficulties in this context.

This is also consistent with Tedeschi and Calhoun's (1998) view that PTG results from a psychological struggle where enduring distress and positive outcomes can co-exist.

Dispositional controlled motivation was positively related to disengagement-oriented coping strategies in Manuscript 1 and 2, although unrelated in the bereavement article (Manuscript 3). These findings were coherent with previous research linking different types of motivation and coping strategies (Amiot, et al., 2004; Knee & Zuckerman, 1998). Moreover, individuals with a more controlled motivation orientation tend to engage in activities because of internal and external pressure to respond in certain ways often with the aim of escaping negative feelings or attaining ego-related rewards (i.e., introjected regulation; Deci & Ryan, 2000). Thus, their more defensive response style (Weinstein et al., 2011) is consistent with disengagement related coping strategies such as denial and mental disengagement. Dispositional controlled motivation was negatively related to secondary appraisal in Manuscript 1 and Manuscript 3, and unrelated in the relationship dissolution manuscript (Manuscript 2). This is consistent with theoretical assumptions that suggest individuals with more controlled motivation orientation should have a tendency to feel a lower sense of self-efficacy, which is thought to lead to a sense of helplessness and lack of confidence in handling stressful situations (Skinner & Edge, 2002).

Secondary appraisal was unrelated to PTG across all 3 manuscripts. This was not surprising since the secondary appraisal scale included items relating to previous experience with the negative life event, the event being predictable, feeling in control of the event, and having confidence in one's coping ability, which means one is less likely to have a "shattering of assumptions" and arguably less psychological struggle in the aftermath of the event, which is considered essential for PTG to occur (Tedeschi & Calhoun, 2004).

Primary appraisal was positively related to PTG in Manuscript 1 (i.e., various negative life events) and Manuscript 3 (i.e., bereavement). These findings are consistent with PTG literature, which indicates increased levels of stress, loss, and severity are related to PTG (Armeli et al., 2001; Park et al., 1996). Of note, primary appraisal was only associated with autonomous motivation in the first manuscript. Given that these manuscripts were the first to combine types of appraisals together to make up a primary appraisal scale rather than using single items as has been done in past research (Smith & Ellsworth, 1985; Tong et al., 2009), future research is needed to clarify these inconsistent findings. Furthermore, primary and secondary appraisal played no mediating role in the breakup or bereavement samples, except for primary appraisal in Manuscript 1. This could reflect how the authors of the current research measured cognitive appraisals, or could indicate that cognitive appraisals may not be as relevant as coping strategies in predicting PTG following breakups and bereavement. Future research is needed to shed light on these relationships.

Some unexpected findings emerging from the current research are worth discussing. We hypothesized that autonomous motivation would be positively related to secondary appraisal (i.e., previous experience with the negative life event, predictability of event, controllability of event, coping ability) given theoretical assumptions that autonomously motivated individuals are more likely to feel less pressured, and have a greater sense of self-efficacy under stress (Hodgins & Knee, 2002). However, secondary appraisal was unrelated to autonomous motivation across all samples and subsamples. In addition, we were surprised to see no role for cognitive appraisals as mediators in the bereavement or breakup manuscripts. Findings reveal that task-oriented coping strategies play a more relevant role in explaining PTG.

Another unexpected finding was that controlled motivation was positively related (i.e., based on bivariate correlations) to PTG in at least one study of each manuscript. Although this relationship turned out to be unrelated when looking at partial-correlations, we speculate that control motivated individuals who report higher levels of PTG may be employing an ego-protection mechanism in an attempt to convey an enhanced view of one's self to maintain self-esteem and avoid the negative feelings related to the negative life event. Future research is needed to verify this assumption and investigate other possible moderating variables that could better explain these findings. Although controlled motivation was positively related to disengagement-oriented coping strategies in Manuscript 1 and 2, it is unclear why this relationship was null in the bereavement sample.

### **Theoretical Implications**

Several of the findings in the current thesis provide empirical support for facets of the proposed models of PTG in the literature. Task-oriented coping strategies and primary appraisal's positive associations to PTG are consistent with Schaefer and Moos' (1992) and Tedeschi and Calhoun's (2004) models. It is suggested that the retrospective self-reported primary appraisal of the negative life event may be a type of re-appraisal consistent with the concept of deliberate rumination in Tedeschi and Calhoun's theory. Moreover, in Manuscript 1 and Manuscript 3 (i.e., bereavement) disengagement-oriented coping strategies, including denial, were positively associated with PTG. These findings may indicate an illusory or positive illusion component to PTG consistent with Taylor and Armor's (1996) and Zoellner and Maercker's (2006) models, where denial may be adaptive in the short term.

The current research merges two literatures, namely, self-determination theory and posttraumatic growth. In Jayawickreme and Blackie's (2014) recent review of the current state of

research on PTG, they highlight the need for researchers to investigate motivational orientations. Consistent with their speculations, the findings from the current studies show that an autonomous motivation orientation allows for cognitive flexibility in how an individual responds to negative life events. Moreover, it may be that autonomously motivated individual's openness and less defensive style may foster integration of these negative life experiences into self structures and ultimately, help them reconstruct their life narrative. If this is the case, this would be an important finding for Pals and McAdams (2004) conceptualization that reconstruction of a life narrative is the mechanism by which growth takes place.

### **Clinical Implications**

Although findings are preliminary, based on the results, we believe that there are some potential clinical implications to be considered. It is clear from the present research that being autonomously motivated is a protective factor in facilitating PTG. For practitioners, this is highly relevant to understand how we may create an atmosphere that can help guide clients to develop an autonomous motivation orientation. In order to help individuals develop that intrinsic and authentic way of being, practitioners should be sensitive to facilitating an atmosphere that is conducive to exploration, integration, and meaning construction (Tedeschi & Calhoun, 2006). Integrating negative life experiences into a coherent sense of self requires a supportive environment that satisfies one's basic psychological needs for autonomy, competence, and relatedness (Joseph & Linley, 2005; Ryan & Deci, 2000). It is the satisfaction of these needs that is the central process by which autonomous motivation is created (Deci & Vansteenkiste, 2004). Thus, instilling a sense of autonomy, competence, and relatedness in clientele may foster autonomous motivation, which may help recovery by promoting integration of negative life event related information (Mancini, 2008) and the adoption of constructive task-oriented coping

strategies. Moreover, our findings suggest that practitioners may want to promote the use of task-oriented coping strategies such as acceptance and positive re-interpretation in therapy, as it may benefit clients in the process of meaning making and growth (Michael & Cooper, 2013).

