

Examining Relations Between Stress Generation and Inferential Style

At Micro and Macro Levels

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By

Laura Marie Scallion

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OR

Dean
College of Graduate Studies and Research
University of Saskatchewan
107 Administration Place
Saskatoon, Saskatchewan S7N 5A2
Canada

Abstract

The generation of stress, or the amount of life events that are influenced at least partially by individuals, is a phenomenon that was initially observed in individuals with depressive symptoms. Stress generation (SG) is also observed when individuals are in remission from depression (e.g., Daley et al., 1997), with other forms of psychopathology (e.g., anxiety; Auerbach et al., 2012), and in non-depressed samples (e.g., Chun, Cronkite & Moos, 2004). Researchers have examined the impact that various individual difference factors have on the occurrence of SG, including cognitive vulnerability factors such as negative cognitive styles (i.e., attributing negative events to internal, stable, and global causes, and associating negative events with negative consequences and negative self-implications; Abramson, Metalsky, & Alloy, 1989).

However, researchers examining negative cognitive styles and SG have only assessed styles as they relate to *hypothetical* events; no researchers have examined the relation between SG and inferential styles for real-life events. Further, SG research defines SG as a tendency for individuals to experience greater *objectively* identified dependent events (i.e., based on team ratings) and has not considered participants' perspectives of the dependence of their life events. The purpose of my dissertation was to address these limitations.

In Study 1, I examined whether negative cognitive styles for hypothetical events related to inferential style for real-life events. I also examined the relation between inferential style for real-life events (i.e., a pattern of consistently attributing events to more internal or external causes, which is identified by comparing participant ratings to ratings provided by a team of raters) and SG in university students (83 females, 20 males, 3 undeclared, M age = 19.56). SG was measured two different ways: (a) using the traditional method (i.e., team ratings, labeled

observer ratings); and (b) using the participants' own ratings of dependence, labeled actor ratings. Inferential style and depressive symptoms correlated with actor reported dependent events (i.e., SG). However, an internal cognitive style for hypothetical events did not correlate with actor reported dependent events. Contrary to expectations, none of my control variables correlated with observer rated dependent events (i.e., traditional SG). Unexpectedly, depressive symptoms correlated with both actor and observer rated *independent* events.

Study 2 expanded upon Study 1 by examining whether inferential style for real-life events was associated with subsequent SG or future life events at the daily level. Specifically, in Study 2, I attempted to address this gap by examining the relation between inferential style for real-life events and SG at the daily level in university students (73 females, 30 males, M age = 20.14). Participants completed self-report measures of negative life events, depressive symptoms, cognitive styles for hypothetical events, self-reflection, and insight. Self-monitoring the dependence of events did not influence inferential style across the days of study. However, self-monitoring (i.e., reporting daily) was associated with a decrease in all types of events over the course of data collection. Inferential style positively related to actor dependent events and observer independent events. In contrast, inferential style was negatively associated with actor independent events. It was not, however, significantly related to observer dependent events. None of the examined control variables, including trait levels of self-reflection and insight, significantly influenced the relation between inferential style and daily stressful events.

Taken together, the results provide some of the first evidence for the role of inferential style in actor SG at both macro and micro levels. As well, the results provide inconsistent support for the generalization of cognitive styles (for hypothetical events) to inferential styles (for real-life events), at both macro and micro levels. Overall, the findings highlight the

importance of considering the participants' subjective experience in subsequent SG research, given that individual difference factors I studied were differentially associated with actor- and observer SG.

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Chapter 1: General Introduction

The impact of stressful life events (SLEs) is widely researched. SLEs are associated with various physical and mental health concerns. As such, researchers have studied individual difference factors associated with SLEs to better understand why SLEs occur. Stress generation research is one area focused on identifying individual difference factors associated with the occurrence of subsequent SLEs.

The stress generation theory evolved out of various theories of depression including behavioural, interpersonal, stressful life event, and cognitive theories. These theories include an emphasis on the role of individuals in influencing their environments and focus on the influence of various factors (e.g., environmental, psychological) on depressive symptoms and stressful life events. Based on the concepts from these theories, Hammen (1991, 2006) developed stress generation theory, which she initially created to explain unipolar depression in terms of the reciprocal relation between individuals and their environment.

Specifically, stress generation theory posits that individuals can play an active role influencing and altering their own environments, including certain SLEs they experience (Hammen, 1991). Two types of SLEs exist: dependent, influenced at least in part by the individual (e.g., interpersonal conflicts or divorce) and independent, where the individual has no influence (e.g., death of a family member or natural disasters). Hammen (1991) found women with subjectively based unipolar depression experienced significantly more dependent SLEs, but not independent SLEs, compared to women with chronic medical illnesses, bipolar disorder, or control participants with no mental or physical illnesses.

Individuals reporting depressive symptoms have demonstrated this stress generation effect. However, individuals with other types of psychopathology also display stress generation

(e.g., anxiety; Auerbach et al., 2012), including individuals who are in remission from depression (e.g., Daley et al., 1997; Hammen, 1991; Hammen & Brennan, 2002), and other non-clinically depressed samples (e.g., Chun, Cronkite & Moos, 2004). These findings suggest that depression alone cannot fully account for the occurrence of stress generation (Eberhart & Hammen, 2009; Hammen, 1991). As a result, many researchers have turned to examining individual differences and risk factors that might account for this effect.

Individual difference factors related to stress generation are often studied using non-clinically depressed undergraduate samples, due to convenience. These subclinical samples allow researchers to examine the impact of individual difference factors without the influence of severe symptoms of psychopathology. Further, stress is identified as a particular concern in undergraduate samples, given that it is a period of life (i.e., early to late 20s) associated with many new stressors (e.g., a new living environment), the potential for increased participation in risky behaviours that can exacerbate stress (e.g., increased alcohol use), and the onset of numerous psychological disorders (e.g., Major Depressive Disorder; American Psychiatric Association [APA], 2000).

One individual difference factor that has been of interest to researchers is negative cognitive styles (i.e., attributing negative events to internal, stable, and global causes, and associating negative events with negative consequences and negative self-implications; Abramson, Metalsky, & Alloy, 1989). Although research on the relation between negative cognitive styles and stress generation has been limited, stress generation in university samples has been significantly related to negative cognitive styles. For example, Safford Alloy, Abramson, and Crossfield (2007) found a relation between negative cognitive styles and stress generation in undergraduate women but not between a lifetime history of depression and stress

generation. Given that negative cognitive styles might be more enduring than depressive episodes (Just, Abramson, & Alloy, 2001; Safford, Alloy, Abramson, & Crossfield, 2007), this might help explain reports of increased negative life events before, during, and after depressive episodes.

Although some previous researchers have examined the relations between cognitive styles and stress generation (e.g., Safford et al., 2007; Shih, Abela, & Starrs, 2009), past research has been somewhat methodologically limited. Specifically, researchers have only assessed cognitive styles using self-report questionnaires that ask about hypothetical events (e.g., Gibb, Beevers, Andover, & Holleran, 2006; Safford et al., 2007; Shih et al., 2009). The cognitive styles identified using these methods (e.g., a tendency to attribute negative events to internal causes) have been *assumed* to generalize to represent the way individuals appraise real-world events. However, this assumption has not been fully tested.

Furthermore, there is limited research focusing on whether or not individuals have a particular pattern in considering the causes of real-life events. In one previous study, researchers examined the “accuracy” of youth’s attributions for real-life events by requiring participants and a team of raters to rate the dependence of episodic events (Krackow & Rudolph, 2008). Youths’ ratings were compared to the team’s ratings to identify patterns in their responses. Youth diagnosed with depression or presenting with subsyndromal depression made “inaccurate attributions,” tending to “overestimate” the dependence of SLEs as compared to the coding team (i.e., rating the events as more internally caused; Krackow & Rudolph, 2008). However, no researchers have examined whether this overestimation of the dependence for negative real-life events is related to stress generation or whether the overestimation of the dependence for real-life events is consistent for hypothetical events. This overestimation of dependence is referred to in

my dissertation as inferential style¹, which is conceptualized as the tendency for an individual to display a pattern or style of consistently attributing real-life events to internal or external causes, compared to ratings provided by a team of raters (see Appendix A for the operational definition). The term inferential style was chosen over other terms, such as accuracy, to acknowledge that the team of raters cannot provide a true objective or correct standard to compare the participants' ratings against and, as such, it is not possible to determine the accuracy of participants' ratings (Alloy & Abramson, 1988). Rather, it is only possible to observe systematic patterns in participants' responses across events, when comparing their ratings to a team of observers (Alloy & Abramson, 1988), and this pattern's name is inferential style.

It is unknown whether inferential style for real-life events is associated with stress generation or plays a role in subsequent stress generation. That is, inferential style may or may not be associated with the occurrence of dependent life events, measured at the macro or micro levels (i.e., with daily events). Although the majority of stress generation research has been at a macro level (i.e., looking at major life events) stress generation does apply to daily stressful events (Sahl, Cohen & Dasch, 2009) and researchers have started examining how interpersonal and cognitive vulnerability factors influence daily stress generation (e.g., Cummings, Hayes, Laurenceau, & Cohen, 2010; Eberhart & Hammen, 2009).

My dissertation research aimed to address these gaps and extend stress generation research, by first examining (in Study 1) whether internal cognitive styles (i.e., greater internal ratings for negative events) for hypothetical events, were related to inferential styles for real-life events. It was hypothesized the internality attributions would be correlated for hypothetical and

¹ I also chose the term inferential style over attributional style to avoid confusing terms. Specifically, negative attributional style is a term commonly used in studies examining the learned helplessness model of depression (e.g., Moore & Fresco, 2007; Peterson et al., 1982). Researchers typically measure negative attributional style using the Attributional Style Questionnaire. In the learned helplessness model of depression, it is believed that an individual possesses a negative attributional style when he or she attributes negative events to internal, stable, and global causes, which is believed to lead to depression (Peterson et al., 1982).

real-life events, given that the hopelessness theory of depression (Abramson et al., 1989) anticipates individuals' cognitive styles for hypothetical events will generalize to real-life events. Second, I examined whether undergraduate students hold an inferential style for real-life events that may be related to stress generation. I hypothesized an internal inferential style for real-life events would be related to stress generation, since other cognitive vulnerability factors that encompass internal attributional ratings are associated with stress generation (e.g., Shih et al., 2009; Simons et al., 1993).

Gaps in the literature were further addressed in Study 2 by examining stress generation and inferential style at the micro level. First, I examined whether self-monitoring (i.e., tracking over multiple days) the dependence/independence of events at the daily level was related to changes in inferential style over a seven-day span, which was an exploratory analysis. Second, I examined whether inferential style was related to daily stress generation (i.e., dependent events), after controlling for other variables (i.e., depressive symptoms, negative cognitive styles) related to stress generation. I again hypothesized that an internal inferential style would be associated with daily stress generation. Third, I again examined whether internal cognitive styles for hypothetical events were related to inferential styles associated with real-life events.

This dissertation begins with a description of stress and various ways to conceptualize stress. Next, I introduce the stress generation model, the history of stress generation, and literature supporting the stress generation phenomenon. This is followed by a discussion of the cognitive theories of depression that are relevant to stress generation and a review of studies supporting the relationship between cognitive factors and stress generation. I discuss the limitations in the existing literature and I identify how the limitations are addressed in Study 1. Following the discussion section of Study 1, I provide a description of the use of daily models in

studying stress generation and a discussion on the potential impact of self-monitoring. Again, I discuss the limitations in the literature and I identify how they will be addressed in Study 2. Last, I provide a general discussion.

Literature Review

Description of Stress

Stress is a word commonly used by both laypersons and researchers. It is a heterogeneous concept used to describe a feeling, an internal physiological response, a cognitive interpretation, an external stressor, and so forth. Despite the absence of a unified definition of stress it has been, and continues to be, widely researched across various disciplines (e.g., psychology, sociology, medicine) because “stress, as a universal human and animal phenomenon, results in intense and distressing experience and appears to be of tremendous influence in behaviour” (Lazarus, 1966, p. 2). However, this diversity in conceptualizing stress impacts the way researchers study stress, including the measures they choose, the inferences made, participant selection, and the generalizability of the findings (Breznitz & Goldberger, 1982). It is difficult to compare results of studies on stress unless they have conceptualized and measured stress in a similar way.

As such, it is important to recognize there are three main categories of stress theories used in research across disciplines: response-oriented theories, stimulus-oriented theories, and transaction-oriented theories (Lyon, 2012). The response-oriented theories conceptualize stress as an output (i.e., reaction or response), whereas the stimulus-oriented theories conceptualize stress as an input (i.e., life events); the transaction-oriented theories conceptualize stress as an interaction between inputs and outputs.

Response-oriented theories of stress. The response-oriented theories of stress take a medical perception of stress, identifying stress as a *nonspecific* (or common; Selye, 1982)

internal physiological response, such as inflammation or chemical changes in the body. Concerning stress research in psychology, this use of the term stress often refers to the physiological changes individuals experience in response to a stimulus (e.g., increased cortisol levels). This response is a defensive reaction to a “noxious agent” encountered by an organism (Selye, 1956; 1982), but less focus is placed on the specific nature of the agent. The defensive reaction is the primary focus and it is believed to follow a pattern termed the “general adaptation syndrome” (Selye, 1956; 1982) that has three phases: alarm, resistance, and exhaustion.

The *general adaptation syndrome* begins with an *alarm reaction*, characterized by a bodily response that occurs to defend against the noxious agent (Selye, 1956). If the presence of the agent persists, the second phase then ensues. This second phase is termed the *stage of resistance* and involves physiological resistance forming within the body to either resist or adapt to the agent (Selye, 1956). Following the second phase, the organism has (a) successfully defended against the demand; (b) adapted to the demand; or (c) progressed to the third phase termed the *stage of exhaustion* (Selye, 1956). This third phase arises when the noxious agent persists for a prolonged period and all adaptive energy is expended (Selye, 1956). An individual’s interpretation of the demand is not considered a contributing factor to stress, which is a limitation to the theory, and the theory does not consider the different resources or coping skills uniquely available to different individuals (Lyon, 2012).

Stimulus-oriented theories of stress. The stimulus-oriented theories conceptualize stress as an external stimulus or life event, termed the “stressor,” which the organism responds to with both physiological and psychological reactions. This research emerged as it became apparent that stressors, such as war and natural disasters, significantly affected individuals’ lives (Holroyd & Lazarus, 1982). Researchers were interested in determining the characteristics of stressful events

that required individuals to socially readjust (i.e., defined as “the intensity and length of time necessary to accommodate to a life event, regardless of the desirability to this event,” Holmes & Rahe, 1967, p. 213). This determination helps predict the response typically required or elicited by specific types of events (Holroyd & Lazarus, 1982). Given that stress in this model is synonymous with life events, it was operationalized as the typical adjustment required by individuals in response to selected major life events (Lyon, 2012).

The stimulus-oriented theories of stress assume (a) stress is inherent in specific types of events (e.g., death or pain); (b) life changes result in the same amount of readjustment or adaptation required for each individual; (c) life change will be stressful for everyone, regardless of how desirable an event is to an individual; and (d) there is a common threshold to the amount of readjustment or adaptation an individual can tolerate before the stress results in illness (Brown & Harris, 1978; Lyon, 2012). The primary measures used to test the theory have typically been checklists, which are composed of lists of events that assume a similar effect on all individuals (e.g., Schedule of Recent Experience, Holmes & Rahe, 1967).

Researchers have criticized the use of checklists for six main reasons (Brown & Harris, 1978; McQuaid et al., 1992). Many checklists only include limited types of events and no date of the event, which makes it impossible to determine whether the events occurred before or after the onset of a psychiatric disorder or other variables of interest (e.g., negative cognitive style). Checklists also tend to provide vague descriptions of life events that each participant can interpret differently and fail to differentiate between acute and chronic stressors. Very often, checklists exclude any relevant personal details surrounding events and are vulnerable to redundancy in reporting of events and/or underreporting of certain events (Schwartz, 2012). In addition, researchers that use checklists are criticized for not separating the *unit* of study (e.g.,

SLEs) from *qualities* of the unit (e.g., depressive symptoms, negative cognitive styles). The measurement of the variables of interest (i.e., life events and the other factor of interest) must stay separate in both definition and measurement to avoid contamination (Brown & Harris, 1978). Three forms of contamination that can interfere with the researcher's ability to interpret results include: direct contamination, indirect contamination, and spuriousness (Brown & Harris, 1978).

Direct contamination occurs when the participant's knowledge of the existence of one of the variables (e.g., mental illness, physical health condition) impacts the measurement of life events. This is particularly problematic with checklists since the majority of life-event research is retrospective and the SLEs individuals endorse on the checklist are based on the meaning individuals attach at present, which can be influenced by their knowledge of their current mental or physical health symptoms. For example, individuals' knowledge of a medical condition (e.g., multiple sclerosis) might influence the way they construct their interpretation of past events (e.g., recalling them in a more negative or stressful light), such that they look for events that could explain the onset or exacerbation of symptoms (Brown & Harris, 1978). In this situation, it would not be possible to determine whether the life event contributed to the qualities of interest (e.g., multiple sclerosis), whether the qualities brought about the life events, or if the two influence each other in the measurement process (Brown & Harris, 1978). The use of prospective designs avoids these issues.