### **Strengths of the current research**

There are several important strengths of the current research. The studies included a significant number of participants that allowed for conducting statistical analyses that incorporated multiple variables (i.e., hierarchical regression) and mediation modeling. This is the first series of studies that have demonstrated a link between autonomous motivation and PTG following negative life events. These are the first studies to investigate motivation as a potential factor in conceptualizing and explaining posttraumatic growth. Moreover, not only was motivation identified as an important factor to consider in conceptualizing growth, but these studies contributed to better understanding how previously researched coping strategies and cognitive appraisals are influenced by one's dispositional type of motivation.

### **Limitations and Future Directions**

The findings of the current research must be interpreted in light of some limitations, which offer fruitful avenues for future research. A notable and significant limitation of the current research is that it was correlational in nature, meaning that we cannot conclude a causal link based on the findings. Nonetheless, they provide a first step in better understanding motivation's role in facilitating PTG. Future research should adopt a prospective longitudinal design and measure participants at several points in time prior to and following the negative life event. The specific findings from Manuscript 2 and 3 are based on secondary data (i.e., data from Studies 1 and 2 from Manuscript 1) analyses collected from university students. Thus, our interpretation of the findings cannot generalize to other populations (e.g., general community,

people of different ages across the lifespan) and negative life events (e.g., prisoners of war, survivors of various health conditions). It would be beneficial for future research to investigate these questions with independent samples of student and non-student populations to contribute to our understanding of the relationship between motivation and PTG across the lifespan and various negative life events. Because the relationship dissolution and bereavement samples were taken from the two larger studies on PTG following various life events, we did not measure specific factors related to relationship dissolution (e.g., quality of past relationship, initiator status, motivation for being in the past relationship) and bereavement (e.g., level of closeness to the deceased), that could have contributed to our understanding of PTG. Although, we consider the creation of primary and secondary appraisal subscales (i.e., including multiple items) a strength of the current thesis, future research should determine how best to measure cognitive appraisals in this context and further determine their role in explaining PTG and as potential mediators between dispositional motivation orientations and PTG. Given that the satisfaction of basic psychological needs (autonomy, competence, and relatedness) is the central process by which autonomous motivation is created (Deci & Vansteenkiste, 2004), future research should measure these needs ideally prior to and following the experience of negative life events to determine their influence on motivation, cognitive appraisals, coping, and PTG. Lastly, there was no qualitative data collected in the current studies. Given the topic of recovery and psychological adjustment following adversity, personal narratives could have added to the richness and meaning of the quantitative findings.

### **General Posttraumatic Growth Future Considerations**

There is still several measurement, methodological, and conceptual issues left to be resolved in the area of posttraumatic growth. It is important to identify some of the important issues that the field of PTG continues to debate.

Conceptually, posttraumatic growth has been referred to by many different names in the literature (e.g., stress related growth, benefit finding) and a consensus as to a universal definition continues to be lacking in the literature (Tennen, 2013). Some have argued that PTG should be defined as positive personality change (Jayawickreme & Blackie, 2014) given the theories conceptualization of PTG as changes in individual's pattern of thoughts, feelings, and behaviours across various life domains after the experience of negative life events (Tedeschi & Calhoun, 2004). Additionally, there is still debate as to whether self-reported perceived PTG leads to actual positive behavioural changes. In other words, are changes in cognition enough or do we need observable behavioural changes (Roepke, Forgeard, & Elstein, 2014). Some suggest (Hobfoll et al., 2007) that the cognitive benefits of PTG are separate from the behavioural changes, and more attention should be focused on the measurement of behavioural changes. Others have posited that cognition and behaviour influence one another and that behavioural change can only be understood in the context of cognitive change (Roepke et al., 2014). To make matters more interesting, some research suggests that there may be a difference in outcomes for perceived versus actual PTG (Frazier et al., 2009).

There are additional conceptual issues that also continue to be debated. For instance, determining how many positive changes are needed to classify someone as experiencing PTG (e.g., is positive change in one domain enough?; Miller, 2014). According to Davis, Nolen-Hoeksema, and Larson (1998), it is not the number of changes that are important, but rather

whether any benefits have been experienced. Hence, there is no theoretical reason why changes in one area of PTG should be preferable to three or four. Moreover, researchers continue to battle with defining the appropriate duration of the reported positive changes (e.g., weeks, months, years?) and determining whether the severity of the negative life events is necessary to achieve PTG. Considering the latter point, research indicates that stress and PTG may have an inverted U relationship, whereby medium levels of stressful life events may promote resilience and PTG (Aldwin & Levenson, 2004; Seery, 2011)

In terms of methodological and measurement considerations, the field continues to be in need of prospective longitudinal studies as most research on the mechanisms of PTG are based on cross-sectional designs (Jayawickreme & Blackie, 2014). In line with personality research methods, prospective longitudinal studies may wish to use experience sampling methods in order to determine the relationship between perceived positive changes and changes in behaviour (Fleeson, 2007). Studies should also assess negative life changes following the experience of negative life events, in order to obtain a more balanced picture and reduce the chances of positive response bias (Tomich & Helgeson, 2004).

## **Conclusion**

In summary, Self-Determination Theory (SDT; Deci & Ryan, 1985, 2000) appears to be a promising framework for understanding individual differences in appraising and coping with negative life events as well as directly predicting posttraumatic growth. The findings from the current research underscore the beneficial role of dispositional autonomous motivation in facilitating posttraumatic growth following relationship dissolution, bereavement, and various other negative life events. It is my hope that the findings of this research will inspire other researchers to incorporate motivational constructs into models of PTG following negative life

events. It is also hoped that these findings will help practitioners be aware of the influence of motivational factors in facilitating posttraumatic growth and creating a therapeutic atmosphere that is conducive to fostering autonomous motivation, which may aid in exploration, meaning making, integration, and eventually growth.

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Appendix A  
**Study 1: Informed Consent**  
**Life Experiences in the Past Year**

I am invited to participate in a psychology experiment entitled “Life Experiences in the Past Year” that is currently being conducted by Céline Blanchard, Ph.D., and Andrew Lumb, M.A., both from the School of Psychology at the University of Ottawa.

My participation in this study will consist of completing an online questionnaire of approximately 30 minutes in duration. In agreement with the Integrated System of Participation in Research (ISPR), hosted by the School of Psychology, I will be granted one point for participating in this study.

The risks and inconveniences associated with participating in this study are minimal. However, it is possible that I may experience some psychological discomfort while answering the questions in the online questionnaire related to my general attitudes and feelings, and life changes following my life experiences in the past year. However I have received assurance from the researcher that my participation in this study is **entirely voluntary**. I am free to withdraw from the experiment at any time without incurring any negative consequences. Should I choose to withdraw, I will still be granted my participation point from the ISPR and the data that I will have provided will be destroyed and thus will not be used for any analyses. Furthermore, I do not have to respond to any items in the online questionnaire that make me uncomfortable. In the event that I may experience emotional or psychological discomfort from participating in this study, I may contact the Center for Psychological Services here at the University of Ottawa, 136 Jean-Jacques Lussier, 4<sup>th</sup> Floor (613) 562-5289 or [cps@uottawa.ca](mailto:cps@uottawa.ca).

My anonymity in this project will be protected. The questionnaires will be identified by my unique number code that I use for participating in studies hosted by the ISPR. I am not required to provide my name nor any personal contact information on the questionnaires. I have also been assured that the information that I provide will be kept strictly confidential. The data from the online questionnaires is encrypted for my protection and no information regarding my computer IP address will be obtained by PsychData.com. The data collected from this study will be saved on a CD disk and stored in a locked cabinet in the researchers’ laboratory for a period of 5 years. I have been informed that only the researcher and investigator will have access to the data whether it is the original questionnaires or the data file on the computer. I am aware that the results obtained from this project are for research purposes only and publication of the results will be limited to group responses rather than individual ones in scientific journals.

If I have any questions about the study, or if I would like to receive a report of the results when they come available, I may contact Céline Blanchard, Ph.D. or Andrew Lumb, M.A., at the coordinates below.

If I have any ethical concerns regarding my participation in this study, I may contact the Protocol Officer for Ethics in Research located in Tabaret Hall, 550 Cumberland Street, Room 154, (613) 562-5387 or [ethics@uottawa.ca](mailto:ethics@uottawa.ca).

**If you agree with these statements and consent to participate, please click on the “Continue” button below.**

Appendix A  
**Study 1 : Consentement Informé**  
**Mes Expériences De Vie Durant La Dernière Année**

Je suis invitée à participer à une étude en psychologie intitulée « Mes expériences de vie durant la dernière année », qui est présentement en cours à l'École de psychologie à l'Université d'Ottawa sous la supervision de Céline Blanchard, Ph.D. et Andrew Lumb, M.A.

Ma participation à cette étude consiste à compléter un questionnaire via le web d'une durée de 30 minutes. En accord avec le Système intégré de participation à la recherche (SIPR) de l'École de psychologie, on m'accordera un point de participation à cette étude.

Les risques et inconvénients associés à la participation à cette étude sont minimes. Toutefois, il se peut que je ressente de l'inconfort psychologique lorsque que je répondrai aux questions portant sur mes attitudes et mes sentiments en général mais aussi en répondant aux questions portant sur les changements dans ma vie depuis la dernière année. Cependant, je comprends que ma participation à cette étude est entièrement volontaire. Je peux décider de me retirer à tout moment sans subir des conséquences négatives. Si je choisis de me retirer, je recevrai mes points de participation du SIPR et les données recueillies lors de ma participation seront détruites et ne seront donc pas utilisées pour les analyses. Bien qu'il est important pour la bonne conduite de l'étude de répondre à toutes les questions, je comprends que je ne suis pas tenue de répondre aux questions qui me causent de l'inconfort. Dans l'éventualité que je ressente de l'inconfort lors de cette étude, je peux communiquer avec le Centre des services psychologiques à l'Université d'Ottawa au 136 rue Jean-Jacques Lussier, 4<sup>e</sup> étage, (613) 562-5289 ou [cps@uottawa.ca](mailto:cps@uottawa.ca).

Les chercheurs m'ont assuré que mon anonymat sera respecté par deux moyens. Premièrement, ce formulaire de consentement sera mis dans une boîte à part des questionnaires qu'on me demandera de compléter durant l'étude. Deuxièmement, les questionnaires seront identifiés par le code numérique que j'utilise pour m'inscrire aux études du SIPR. Je ne suis pas obligé de fournir mon nom ni d'autres informations personnelles sur les questionnaires. On m'a également assuré que les données que j'aurai fournies par le biais des questionnaires resteront confidentielles. Les données du questionnaire sont encryptées pour les fins de ma protection et aucune information concernant l'adresse IP de mon ordinateur sera envoyée à PsychData.com. Les données recueillies de cette étude seront sauvegardées sur un CD et conservées dans un cabinet fermé à clé dans le laboratoire du chercheur pendant cinq ans. Seuls les chercheurs responsables de l'étude auront accès aux questionnaires ainsi qu'au fichier de données électronique. On m'a informé que les résultats de cette étude seront utilisés uniquement à des fins de recherche et seront publiés dans des périodiques scientifiques sous forme de moyennes de groupe, plutôt qu'individuelle.

Si je désire obtenir plus de renseignements sur cette étude ou si j'aimerais recevoir un rapport des résultats de l'étude lorsqu'ils seront disponibles, je peux communiquer avec les chercheurs aux coordonnées indiqués ci-bas.

Par contre pour toute question déontologique, je peux communiquer avec la responsable de déontologie en recherche de l'Université d'Ottawa au Pavillon Tabaret, dans la pièce 154, au 550 rue Cumberland, (613) 562-5387 ou [ethics@uottawa.ca](mailto:ethics@uottawa.ca).