Indirect contamination occurs when the same symptom or variable influences the measurement of both the independent and dependent variable (Brown & Harris, 1978). For example, a research study examining the relation between SLEs and anxiety that requires participants to provide a self-report of his or her symptoms and identify his or her own SLEs,

would be at risk for indirect contamination. Specifically, the individual's symptoms of anxiety could influence both his or her self-reported symptoms of anxiety and his or her classification of events as stressful on a checklist. That is, current mood could influence an individual's interpretations of life events, such as viewing the events as more negative or stressful (Brown & Harris, 1978).

The last form of contamination is spuriousness, which can occur even when measurement is conducted with accuracy (Brown & Harris, 1978). It is concerned with the potential influence of an unknown third variable that influences both the independent and dependent variables, making them appear to be related (i.e., creating a spurious link between the two; Brown & Harris, 1978). This is a concern in any research study, but is particularly concerning in studies using checklists, since no detailed information is collected about the events and, as such, the researcher's ability to observe, identify, and consider other potentially influential factors is greatly hindered.

Brown and Harris (1978) expanded this field of research and addressed some of the criticisms and limitations, previously identified, which are associated with using checklists. Specifically, Brown and Harris (1978) introduced a contextual interview method (e.g., the Life Events and Difficulty Schedule) that is now considered a gold standard for assessing SLEs and is described below. This form of measurement continues to focus on the stressful *event* to the exclusion of considering the role of individuals' unique cognitive appraisals of the demands of the situation. However, this exclusion was intentional and the next set of theories discusses the issue at length.

Transaction-oriented theories of stress. The transaction-oriented theories include individuals' cognitive appraisals within their conceptualization of stress. Specifically,

transaction-oriented theories conceptualize stress as a two-stage interactional process that occurs between a person and his or her environment, where the individual's cognitive process mediates the relation (Holroyd & Lazarus, 1982; Lazarus & Launier, 1978). These cognitive processes first determine the threat of a demand (i.e., the anticipation of harm, which occurs when the demand is greater than resources). Second, a judgment is made regarding whether a demand will/will not compromise important values or goals, such as losing a loved one, not meeting expectations, or judging whether it is a physical harm that endangers well-being (Lazarus, 1966).

The cognitive processes that underlie identifying a threat are termed appraisals (Lazarus, 1966). Three types of cognitive appraisals identified in the model include primary, secondary, and reappraisal. In the primary appraisal, the individual makes a judgment comparing the weight of the demand against available coping resources to determine whether the demand presents a threat (Holroyd & Lazarus, 1982; Lazarus, 1966). The secondary appraisal is triggered if the person perceives a threat in the primary appraisal and involves evaluating potential coping options to respond to the threat (Lazarus, 1966). Third, individuals continuously reappraise their primary and secondary appraisals by changing or eliminating them as the situation changes. The appraisals individuals make about situations are believed to be influenced by various factors including the resources available, self-esteem, coping skills, social support, novelty of the situation, duration of the threat and so forth (Lazarus, 1966). This theory anticipates the cognitive appraisal made throughout this process will influence the individual's choice of coping behaviour and the emotions he or she experiences. However, similar to other theories of stress, this transactional conceptualization of stress is difficult to adequately measure, particularly the individuals' appraisals and coping functions (Lazarus & Folkman, 1987).

The conceptualization of stress most relevant to my dissertation is the one posited within stimulus-oriented theories. Specifically, the conceptualization of stress in my dissertation is synonymous with a stressful life event. Research on the impact of SLEs is extensive.² For example, researchers have found relations between SLEs and various physical and mental health concerns including irritable bowel syndrome (IBS; Whitehead, Crowell, Robinson, Heller, & Schuster, 1992), Graves' Disease (Matos-Santos et al., 2001), Multiple Sclerosis (MS; Mohr, Hart, Julian, Cox, & Pelletier, 2004), and depression (Hammen, 1991). In these studies, individuals with each disorder reported significantly more SLEs compared to controls (i.e., IBS, Graves' Disease, depression) or an exacerbation of symptoms following an SLE (i.e., MS). Given the relation between SLEs and physical and mental health conditions, researchers have attempted to identify individual difference factors associated with SLEs. One particular area of research that focuses on identifying individual difference factors associated with the occurrence of current and *subsequent* SLEs is stress generation (Hammen, 1991), which is the focus of this dissertation.

Stress Generation

Stress generation is defined as the occurrence of *dependent* SLEs, which are SLEs that are influenced, at least in part, by the individual, such as interpersonal conflicts or divorce (Hammen, 1991). Researchers initially studied stress generation in relation to depression. In particular, Hammen (1991) was interested in studying how individuals with depression influenced subsequent SLEs. Specifically, she proposed that a transactional relation exists between stress and depression (Hammen, 1991). As previously mentioned, Hammen (1991) provided support for the stress generation model, showing that women with unipolar depression

² It is not the intention of this dissertation to provide an exhaustive review of this area of research; rather, I provided a few examples here that shed some light on the various diseases and disorders shown to be associated with SLEs.

experienced significantly more dependent SLEs, but not independent SLEs, than women with chronic medical illnesses, bipolar disorder, or control participants. The dependent SLEs experienced by women who were diagnosed with unipolar depression tended to be interpersonal and involved conflict (e.g., conflicts with a child over rules and discipline, a dispute with a teacher or boss, or conflicts with a spouse or boyfriend). In this theory, the conceptualization of stress comes from a stimulus-oriented perspective. That is, the identification of stress is the occurrence of dependent life events that are considered stressful for the typical person.

History of Stress Generation

In Hammen's 2006 article, "Stress Generation in Depression: Reflections on Origins, Research, and Future Directions", she discussed the intellectual origins that influenced her development of the stress generation model, which includes theories of behaviour, stress and depression, and interpersonal factors, discussed below, as well as cognitive theories, which I discuss later.

First, Hammen was influenced by behavioural theorists, including Albert Bandura (e.g., the theory of reciprocal determinism; Bandura, 1978) and Walter Mischel (e.g., focus on the influence of personality and situational factors; Mischel & Shoda, 1998), influenced the theory of stress generation. Both of these theorists emphasized the role of individuals in influencing (e.g., selecting into, creating) their environments.

Second, Hammen was influenced by theories of stress and depression, particularly Brown and Harris' (1978) social origins theory of depression. This theory took a broader focus than previous, more simplistic cognitive and behaviour models of depression that had neglected relevant environmental factors. Brown and Harris' theory also attempted to address

methodological limitations of popular measures of SLEs by focusing on the influence of various levels of factors on depression, including historical, environmental, and psychological factors.

To address such limitations, Brown and Harris (1978) created a contextual life event interview called the Life Events and Difficulties Schedule (LEDS), which was used to gather detailed, biographically relevant information surrounding the life events individuals reported (e.g., prior experience with the event type, any consequences resulting from the event, characteristics of the situation). Researchers utilized this detailed, contextual approach to gathering information in an attempt to capture the meaning of the life events, which was not captured in checklists of life events. In particular, in the LEDS, the interviewer asks participants about various domains (e.g., work, romantic relationships, friendships) of their life and gathers extensive background information about each event reported. In order to avoid direct and/or indirect contamination, the participants' reactions to the events are not included in the measurement of the SLEs (Brown & Harris, 1978). Rather, the information gathered in the interviews about the life events is provided to independent teams of raters, with the participants' reported feelings and reactions removed (Brown & Harris, 1978). The teams use this "objective" information to rate the threat (i.e., "degree of threat or unpleasantness;" Brown & Harris, 1978, p. 90) of each event based on the team's interpretation of what the "typical individual" would think and experience in the same circumstances. It is important to note that there is criticism for this exclusion of the participants' appraisals because it suggests that individuals are passive in this process and ignores the meaning each individual uniquely assigns to his or her experience of the stressful event (Holroyd & Lazarus, 1982).

Although this approach would at times result in an incorrect rating, Brown and Harris (1978) believed that "a full account of past behaviour and circumstances surrounding an event

will enable us to make, in the majority of instances, a reasonable estimate of the meaning of an event” (Brown & Harris, 1978, p. 88). Brown and Harris (1978) clarified that a reasonable estimate is “in the sense that the aggregate results for a number of individuals will approximate to the truth and, most important, be free of the kind of systematic bias that vitiates hope of explanatory enquiry” (p. 88).

Hammen’s (1991) measurement approach for stress generation echoed that of Brown and Harris (1978). Hammen developed a simplified contextual life event interview (i.e., UCLA Life Stress Interview; Hammen, 2008), designed in part to reduce the extensive administration time of the LEDES (i.e., 3-5 hours per administration; Slavich, n. d.). The UCLA Life Stress Interview (LSI) is the primary measure used in stress generation research (see Chapter 2, Measures section for a description).

Third, Hammen was influenced by Coyne’s (1976) interpersonal model of depression, which suggested depressive symptoms develop through individuals’ interactions within their environment. Specifically, depression arises when an individual’s social context, that typically provides him or her with support, is disrupted (e.g., a close family member or friend dies). This disruption in support leads the individual to turn to other supports within his or her social context to express distress and seek reassurance, in order to confirm he or she can still receive support and validation. Continuous reassurance seeking reflects depressive symptomatology and is detrimental to the depressed individual’s social relationships. Specifically, the constant requests made by the individual seeking reassurance can be confusing and frustrating to his or her supports, although they might not verbally express the frustrations (Coyne, 1976). This frustration is instead often expressed in other ways, such as through nonverbal behaviours or verbal tone used when providing reassurance. This discrepancy between the behaviours and

verbal reassurances provided by supports will confirm to the individual with depressive symptoms that the reassurance was not genuine and, in turn, the individual will display more symptoms in hopes of gaining support. The depressed individual and social supports maintain this process that eventually establishes an environmental norm (Coyne, 1976).

In summary, all of these theories contributed to Hammen's focus on explaining unipolar depression in terms of the reciprocal relation between individuals and their environment (Hammen, 2006). However, more recently, research on the stress generation model has expanded to examine other forms of psychopathology and non-clinically depressed samples. As such, the following sections provide an overview of research on (a) the relation between stress generation and depressive symptoms; (b) the relation between stress generation and other forms of psychopathology; and (c) the relation between individual difference factors and stress generation in non-clinically depressed samples.

Stress Generation and Depression

Researchers have observed stress generation, as related to unipolar depression, across different ages, gender, and severities of pathology. Specifically, stress generation has been supported in clinical samples of adults. For example, researchers of a 10-year longitudinal study, including 313 adult patients treated for unipolar depression and 332 matched community controls, found depressed patients consistently experienced more dependent SLEs compared to controls, even after controlling for baseline levels of stressful events (Chun et al., 2004). Another study by Harkness, Monroe, Simons, and Thase (1999) examined stress generation in three groups of patients diagnosed with unipolar depression (i.e., Group 1 = no previous episodes of depression or first-onset, $n = 28$; Group 2 = one previous episode, $n = 10$; Group 3 = at least two previous episodes, $n = 21$). The researchers found adults with at least two recurrent unipolar

depressive episodes experienced greater stress generation (i.e., more total dependent events) compared to adults experiencing their first episode of unipolar depression, within the 12 months preceding onset.

Stress generation is also supported in clinical samples of children and adolescents. For example, in a cross-sectional study, researchers examined stress generation in a sample of 88 clinic-referred children and adolescents that included four diagnostic groups: depressed (i.e., major depression, dysthymia, $n = 19$), externalizing (i.e., Attention Deficit Hyperactivity Disorder, Oppositional Defiant Disorder, Conduct Disorder, Impulse Control Disorder, $n = 22$), comorbid depressed/externalizing ($n = 15$), and clinic control (i.e., no current or past depressive or externalizing symptoms, $n = 18$; Rudolph et al., 2000). The researchers found that unipolar depression was associated with dependent interpersonal life events but not dependent non-interpersonal life events (Rudolph et al., 2000). In addition, adolescents diagnosed with depression generated significantly more dependent events compared to children diagnosed with depression (Rudolph et al., 2000). Overall, individuals with comorbid diagnoses of depression and externalizing disorders generated significantly more dependent interpersonal episodic events compared to controls, unipolar depression, and externalizing groups (Rudolph et al., 2000).

Williamson, Birmaher, Anderson, Al-Shabbout, and Ryan (1995) also examined the relation between stress generation and depression in adolescents. They found that adolescents diagnosed with a current episode of major depressive disorder (MDD) experienced significantly more dependent SLEs compared to “normal controls” (i.e., no history of any Axis I lifetime psychiatric disorder) over the year preceding the interview (Williamson et al., 1995). Last, in a 3-year longitudinal study, children and adolescents of unipolar depressed mothers were shown to

generate significantly more dependent stressful events compared to children of medically ill and “normal women” (Adrian & Hammen, 1993).

Community samples have documented effects of stress generation, including adolescent males and females (e.g., Daley et al., 1997; Hammen & Brennan, 2001; Rudolph, 2008) and adult men and women. In regard to men, for example, a community sample of 113 men were followed biennially for 35 years and at the end of the study, the men completed a life event checklist retrospectively reporting on the events they experienced over those 35 years (Cui & Vaillant, 1997). A psychiatrist, blinded to the men’s responses, read each man’s prospectively gathered record and completed the same life event checklist, based on the historical data that was gathered for each participant. The psychiatrist’s and participants’ ratings were combined to identify the total number of negative life events each participant experienced over the 35 years. Results showed that men identifying as having MDD experienced significantly more dependent negative life events, compared to the normal control group (Cui & Vaillant, 1997). Regarding women, one study by Harkness and Luther (2001) examined the role of clinical risk factors (i.e., comorbid anxiety and/or dysthymic disorder) in the generation of life events within a community sample of women diagnosed with MDD. Results showed that women meeting diagnostic criteria for both comorbid anxiety and dysthymic disorders, in the six months prior to the onset of the index depressive episode, displayed significantly higher levels of dependent stressful events compared to all other groups (i.e., major depression alone, MDD with comorbid anxiety, MDD with comorbid dysthymia; Harkness & Luther, 2001). Last, stress generation was associated with recurrent depression (Harkness et al., 1999).

Stress Generation and Other Forms of Psychopathology

Hammen (1991) initially developed the stress generation model as a theory of depression; however, it has also been observed, by more recent researchers, in individuals diagnosed or presenting with other forms of psychopathology. This has included individuals presenting with symptoms of anxiety (e.g., Auerbach et al., 2012; Harkness & Luther, 2001; Riskind, Black, & Shahar, 2010; Uliaszek et al., 2012), social phobia (Uliaszek et al., 2010), and cyclothymia (Lovejoy & Steuerwald, 1997). Further, stress generation is associated with avoidant personality disorder symptoms (Cummings et al., 2013) and symptoms associated with other personality disorders (Daley, Hammen, Davila, & Burge, 1998; Daley, Rizzo, & Gunderson, 2006; Hankin, 2010).

Temporal Pattern of Stress Generation

Generated SLEs often occur when individuals are in remission and not clinically depressed. For example, in the first stress generation study, Hammen (1991) found that among the 11 women with unipolar depression, 33% of their dependent events occurred before the onset of a depressive episode and 53% occurred after a depressive episode resolved; only 13% occurred during a depressive episode. Additionally, a longitudinal study of 134 community female adolescents (i.e., high school graduates) found that adolescents diagnosed with depression reported increased dependent events over the prior year. However, the vast majority of the dependent events occurred outside of depressive periods (81%) or in an immediate remission period (8%; Daley et al., 1997). These findings suggest the majority of dependent events do not occur during periods of significant depressive symptoms.

Hammen and Brennan (2002) found that, in a community sample of women, participants with less severe depressive symptoms (i.e., diagnosed with dysthymia) functioned significantly

worse than participants diagnosed with MDD in areas including friendship, relations with extended family, attachment security, and partner reported marital satisfaction. Formerly depressed women displayed persistent dysfunction in interpersonal relationships with friends, spouses, children, and extended family, compared to never-depressed women (Hammen & Brennan, 2002). Further, formerly depressed women reported higher rates of interpersonal SLEs, compared to never-depressed women. As such, Hammen and Brennan (2002) also suggest that factors, other than depressive symptoms, such as an individual's life context (e.g., marrying a partner with psychological difficulties) likely contribute to enduring interpersonal dysfunction.

Individual Difference Factors Associated with Stress Generation

After it became clear the stress generation effect was not uniquely associated with depression (i.e., occurs outside of depressive episodes), many researchers within the stress generation field turned to examining the various individual difference factors that could account for the stress generation effect. Identifying individual difference factors that contribute to stress generation is an important endeavor to potentially reduce risk and prevent the onset of psychopathology. That is, identifying and addressing (e.g., through psychological treatments) individual difference factors that contribute to stress generation could potentially reduce stress generation. This, in turn, could reduce an individual's total number of SLEs experienced, and could possibly prevent or reduce the risk of triggering the onset of psychopathology.

As such, studies have identified factors that influence stress generation even after controlling for depressive symptoms, including childhood abuse and neglect (Harkness, Lumley, & Truss, 2008), an autonomous personality style (Daley et al., 1997), and chronic (i.e., ongoing) interpersonal stress - which predicts future episodic (i.e., particular discrete episodes or events of stress that are short lived) stress (Daley et al., 1997). These findings suggest most generated

events are not simply consequences of depressive symptoms, but relate to enduring cognitions, traits, behaviours, and circumstances (Daley et al., 1997; Kercher & Rapee, 2009; Rudolph, 2008; Rudolph et al., 2000).