**Si vous êtes en accord avec les conditions présentées ci-haut, et que vous consentez à participer, s'il vous plaît appuyer sur la touche 'continue'.**

## Appendix B

### General Information

- (1) Gender: (please check one)    **Female** ☐    **Male** ☐    (2) Age: \_\_\_\_\_
- (3) Are you a **full-time** ☐ or **part-time** ☐ student? (please check one)
- (4) What year of University are you in? (circle one)    **1<sup>st</sup>**    **2<sup>nd</sup>**    **3<sup>rd</sup>**    **4<sup>th</sup>**
- (5) What is the name of your program of study? \_\_\_\_\_ (6) What is your first language? \_\_\_\_\_
- (7) What is the ethnic/racial group that you most identify with?  
(e.g., Caucasian, Asian, African American): \_\_\_\_\_
- (8) Are you currently employed:
- full-time** ☐    **part-time** ☐    **not at all** ☐
- (9) Have you experienced a significant *positive* life event in the past 1 year? (please circle)    **YES**    **NO**
- (10) Please describe the most *positive* life event that you experienced in the past 1 year (e.g., Marriage):  
\_\_\_\_\_
- (11) Overall, how would you describe the impact of the *positive* life event on you?
- |                            |          |          |          |          |          |                               |
|----------------------------|----------|----------|----------|----------|----------|-------------------------------|
| <b>1</b>                   | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b>                      |
| <b>Mildly<br/>Positive</b> |          |          |          |          |          | <b>Extremely<br/>Positive</b> |
- (12) Have you experienced a significant *negative* life event in the past 1 year? (please circle)    **YES**    **NO**
- (13) Please describe the most negative/stressful life event that you experienced in the past 1 year (e.g., relationship breakup):  
\_\_\_\_\_
- (14) How many weeks/months has it been since the negative life event? \_\_\_\_\_
- (15) Overall, how would you describe the impact of the negative life event on you?
- |                               |          |          |          |          |          |                               |
|-------------------------------|----------|----------|----------|----------|----------|-------------------------------|
| <b>1</b>                      | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b>                      |
| <b>Extremely<br/>Negative</b> |          |          |          |          |          | <b>Extremely<br/>Positive</b> |
- (16) How *stressful* was this negative life event to you at the time that it occurred?
- |                       |          |          |          |          |          |                  |
|-----------------------|----------|----------|----------|----------|----------|------------------|
| <b>1</b>              | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b>         |
| <b>Not at<br/>all</b> |          |          |          |          |          | <b>Extremely</b> |

(17) How *stressful* is this negative life event to you currently?

|                       |          |          |          |          |          |                  |
|-----------------------|----------|----------|----------|----------|----------|------------------|
| <b>1</b>              | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b>         |
| <b>Not at<br/>all</b> |          |          |          |          |          | <b>Extremely</b> |

(18) Please indicate the amount of “personal growth” you experienced as a result of this negative life event.

|                       |          |          |          |          |          |                  |
|-----------------------|----------|----------|----------|----------|----------|------------------|
| <b>1</b>              | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b>         |
| <b>Not at<br/>all</b> |          |          |          |          |          | <b>Extremely</b> |

### Appendix C Impact of Events Scale - Revised

*Instructions:* The following is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you **during the past 7 days** with respect to ***your negative life event you experienced in the past 1 year***. How much were you distressed or bothered by these difficulties?

|                                                                                          | Not<br>at<br>all<br>0 | A<br>little<br>bit<br>1 | Mod-<br>erate-<br>ly<br>2 | Quite<br>a bit<br>3 | Ex-<br>treme-<br>ly<br>4 |
|------------------------------------------------------------------------------------------|-----------------------|-------------------------|---------------------------|---------------------|--------------------------|
| 1 Any reminder brought back feelings about it.                                           | 0                     | 1                       | 2                         | 3                   | 4                        |
| 2 I had trouble staying asleep.                                                          | 0                     | 1                       | 2                         | 3                   | 4                        |
| 3 Other things kept making me think about it.                                            | 0                     | 1                       | 2                         | 3                   | 4                        |
| 4 I felt irritable and angry.                                                            | 0                     | 1                       | 2                         | 3                   | 4                        |
| 5 I avoided letting myself get upset when I thought about it or was reminded of it.      | 0                     | 1                       | 2                         | 3                   | 4                        |
| 6 I thought about it when I didn't mean to.                                              | 0                     | 1                       | 2                         | 3                   | 4                        |
| 7 I felt as if it hadn't happened or wasn't real.                                        | 0                     | 1                       | 2                         | 3                   | 4                        |
| 8 I stayed away from reminders about it.                                                 | 0                     | 1                       | 2                         | 3                   | 4                        |
| 9 Pictures about it popped into my mind.                                                 | 0                     | 1                       | 2                         | 3                   | 4                        |
| 10 I was jumpy and easily startled.                                                      | 0                     | 1                       | 2                         | 3                   | 4                        |
| 11 I tried not to think about it.                                                        | 0                     | 1                       | 2                         | 3                   | 4                        |
| 12 I was aware that I still had a lot of feelings about it, but I didn't deal with them. | 0                     | 1                       | 2                         | 3                   | 4                        |
| 13 My feelings about it were kind of numb.                                               | 0                     | 1                       | 2                         | 3                   | 4                        |
| 14 I found myself acting or feeling like I was back at that time.                        | 0                     | 1                       | 2                         | 3                   | 4                        |
| 15 I had trouble falling asleep.                                                         | 0                     | 1                       | 2                         | 3                   | 4                        |
| 16 I had waves of strong feelings about it.                                              | 0                     | 1                       | 2                         | 3                   | 4                        |
| 17 I tried to remove it from my memory.                                                  | 0                     | 1                       | 2                         | 3                   | 4                        |
| 18 I had trouble concentrating.                                                          | 0                     | 1                       | 2                         | 3                   | 4                        |

|    |                                                                                                                         |   |   |   |   |   |
|----|-------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|
| 19 | Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart. | 0 | 1 | 2 | 3 | 4 |
| 20 | I had dreams about it.                                                                                                  | 0 | 1 | 2 | 3 | 4 |
| 21 | I felt watchful and on guard.                                                                                           | 0 | 1 | 2 | 3 | 4 |
| 22 | I tried not to talk about it.                                                                                           | 0 | 1 | 2 | 3 | 4 |

## Appendix D

### Posttraumatic Growth Inventory

Indicate for the statements below the degree to which the change reflected in the question is true in your life ***as a result of the negative life event***, using the following scale.

0 = I did not experience this change as a result of the negative life event.

1 = I experienced this change to a very small degree as a result of the negative life event.

2 = I experienced this change to a small degree as a result of the negative life event.

3 = I experienced this change to a moderate degree as a result of the negative life event.

4 = I experienced this change to a great degree as a result of the negative life event.

5 = I experienced this change to a very great degree as a result of the negative life event.

|                                                                         |   |   |   |   |   |   |
|-------------------------------------------------------------------------|---|---|---|---|---|---|
| 1. I changed my priorities about what is important in life.             | 0 | 1 | 2 | 3 | 4 | 5 |
| 2. I have a greater appreciation for the value of my own life.          | 0 | 1 | 2 | 3 | 4 | 5 |
| 3. I developed new interests.                                           | 0 | 1 | 2 | 3 | 4 | 5 |
| 4. I have a greater feeling of self-reliance.                           | 0 | 1 | 2 | 3 | 4 | 5 |
| 5. I have a better understanding of spiritual matters.                  | 0 | 1 | 2 | 3 | 4 | 5 |
| 6. I more clearly see that I can count on people in times of trouble.   | 0 | 1 | 2 | 3 | 4 | 5 |
| 7. I established a new path for my life                                 | 0 | 1 | 2 | 3 | 4 | 5 |
| 8. I have a greater sense of closeness with others.                     | 0 | 1 | 2 | 3 | 4 | 5 |
| 9. I am more willing to express my emotions.                            | 0 | 1 | 2 | 3 | 4 | 5 |
| 10. I know better that I can handle difficulties.                       | 0 | 1 | 2 | 3 | 4 | 5 |
| 11. I am able to do better things with my life.                         | 0 | 1 | 2 | 3 | 4 | 5 |
| 12. I am better able to accept the way things work out.                 | 0 | 1 | 2 | 3 | 4 | 5 |
| 13. I can better appreciate each day.                                   | 0 | 1 | 2 | 3 | 4 | 5 |
| 14. New opportunities are available which wouldn't have been otherwise. | 0 | 1 | 2 | 3 | 4 | 5 |
| 15. I have more compassion for others.                                  | 0 | 1 | 2 | 3 | 4 | 5 |
| 16. I put more effort into my relationships.                            | 0 | 1 | 2 | 3 | 4 | 5 |
| 17. I am more likely to try to change things which need changing.       | 0 | 1 | 2 | 3 | 4 | 5 |
| 18. I have a stronger religious faith.                                  | 0 | 1 | 2 | 3 | 4 | 5 |
| 19. I discovered that I'm stronger than I thought I was.                | 0 | 1 | 2 | 3 | 4 | 5 |
| 20. I learned a great deal about how wonderful people are.              | 0 | 1 | 2 | 3 | 4 | 5 |
| 21. I better accept needing others.                                     | 0 | 1 | 2 | 3 | 4 | 5 |

Appendix E  
GENERAL ATTITUDES – GLOBAL MOTIVATION SCALE

*Indicate to what extent each of the following statements corresponds generally to the reasons why you do different things.*

| Do Not<br>agree at all<br>1 | Very slightly<br>agree<br>2 | Slightly<br>agree<br>3 | Moderately<br>agree<br>4 | Mostly<br>agree<br>5 | Strongly<br>agree<br>6 | Very Much<br>agree<br>7 |
|-----------------------------|-----------------------------|------------------------|--------------------------|----------------------|------------------------|-------------------------|
|-----------------------------|-----------------------------|------------------------|--------------------------|----------------------|------------------------|-------------------------|

**IN GENERAL, I DO THINGS . . .**

|                                                                              |   |   |   |   |   |   |   |
|------------------------------------------------------------------------------|---|---|---|---|---|---|---|
| 1. ... in order to help myself become the person I aim to be.                | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. ... because I like making interesting discoveries.                        | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. ... because I want to be viewed more positively by certain people.        | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. ... because I chose them as means to attain my objectives.                | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. ... for the pleasure of acquiring new knowledge.                          | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. ... because otherwise I would feel guilty for not doing them.             | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. ... because by doing them I am living in line with my deepest principles. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. ... although it does not make a difference whether I do them or not.      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. ... for the pleasant sensations I feel while I am doing them.             | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. ... in order to show others what I am capable of.                        | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. ... because I chose them in order to attain what I desire.               | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. ... because I would beat myself up for not doing them.                   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 13. ... even though I do not have a good reason for doing them.              | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 14. ... in order to attain prestige.                                         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 15. ... even though I believe they are not worth the trouble.                | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 16. ... because I would feel bad if I do not do them.                        | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 17. ... because by doing them I am fully expressing my deepest values.       | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 18. ... because they reflect what I value most in life.                      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

.....

Appendix F  
**Ryff Scales of Psychological Well-being**

The following set of questions deal with how you currently feel about yourself and your life. Please remember that there is no right or wrong answers.

| 1<br>Strongly<br>Disagree                                                                                     | 2<br>Disagree<br>Somewhat | 3<br>Disagree<br>Slightly | 4<br>Agree<br>Slightly | 5<br>Agree<br>Somewhat | 6<br>Strongly<br>Agree |
|---------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|------------------------|------------------------|------------------------|
| 1. I tend to be influenced by people with strong opinions.                                                    | 1                         | 2                         | 3                      | 4                      | 5 6                    |
| 2. I have confidence in my opinions, even if they are contrary to the general consensus.                      | 1                         | 2                         | 3                      | 4                      | 5 6                    |
| 3. I judge myself by what I think is important, not by the values of what others think is important.          | 1                         | 2                         | 3                      | 4                      | 5 6                    |
| 4. In general, I feel I am in charge of the situation in which I live.                                        | 1                         | 2                         | 3                      | 4                      | 5 6                    |
| 5. The demands of everyday life often get me down.                                                            | 1                         | 2                         | 3                      | 4                      | 5 6                    |
| 6. I am quite good at managing the many responsibilities of my daily life.                                    | 1                         | 2                         | 3                      | 4                      | 5 6                    |
| 7. I think it is important to have new experiences that challenge how you think about yourself and the world. | 1                         | 2                         | 3                      | 4                      | 5 6                    |
| 8. For me, life has been a continuous process of learning, changing, and growth.                              | 1                         | 2                         | 3                      | 4                      | 5 6                    |
| 9. I gave up trying to make big improvements or changes in my life a long time ago.                           | 1                         | 2                         | 3                      | 4                      | 5 6                    |
| 10. Maintaining close relationships has been difficult and frustrating for me.                                | 1                         | 2                         | 3                      | 4                      | 5 6                    |
| 11. People would describe me as a giving person, willing to share my time with others.                        | 1                         | 2                         | 3                      | 4                      | 5 6                    |
| 12. I have not experienced many warm and trusting relationships with others.                                  | 1                         | 2                         | 3                      | 4                      | 5 6                    |
| 13. I live life one day at a time and don't really think about the future.                                    | 1                         | 2                         | 3                      | 4                      | 5 6                    |
| 14. Some people wander aimlessly through life, but I am not one of them.                                      | 1                         | 2                         | 3                      | 4                      | 5 6                    |
| 15. I sometimes feel as if I've done all there is to do in life.                                              | 1                         | 2                         | 3                      | 4                      | 5 6                    |
| 16. When I look at the story of my life, I am pleased with how things have turned out.                        | 1                         | 2                         | 3                      | 4                      | 5 6                    |
| 17. I like most aspects of my personality.                                                                    | 1                         | 2                         | 3                      | 4                      | 5 6                    |
| 18. In many ways, I feel disappointed about my achievements in life.                                          | 1                         | 2                         | 3                      | 4                      | 5 6                    |