Research has focused on how various individual differences contribute to stress generation and affect the relation between SLEs and depressive symptoms (Hammen, 2006). For example, maladaptive interpersonal skills and variables related to interpersonal functioning, such as excessive reassurance seeking (i.e., persistently seeking assurances from others that one is lovable and worthy; Joiner, Metalsky, Katz, & Beach, 1999) are associated with increases in dependent SLEs (Bottonari et al., 2007; Daley et al., 1997; Hankin, Kassel, & Abela, 2005; Potthoff et al., 1995). Insecure attachment styles, including both dismissive (i.e., discomfort with being close to others and feeling dependent in relationships) and preoccupied (i.e., fearful of being rejected or abandoned by others) attachment, are associated with increased stress generation (Bottonari et al., 2007). Dysfunctional skills in interpersonal problem solving and interpersonal communication also contribute to the generation of SLEs. For example, poor interpersonal problem-solving skills were shown to predict interpersonal stress in a longitudinal study (Davila, Hammen, Burge, Paley, & Daley, 1995). As well, wives with low mood displayed dysfunctional interpersonal skills, soliciting, receiving, and providing support in a negative manner when interacting with their husbands (Davila, Bradbury, Cohan, & Tochluk, 1997). This type of interactional style created SLEs in their marital relationships over time.

Personality factors have also been associated with increased SLEs. Neuroticism is the most extensively studied trait that is a strong predictor of SLEs, especially events related to interpersonal relationships (Kendler, Gardner, & Prescott, 2003; Kercher, Rapee, & Schniering, 2009). Other personality traits that influence stress generation include sociotropic (i.e., basing

self-worth on interpersonal interactions and being concerned with what others think) and autonomous (i.e., placing more emphasis on independence and achievement-related goal attainment) personality styles (Daley et al., 1997). Specifically, these personality styles are shown to predict dependent episodic stress and conflict-related stress at two-year follow-up, even after controlling for psychiatric status (Daley et al., 1997). As such, Daley and colleagues (1997) posited that stress-generation is likely more associated with stable traits and behaviours, such as an autonomous personality, rather than depressive symptoms. Other studies that have shown stress generation occurs in non-clinically depressed samples further support this idea.

Stress Generation in Non-clinically Depressed Samples

Non-clinically depressed community samples and stress generation. Researchers who have found a stress generation effect in non-clinically depressed samples include Chun and colleagues (2004) and Rudolph and Hammen (1999). In particular, Chun and colleagues (2004) found their control group (i.e., 332 demographically matched community controls) displayed a comparable stress generation process to their depressed patient group (i.e., a positive linear trend in the association between depressive symptoms and subsequent stressors). That is, being even mildly symptomatic contributed to subsequent interpersonal stressors, particularly the presence of conflict with family and others (Chun et al., 2004). However, the patients' stress generation was more pervasive and associated with more types of stressors compared to the community controls (Chun et al., 2004). This finding suggests that depressive symptoms of any severity can contribute to dependent interpersonal stressful events (Chun et al., 2004), a finding supported in research by Rudolph and Hammen (1999).

Specifically, Rudolph and Hammen (1999) studied the relation between depressive symptoms and life events. They used the Children's Depression Inventory (Kovacs, 1981) to

assess levels of depression in their sample. Scores on this measure can range from 0-54, with a diagnostic cut-off of 13 for clinical samples and 19 for community samples (Friedberg & Sinderman, 2011). The depression scores for Rudolph and Hammen's (1999) sample ranged from 0-20 and the mean score for the sample was only 6.31 ($SD = 5.14$), which was well below cut-off, indicating this sample consisted of individuals experiencing mild to moderate symptoms of depression. The results in this study showed significant relations between these milder levels of depressive symptoms and stress generation. In particular, depressive symptoms in girls were significantly associated with total objective stress and interpersonal conflict stress but depressive symptoms in boys were not significantly associated with any stress indexes (Rudolph & Hammen, 1999). In general, female adolescents reported significantly more interpersonal stress compared to preadolescent girls. Adolescent males reported significantly more non-interpersonal stressful events than preadolescent males (Rudolph & Hammen, 1999).

Stress generation and university student samples. A large proportion of stress generation research has also utilized non-clinically depressed university student samples to study the relationships between individual difference factors and stress generation. This often intentional use of non-clinically depressed samples has enabled researchers to examine the impact of individual difference factors without the influence of depressive symptoms. Even though stress impacts individuals across the lifespan, stress has been identified as a particular concern in college and undergraduate university samples, discussed below.

Stress and university samples. A survey of health trends on Canadian campuses found that more than half (58%) of postsecondary students reported overall stress levels (within the past 12 months) as *more than average stress* to *tremendous stress* (American College Health Association [ACHA], 2013; Tellier & DiGenova, 2014). The sample consisted of 34,049

postsecondary students with the majority of students between the ages of 18 and 23 years old (i.e., 73.1%), attending 32 different universities across Canada (ACHA, 2013). The students identified stress as the most significant factor negatively affecting their individual academic performance (i.e., lower grades on exams, in courses, on projects; and/or course dropouts or failures) over the past 12 months and approximately 90% of students reported feeling overwhelmed by the demands in their lives over the past 12 months (ACHA, 2013; Tellier & DiGenova, 2014). In addition, this period of life is associated with many new stressors. Specifically, when students transition from high school to postsecondary education, they report increased stressors that include a new living environment, the need to adapt to new responsibilities, changes in relationships with parents, building a new social support network, increased time demands, examinations, increased workload, pressure to succeed, fear of failure, the need to make career decisions, and financial burden (e.g., Beiter et al., 2015; Prairie Research Associates [PRA], 2011; Robotham & Julian, 2006).

University life can also be associated with increased participation in risky behaviours, other behaviours that exacerbate stress, and changes in available coping resources. Potential risky behaviours include alcohol abuse problems, cigarette consumption, drug experimentation, and unprotected sex (Robotham & Julian, 2006; Tavalacci et al., 2013; Tellier & DiGenova, 2014). Further, post-secondary students tend to report poor quality of sleep, decreased physical activity, poor eating habits, and combining part- or full-time work with part- or full-time educational requirements. These are all behaviours that can exacerbate stress (Beiter et al., 2015; Bray & Born, 2004; PRA, 2011; Robotham & Julian, 2006; Tavalacci et al., 2013). The perception of available coping resources, such as available social supports, can also exacerbate the stress an individual experiences (Robotham & Julian, 2006). For example, if individuals

moved away for university, their coping resources would be reduced if they typically relied on friends and/or family for support and, in turn, they might experience increased difficulty coping with stressors.

Additionally, the average age of onset for many psychological disorders is within the early to late 20s (e.g., Substance-related disorders, Manic Episodes, Schizophrenia, Major Depressive Disorder, Bipolar I Disorder, Obsessive Compulsive Disorder in females; APA, 2000), which is also the typical age range for individuals attending university. These various psychological disorders have numerous vulnerability factors that can contribute to their onset, and one common factor that contributes to onset and/or exacerbation of symptoms for the listed disorders is the experience of SLEs (e.g., Ambelas, 1979; APA, 2000; de Silva, & Marks, 1999; Ellicott, Hammen, Gitlin, Brown, & Jamison, 1990; Norman, & Malla, 1993).

As such, the predominant focus on university students within the stress generation literature is not surprising, given this transitional time in life is associated with many new stressors and behaviours that can exacerbate or even produce stressors, which provides ample opportunity to study the stress generation effect. Further, focusing on university students provide researchers with the opportunity to study the stress generation effect before the onset of, or during periods of remission from, psychopathology. It also provides the opportunity to identify potential areas in which to intervene (i.e., identifying individual difference factors that could be targeted in a treatment) to reduce stress generation and, in turn, possibly the risk of triggering symptoms of psychopathology.

Non-clinically depressed university student samples and stress generation.

Approximately 31% of stress generation studies have utilized university samples (Cummings, 2015). For example, Eberhart, Auerbach, Bigda-Peyton and Abela (2011) examined relations

between maladaptive schemas, “depression,” and stress generation in non-clinically depressed university students over a six-week period. The researchers used the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) to assess depressive symptoms, which is a 20-item self-reported scale (Radloff, 1977). Scores can range from 0-60 on the CES-D and a cut-off score of 16+ identifies individuals at risk for clinical depression (Radloff, 1991). Participants included in the study consisted of 118 female university students, with a mean score of 13.35 ($SD = 8.16$) on the CES-D, which is below the cut-off for depression and suggests that the majority of the sample was experiencing mild to moderate depressive symptoms. Results showed a stress generation effect within this predominantly non-clinically depressed sample. Specifically, maladaptive schemas (i.e., abandonment, mistrust/abuse, emotional deprivation, defectiveness, social isolation, dependence, vulnerability to harm, failure, and enmeshment, and subjugation) significantly predicted dependent interpersonal SLEs, even after controlling for depressive symptoms.

Similarly, a study by Gibb and colleagues (2006) examined associations between negative cognitive style, depressive symptoms, and stress generation in a sample of 162 undergraduate students over a six-week period. The Beck Depression Inventory–II (BDI-II; Beck, Steer, & Brown, 1996) measured depressive symptoms, which is a 21 item self-report measure with scores ranging from 0-63 (scores of 0-13 = *minimal depression*, 14-19 = *mild depression*, 20-28 = *moderate depression*, and 29-63 *severe depression*). Participants’ mean score on the BDI-II at Time 1 was 11.44 ($SD = 8.77$), which is within the minimal depression range (Gibb et al., 2006). Further, the BDI-II scores consistently decreased over time to a final mean score of 6.95 ($SD = 8.3$) at Time 7, which is also within the minimal depression range (Gibb et al., 2006). Researchers observed a stress generation effect, where depressive symptoms

predicted changes in hassles from week to week (Gibb et al., 2006). Another study, by Uhrlas and Gibb (2007), also used the BDI-II to examine the relations between depressive symptoms, childhood emotional maltreatment, and stress generation over a seven-week period. The sample included 208 undergraduate students with initial mean BDI-II scores of 11.50 ($SD = 9.27$) and final mean BDI-II scores, at Time 8, of 8.27 ($SD = 8.24$), which were both within the minimal depression range. Researchers observed a stress generation effect, where depressive symptoms predicted changes in hassles. Childhood emotional maltreatment was also associated with greater negative hassles (Uhrlas & Gibb, 2007).

Liu and Kleiman (2012) designed another study of stress generation that controlled for symptoms of depression using the BDI-II. The researchers were interested in analyzing maladaptive behavioural processes (i.e., dimensions of impulsivity) in relation to stress generation over a four-week period (Liu & Kleiman, 2012). The participants included in the study consisted of 201 undergraduate students with mean BDI-II scores of 7.30 ($SD = 0.56$), within the minimal depression range. Results showed that female gender and baseline depressive scores were associated with the number of subsequent negative dependent, but not independent, events (Liu & Kleiman, 2012). As such, the main analyses controlled for gender and depressive symptoms, which showed that one dimension of impulsivity (i.e., greater negative urgency) predicted higher rates of negative dependent events at follow-up, but not independent events (Liu & Kleiman, 2012).

In addition, a number of researchers studying stress generation in university samples have used the original Beck Depression Inventory (BDI) to measure participants' depressive symptoms. The BDI is a 21-item self-report with scores ranging from 0 to 63 (i.e., scores of 0-9 = *minimal depression*, 10-18 = *mild depression*, 19-29 = *moderate depression*, and 30-63 =

severe depression). As will be discussed, the mean depressive symptoms were consistently within minimal to mild ranges of depressive symptoms across the studies and the effects of stress generation related to the individual difference factors of interest.

In particular, a study by Shahar, Joiner, Zuroff, and Blatt (2004) examined relations between personality traits, interpersonal behaviour, and depressive symptoms over five weeks. The sample included 198 undergraduate students with mean BDI scores of 7.07 ($SD = 7.67$) at Time 1, and 5.82 ($SD = 6.6$) at Time 2, which were both within the minimal depression range (Shahar et al., 2004). Results showed that self-criticism and depressive symptoms at Time 1 were associated with the generation of various domains of SLEs (i.e., friend-related, roommate-related, school stress, achievement stress). Additionally, reassurance-seeking behaviour predicted spouse-related stress (Shahar et al., 2004).

In another study, Shih (2006) examined sex differences in stress generation, as well as the role of personality traits and depression, in a sample of 99 undergraduate students over a six-week period. The participants' mean BDI score was 6.82 ($SD = 5.64$) at Time 1 and the average mean BDI score over the six-week period was 5.15 ($SD = 4.87$), which were both within the minimal depression range. The researchers identified and excluded any potential participants with a current diagnosis of minor or major depression using the Structured Clinical Interview for DSM-IV (SCID-1-CV; First, Spitzer, Gibbon, & Williams, 1996). Results showed that prior-week depressive symptoms predicted higher levels of dependent interpersonal stress (Shih, 2006). As well, sociotropy predicted higher dependent interpersonal stress in women, but not in men, and the generated stress in turn predicted higher depressive symptoms (Shih, 2006). Overall, men and women did not differ in the levels of dependent interpersonal events they generated (Shih, 2006).

Similarly, in a study by Lakdawalla and Hankin (2008), the relations between stress generation, personality, dysfunctional attitudes, negative cognitive styles, and dysphoric symptoms were analyzed over two years in undergraduate students. The participants' mean BDI score was 13.37 ($SD = 9.77$) at Time 1 and 15.96 ($SD = 10.31$) at Time 2, which was in the mild depression range. Results showed that negative emotionality (i.e., a factor including feeling alienated, having a negative stress response, and low threshold for negative emotions; Lakdawalla & Hankin, 2008) predicted higher levels of negative life events over two years, which in turn predicted higher dysphoric symptoms.

In addition, Shih and Eberhart (2008, 2010) published two articles that both examined stress generation, depressive symptoms, and interpersonal behaviours in university students over six-week periods. The participants in the first article (Shih & Eberhart, 2008) included 51 college students with mean BDI scores of 7.46 ($SD = 5.47$). Further, the researchers identified any potential participants with a current or past diagnosis of minor or major depression using the SCID-1-CV and excluded any participants with a current depression diagnosis. Results showed that both current depressive symptoms and the interpersonal behaviour of being "too caring" predicted higher dependent interpersonal stress (Shih & Eberhart, 2008). Prior depression status predicted both current depressive symptoms, and being too caring. It also predicted dependent interpersonal stress, but not after controlling for current depressive symptoms or being too caring (Shih & Eberhart, 2008). This suggests a possible cyclical relation between stress and depression, whereby remaining subclinical depressive symptoms, following a history of depression, predicted greater dependent interpersonal stress that could have exacerbated depressive symptoms (Shih & Eberhart, 2008). Alternatively, the interpersonal behaviour (i.e.,

being too caring) could be longstanding; influencing the generation of SLEs and, in turn, could have contributed to both the current and past depressive episodes.

The participants in the second study (Shih & Eberhart, 2010) included 99 college students with mean BDI scores of 6.81 ($SD = 5.67$). Again, the researchers identified and excluded any potential participants with a current diagnosis of minor or major depression using the SCID-1-CV. The second study (Shih & Eberhart, 2010) expanded on the first (Shih & Eberhart, 2008) by analyzing gender differences in the association between stress generation and interpersonal behaviours. Results showed a stress generation effect, whereby greater BDI scores predicted higher levels of dependent interpersonal stress (Shih & Eberhart, 2010). As well, the interpersonal behaviour of being too caring was associated with stress generation in women but not in men (Shih & Eberhart, 2010).

Joiner, Wingate, Gencoz, and Gencoz (2005) also designed two studies (i.e., Study 2 and 3), which examined the specificity of stress generation to depressive symptoms rather than anxious symptoms, as well as the role of hopelessness in stress generation over five-week periods. The sample in Study 2 included 95 undergraduate students with mean BDI scores of 5.77 ($SD = 5.21$), in the minimal depression range (Joiner et al., 2005). Results showed that the stress generation effect was specific to depressive symptoms, since BDI scores were associated with increases in reported stress but anxiety scores were not (Joiner et al., 2005). However, when a measure of hopelessness was included within the analyses, the relation between depressive symptoms and generated stress was substantially reduced and no longer significant. The sample in Study 3 included 97 undergraduate students with mean BDI scores of 7.80 ($SD = 7.76$), in the minimal range (Joiner et al., 2005). Results showed that both hopelessness scores and depressive symptoms significantly predicted increases in negative events (i.e., roommate rejection), but

depressive symptoms did not predict the same increase in negative events when controlling for hopelessness (Joiner et al., 2005). This finding suggests the cognitive vulnerability factor of hopelessness might play a more significant role in subsequent life events than depressive symptoms. However, the measure used to assess events in this study did not differentiate between dependent and independent events, so it is not possible to directly comment on the stress generation effect (Joiner et al., 2005).

Another study by Joiner, Wingate, and Otamendi (2005) examined the associations between hopelessness, stress, and “depression” over a five-week period. The sample included 169 undergraduate students with mean BDI scores of 6.70 ($SD = 7.85$) at Time 1 and 7.85 ($SD = 7.41$) at Time 2, both in the minimal depression range. Results showed hopelessness scores significantly predicted self-reported interpersonal stress over time, even after controlling for depressive symptoms.