Appendix G  
Center for Epidemiologic Studies-Depression Scale (CES-D)

Please tell us how often you have felt this way in *the past week* using the following scale.

| <b>Rarely or None<br/>of the Time<br/>(<math>&lt; 1</math> day)</b>                      | <b>Some or a<br/>little of the time<br/>(1-2 days)</b> | <b>Occasionally or a<br/>moderate amount of time<br/>(3-4 days)</b> | <b>Most or all<br/>of the time<br/>(5-7 days)</b> |
|------------------------------------------------------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------|
| <b>0</b>                                                                                 | <b>1</b>                                               | <b>2</b>                                                            | <b>3</b>                                          |
| 1. I was bothered by things that usually don't bother me.                                | 0                                                      | 1                                                                   | 2 3                                               |
| 2. I did not feel like eating; my appetite was poor.                                     | 0                                                      | 1                                                                   | 2 3                                               |
| 3. I felt that I could not shake off the blues even with help from my family or friends. | 0                                                      | 1                                                                   | 2 3                                               |
| 4. I felt I was just as good as other people.                                            | 0                                                      | 1                                                                   | 2 3                                               |
| 5. I had trouble keeping my mind on what I was doing.                                    | 0                                                      | 1                                                                   | 2 3                                               |
| 6. I felt depressed.                                                                     | 0                                                      | 1                                                                   | 2 3                                               |
| 7. I felt that everything I did was an effort.                                           | 0                                                      | 1                                                                   | 2 3                                               |
| 8. I felt hopeful about the future.                                                      | 0                                                      | 1                                                                   | 2 3                                               |
| 9. I thought my life had been a failure.                                                 | 0                                                      | 1                                                                   | 2 3                                               |
| 10. I felt fearful.                                                                      | 0                                                      | 1                                                                   | 2 3                                               |
| 11. My sleep was restless.                                                               | 0                                                      | 1                                                                   | 2 3                                               |
| 12. I was happy.                                                                         | 0                                                      | 1                                                                   | 2 3                                               |
| 13. I talked less than usual.                                                            | 0                                                      | 1                                                                   | 2 3                                               |
| 14. I felt lonely.                                                                       | 0                                                      | 1                                                                   | 2 3                                               |
| 15. People were unfriendly.                                                              | 0                                                      | 1                                                                   | 2 3                                               |
| 16. I enjoyed life.                                                                      | 0                                                      | 1                                                                   | 2 3                                               |
| 17. I had crying spells.                                                                 | 0                                                      | 1                                                                   | 2 3                                               |
| 18. I felt sad.                                                                          | 0                                                      | 1                                                                   | 2 3                                               |
| 19. I felt that people dislike me.                                                       | 0                                                      | 1                                                                   | 2 3                                               |
| 20. I could not 'get going'.                                                             | 0                                                      | 1                                                                   | 2 3                                               |

## Appendix H

### COPE Inventory

We are interested in how people respond when they confront difficult or stressful events in their lives. There are lots of ways to try to deal with stress. This questionnaire asks you to **indicate what you did to cope following your reported most significant life event you experienced in the past year.**

Then respond to each of the following items by placing a number in the blank beside each item, using the response choices listed below. Please try to respond to each item separately in your mind from each other item. Choose your items thoughtfully, and make your answers as true FOR YOU as you can. Please answer every item. There are no “right” or “wrong” answers, so choose the most accurate answer for YOU – not what you think “most people” would say or do. **Indicate what YOU did to cope with your reported negative life event you experienced in the past year.**

|    |                                                                          | I usually don't<br>do this at all | I usually do this<br>a little bit | I usually do this a<br>medium amount | I usually do this<br>a lot |
|----|--------------------------------------------------------------------------|-----------------------------------|-----------------------------------|--------------------------------------|----------------------------|
| 1  | I try to grow as a person as a result of the experience                  | 1                                 | 2                                 | 3                                    | 4                          |
| 2  | I turn to work or other substitute activities to take my mind off things | 1                                 | 2                                 | 3                                    | 4                          |
| 3  | I get upset and let my emotions out                                      | 1                                 | 2                                 | 3                                    | 4                          |
| 4  | I try to get advice from someone about what to do                        | 1                                 | 2                                 | 3                                    | 4                          |
| 5  | I concentrate my efforts on doing something about it                     | 1                                 | 2                                 | 3                                    | 4                          |
| 6  | I say to myself “this isn’t real”                                        | 1                                 | 2                                 | 3                                    | 4                          |
| 7  | I put my trust in God                                                    | 1                                 | 2                                 | 3                                    | 4                          |
| 8  | I laugh about the situation                                              | 1                                 | 2                                 | 3                                    | 4                          |
| 9  | I admit to myself that I can’t deal with it, and quit trying             | 1                                 | 2                                 | 3                                    | 4                          |
| 10 | I stop myself from doing anything too quickly                            | 1                                 | 2                                 | 3                                    | 4                          |
| 11 | I discuss my feelings with someone                                       | 1                                 | 2                                 | 3                                    | 4                          |
| 12 | I use alcohol or drugs to make myself feel better                        | 1                                 | 2                                 | 3                                    | 4                          |
| 13 | I get used to the idea that it happened                                  | 1                                 | 2                                 | 3                                    | 4                          |
| 14 | I talk to someone to find out more about the situation                   | 1                                 | 2                                 | 3                                    | 4                          |
| 15 | I keep myself from getting distracted by other thoughts or activities    | 1                                 | 2                                 | 3                                    | 4                          |
| 16 | I daydream about things other than this                                  | 1                                 | 2                                 | 3                                    | 4                          |
| 17 | I get upset, and am really aware of it                                   | 1                                 | 2                                 | 3                                    | 4                          |
| 18 | I seek God’s help                                                        | 1                                 | 2                                 | 3                                    | 4                          |
| 19 | I make a plan of action                                                  | 1                                 | 2                                 | 3                                    | 4                          |
| 20 | I make jokes about it                                                    | 1                                 | 2                                 | 3                                    | 4                          |
| 21 | I accept that this has happened and that it can’t be changed             | 1                                 | 2                                 | 3                                    | 4                          |
| 22 | I hold off doing anything about it right away                            | 1                                 | 2                                 | 3                                    | 4                          |
| 23 | I try to get emotional support from friends or relatives                 | 1                                 | 2                                 | 3                                    | 4                          |
| 24 | I just give up trying to reach my goal                                   | 1                                 | 2                                 | 3                                    | 4                          |
| 25 | I do more to try to get rid of the problem                               | 1                                 | 2                                 | 3                                    | 4                          |
| 26 | I try to lose myself for a while by drinking alcohol or taking drugs     | 1                                 | 2                                 | 3                                    | 4                          |
| 27 | I refuse to believe that it has happened                                 | 1                                 | 2                                 | 3                                    | 4                          |

|    |                                                                                          | I usually don't<br>do this at all | I usually do this<br>a little bit | I usually do this a<br>medium amount | I usually do this<br>a lot |
|----|------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------|--------------------------------------|----------------------------|
| 28 | I let my feelings out                                                                    | 1                                 | 2                                 | 3                                    | 4                          |
| 29 | I try to see it in a different light, to make it seem more positive                      | 1                                 | 2                                 | 3                                    | 4                          |
| 30 | I talk to someone who could do something concrete about the problem                      | 1                                 | 2                                 | 3                                    | 4                          |
| 31 | I sleep more than usual                                                                  | 1                                 | 2                                 | 3                                    | 4                          |
| 32 | I try to come up with a strategy about what to do                                        | 1                                 | 2                                 | 3                                    | 4                          |
| 33 | I focus on dealing with this problem, and if necessary let other things slide a little   | 1                                 | 2                                 | 3                                    | 4                          |
| 34 | I get sympathy and understanding from someone                                            | 1                                 | 2                                 | 3                                    | 4                          |
| 35 | I drink alcohol or take drugs, in order to think about it less                           | 1                                 | 2                                 | 3                                    | 4                          |
| 36 | I kid around about it                                                                    | 1                                 | 2                                 | 3                                    | 4                          |
| 37 | I give up the attempt to get what I want                                                 | 1                                 | 2                                 | 3                                    | 4                          |
| 38 | I look for something good in what is happening                                           | 1                                 | 2                                 | 3                                    | 4                          |
| 39 | I think about how I might best handle the problem                                        | 1                                 | 2                                 | 3                                    | 4                          |
| 40 | I pretend that it hasn't really happened                                                 | 1                                 | 2                                 | 3                                    | 4                          |
| 41 | I make sure not to make matters worse by acting too soon                                 | 1                                 | 2                                 | 3                                    | 4                          |
| 42 | I try hard to prevent other things from interfering with my efforts at dealing with this | 1                                 | 2                                 | 3                                    | 4                          |
| 43 | I go to movies or watch TV, to think about it less                                       | 1                                 | 2                                 | 3                                    | 4                          |
| 44 | I accept the fact that the situation happened                                            | 1                                 | 2                                 | 3                                    | 4                          |
| 45 | I ask people who have had similar experiences what they did                              | 1                                 | 2                                 | 3                                    | 4                          |
| 46 | I feel a lot of emotional distress and I find myself expressing those feelings a lot     | 1                                 | 2                                 | 3                                    | 4                          |
| 47 | I take direct action to get around the problem                                           | 1                                 | 2                                 | 3                                    | 4                          |
| 48 | I try to find comfort in my religion                                                     | 1                                 | 2                                 | 3                                    | 4                          |
| 49 | I force myself to wait for the right time to do something                                | 1                                 | 2                                 | 3                                    | 4                          |
| 50 | I make fun of the situation                                                              | 1                                 | 2                                 | 3                                    | 4                          |
| 51 | I reduce the amount of effort I'm putting into solving the problem                       | 1                                 | 2                                 | 3                                    | 4                          |
| 52 | I talk to someone about how I feel                                                       | 1                                 | 2                                 | 3                                    | 4                          |
| 53 | I use alcohol or drugs to help me get through it                                         | 1                                 | 2                                 | 3                                    | 4                          |
| 54 | I learn to live with it                                                                  | 1                                 | 2                                 | 3                                    | 4                          |
| 55 | I put aside other activities in order to concentrate on this                             | 1                                 | 2                                 | 3                                    | 4                          |
| 56 | I think hard about what steps to take                                                    | 1                                 | 2                                 | 3                                    | 4                          |
| 57 | I act as though it hasn't even happened                                                  | 1                                 | 2                                 | 3                                    | 4                          |
| 58 | I do what has to be done, one step at a time                                             | 1                                 | 2                                 | 3                                    | 4                          |
| 59 | I learn something from the experience                                                    | 1                                 | 2                                 | 3                                    | 4                          |
| 60 | I pray more than usual                                                                   | 1                                 | 2                                 | 3                                    | 4                          |

## Appendix I

### Cognitive Appraisal

*Instructions:* The following is a list of ways people sometimes view stressful and negative life events. Please read each item, and then indicate how you viewed *your negative life event you experienced in the past 1 year at the time that it occurred*.