Although the authors of the studies above were reportedly studying the relation between stress generation and depression or depressive symptoms, the levels of depressive symptoms across the studies were consistently within the minimal to mild range. Taken together, these findings further support the notion that depression alone does not account for the occurrence of stress generation, since factors were uniquely associated with stress generation and stress generation was shown to occur outside of depressive episodes. Furthermore, the findings lend support to the utility of studying non-clinically depressed samples in order to elucidate individual difference factors associated with stress generation. My dissertation expands on this research by focusing on the role of individual difference factors in stress generation, using a university sample who are primarily non-clinically depressed or have depressive symptoms that are predominantly within the minimal to mild range. In particular, I examined the relation between a

cognitive vulnerability factor and stress generation, since cognitive vulnerabilities are identified as a potential salient factor associated with the generation of life events. This is discussed below, after I first provide an overview of major cognitive models of depression and some research supporting the models, before returning to link cognitive models and stress generation.

Relevant Cognitive Theories

Cognitive vulnerabilities related to stress generation are described by two prominent cognitive theories of depression, including one by Aaron Beck (1967), and another by Lynn Abramson and colleagues (1989). These theories posit that certain cognitive styles increase individuals' vulnerability to developing depressive symptoms and that SLEs trigger this vulnerability. In addition, it appears cognitive styles are not only triggered by SLEs, but also contribute to the generation of subsequent SLEs, which is discussed later. Rehm's self-control model (1977) is also relevant, despite its behavioural focus, since her theory incorporates cognitive concepts. I discuss these three theories below.

Beck's Cognitive Theory

According to Beck, depressed individuals' attitudes or schemas (i.e., structured way of thinking that influences the way individuals process information from an early age; Beck, 1967) tend to focus on themes of worthlessness, failure, and inadequacy. Negative life events or a loss can trigger this maladaptive cognitive style, which predisposes individuals to develop depression (Beck, 1979). The individual typically identifies something negative about the self as the cause of the event (e.g., "It happened because I am a failure"), which might be inaccurate (Beck, 1967).

Further, there is a tendency for depressed individuals to ignore or discount evidence that contradicts the existence of the negative attribute and to have difficulty considering alternative explanations that may reduce self-blame (Beck, 1979). The theory has received empirical support

from studies using the Dysfunctional Attitudes Scale (Weissman & Beck, 1978) to measure the cognitive vulnerability (i.e., the dysfunctional attitude). This theory suggests that individuals vulnerable to depression will have a distorted negative view of life events they encounter, with a tendency to attribute negative events to internal causes. Hammen (2006) stated that Beck's cognitive theory of depression contributed to her view that individuals play "a critical role in creating their depression by their negative interpretations of themselves and worlds" (p. 1067).

Abramson's Hopelessness Theory

The hopelessness theory of depression by Abramson and colleagues (1989) identifies hopelessness as the only direct cause for depressive symptoms (Abramson et al., 1989). Hopelessness is an expectation that one is helpless, valued outcomes will not occur, and that one is incapable of changing outcomes through behaviour (Abramson et al., 1989). Negative or stressful life events can trigger hopelessness. However, a negative event can only lead to depression by interacting with an individual's negative or hopeless cognitive style (Abramson et al., 1989).

There are three types of inferences associated with a negative cognitive style that are believed to moderate the relation between stressful events and depression including: (a) the individual believes the event was the result of *stable and global causes* or, in other words, causes that are likely to be maintained and could affect many areas of their life; (b) the individual infers from the event there will be many *negative consequences*; and/or (c) the individual infers *negative characteristics about the self* given the occurrence of the event, such as their "worth, abilities, personality, desirability, and so forth" (Abramson et al., 1989, p. 361).

Similar to Beck's model, the hopelessness theory suggests that individuals vulnerable to depression will have a negative cognitive style that tends to lead to internal attributions for

negative events. However, the hopelessness theory posits that internal attributions alone are not necessarily maladaptive or distorted (Abramson et al., 1989). The internal attributions might be accurate and in certain situations might actually be adaptive. Abramson and colleagues (1989) only consider negative attributions towards the self as contributing to depressive symptoms when the attribution is internal, stable, and global.

The hopelessness theory has received empirical support (e.g., Alloy et al., 1999, 2000, 2006); however, the support has consistently been provided from studies using the Attributional Style Questionnaire (i.e., ASQ; Peterson et al., 1982) or the updated Cognitive Styles Questionnaire (i.e., CSQ; Abramson, Metalsky, & Alloy, 2000) to assess the negative cognitive style. This type of measurement presents a limitation to the generalizability of the findings. Specifically, researchers have predominantly examined the theory using hypothetical events and it is *assumed* the results will generalize to cognitive styles for actual events that occur in individuals' lives. That is, it is hypothesized the same negative cognitive style garnered in response to hypothetical situations will be present for real-life events, but this has not been fully examined. My dissertation addresses these limitations by comparing individuals' internal cognitive styles for hypothetical and real-life events, and examining specifically whether internal cognitive styles for real-life events are associated with stress generation.

Rehm's Self-Control Model

Rehm's (1977) self-control model is a behavioural model of depression believed to subsume some of the concepts presented in these cognitive theories. The model suggests depression arises due to deficits in one's self-control, which consists of three interacting processes: self-monitoring, self-evaluation, and self-reinforcement. The most relevant process to my dissertation research is self-evaluation, which involves comparing one's internally attributed

performance to an internal standard that may or may not be realistic (Rehm, 1977). In this process, individuals compare their performance to an internal standard, making internal attributional conclusions about the self that can be either positive or negative, depending on their match with the expected standard. For example, if an individual with depression set an internal standard requiring him or her to workout every day for one hour and he or she did not meet this high standard, then he or she would believe he or she is a failure.

A deficit that may arise in this process is making an *inaccurate* attribution of the causality of past negative consequences, such as making excessive external or internal attributions of causality for negative consequences or events (Rehm, 1977). When individuals make excessive external attributions, they are unable to see connections between their actions and consequences, which can lead to feelings of helplessness (Rehm, 1977). In contrast, when individuals make excessive internal attributions, they see connections between actions and consequences but perceive themselves as incompetent, unskilled, and thus unable to produce the behaviour necessary to receive positive reinforcement (Rehm, 1977). Rehm (1977) believes this leads to feelings of helplessness. For example, a person may consistently attribute his or her tendency to have arguments with a friend (i.e., a negative event) to his or her own poor social skills (i.e., internal cause), and feel helpless in changing the situation since he or she perceives his or her poor social skills to be permanent or out of his or her control.

Rehm's theory is consistent with the previously discussed cognitive theories, in that it suggests individuals vulnerable to depression will present with a maladaptive attributional style for events. However, instead of only anticipating internal attributions (e.g., "This happened because I have no skill at this task"), this theory suggests that individuals may consistently attribute *either* internally or externally and that both extremes are problematic. There is empirical

support that the use of the self-control model can inform effective therapy for depression (e.g., Rehm et al., 1981).

Stress Generation Studies of Cognitive Factors

Studies have shown negative cognitive styles (i.e., attributing negative events to internal, stable, and global causes, and associating negative events with negative consequences and negative self-implications; Abramson et al., 1989) and dysfunctional attitudes (i.e., maladaptive attitudes that are extreme and rigid, and relate to one's self-worth and perfectionistic standards; Weissman & Beck, 1978) are linked to stress generation. In a retrospective study, Simons, Angell, Monroe and Thase (1993) found scores of achievement items³ and interpersonal items⁴ on a measure of negative cognitive style (i.e., Attributional Style Questionnaire, Peterson et al., 1982) predicted negative dependent events for individuals with single-episode depression.

In a prospective study, researchers showed negative cognitive styles were associated with higher reports of dependent and interpersonal events over a six-month period (Safford et al., 2007). In that study, the negative cognitive style was conceptualized as scores within the highest quartiles on both the Dysfunctional Attitudes Scale (DAS, a 40-item self-report questionnaire assessing maladaptive thinking; Weissman & Beck, 1978) and Cognitive Styles Questionnaire (CSQ, a self-report measure requiring attributions to be made for hypothetical events; Peterson et al., 1982), which were scores greater than or equal to 3.69 and 4.43, respectively (Alloy et al., 2000). These findings were specific to undergraduate women and remained even after controlling for past depression diagnosis. Current depression was an exclusion criterion, so existing depressive symptoms did not confound the results. This study did not find a relation between a lifetime history of depression and stress generation among undergraduate students

³ An example of an achievement item is, "You have been looking for a job unsuccessfully for some time" (Peterson et al., 1982, p. 291).

⁴ An example of an interpersonal item is, "You meet a friend who acts hostilely toward you" (Peterson et al., 1982, p. 291).

who were not currently depressed. This led Safford and colleagues (2007) to further conclude that stress generation might not be due to depressive symptoms, as other researchers had noted in the past. Instead, Safford and colleagues (2007) speculated negative cognitive styles might better explain stress generation. Given that negative cognitive styles might be more enduring than symptoms of depression (Just et al., 2001; Safford et al., 2007); this might help explain reports of increased negative life events before, during, and after episodes of depression.

Consistent with Safford and colleague's (2007) findings, Shih and colleagues (2009) found that cognitive vulnerabilities including a negative cognitive style (i.e., identified as the highest score on either the Children's Attributional Style Questionnaire; Seligman, 1984; or the Children's Cognitive Style Questionnaire; Abela, 1997) and self-criticism (i.e., measured using the Children's Depressive Experiences Questionnaire; Abela and Taylor, 2003) in children predicted dependent stress (i.e., both interpersonal and non-interpersonal), but not independent stress, even after controlling for depressive symptoms.

In contrast, Gibb and colleagues (2006) conducted a multi-wave study that found negative cognitive styles (i.e., measured using the CSQ) moderated⁵ the relation between negative events (i.e., assessed using a checklist of events each week) and subsequent depressive symptoms, but did not support negative cognitive styles as a moderator for the relation between depressive symptoms and subsequent stress generation. However, the mean score for the CSQ in this study was 3.52 ($SD = 1.02$), which indicates the negative cognitive styles of participants in this sample were not in the high-risk range, based on cutoffs used in previous studies that employed the CSQ (e.g., Alloy et al., 2000; Safford et al., 2007). As such, the inconsistency in findings might be due to the different degrees of negative cognitive styles that presented across

⁵ Moderated indicates no significant variability remained in the relation after negative inferential styles was added.

the different studies, where lower scores on measures of negative cognitive styles were not related to stress generation but higher scores were related.

Although some researchers have examined the relations between cognitive vulnerabilities and stress generation, this area of research is somewhat methodologically limited. The studies suggest negative cognitive styles might be a salient factor related to the generation of life events. However, the studies described thus far have determined the presence of cognitive vulnerabilities using self-report questionnaires that ask about *hypothetical* events. Researchers have assumed the cognitive vulnerabilities identified using these methods could be generalized to represent the way individuals appraise real-world events.

Depressive Realism and Cognitive Studies of Appraisal Accuracy

As reviewed, cognitive vulnerabilities, identified in Beck's (1967) and Abramson and colleagues' (1989) theories, are associated with stress generation, even when controlling for depressive symptoms. It is possible other cognitive theories of depression are relevant as well. Specifically, one potentially relevant theory, which challenges the cognitive theories of Beck and Abramson and colleagues, is depressive realism.

In contrast to other cognitive theories, Alloy and Abramson (1979) initially posited that individuals with depression do not present with distorted cognitions, but might actually have *more* realistic views of their experiences compared to non-depressed individuals (Alloy & Abramson, 1979). This has been termed *depressive realism*. In this model, researchers believe depression arises when an individual lacks an optimistic or self-enhancing bias (e.g., underestimating responsibility for negative events and overestimating for positive) in interpreting the world and instead views the world realistically. In contrast, non-depressed individuals possess a self-enhancing bias. This theory received initial empirical support in a study where the

researchers examined individuals' estimations of the contingency between their response (i.e., pressing a button or not pressing) and outcomes (i.e., a green light turning on or not turning on) for a series of problems that had various degrees of contingency (Alloy & Abramson, 1979). The findings showed that individuals with symptoms of depression were more accurate than non-depressed participants (i.e., scoring below nine on the BDI, in the minimal range) in their estimates of contingency between their responses and non-contingent outcomes in a series of experiments. Specifically, non-depressed individuals displayed an "illusion of control" (or optimistic bias), overestimating control for success, and an "illusion of no control," underestimating control for failures. Researchers believed depressed individuals lacked this positive distortion.

There are many findings in support of depressive realism (for reviews see Ackermann & DeRubeis, 1991; Alloy & Abramson, 1988); however, there are also studies providing contradictory evidence that suggests individuals with depressive symptoms are not more accurate than those without symptoms (see Ackermann & DeRubeis, 1991). Researchers have suggested these contradictory findings relate to the types of tasks employed for measurement in depressive realism studies (Ackermann & DeRubeis, 1991). Specifically, it is believed only measures that allow the participants' performance to be compared against an objective standard (e.g., recalling evaluative feedback previously provided in an experiment) can inform whether individuals with depression are indeed more accurate than those without. Studies that are able to assess this accuracy of participants' responses mostly include those that are conducted in laboratory settings using contingency judgments, and those that require participants to recall evaluative feedback, amongst others (Ackermann & DeRubeis, 1991). Although such laboratory studies adequately assess for accuracy, by using an objective standard, they are limited in their ecological validity

and cannot be generalized to an individual's accuracy in judging real world experiences or life events (Alloy & Abramson, 1988). The inability to measure realism or accuracy limits depressive realism studies of life events. As noted by Haaga and Beck (1995), realism is difficult to achieve "given the nonobjective or unknowable nature of many important social stimuli" (p. 44). This suggests that studies using real-life events can only assess *patterns* in attributions and cannot determine the accuracy of participants' attributions, because there is not necessarily an objective standard for comparison.

Cognitive studies on accuracy and realism. Researchers have attempted to examine the accuracy⁶ of attributions for life events, including Krackow and Rudolph (2008). Specifically, the researchers examined the accuracy of participants' appraisals of real-life events as compared to appraisals made for the same events by an independent coding team. The study included three groups of youth (9 - 14 years old) who were (a) diagnosed with depression; (b) presenting with subsyndromal levels of depression; or (c) had no symptoms consistent with an Axis I diagnosis of major depressive disorder in the DSM-IV. Researchers categorized the participants in these groups based on their psychiatric status determined by the Schedule for Affective Disorders and Schizophrenia for School-Age Children- Epidemiologic Version 5. Participants completed life stress interviews where they provided detailed reports of episodic life events experienced over the past year. The interviewers probed for information regarding the time, duration, and context of the stressful events. Following the interview, the interviewer created a narrative of each event and presented the narratives to a team of independent raters. The participants (during the interview) and raters (after the interview) assigned each episodic event two ratings on a 5-point scale. The ratings included the stressfulness by participants or objective stress by the raters (i.e.,

⁶ The terminology I use throughout these paragraphs (e.g., accuracy, overestimation, and objective standard) is derived from the respective articles. Please see the critique of the use of this type of terminology following this section (p. 57).

the negative impact of the event for a typical person), and the dependence of each event by both the participants and the raters (i.e., individual's contribution to the event). In addition, the team of raters classified each event as either interpersonal or non-interpersonal. The researchers summed the ratings across relevant events to create four composite scores (i.e., independent interpersonal, independent non-interpersonal, dependent interpersonal, and dependent non-interpersonal). The youths' appraisals of the stressfulness of the events were regressed onto the team's objective stress rating to compute standardized residual scores for the youths' estimates for each composite (Krackow & Rudolph, 2008). The researchers used the same procedure with youths' appraisals of the dependence of the events. Higher scores on stressfulness and dependence indicated an overestimation made by the participants, compared to the team. For example, if a participant rated her or his life events as more dependent than the team rated the events, the calculations produced a higher score, indicating the participant overestimated the dependence of the events, compared to the objective standard (i.e., team rating).

The results showed that youth currently diagnosed with depression and those who presented with subsyndromal depression were mostly inaccurate, as they tended to overestimate the stressfulness of SLEs and the dependence of SLEs, compared to non-symptomatic youth (Krackow & Rudolph, 2008). Adolescents in these two diagnostic categories rated events as more stressful and felt they played more of a role in the occurrence of the events, as compared to the ratings of the independent coding team. The authors of the study concluded that more biased appraisals of events (i.e., overestimation) displayed by the participants was consistent with cognitive vulnerability-stress theories of depression. That is, the results were consistent with Beck (1967) and Abramson and colleagues' (1989) theories of depression, which hypothesized that individuals, vulnerable to depression, would attribute negative life events internally. The

results were also consistent with Rehm's (1977) theory, which suggests that individuals vulnerable to depression present with a self-control deficit that might involve the tendency to make maladaptive attributions that are consistently either internal or external.

However, it is unclear whether this overestimation of the role one plays in stressful life events contributes to stress generation. In addition, researchers cannot assume these findings with youth generalize to adult populations. My dissertation research aimed to replicate and extend this study by using an adult population (i.e., undergraduate students) and examined whether the overestimation of internal causation was associated with stress generation.

The second group of researchers that attempted to examine the accuracy of attributions for life events was Moore and Fresco (2007). Specifically, they examined the relations between a depressogenic or negative attributional style (i.e., from the hopelessness theory), dysphoria (i.e., defined as scoring 14 or above on the Beck Depression Inventory-II, also classified as mild depression and above), and realism (i.e., difference score between participants' ratings and team ratings for the causes of events, with scores closer to zero indicating more realistic thinking) in college students, using hypothetical events. In an attempt to increase the ecological validity of the hypothetical events used in this study, the researchers obtained descriptions of real positive and negative events prior to this study from other students outside of the study. The researchers extracted information about the causes of events from the students' descriptions and used these as an objective standard.