| 1                                                                                             | 2        | 3                    | 4                            | 5                 | 6     | 7                 |   |   |   |   |   |
|-----------------------------------------------------------------------------------------------|----------|----------------------|------------------------------|-------------------|-------|-------------------|---|---|---|---|---|
| Strongly<br>disagree                                                                          | Disagree | Slightly<br>disagree | Neither agree<br>or disagree | Slightly<br>agree | Agree | Strongly<br>Agree |   |   |   |   |   |
| 1. When it occurred I viewed it as a significant loss.                                        |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 2. When it occurred I had help available.                                                     |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 3. At that time I had someone to turn to.                                                     |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 4. At that time I felt it had serious implications for me.                                    |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 5. When it occurred I knew it had long term consequences for me.                              |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 6. At that time I felt it was a test of my abilities.                                         |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 7. I had previous experience with this type of event.                                         |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 8. I had never encountered a situation like it before.                                        |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 9. I had a fair warning that it was about to happen.                                          |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 10. At that time I felt I had the ability to handle it.                                       |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 11. When it occurred I felt I had the skill to handle it.                                     |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 12. When it occurred I knew I could overcome it.                                              |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 13. At that time, I felt I could have prevented the event.                                    |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 14. When it occurred I felt it was beyond anyone's power to control.                          |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 15. When it occurred I constantly thought about it.                                           |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 16. When it occurred I had waves of strong feelings about it.                                 |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 17. When it occurred it was very important to me.                                             |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 18. At that time, I felt it was an extreme challenge.                                         |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 1                                                                                             | 2        | 3                    | 4                            | 5                 | 6     | 7                 |   |   |   |   |   |
| Not at all                                                                                    |          |                      |                              |                   |       | Completely        |   |   |   |   |   |
| 19. At the time of its occurrence, to what extent did you view it as a loss?                  |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 20. How much control did you have over the occurrence of the event?                           |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 21. Once the event occurred, how much control did you have<br>over changing the course of it? |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 22. At the time of its occurrence, to what extent did you view it as stressful?               |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 1                                                                                             | 2        | 3                    | 4                            | 5                 | 6     | 7                 |   |   |   |   |   |
| Not at all                                                                                    |          |                      |                              |                   |       | Extremely         |   |   |   |   |   |
| Predictable                                                                                   |          |                      |                              |                   |       | Predictable       |   |   |   |   |   |
| 23. How predictable was this event?                                                           |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |
| 1                                                                                             | 2        | 3                    | 4                            | 5                 | 6     | 7                 |   |   |   |   |   |
| Not at all                                                                                    |          |                      |                              |                   |       | Extremely         |   |   |   |   |   |
| threatening                                                                                   |          |                      |                              |                   |       | threatening       |   |   |   |   |   |
| 24. At the time of its occurrence, how threatening was this event.                            |          |                      |                              |                   | 1     | 2                 | 3 | 4 | 5 | 6 | 7 |

## Appendix J

### Study 1 Debriefing

#### ***Was there deception involved in this study?***

No. There was no deception in this study. However, at the beginning of the online questionnaire you filled out the question “Have you experienced a significant negative life event in the past 1 year?” If you answered “yes”, then you completed an online questionnaire that included instructions on your questionnaires to answer in relation to your “negative life event”. If you answered “no”, then you were sent to this debriefing form because you did not experience a negative life event in the past year.

#### ***What was the purpose of the study?***

The purpose was to determine the specific predictors of personal growth following the experience of a negative/stressful life event. More specifically, this study was investigating the relationship between Self-Determination Theory (SDT), a well-grounded theory in motivation and personal growth following the experience of a negative/stressful life event. According to SDT, to be self-determined is to “endorse one’s actions at the highest level of reflection” and to “experience a sense of freedom to do what is interesting, personally important, and vitalizing.” It is suggested that someone who has a self-determined motivation is more likely to appraise stressful situations as challenges rather than as threats. However, during stressful events, non-self-determined individuals should appraise stressful situations as threats rather than challenges. Thus, one purpose of this study was to see the extent of personal growth following stressful life events for self-determined compared to non-self-determined individuals. Secondly, we wanted to see whether the satisfaction of three fundamental needs (competence, autonomy, relatedness) for optimal psychological growth, social development and well-being were significantly related to personal growth following negative/stressful life events.

#### ***Why is this important for scientists or the general public?***

If we can provide evidence that specific individual factors are associated with personal growth following negative/stressful life events, this has implications for adaptive coping with future stressful life events. It is suggested that self-determined motivation may have a direct link with more adaptive cognitive appraisals and coping skills. Therefore, future prevention and therapy interventions following negative/stressful life events may incorporate teaching skills related to specific individual factors that are found in this study that positively relate to personal growth. In addition, we are interested in seeing the role that cognitive appraisals of the negative life events influence posttraumatic growth and coping.

#### ***What are our hypotheses and predictions?***

In this study we propose several hypotheses. First, it is predicted that there will be significant differences in personal growth for those individuals who have experienced a significant negative life event in the past 1 year. Second, for those experiencing negative life events it is expected that there will be a significant positive relationship between self-determination and posttraumatic growth. Third, for those experiencing negative life events it is expected that there will be a significant positive relationship between the satisfaction of basic needs and posttraumatic growth. Lastly, self-determined motivation and psychological need satisfactions direct relationship to posttraumatic growth is expected to be indirectly influenced by cognitive appraisals and coping strategies.

***Is there anything I can do if I found this experiment to be emotionally upsetting or if I am worried about my health?***

Yes. In the event that you may experience emotional or psychological discomfort from participating in this study, you may contact the Center for Psychological Services here at the University of Ottawa, 136 Jean-Jacques Lussier, 4<sup>th</sup> Floor (613) 562-5289 or [cps@uottawa.ca](mailto:cps@uottawa.ca).

***Where can I learn more?***

You may want to look at the following article about posttraumatic growth:

Park, C. L., Cohen, L. H., & Murch, R. L. (1996). Assessment and prediction of stress-related growth. *Journal of Personality*, 64, 72-105.

***What if I have questions later?***

If you have any questions about the study, or if you would like to receive a report of the results when they come available, you may contact Céline Blanchard, Ph.D. or Andrew Lumb, M.A. at [celine.blanchard@uottawa.ca](mailto:celine.blanchard@uottawa.ca) or [alumb038@uottawa.ca](mailto:alumb038@uottawa.ca).

If you have any ethical concerns regarding your participation in this study, you may contact the Protocol Officer for Ethics in Research located in Tabaret Hall, 550 Cumberland Street, Room 154, (613) 562-5387 or [ethics@uottawa.ca](mailto:ethics@uottawa.ca).

**For the purpose of making sure future participants are unaware of the current study, we ask that you please do not divulge any information about this study to your classmates. Thank you.**