Participants included in the study by Moore and Fresco (2007) were provided with these hypothetical events and were asked to rate the cause of the events twice: (a) as if the event happened to them; and (b) as if the event happened to someone else. A group of trained raters rated each set of cause and event statements before the participants rated them to establish the

objective rating. Realism scores were difference scores created by the subtraction of the participants' ratings from the objective ratings of the trained raters, where higher scores indicated a positive bias and lower scores indicated a pessimistic bias. The results showed individuals with a depressogenic attributional style were less realistic in assessing the cause of hypothetical events compared to individuals with non-depressogenic styles (Moore & Fresco, 2007).

Individuals classified as dysphoric were also less realistic compared to individuals classified as non-dysphoric (i.e., scoring 13 or below on the BDI-II, in the minimal depression range) in identifying the cause of events. Specifically, individuals with a depressogenic attributional style and those classified as dysphoric displayed a pessimistic bias, whereas individuals with a non-depressogenic attributional style showed an optimistic bias. That is, participants with a negative attributional style and/or depressive symptoms rated the negative events as more often caused by internal, stable, and global causes than the team; whereas individuals with a low score on the negative attributional style rated negative events as less often caused by internal, stable, and global causes compared to the team.

According to the authors, these findings are inconsistent with the depressive realism literature, which would expect depressed individuals to be less biased and more realistic in their evaluations (Moore & Fresco, 2007). A limitation to Moore and Fresco's study, however, is the use of hypothetical events rather than real-world events from participants' lives. It is unclear whether the results found in this study would generalize to real-life experiences. My dissertation research aimed to extend this study by comparing causal ratings for the internality of hypothetical and real-life events, to determine whether the ratings were consistent and generalizable across event types.

Criticisms of methods used to assess accuracy and realism. Despite the attempts of the above studies to create an objective standard to use as a comparison to assess for the accuracy or realism of cognitive attributions, the methods do not provide a true objective standard (Alloy & Abramson, 1988). Specifically, Alloy and Abramson (1988) note, “to determine the accuracy or realism of an individual’s inference in any given situation, one would need to know the objective state of affairs –that is, the ‘correct’ answer—in that situation” (p. 226). Studies that compare the self-evaluating ratings of participants to the ratings of a group of trained observers do not include a true objective way to determine the accuracy of the judgments made by participants since the trained raters present with their own biases (Ackermann & DeRubeis, 1991; Jones & Nisbett, 1971). The raters can never know the full circumstances or truth of the situations the participants describe (Alloy & Abramson, 1988) and there is often disagreement within teams, suggesting there is not a true correct response. Similarly, hypothetical events do not provide a true objective cause for the events, instead a team of raters determines what they think is likely the true cause of the event and there is still some variation among the raters’ responses (Alloy & Abramson, 1988; Ackermann & DeRubeis, 1991).

Instead, it has been suggested that researchers who attempt to examine cognitive biases using less objective measures and more real-world stimuli are actually measuring inferential bias (i.e., referred to here as inferential style), not accuracy or distortion (Alloy & Abramson, 1988). Researchers define an inferential bias as "a tendency to make judgments in a systematic and consistent manner across specific times and situations" (Alloy & Abramson, 1988, p. 227). Alloy and Abramson (1988) explained, “an inferential bias can make either accurate or erroneous judgments in particular situations” (p. 227). Specifically, individuals tend to make accurate inferences when the experiences encountered are consistent with their inferential bias and

inaccurate inferences when the experiences are incongruent with their inferential bias (Dykman, Abramson, Alloy, & Hartlage, 1989; Dykman, Horowitz, Abramson, & Usher, 1991). As such, these studies actually inform on the “nature and degree of bias associated with depressed and non-depressed people’s inferences” (Alloy & Abramson, 1988, p. 277). In relation to the studies by Krackow and Rudolph (2008) and Moore and Fresco (2007), this suggests their results showed participants with greater depressive symptoms displayed an internal inferential bias. Although it is not possible to examine realism or accuracy using studies that compare participants’ ratings to team ratings, measuring inferential biases is the best quantitative option currently available to examine individuals’ cognitions for real-life events.

However, the use of the term bias and other language used throughout stress generation literature is also criticized for invalidating individuals’ inferences regarding their own life experiences and viewing the individuals’ inferences as information that needs to be reinterpreted by researchers (Stoppard, 2010). Specifically, researchers criticize terms used to describe participants’ ratings, such as biased, inaccurate, and unrealistic, for suggesting the ratings provided by the participants are invalid. Further, researchers tend to use terms such as objective when describing the team ratings. This term suggests the team provides a true objective standard or correct classification of the dependence of events and that the team rating can be used as a comparison in determining the accuracy of participants’ ratings. Rather, as suggested by Alloy and Abramson (1988), it is possible only to observe patterns in the inferences individuals make about the stressful life events they experience.

Based on these criticisms and suggestions, I carefully chose to use the term inferential style throughout my dissertation rather than bias, accuracy, or realism. As well, I chose to use the terms “actor” rating instead of “subjective” rating and “observer” rating instead of objective

rating. Each of these terms address the criticisms of the language used in Krackow and Rudolph (2008), and Moore and Fresco's (2007) studies. I also chose these terms that are role related, to acknowledge the participants' ratings were valid, and the team ratings were not a true objective standard.

Dissertation Focus

Despite the now relatively extensive literature on stress generation, gaps and areas for further study remain. As discussed, stress generation (a) occurs across various populations; (b) is associated with the onset and recurrence of depressive symptoms; (c) is associated with other forms of psychopathology; and (d) is related to individual difference factors in populations that are not clinically-depressed. One individual difference of particular interest that has received limited research focus is whether individuals present with a particular cognitive pattern in identifying the causes of real-life events and whether inferential style relates to stress generation.

The aim of my dissertation was to extend Krackow and Rudolph's (2008) study with youth and Moore and Fresco's (2007) study that used hypothetical events, by examining: (a) whether inferential styles for real-life events (i.e., consistently attributing events to internal or external causes) were consistent with styles for hypothetical events; and (b) whether inferential styles for real-life events were related to stress generation. I also aimed to extend stress generation literature by measuring stress generation (i.e., the occurrence of dependent stressful events) based on observer ratings, as well as actor ratings. I examined the occurrence of independent events, which was consistent with previous stress generation. I also measured the independent events based on observer ratings and actor ratings.

Chapter 2: Study 1

Literature Review

The first purpose of Study 1 was to address the research question “Are hypothetical, internal cognitive styles related to inferential styles associated with actual experienced, real-life events?” Previous research on cognitive styles for hypothetical events suggests internal cognitive styles should exist for real-life events. My study focused on the CSQ Internal (CSQ-I) ratings, since this subscale is the most relevant construct to inferential style, which measures the participants’ patterns of internal/external inferences of causation for real-life events. I hypothesized the internality attributions would be correlated for the hypothetical and real-life events. The second purpose of Study 1 was to address the research question “Is inferential style for real-life events related to stress generation in an undergraduate student population?” Although researchers have not examined this question before, cognitive theories of depression predominately suggest internal inferential styles tend to be associated with depressive symptoms (e.g., Beck, 1967; Abramson et al., 1989). Additionally, internal inferential styles should be associated with stress generation, given that other cognitive vulnerability factors encompassing internal attributional ratings are associated with stress generation (e.g., Shih et al., 2009; Simons et al., 1993).

As such, I hypothesized an internal inferential style for real-life events would relate to stress generation. Inferential style was operationally defined as the difference between participants’ (actors’) and independent raters’ (observers’) ratings of dependence/independence using a contextual interview of stressful negative life events, similar to Krackow and Rudolph (2008) and Moore and Fresco (2007). I controlled for the potential impact of depressive symptoms, since Krackow and Rudolph’s (2008) results suggest individuals with higher levels of

depressive symptoms could display less agreement with observers in their ratings of dependence, compared to individuals with lower levels of depression.

Method

Epistemological Assumptions

Throughout stress generation research, including the studies by Moore and Fresco (2007) and Krackow and Rudolph (2008), the aim has been to establish an objective truth or true cause of an event. This type of approach is consistent with a positivist epistemology, which researchers have criticized for (a) assuming an absolute objective truth can be obtained for processes that can be observed by gathering and verifying knowledge through the use of observational (e.g., team ratings of events) and experimental methods (Clark, 1998; Crotty, 1998); (b) disregarding the subjective experiences of individuals, since they are not believed to be verifiable and are considered to be a different type of knowledge than the scientific facts obtained using observational and experimental methods (Crotty, 1998); (c) attempting to identify universal laws for observable phenomena, at the expense of individual experience (Clark, 1998); and (d) assuming the researcher is capable of being unbiased and not influenced by a theoretical position (Clark, 1998). It is now generally accepted it is not possible to remain free of bias (Ryan, 2006).

Given these criticisms, I approached my research from a post-positivist epistemology that evolved to address some of the criticisms associated with the positivist epistemology. Specifically, the post-positivist epistemology acknowledges it is not possible to establish an absolute objective truth, but the researcher attempts to gain closer approximations to the truth (Clark, 1998; Crotty, 1998). Further, the researcher is not looking for a universal law and I do not assume the knowledge obtained can be generalized to all situations. Rather, the post-positivist position is that the findings of research are generalizable to other situations that have

similar contexts (Clark, 1998). In addition, researchers believe the unobservable factors that influence the phenomena under study exist in reality and assist in explaining the observable phenomena (Clark, 1998). Unlike positivism, the post-positivist philosophy does not assume the researcher is completely unbiased in the research process. The researcher's biases and theoretical position are believed to influence the research, the direction it takes, and inferences made (Clark, 1998; Crotty, 1998).

Personal Background

Given that a researcher's biases and theoretical position influence research, it is important to identify my own biases that could have potentially interfered with my interpretations of the research findings and conclusions drawn below. I am approaching this research as a clinical psychology graduate student. My courses have always framed psychopathology and stress generation within the biopsychosocial model. I learned about various ways to measure symptoms and life events using both objective (e.g., team ratings, observation) and subjective measures (e.g., self-report questionnaires). I initially believed that using strictly objective methods to study stressful life events was an adequate way to study the impact that stressful life events have on people's lives. Further, using a team of raters to control for individuals' moods and cognitions appeared to be a reasonable method, particularly when the goal of the research was to identify types of events that were inherently stressful for all individuals (e.g., war, natural disasters). However, I changed my perspective after becoming familiar with the research literature that criticizes the sole use of objective measures when studying life events and psychopathology.

My perspective has evolved and I believe there are benefits to examining stressful life events using both observer and actor ratings. In particular, I believe observer ratings are particularly useful when researchers are interested in identifying the number of stressful life

events an individual has experienced, controlling for mood. This would address the indirect contamination concerns identified by Brown and Harris (1978) that I previously discussed. For example, if an individual provided self-reports of his or her symptoms of anxiety and also provided a self-report identifying the number of stressful life events he or she experienced, both self-reports could have been influenced by symptoms of anxiety. In contrast, observer ratings of the stressful life events would avoid contamination. However, even in this situation, I think it is beneficial to obtain ratings from both observers and actors so researchers can compare the two and discrepancies can be identified and studied further.

In contrast, I believe if a researcher is interested in identifying individual difference factors associated with stress generation to target in future treatment, then it is necessary to examine actor ratings. That is, I believe it is more meaningful, particularly for treatment purposes, to determine which individual difference factors actually contribute to stress generation as identified by the actor, rather than observer. This reflects my overarching belief that, although observers might come close to accurately identifying stressful events, only the individual can truly determine whether an event is stressful or not. However, I also believe it is useful to continue to gather observer ratings with this type of research, in order to examine whether the factors are differentially related to observer and actor ratings. This could inform whether previous findings using only observer ratings are generalizable. Additionally, given there are currently no therapies specifically designed to reduce stress generation, it is likely current therapies are not adequately addressing stress generation and could continue to improve as research advances. These biases and assumptions will likely influence my interpretations and conclusions. Specifically, I may unintentionally look for patterns that are consistent with my views.

Influenced by previous research and this epistemological stance, my dissertation aims to balance the tension inherent in using quantitative methods in a research area traditionally influenced by a positivist perspective with my own awareness of the importance of framing language and the need to question previous frames.

Participants

Participants were 106 undergraduate students recruited from the Introductory Psychology (PSY 120/121) subject pool at the University of Saskatchewan. The sample was predominantly female (83 females, 20 males, 3 undeclared), ages ranged from 17 to 44 years old ($M = 19.56$, $SD = 3.67$) and 67% were Caucasian, 11.3% East Asian, 8.5% South Asian, 5.7% Aboriginal, 5.7% Other, 5.7% Middle Eastern, 1.9% Hispanic/Latin, and 0.9% African American.

Measures

Beck Depression Inventory-II (BDI-II). Participants completed the BDI-II to measure levels of depressive symptoms (Beck et al., 1996). The BDI-II is a widely used self-report instrument that measures severity of depressive symptoms occurring in the previous two weeks. It consists of 21 questions that participants rate on a 0–3 scale, with higher scores representing higher levels of depressive symptoms (e.g., Sadness: 0 – *I do not feel sad*, 1 – *I feel sad much of the time*, 2 – *I am sad all the time*, 3 – *I am so sad or unhappy that I can't stand it*). Beck and colleagues (1996) initially standardized the BDI-II with a sample of 500 outpatients and a sample of 120 college students. The coefficient alphas in the study by Beck and colleagues (1996) were .92 and .93 respectively, showing that the measure had high internal consistency. In addition, the stability of the BDI-II over time was estimated by Beck and colleagues (1996) using a sample of 26 outpatients who were administered the measure and retested after one week. The test-retest correlation was significant, Pearson $r = .93$, $p < .001$ (Beck et al., 1996). Researchers have

frequently used the BDI-II with college student populations and student norms are available (Steer & Clark, 1997).

In the present study, the BDI-II was shown to have high internal consistency with a Cronbach's $\alpha = .905$ (Field, 2009). I calculated the total score for the BDI-II items by summing the 21 items on the questionnaire (Beck et al., 1996). I analyzed depressive symptoms on a continuum, consistent with previous research studying the impact of depressive symptoms on stress generation in undergraduate samples (e.g., Bottonari et al., 2007; Cummings et al., 2010; Davila et al., 1997; Potthoff et al., 1995).

Cognitive Styles Questionnaire (CSQ). I administered the CSQ (Abramson et al., 2000) to participants to assess negative cognitive styles, which includes negative inferences about the causes and consequences of events and self-implications. A negative cognitive style is a cognitive vulnerability associated with depression that the hopelessness theory of depression features (Abramson et al., 1989). This measure is a revised version of the Attributional Style Questionnaire (Peterson et al., 1982) and researchers designed it specifically for use with college students (Haefffel et al., 2008). Previous research has shown the internal consistency for the CSQ composite score to range from an alpha coefficient of .88 to .96 (see Haefffel et al., 2008 for a review). The test-retest reliability of the CSQ negative composite after 1 year was $r = .80$ (Alloy et al., 2000).

The CSQ presents participants with twelve positive (e.g., "In an important class, you are able to get all of the work done that your professor expects of you") and twelve negative (e.g., "An important romantic relationship you are involved in breaks up because the other person no longer wants a relationship with you") hypothetical situations. This study only used the negative hypothetical events, since the scoring instructions for the measure states it can be administered

using only the negative events (Haefffel, 2008). Further, other studies have administered the shortened version (e.g., Hankin, Fraley, & Abela, 2005). The study situations included negative events in areas of academic achievement, employment, and interpersonal relationships.

The CSQ presented participants with each situation and asked participants to write one major cause for the scenario. The CSQ instructed the participants to think about that cause and indicate on a 7-point scale the cause in relation to (a) internal-external attribution:

Think about the cause (i.e., what you wrote down on the line above) of the class reacting negatively to your talk. Is it something about you or something about other people or circumstances that causes the class to react negatively to your talk?, 1= *“totally caused by other people or circumstances”* to 7 = *“totally caused by me”* (Abramson et al., 2000);

(b) stable-unstable attribution:

Think about the cause (i.e., what you wrote down on the line above) of the class reacting negatively to your talk. Is the cause something that leads to failure just in the class reaction to that talk, or does this cause also lead to failure in other areas of your life? 1= *“this cause leads to failure just in the class reaction to that talk”* to 7 = *“this cause leads to failure in all areas of my life”*), (Abramson et al., 2000);

and (c) global-specific attribution:

Think about the cause (i.e., what you wrote down on the line above) of the class reacting negatively to your talk. Now assume that in the future, you give a talk to a class on other occasions. Will the cause of the class reacting negatively now as described above again cause a class to react negatively in the future? 1= *“will never again cause a class to react negatively to my talk”* to 7 = *“will always cause a class to react negatively to my talk”* (Abramson et al., 2000).

Participants also reported the meaning of the situation using a 7-point scale, specifically, whether the situation meant more negative situations would happen (e.g., 1 = “*not at all likely to lead to other negative things happening to me*” to 7 = “*extremely likely to lead to other negative things happening to me*,” Abramson et al., 2000) and whether the situation meant they were flawed (e.g., 1 = “*definitely does not mean I am flawed in some way*” to 7 = “*definitely does mean I am flawed in some way*,” Abramson et al., 2000).

A CSQ internal (CSQ-I) score was calculated for each participant to determine his or her internal cognitive style for hypothetical negative life events. The CSQ-I was calculated by taking the participant’s average rating across internal items. In the present study, calculations showed the CSQ-I had acceptable internal consistency (Cronbach’s $\alpha = .704$; Field, 2009). I did not use the CSQ composite score in this study, but examined only internal ratings consistent with Krackow and Rudolph (2008) and Moore and Fresco (2007), who examined only internal ratings. Specifically, I was interested in determining whether participants’ ratings of internal causation were consistent for real and hypothetical events.

UCLA Life Stress Interview (UCLA LSI). The UCLA LSI (Hammen, 2008) is a semi-structured contextual life event interview that evaluates the occurrence of stressful or threatening life events. Researchers have used the measure in a variety of stress generation studies that utilized community or clinical samples (e.g., Adrian & Hammen, 1993; Hammen, 1991; Hammen et. al, 1992; Hammen & Brennan, 2001; Rudolph & Hammen, 1999; Shih, Eberhart, Hammen, & Brennan, 2006). The UCLA LSI of episodic events is modeled after the contextual threat interviewing methods of Brown and Harris (1978).

Contextual interview-based measures of stress are widely viewed as the gold standard for documenting SLEs. Compared to life event checklists, they have greater precision for dating

events, allow for more accurate discrimination between independent and dependent stressors, and, most importantly, focus on the circumstances surrounding events without the influence of participants' own interpretations or reactions (Hammen, 2005; Kessler, 1997; Liu & Alloy, 2010; Mazure, 1998; Monroe, 2008). This focus on the contextual setting, rather than the participant's interpretation, is important since it eliminates the possible influence of mood bias on the classification of events as negative. In particular, individuals with depression show "biases" in their threshold for what constitutes a SLE (Simons et al., 1993) and the perceived severity (Krackow & Rudolph, 2008; Simons et al., 1993). Additionally, significant discrepancies exist between the results of self-report measures and interview-based assessments of SLEs (Simons et al., 1993). Specifically, the results for self-report measures showed that individuals with higher scores on cognitive vulnerability measures reported a higher number of negative events and higher severity ratings for events in comparison to the results of interview-based assessment (Simons et al., 1993). Thus, interview-based assessments provided greater detail and reduced effects of biases.

In a contextual life event interview, the interviewer asks participants about various domains (e.g., work, romantic relationships, friendships), and aims to obtain sufficient information about each event and the surrounding circumstances so an observer (or objective) rating of the severity (i.e., stressfulness) and independence/dependence of the event can be determined. Independent raters, in teams of two or more, review transcripts of the interview, with any participant report of emotional reaction removed if needed, and estimate the severity of the event for the average person based on the contextual information (Hammen, 2005; Hammen, 2008). As previously mentioned, studies that use the UCLA LSI typically refer to the ratings provided by the independent team of raters as the objective rating, which is referred to in this

dissertation as the observer rating. Similarly, researchers typically refer to the ratings provided by the participants as subjective ratings, which I refer to in this dissertation as actor ratings.

Administration. I informed the participants during the informed consent process that I would audio-record them while they completed the UCLA LSI. I read the following instructions to the participants:

I am interested in finding out how you have been doing in the past six months - that would be from [date six months previous] to today. I would like to ask you some questions about different areas of your life. There are no right or wrong answers to these questions. If any question does not make sense to you, just let me know. Do you have any questions before we begin? (Hammen, 2008).

The entire interview took each participant approximately 60 minutes to complete. Either myself or another graduate student, both trained in the administration of the UCLA LSI, conducted the interviews. The interviews addressed the participants' episodic SLEs across several areas of their life including intimate relationships, close friendships, job, finances, relations with children (if applicable), relations with extended family members, health of self, and health of family members. We asked the participant to identify any events that had a distinct onset and no relation to any chronic stress conditions. Further, we used topic areas from the modified Paykel list of life events (Hammen, 2008), which is included in the UCLA LSI, to prompt for any areas that were missed in the interviewer prompts. Interview administrators asked the participants to provide the date and details of each event. The details were obtained to understand the circumstances surrounding the event and included prior experiences with each event, what happened during the event, what led up to it, whether the event was expected, what the person did in response to the event, and what happened following the event. It was important

to obtain the surrounding circumstances because this context could have modified the coding team's understanding of the impact of an event. For example, a fight with a friend could be friendship ending or an argument over a slight matter with few consequences. Therefore, the more details obtained, the clearer the meaning and context of an event became, which made it easier to gauge the impact such an event would have on the typical individual.

Participants then provided actor ratings of the dependence/independence of each episodic event on a 5-point Likert-type scale (1 = *completely independent* to 5 = *completely dependent*). The interview administrators provided the participants with additional instructions if they had difficulty categorizing the events as independent or dependent, which were as follows:

The rating you provide indicates the amount you think you influenced the occurrence of the event. If you think you had no influence, you should respond 1 (*totally independent*). If you think you may have influenced the event slightly, you should respond 2. If you think it was an equal mixture of your influence and another factor or person, you should respond 3. If you think you had more influence on the event than another factor or person, you should respond 4. If you think the event was entirely influenced by you, then you should respond 5.

Interview administrators did not aid the participants in the categorization, but did provide standardized clarification instructions if difficulty arose in grasping the concepts (see Appendix B). In addition, participants provided actor ratings of the stressfulness or severity of each episodic event on a 5-point Likert-type scale, ranging from 1 (*no or minimal impact*) to 5 (*severe*).

Coding. After the entire interview was complete, the interviewer noted the participants' independence ratings. Before observers coded, the interviewer transcribed each episodic event

report into narrative form. The narrative included all information about the dates and circumstances with as much detail as possible. However, the interviewer excluded any information about the participant's actual reaction to the event (i.e., "I was so scared!") from the narrative forms. For example, if a participant reported "On March 21, 2014, I was in a car accident where I was hit from behind and I was so terrified because it was the first time I was in an accident," the team would be provided with the following narrative "On March 21, 2014, I was in a car accident where I was hit from behind and it was the first time I was in an accident." This ensured that the ratings for each event were judged on the context and represented how much impact the event would have on a typical person under similar circumstances. Before joining the coding team, I trained potential raters to criterion (intraclass correlation of .80) with sample events provided with the UCLA LSI manual and training materials.

An independent coding team (consisting of three raters) determined the rating of the stressfulness or severity of each episodic event based on the narrative provided by the interviewer. Guidelines did not permit interviewers to participate in the rating of the events but interviewers did present the events to the team for coding. These severity ratings were on a 5-point Likert-type scale, ranging from 1 (*no or minimal impact*) to 5 (*severe*). I created each team from a pool of raters that included four clinical psychology graduate students and six advanced undergraduates. For each event, the team also rated the independence of the participant's behaviours on a 5-point scale, ranging from 1 (*independent*) to 5 (*dependent*). The raters showed consistency in their ratings for events with intraclass correlation coefficients ranging from .843 to .935.

Events were included in my calculations if they received a stressfulness rating greater than three by actors or observers, consistent with UCLA-LSI instructions. I classified events as

dependent SLEs if they were rated as three or above on dependence and three or above on stress (e.g., Cummings et al., 2013; Daley et al., 1997; Hammen, 1991; Rudolph et al., 2000).

Independent SLEs were events rated less than three on dependence and three or above on stress by actors or observers (e.g., Cummings et al., 2013; Daley et al., 1997; Hammen, 1991; Rudolph et al., 2000). There were four different categorizations of events (a) observer dependent; (b) observer independent; (c) actor dependent; and (d) actor independent. For each event category, I calculated the total number of events in that category based on the criteria described.

Calculating Inferential Style. To examine the participants' estimations of the dependence of the events, I first calculated a difference score for each event by subtracting the observer rating from the actor rating, where higher scores indicated an internal inferential style (Moore & Fresco, 2007). Next, I calculated a mean difference score for each participant by calculating the mean of the difference scores across all events. These means difference scores are referred to going forward as the inferential style score. Higher scores (i.e., positive difference scores) indicated that participants made more internal ratings of the dependence of SLEs compared to the team's ratings. Researchers have previously utilized this method of calculating a mean difference score and they recommend the method for comparing observer and actor scores (e.g., Moore & Fresco, 2012; Siegel & Alloy, 1990).

I chose this approach over the method used in Krackow and Rudolph's (2008) article, which regressed the actor ratings onto the observer ratings to compute standardized residual difference scores for the participants' estimates (Krackow & Rudolph, 2008). However, researchers recommend avoiding the use of the residual difference scores when actor and observer ratings significantly correlate, because the relation between the residual difference scores and actor ratings (i.e., the dependent variable) decreases (De Los Reyes & Kazdin, 2005).

This was a concern in my data, since observer and actor ratings were significantly correlated ($r = .445, p < .001$; $r = .499, p < .001$ for dependent and independent events, respectively). Further, when actor and observer ratings significantly correlate the relation between the residual difference scores and observer ratings (i.e., the independent variable) increases, such that the relation between the residual difference score and another variable will be essentially identical to the correlation between that same variable and the observer's rating (De Los Reyes & Kazdin, 2005). In addition, I used the raw scores instead of z -scores, since the actors' ratings and observers' ratings were already on the same metric and the variances were not significantly different (De Los Reyes & Kazdin, 2005).

Procedure

I obtained approval from the University of Saskatchewan Behavioural Research Ethics Board to conduct this research study. To sign up for the study, potential participants logged on to the subject pool system located at <http://usask.sona-systems.com>. After reading the study description, interested potential participants scheduled a data collection timeslot. Participants completed this study in the Psychological Services Centre (PSC) or in the VideoTherapy Analysis Lab (ViTAL), both in the Arts building at the University of Saskatchewan. Following completion of informed consent, participants completed the demographics information form (Appendix B), and then the UCLA LSI to evaluate episodic (acute) SLEs that occurred over the previous six months. Each participant then completed the BDI-II to measure his or her level of depressive symptoms and a measure of cognitive vulnerability (i.e., the CSQ). We administered the BDI-II and CSQ following the UCLA LSI in this study to avoid carry over effects that could have occurred via priming of depressed mood and/or internal cognitive styles, if participants had completed those measures first. At the end of the interview, we verbally debriefed each

participant and handed him or her a debriefing form. We then assigned the participants 1-bonus point for each half hour of their participation (i.e., total of three bonus points) via the subject pool online software.

Participants were included in the final analyses if they (a) completed the initial interviews; (b) completed all the questionnaires; and (c) missed no more than one data point per subscale for each questionnaire. Based on these criteria, one participant was initially excluded from the study, due to missing more than one data point on a subscale. As well, I conducted preliminary analyses that identified six participants as univariate and multivariate outliers, and these participants were initially excluded from analyses. However, analyses with the reduced sample and full sample produced the same results. As such, I based the results presented here on the full sample of 106 participants.

Results

Preliminary Analyses

I examined the variables of interest (i.e., BDI-II, CSQ-I, inferential style) for accuracy of data entry, missing values, skewness, kurtosis, and outliers.

Examining missing data. Missing values accounted for less than 5% of the data and were missing at random (Little, 1988). Five participants were missing a response for one of the 21 items on the BDI-II (i.e., 5% of their BDI-II data; Tabachnick & Fidell, 2013). As such, I calculated the participant's mean score on the BDI-II and then multiplied by 21 to obtain a total BDI-II score. When comparing the results of the mean total with the results of the total raw score, the findings were the same. As such, I present the results based on the total raw score here. In addition, there were 19 participants missing data for the CSQ. The CSQ consists of five subscales that each contains 12 items. I calculated a subscale mean using the existing data when

participants were missing a maximum of one item within a subscale (i.e., 8% of the CSQ data; Bennett, 2001). When data were missing, I simply divided the sum by the total number of items the participant responded to, rather than the total number of items for the subscale.

Examining skewness and kurtosis. The skewness and kurtosis analyses revealed that the BDI-II had significant skewness and kurtosis (see Table 3.1). As such, I performed a square root transformation, which corrected the skewness and kurtosis (see Table 3.1). However, given that the results of all analyses were the same for the non-transformed BDI-II and the transformed BDI-II, I presented the non-transformed BDI-II scores here. The CSQ-I did not have significant skewness or kurtosis so transformations were not necessary.

Table 3.1

Study 1: Examining Skewness and Kurtosis

Measure	Skewness	Kurtosis
BDI-II	5.72*	4.43*
CSQ-I	-0.55	-0.44
Inferential style	-3.37*	6.54**

Note. Numbers provided are *z* scores. BDI-II = Beck Depression Inventory-II; CSQ-I = Cognitive Styles Questionnaire-Internal subscale.

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

Last, inferential style had significant skewness and kurtosis, which I corrected for after removing four extreme cases (i.e., *z* scores of +/- 3 or greater; Tabachnick & Fidell, 2013) identified as univariate outliers. However, analyses conducted with the full sample and reduced sample yielded the same results so I present only the results from the full sample here.

Descriptive Statistics

I present descriptive results for the self-report measures including inferential style, BDI-II and the CSQ-I, in Table 3.2. Regarding depressive symptoms, the majority of participants (76%

or 81 participants) were in the minimal or non-depressed range (i.e., a score of 0-13), 12% were in the mild range (i.e., a score of 14-19), 7% were in the moderate range (i.e., a score of 20-28), and 5% were in the severe range (i.e., scores 29-63; Beck et al., 1996). As such, the depression scores were positively skewed, showing that the majority of participants reported minimal to mild depression with fewer participants reporting symptoms within the moderate to severe range. In addition, a two-tailed Pearson r correlation revealed that BDI-II scores were not significantly correlated with inferential style ($r = .07, p = .49$).

Table 3.2

Study 1: Descriptive Statistics for Symptom Measures and Life Events

Measure	M	SD	Range	
			Potential	Actual
BDI-II	9.85	7.96	0-63	0-39
CSQ-I	5.03	0.83	1-7	3-7
Inferential Style	0.20	.053	$-\infty$ - $+\infty$	-2-+2
UCLA Life Stress Interview				
Observer Dependent Events	0.56	0.79	0- ∞	0-3
Actor Dependent Events	1.54	1.14	0- ∞	0-4
Observer Independent Events	1.00	1.24	0- ∞	0-5
Actor Independent Events	1.83	1.52	0- ∞	0-7

Note. SD = standard deviation; BDI-II = Beck Depression Inventory-II; CSQ-I = Cognitive

Styles Questionnaire-Internal subscale. Higher scores on the BDI-II and CSQ-I reflect greater depressive symptoms and a higher internal cognitive style, respectively. As well, higher scores for each UCLA event category reflects a greater number of life events experienced in that category.

Main Analyses

Associations between CSQ-I and inferential style. My first hypothesis was that CSQ-I would be associated with an internal inferential style for real-life events. I used a two-tailed Pearson r correlation to test this hypothesis and the results were considered significant if the

correlation reached a significance level of .05. I found some support for the association between CSQ-I and an internal inferential style ($r = .206, p = .03$).

Associations between inferential style and control variables with stress generation.

My second hypothesis was that an internal inferential style for real-life events related to stress generation (i.e., dependent SLEs). I used two-tailed Pearson r correlations to test this hypothesis. I ran separate analyses based on the observer and actor ratings of the dependence and stressfulness of the events. As well, I examined whether relations existed between BDI-II and CSQ-I with dependent SLEs in order to determine whether it was necessary to run additional analyses to clarify the unique variance associated with inferential style. Given the number of correlations I ran for each event type, I used the Bonferroni method to correct for inflation of Type I error rates. I considered each event type a family of comparisons and results for each event type were considered significant only if they reached a significance level of .01 (Shaffer, 1995).

Inferential style and BDI-II were both significantly related to actor dependent stressful events (see Table 3.3). However, there were no significant relations between any of the variables and observer dependent stressful events.

Table 3.3

Study 1: Correlations Between Symptom Measures and Life Events

Measure	UCLA LSI Dependent Events		UCLA LSI Independent Events	
	Observer	Actor	Observer	Actor
Inferential Style	-.03	.26**	.11	-.04
BDI-II	.13	.33***	.30**	.26**
CSQ-I	.14	.08	.15	.25*

Note. BDI-II = Beck Depression Inventory-II; CSQ-I = Cognitive Styles Questionnaire-Internal subscale.

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

CSQ-I was not correlated with actor dependent stressful events. This suggests that individuals' tendency to make internal attributions for hypothetical events is not associated with greater reports of real-life events that they identify as dependent stressful events.

Last, actor- and observer dependent stressful events were significantly related, suggesting that greater identification of dependent stressful events by individuals is correlated with greater identification of dependent stressful events by observers ($r = .445, p < .001$).

Partial correlational analyses for actor dependent events. Based on the findings above, I ran partial correlations to clarify the unique variance of factors related to actor dependent events. I chose partial correlations over semi-partial correlations based on Field's (2009) recommendations. Specifically, Field (2009) indicates that partial correlations are useful for examining the "unique relationship between two variables when other variables are ruled out", whereas "semi-partial correlations are ...useful when trying to explain the variance in one particular variable... from a set of *predictor* variables" (p. 190). Inferential style had a significant partial correlation with actor dependent events of $r_{(103)} = .253, p = .009$, controlling for BDI-II. As well, BDI-II had a significant partial correlation with actor dependent events of $r_{(103)} = .322, p$

= .001, controlling for inferential style. These findings suggest that both inferential style and depressive symptoms are uniquely associated with actor dependent events, after controlling for the other respective variable.

Associations between inferential style and control variables with independent events. I also examined the relations between inferential style and actor- and observer independent SLEs. Inferential style was not significantly related to actor- or observer independent SLEs (see Table 3.3). However, BDI-II was significantly related to both actor- and observer independent events. As well, observer and actor independent events were significantly related ($r = .499, p < .001$), suggesting that the participants and observers showed consistency in their classification of independent events.

Discussion

The purpose of Study 1 was to address the following research questions: “Are internal cognitive styles (measured using hypothetical events) related to inferential styles associated with actual experienced (i.e., ‘real-life’) events?” and “Is inferential style for real-life events related to stress generation in an undergraduate student population?”

My first hypothesis was that the internality attributions would be correlated for the hypothetical (CSQ-I) and real-life events (UCLA LSI), given the hopelessness theory of depression anticipates that individuals’ cognitive styles for hypothetical events will generalize to real-life events. CSQ-I did display a small correlation with inferential style for real-life events. This provides some support the hopelessness theory and suggests that individuals’ ratings of internality are somewhat consistent for both hypothetical and real-life events. This finding has important implications for the measurement of cognitive styles as well as the generalizability of previous research using hypothetical events to assess cognitive styles, as it indicates that these

assessment methods are similar but not equivalent to an individual's inferential styles for real-life events.

For my second research question, I examined whether inferential style and stress generation (i.e., dependent stressful events) correlated. I found a significant relation between inferential style and actor dependent events. However, I did not find a significant relation between inferential style and observer dependent events, which is the traditional method of measuring stress generation.

Thus, consistent with my expectations, it is possible that inferential style is related to stress generation, as measured with actor ratings. However, those individuals are not experiencing higher rates of events considered dependent by the independent coding team. This inconsistency in the relation between inferential style and observer versus actor dependent events suggests the participants' own ratings for the stressfulness and dependence of life events are an important consideration, which is further supported by research that shows perceived stress predicts psychological symptoms (see Cohen, 1986). Further, this suggests that subjective ratings could also be more clinically useful than team ratings typically used in stress generation research. I discuss this further in the General Discussion.

However, one possible alternate explanation for this discrepancy between actor and observer dependent events is that participants might also have possessed an "enhancing attribution style" (i.e., high scores on the CSQ stability, globality, and composites scores for positive events, or attributing positive events to stable and global causes). This could have influenced the relation between inferential style and observer events, since an enhancing attributional style is shown to be associated with a decrease in observer stress generation (Kleiman, Liu, & Riskind, 2012). Further, Haefel and Vargas (2011) found participants could

present with both a negative cognitive style (i.e., CSQ composite score for negative events) and enhancing cognitive style (i.e., CSQ composite score for positive events). Participants with a negative cognitive style and an enhancing cognitive style and/or high numbers of positive events reported lower depressive symptoms similar to individuals without a negative cognitive style (Haefffel & Vargas, 2011). In contrast, individuals with a high negative cognitive style and low enhancing cognitive style showed greater depressive symptoms. It is unclear how these different combinations of cognitive styles (e.g., having both a negative and enhancing cognitive style versus high negative and low enhancing cognitive style) relate to stress generation and whether the different combinations of cognitive styles relate differently to actor- and observer dependent stressful events. Unfortunately, I did not examine positive events in this study and thus these possibilities cannot be resolved within my data.

Depressive Symptoms and Inferential Style

Last, I examined whether depressive symptoms were associated with internal inferential style and controlled for depressive symptoms (i.e., by running partial correlations) when I ran correlations between inferential style and other variables. This analysis was necessary, since Krackow and Rudolph (2008) found youth with clinical depression were more likely to overestimate their contribution to interpersonal events (or show an internal bias) compared to non-symptomatic youth. There was no support for the relation between depressive symptoms and inferential style in this study. This was surprising given that, Krackow and Rudolph (2008) reported individuals with subsyndromal depression were similar to those with clinical depression in their tendency to overestimate their contribution to events. Further, research using hypothetical events indicates that individuals with depression show a negative bias against the self, where they do attribute negative events internally and positive events externally (Abramson

& Alloy, 1981; Haack, Metalsky, Dykman, & Abramson, 1996; Sweeney, Anderson, & Bailey, 1986). In contrast, non-depressed individuals display a self-serving bias, wherein they attribute hypothetical positive events internally and negative events externally (for example, Abramson & Alloy, 1981; Alloy & Abramson, 1979; Haack et al., 1996; Haeffel & Vargas, 2011; Kleiman et al., 2012; Kuiper 1978; Mezulis, Abramson, Hyde, & Hankin, 2004). Harvey (1981) and Gongguy and Hammen (1980) found similar results for real-life events.

One possible explanation for this result is the restricted range of depressive symptoms in my sample. Specifically, the average BDI-II score was in the minimal range ($M = 9.85$, $SD = 7.96$), with scores ranging from 0 to 39, and 76% of the sample fell in the minimal/non-depressed range. It is possible that using a sample containing more participants with moderate to severe levels of depressive symptoms could result in significant findings and in which case, it would be important to control for depressive symptoms.

Internal Cognitive Style, Depressive Symptoms, and Stress Generation

CSQ-I was not associated with actor dependent stressful events. This suggests that individuals' tendency to make internal attributions for hypothetical events (CSQ-I) is not associated with greater self-reported stress generation. This was a surprising finding since inferential style was associated with actor stress generation. It is possible that CSQ-I and inferential styles differently measure this construct of inferential style and might be differentially related to stress generation. In this regard, this finding challenges the generalizability regarding the use of hypothetical cognitive styles as a proxy for real-life inferential style. Although these assessment methods display a small correlation, in my data, they have differential relationships with actor reported stress generation.

In addition, there was a significant correlation between depressive symptoms and actor dependent stressful events. This finding indicates that despite the minimal depressive symptoms in this sample, depressive symptoms are associated with more self-identified stress generation. In contrast, there was not a significant association between depressive symptoms and observer dependent events. The research literature is inconsistent regarding this type of finding. Specifically, some previous studies found that even minimal depressive symptoms were associated with stress generation (e.g., Shih & Eberhart, 2008). Alternatively, other researchers found that after controlling for individual difference factors (e.g., hopelessness), depressive symptoms were no longer associated with observer stress generation (e.g., Joiner et al.; 2005).

Variable Associations with Independent Events

Stress generation refers to higher levels of dependent events, not independent events. However, relations between independent events and individual difference factors have been observed in other stress generation studies (e.g., Cummings et al., 2013; Harkness & Stewart, 2009; Liu & Kleiman, 2012).

In my study, there were significant relations between depressive symptoms and both actor- and observer independent events. This finding runs counter to stress generation, which considers independent events to be fateful, uncontrollable experiences. However, as mentioned, other researchers have reported similar findings. As outlined in Harkness and Stewart (2009), it is possible that the context of an individual's life increases their risk of exposure to more independent stressful events. For example, an individual's initial environment (e.g., a physically abusive home life) could contribute to both increased depressive symptoms and/or exposure to independent life events. Additionally, the depressive context of an individual's life could increase exposure to independent stressful events. For example, individuals with higher

depressive symptoms might choose friends who are also experiencing high levels of distress.

Alternatively, the sample included in this study was predominantly female and research suggests that general societal views towards women's behaviour could also create a context that increases their risk of exposure to independent and/or dependent stressful events (Shih & Eberhart, 2010).

For example, there is evidence that when women engage in similar workplace behaviours as men (e.g., not helping a colleague), colleagues interpret their behaviour more negatively than that of men, which might create a more stressful life context for women (Heilman & Chen, 2005). These findings suggest that understanding the broader context of individual's lives might be essential for better understanding depressive symptoms and stress generation.

Actor and Observer Agreement in Dependent and Independent Events

Actor- and observer dependent, as well as independent, stressful events were significantly related, suggesting that the participants and observers showed some consistency in their classification of events. Cognitive theories (e.g., Abramson et al., 1989; Beck, 1967) would anticipate individuals with depression to show less consistency with the objective team compared to individuals without depression. However, the restricted range of depressive symptoms in my sample does not allow for examination of the theories. I discussed this further, as well as future directions emerging from all of Study 1 results in my General Discussion.

Chapter 3: Study 2

Literature Review

Inferential Style at the Micro Level

Another gap in the research literature is whether inferential style for real-life events plays a role in subsequent stress generation. That is, it is unclear whether inferential style is associated with the occurrence of *future* life events. This study attempted to address this gap by examining stress generation and inferential style at the daily level. Daily studies, such as my Study 2, and retrospective studies such as my Study 1, capture two different types of information (Reis, 2012). Specifically, daily studies provide information regarding thoughts and feelings during (or close after) events (Reis, 2012), whereas retrospective studies provide global reports that “capture respondents’ *beliefs* about their experiences rather than the experience itself and are subject to pronounced focusing effects” (Schwarz, 2012, p. 34). That is, because participants’ retrospective biases will interfere with self-reporting, global measures can only assess participants’ beliefs about their experiences. As such, this study complements Study 1 by examining inferential styles closer to the time of the event, and answering the next and more specific question of whether inferential style contributes to stress generation.

The majority of researchers have examined stress generation at a macro level (i.e., looking at major life events). However, stress generation also applies to daily stressful events (e.g., Sahl et al., 2009), and researchers have recently begun to look at how interpersonal and cognitive vulnerability factors influence *daily* stress generation (e.g., Cummings et al., 2010; Eberhart & Hammen, 2009). This research utilized micro level methods that capture real-time data and emphasize the importance of the situational context in understanding behaviours and psychological processes (Reis, 2012). The findings of daily life research “contribute to

methodologically diverse research programs that advance the depth, accuracy and usefulness of science-based knowledge and interventions” (Reis, 2012, p. 9).

Daily Models for Studying Stress Generation

Daily stress generation research. Researchers have demonstrated that stress generation does occur and can be examined at the daily level. In the first published study of daily stress generation, Sahl and colleagues (2009) showed that morning hostile mood predicted more daily dependent SLEs. High interpersonal competence moderated this relation. This finding was in opposition to stress generation at the macro level, suggesting that the impact of individual variables may differ at the macro level compared to the micro (daily) level. However, the findings of Cummings and colleagues (2010) were consistent with macro level research, showing that low interpersonal competence mediated the relation between depressive symptoms and subsequent daily dependent events. Depressive symptoms also had a direct effect on both daily independent and dependent events. The mixed findings in these studies suggest that further research is required to determine whether factors associated with stress generation (e.g., impulsivity; Liu & Kleiman, 2012) do actually differ at the daily level compared to the macro level.

Other researchers used daily diaries in combination with semi-structured contextual interviews to examine the relation between interpersonal behaviours and subsequent negative life events (Eberhart & Hammen, 2009). This method allowed participants to report life events daily for 14 days (reducing errors in recall) and provide contextual information about each event at a 4-week follow-up interview. The information obtained in the interview enabled independent judges to provide objective ratings for stress severity and independence of the events, similar to the use of the UCLA LSI in the study of macro-level stress generation. The results of this study

showed that daily problematic interpersonal behaviours (e.g., reassurance seeking) predicted daily interpersonal conflict within the same day and over a 14-day period.

To expand these findings, Eberhart and Hammen (2009) recommended future researchers look at more comprehensive models of depression that integrate the stress generation model and stress-diathesis model, such as Hankin and Abramson's (2001) cognitive vulnerability-transactional model. This model proposes that negative events increase negative affect and cognitive vulnerabilities. The cognitive vulnerabilities can then interact with negative events and negative affect to increase depressive symptoms, which in turn, can lead to greater dependent negative events (Hankin & Abramson, 2001).

Stress generation researchers answered this call, and began to look at the cognitive vulnerability-transactional model at the daily level (e.g., Hankin, 2010). Hankin's (2010) study provided support for the cognitive vulnerability-transactional model, showing that negative emotionality predicted trajectories of depressive symptoms and daily objective stressors (i.e., participants' self-reported negative events that were categorized as SLEs by trained raters based on a stressor coding system) over 35 days. These generated daily objective stressors then predicted fluctuations in next day depressive symptoms. The combination of greater daily objective stressors and increased cognitive vulnerabilities (including negative cognitive style and dysfunctional attitudes) predicted higher elevations of daily depressive symptoms even after controlling for negative emotionality (Hankin, 2010). This study was interested only in examining whether cognitive vulnerabilities predicted daily depressive symptoms and did not consider whether the cognitive vulnerabilities predicted daily stress generation. Thus, the link between cognitive vulnerabilities and daily stress generation remains unexamined. However, Hankin's (2010) results show that it is possible to examine the impact of negative cognitive

styles at the daily level and, therefore, it is likely possible to examine whether negative cognitive styles will have a similar impact on stress generation at the daily level as the macro level, where it is shown to contribute to stress generation.

Researchers have also used daily methods to examine interpersonal predictors of stress generation (i.e., reassurance seeking and sociotopy) and gender differences in stress generation (Shih & Auerbach, 2010). In particular, college students completed daily diaries of their mood and SLEs for 14 days. Results indicate that greater reassurance seeking predicted stress generation (i.e., increased dependent interpersonal events) and greater sociotopy predicted decreased dependent interpersonal events in women but not men. Additionally, recent research used daily methods to examine the relations between avoidant personality disorder symptoms (AVPD), interpersonal competence, and stress generation in college students (Cummings et al., 2013). AVPD was associated with increases in both dependent and independent negative events. Furthermore, greater AVPD symptoms predicted lower conflict management skills, which mediated the relation between AVPD and the increase in negative events.

Overall, these findings provide evidence for the observation of the stress generation process at the daily level. This opens the door for researchers to examine the impact of individual difference factors on minor events, which is important since the cumulative effect of these minor events increases vulnerability to, and is predictive of, psychological maladjustment (Gunthert & Wenzel, 2012; Kanner et al., 1981). Furthermore, research shows minor events mediate the relation between major life events and psychopathology (Kanner et al., 1981; Wagner, Compas, & Howell, 1988). The impact of daily events is difficult to explore in retrospective studies since participants often forget these minor events (Reis, 2012). Thus, it is important for researchers to continue exploring this area of research to gain a better understanding of the role individual

difference factors play in daily stress generation. I discuss the strengths associated with the use of daily methods in the following section.

Strengths of daily methods.

Reduced retrospective bias and increased ecological validity. Daily methods involve the collection of data in real-time (or close to the time of the event), which reduces memory and cognitive biases associated with retrospective reports and increases ecological validity (i.e., an accurate representation of the typical conditions associated with an event; Reis, 2012; Wilhelm, Perrez, & Pawlik, 2012). Further, to increase ecological validity researchers are able to collect details surrounding the context of the event that may not be accessible in retrospective reports and can aid in understanding the impact the context has on behaviour (Reis, 2012; e.g., Eberhart & Hammen, 2009).

In addition, daily methods reduce retrospective biases by posing questions about current behaviours, feelings, and experiences, whereas retrospective studies ask similar questions about the past or typical experiences; people might not be able to accurately report on how they previously felt during an event that occurred six months ago (Schwarz, 2012). The ability of daily methods to improve accuracy and reduce bias was particularly helpful in my dissertation research, since I was interested in examining how participants felt at the time of each event (e.g., “How stressful was the event on a 5-point scale”).

Representativeness. The ability of daily methods to obtain reports closer to the events allows for better representation of the more minor experiences of everyday life (Reis, 2012). Retrospective methods tend to underrepresent more subtle emotional states, as they can be easily forgotten, and over represent more intense emotional experiences that are more salient (Reis, 2012; Thomas & Diener, 1990).

Electronic data. Finally, daily methods allow researchers to collect data using electronic tools (e.g., handheld electronic devices, electronic daily diaries), which has become a standard source of data collection in daily research since it provides many benefits (Bolger et al., 2003). Specifically, electronic data reduce time and money required for data entry and human error, since transcribing is not required (Bolger et al., 2003). As well, electronic data are time stamped so researchers are able to confirm time compliance (Bolger et al., 2003).

Impact of Self-Monitoring

The methods stress generation researchers use at the daily level (i.e., requiring participants to report on life event daily) requires participants to self-monitor (e.g., Cummings et al., 2010; Flory, Raikkonen, Matthews, & Owens, 2000; Hankin et al., 2005; Sahl et al., 2009).

Impact of self-monitoring on cognitions. Self-monitoring, also referred to as induced self-focused attention, could influence inferential style. The theory of objective self-awareness posits the focus of attention, either inward or outward, will determine the locus of causal attribution (Duval & Wicklund, 1972; Duval & Wicklund, 1973; Smith & Greenberg, 1981). That is, the extent a person focuses on one area of a situation, the more likely that person will attribute the cause of an event to that area (Duval & Wicklund, 1972; Duval & Wicklund, 1973).

This is particularly relevant to my second study since, as discussed below, participants were required to repeatedly self-monitor the dependence of episodic events. The format of the questions elicited an inward focus (i.e., considering whether the event was dependent on the individual, rather than whether the event was dependent on other external factors). Based on this, the theory of objective self-awareness would anticipate that the inferential styles of individuals would display a greater internal pattern (Duval & Wicklund, 1972; Duval & Wicklund, 1973). However, self-awareness is only considered a temporary state of self-directed attention that can

be influenced by situational factors, a person's inherent qualities, or a combination of both (Fenigstein et al., 1975).

Theory of public and private self-consciousness. The theory of public and private self-consciousness expanded on the theory of objective self-awareness, suggesting that differences can naturally exist in self-focused attention. That is, individuals can present with a *self-consciousness* trait that is defined, as a “consistent tendency of persons to direct attention inward or outward” (Fenigstein et al., 1975, p. 522). For example, some individuals might obsessively think about themselves and criticize their own behaviours and thoughts, whereas other individuals might have no understanding about how others perceive them or how they feel (Fenigstein et al., 1975). Further, Fenigstein and colleagues (1975) speculated that the degree of the self-consciousness trait might be associated with differences in individuals' susceptibility to a researcher's attempts to direct their attention. As such, the researchers developed the Self-Consciousness Scale (SCS) to examine these individual differences in self-focused attention.

The SCS separates self-consciousness into two major components (Fenigstein et al., 1975): private self-consciousness (i.e., focus inward on thoughts and feelings) and public self-consciousness (i.e., “Awareness of the self as a social object that has an effect on others”, p. 523). Researchers examined private self-consciousness (PrSC) more extensively and it is particularly relevant to this research study. That is, inward focus on thoughts and feelings might relate to one's internal attributions for the dependence of events (inferential style), and be related to the generation of events (stress generation).

Research examining private self-consciousness (PrSC) at the daily level found it related to both depressive symptoms and internal attributions. Specifically, Larsen and Cowan (1988) used daily methods to examine the relation between PrSC and depression, as well as the relation

between daily mood and daily events that were classified as good, bad, or neutral by an objective coding team. The participants provided daily ratings of mood and descriptions of daily events with attributional ratings (i.e., rating on a 7-point scale: 1 = *due to others*, 7 = *due to me*). Independent raters judged how good or bad the events would be for the average college student based on the descriptions provided by the participants to establish “objective event ratings” (i.e., rating on a 9-point scale: 1 = *extremely bad*, 9 = *extremely good*). The raters also coded whether an event was external (e.g., a car accident, receiving a B on a test) or self-focused (e.g., preoccupation with worry over health concerns; Larsen & Cowan, 1988). The results showed that when asked to describe the worst daily event, high scorers on both PrSC and depression reported significantly more events that were self-focused compared to low scorers. However, only depression scores were associated with the degree of internal attribution for negative life events. The researchers did not examine the impact of PrSC and mood on stress generation or differentiate between events that were independent and dependent. Also, there has been inconsistent support for the finding that high PrSC is associated with internal ratings with some studies supporting the finding (e.g., Buss & Scheier, 1976; Duval & Lalwani, 1999; Ingram & Smith, 1984; Kuiper, 1978; Pyszczynski, Holt, & Greenberg, 1987; Seligman et al., 1979; Smith, Ingram, & Roth, 1985), and other studies finding that the two variables were unrelated (e.g., Smith et al., 1985).

Private self-consciousness measurement issues. These inconsistent findings for PrSC and internal attributions might be explained by the idea that PrSC is composed of two dimensions that relate differently to psychopathology and well-being: self-reflection and internal state awareness (e.g., Anderson, Bohon, & Berrigan, 1996; Burnkrant & Page, 1984; Mittal & Balasubramanian, 1987; Piliavin & Charng, 1988). Self-reflection (SR) appears to measure

rumination (Anderson et al., 1996), whereas internal state awareness (ISA) appears to measure neutral or positive attention to the self (Anderson et al., 1996). However, researchers did not find these subscales of the SCS to consistently have sufficient internal consistency (e.g., Cronbach's alphas for the PrSC scale, SR, and ISA were .63, .56 and .57, respectively; Anderson et al., 1996). As such, Grant, Franklin, and Langford (2002) developed the Self-Reflection and Insight Scale (SRIS), designed to improve upon the Private Self-Consciousness Scale. Factor analysis revealed two factors for the SRIS, an insight factor ($\alpha = .87$) defined as “the clarity of understanding of one’s thoughts, feeling and behavior” (Grant et al., 2002, p. 821), and a self-reflection factor ($\alpha = .91$) defined as “the inspection and evaluation of one’s thoughts, feelings, and behavior” (Grant et al., 2002, p. 821). This is consistent with the conceptualization of PrSC as consisting of two separate dimensions. The authors concluded that the SRIS is a superior measure, compared to the PrSC of the SCS, because it has better internal reliability and good test-retest reliability (see Methods section below).

Research using the Self-Reflection and Insight Scale. Researchers used the SRIS in multiple studies, indicating that each factor has unique relations with differing individual difference variables. There is a positive relation between the insight factor and psychological wellbeing (i.e., autonomy, environmental mastery, personal growth, positive relationships with others, purpose in life, self-acceptance; Harrington & Loffredo, 2011); positive affect (Haga, Kraft, & Corby, 2009; Silvia & Phillips, 2011); satisfaction with life (Haga et al., 2009; Lyke, 2009); cognitive flexibility (Grant et al., 2002); and self-regulation (Grant et al., 2002). As well, it is negatively related to: rumination (Harrington & Loffredo, 2011); negative affect (Haga et al., 2009; Silvia & Phillips, 2011); neuroticism (Haga et al., 2009); depressed mood (Grant et al.,

2002; Haga et al., 2009); anxiety (Grant et al., 2002; Silvia & Phillips, 2011); stress (Grant et al., 2002); and alexithymia (Grant et al., 2002).

In contrast, the self-reflection factor positively relates to rumination (Harrington & Loffredo, 2011), neuroticism (Haga et al., 2009), positive affect, negative affect (Haga et al., 2009), anxiety (Grant et al., 2002; Silvia & Phillips, 2011), and stress (Grant et al., 2002).

Researchers have not examined the relations between insight, self-reflection, and internal versus external attribution ratings. It is possible that the self-reflection process would be associated with internal attributions and, as such, potentially impact inferential style, given that self-reflection in the SRIS is defined as “the inspection and evaluation of one’s thoughts, feelings, and behavior”, which requires inward focus. As previously mentioned, the theory of objective self-awareness (Duval & Wicklund, 1972; Duval & Wicklund, 1973) would anticipate that the inward focus would be associated with internal attributions. As such, I examined whether self-reflection and insight, as measured using the SRIS, were associated with inferential style. As well, I examined whether self-reflection or insight were related to stress generation, which was not previously studied.

Impact of self-monitoring on behaviour. A large body of research shows that having people track and self-monitor variables of interest typically leads to an increase in desirable behaviours and decreases in undesirable behaviours (Nelson & Craighead, 1977). That is, the very act of self-monitoring can change behaviour. For example, self-monitoring has been associated with positive behavioural change in studies on smoking frequency and duration (McFall, 1970), alcohol consumption (Helzer, Badger, Rose, Mongeon, & Searles, 2002), eating and exercising (Helsel, Jakicic, & Otto, 2007), and repetitive motor behaviours (Hutzell, Platzek, & Logue, 1974). In addition, self-monitoring relates to decreased depressed mood and increased

reporting of pleasant activities in individuals with depression, when mood was reported at random intervals each day over a 1-week period (Harmon, Nelson, & Hayes, 1980). Participants' behaviours have changed even when researchers were not attempting to promote such change (Nelson & Hayes, 1981). As such, increasing purposeful awareness of behaviours (i.e., self-monitoring stressful events) might promote changes in inferential style. This concept is consistent with the theory of objective self-awareness, previously discussed.

Researchers typically identify this reactivity to daily self-monitoring as a limitation (Barta, Tennen, & Litt, 2012; Gunthert & Wenzel, 2012). However, in this study I attempted to utilize reactivity by conceptualizing self-monitoring as a tool that facilitates increased awareness into factors contributing to life events. I anticipated that this increased awareness would be reflected in a change in inferential style, such that extreme inferential styles (i.e., consistently either making external or internal attributions) become more balanced over time (i.e., across days of self-monitoring). In contrast, the theory of objective self-awareness would expect the opposite, due to the inward focus induced by self-monitoring.

It is important to note some studies have not found a reactive effect in behaviours that were being self-monitored. For example, researchers assessed reactivity to self-monitoring in undergraduate students with problem drinking (Hufford, Shields, Shiffman, Paty, & Balabanis, 2002). The students were required to maintain an electronic diary using a PalmPilot to record drinking and temptations to drink for 2-weeks (Hufford et al., 2002). There was a trend showing a decrease in the number of drinks consumed per week and the number of days spent drinking but it was not significant (Hufford et al., 2002). In another study, monitoring sadness for 7-days, by reporting mood each morning in an online questionnaire, did not influence next day mood reports of sadness by undergraduate students (Sahl et al., 2009). In addition, monitoring

thoughts, feelings, and behaviours was not associated with adaptive cognitive changes (i.e., increases in insight) in a study comparing responses of undergraduate students who regularly kept journals to those who did not keep journals (Grant et al., 2002). Participants who kept journals displayed lower scores on insight (i.e., “The clarity of understanding of one’s thoughts, feeling and behavior,” p. 821) and higher scores on self-reflection (i.e., “The inspection and evaluation of one’s thoughts, feelings and behavior,” p. 821), suggesting that self-monitoring is not associated with increased insight. A limitation to this study was that the participants who kept journals were self-selected so it is unclear whether the findings relate to an unidentified individual difference factor. Furthermore, it is unclear if using a journal is similar to self-monitoring, or if these are separate constructs. For example, individuals who regularly keep journals may use them as a form of rumination; maintaining focus on unpleasant emotions rather than attempting to problem solve or gain insight (Grant et al., 2002). Thus, it is possible, but unclear, whether daily self-monitoring of the dependence of SLEs will be associated with changes in inferential style, given that reactivity to self-monitoring has been an inconsistent phenomenon.

Purpose of the Second Study in This Program of Research

The first purpose of Study 2 was to address the research question “Does self-monitoring the dependence/independence of events at the daily level relate to changes in inferential style over a 7-day span?” In this study, I operationalized self-monitoring as the day of study, or time. The theory of objective self-awareness (Duval & Wicklund, 1972) and Rehm’s self-control model (1977) anticipate that the inward focus and internal comparison elicited through self-monitoring would influence attributions, such that individuals would display a greater internal inferential style. However, research on reactivity to self-monitoring is inconsistent; suggesting

that focusing on the self and one's behaviours is not always associated with change. Further, researchers have not examined the potential relation between self-monitoring and inferential style. As such, this analysis was exploratory.

The second purpose of Study 2 was to address the research question, "Does inferential style relate to daily stress generation (i.e., dependent events)?" Study 1 showed inferential style was associated with stress generation and, as such, I hypothesized an internal inferential style would be associated with daily stress generation. Last, I examined whether control variables (i.e., BDI-II, CSQ-C, and CSQ-I) influenced the relation between daily inferential style and stress generation. I also included trait level measures of self-reflection (SRIS-SR) and insight (SRIS-I) to explore their potential influence on daily inferential style and stress generation. This is exploratory in nature since researchers have not examined relations with the Self-Reflection and Insight scale before.

Method

Participants

Participants were 103 undergraduate students recruited from the Introductory Psychology (PSY 120/121) participant pool at the University of Saskatchewan. The sample was predominantly female (73 females, 30 males), ages ranged from 17 to 38 years old ($M = 20.14$, $SD = 4.04$), and 62.1% were Caucasian, 10.7% South Asian, 8.7% Other, 6.8% East Asian, 6.8% Aboriginal, and 4.9% Middle Eastern.

Measures

Beck Depression Inventory-II (BDI-II). Similar to Study 1, participants completed the BDI-II to measure levels of depressive symptoms (Beck et al., 1996). In this study, the BDI-II was shown to have high internal consistency with Cronbach's $\alpha = .877$ (Field, 2009). I calculated

the total score for the BDI-II items by summing all of the items. I again analyzed depressive symptoms on a continuum.

Cognitive Styles Questionnaire (CSQ). Similar to Study 1, I administered the CSQ (Abramson et al., 2000) to participants to assess negative cognitive styles, which include negative inferences about the causes and consequences of events and self-implications. I calculated a CSQ composite score for each participant to determine his or her overall cognitive vulnerability. Specifically, I calculated the participants' overall average scores for items on stability, globality, consequence, and self-worth for the 12 negative events. Higher composite scores indicated a greater cognitive vulnerability to depression. In the present study, the CSQ composite score had high internal consistency (Cronbach's $\alpha = .956$). The internal subscale was below the acceptable cut-off for internal consistency of .70 (Cronbach's $\alpha = .646$; Field, 2009). This finding could suggest that the participants did not respond consistently to the internality items (i.e., showing a consistent internal or external response pattern) and instead showed variability in their responses to the different event types.

Self-Reflection and Insight Scale (SRIS). I administered the SRIS (Grant et al., 2002) to participants to assess their overall level of general insight and self-reflection. It is a 20-item measure that assesses both self-reflection (i.e., "The inspection and evaluation of one's thoughts, feelings, and behavior," Grant et al., 2002, p. 821) and insight (i.e., "The clarity of understanding of one's thoughts, feeling and behavior," Grant et al., 2002, p. 821). The participants rated each item on a 6-point Likert-type scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). The self-reflection subscale is broken down into two subscales including engagement in self-reflection (six items; e.g., "I don't really think about why I behave the way that I do," Grant et al., 2002, p. 825) and need for self-reflection (six items; e.g., "It is important for me to evaluate

the things that I do,” Grant et al., 2002, p. 825). However, I summed the two subscales to create a total self-reflection score. The insight subscale includes eight items (e.g., “I usually have a very clear idea about why I’ve behaved in a certain way,” Grant et al., 2002, p. 825). To score the measure, I summed the responses to each item of a subtest to obtain a total score for that subtest. Higher scores indicated greater insight or self-reflection. Previous research demonstrated self-reflection and insight subscales were reliable, with coefficient alphas of .91 and .87, respectively (Grant et al., 2002). Additionally, the test-retest correlations for the two subscales over a 7-week period were .77, $p < .001$ and .78, $p < .001$ respectively (Grant et al., 2002). In the present study, the insight and self-reflection subscales were both shown to have high internal consistencies with Cronbach’s $\alpha = .788$ and Cronbach’s $\alpha = .894$, respectively.

Daily Negative Events Checklist. Participants completed a 26-item checklist of stressful daily negative events on each day of the study (Cummings et al., 2010; Sahl et al. 2009). The negative events included in the checklist were categorized as independent ($n = 9$, e.g., “poor weather”) or dependent ($n = 17$, e.g., “Had an argument with my partner, close friend or other individual”), a priori in the original publication of the measure. Specifically, in Sahl et al (2009), the negative events were categorized by three doctoral students in clinical psychology, involved in the development of the checklist. The students categorized the negative events by independently rating each negative event using a 5-point rating scale ranging from 1 (*completely independent*) to 5 (*completely dependent*; Cummings et al., 2010; Sahl et al., 2009). As indicated by an intraclass correlation coefficient of 0.70, the raters in that study displayed good agreement (Shrout & Fleiss, 1979). As such, Cummings and colleagues (2010) averaged the three ratings for each event to generate a final rating of dependent (average score ≥ 3) or independent (average score of 1 or 2) for each event. In the present study, I summed the number of events on each

subscale (i.e., independent and dependent) each day to obtain two total scores of negative events encountered each day.

In addition, the participant provided actor ratings of the dependence/independence of each episodic event they experienced on a 5-point Likert-type scale (1 = *the event was totally independent of me or I had no influence or control* to 5 = *the event was totally dependent on me or influenced by me*, see Appendix B).

To calculate the participants' inferential style (i.e., mean difference score between observers' and actors' ratings) I subtracted observer ratings from the participant's actor ratings for each event to create a difference score for each event. Next, the mean of the difference scores for all events was calculated. This produced a mean difference score for each participant that I used as the dependent variable (i.e., inferential style). Higher scores indicated an internal inferential style, where participants rated the events as more dependent compared to the observers. I again chose this method of calculating inferential style scores over Krackow and Rudolph's (2008) method, consistent with Study 1.

Procedure

I obtained approval from the University of Saskatchewan Research Ethics Board to conduct this research study. To sign up for the study, participants logged on to the subject pool system located at <http://usask.sona-systems.com>. After reading the study description, participants chose to participate and scheduled a data collection timeslot via Sona Systems. On the first day of the study, participants completed informed consent, a demographic information form (Appendix B), and baseline measures (i.e., BDI-II, CSQ, SRIS) through <http://fluidsurveys.usask.ca>. On the following seven consecutive days the participants completed the daily negative events checklists through <http://fluidsurveys.usask.ca>. The survey was open

each evening from approximately 6pm to 10:30am the following morning to ensure that participants had a sufficient window of time to complete the survey. I emailed participants a reminder each evening that included the link to the survey. The final online survey (i.e., day eight) included debriefing information for the participants. After participants completed the final day of the online surveys, they received 1-bonus point for each half hour of their participation (i.e., total of three bonus points), which I assigned through the PSY 120/121 subject pool online software. As well, I entered participants into a draw for \$100 cash if they initially consented to be included in the draw and completed at least 70% of the daily entries (i.e., five out of seven days).

Participants were included in the study if they (a) completed the initial questionnaires; and (b) completed at least four out of the seven daily checklists, which is consistent with previous daily research on stress generation (e.g., Cummings et al., 2010) and still included a substantial portion of the sample. Specifically, of the 103 participants, 50.5% completed the total seven days of daily dairies, 27.2% completed six days, 15.5% completed five days, and 6.8% completed only four days.

The participants' daily online responses were time-stamped and responses outside of the allowed time frame were excluded. Based on these criteria, I excluded nine participants from the study. This is lower than attrition rates of other studies that have conducted internet-based daily studies with college students (e.g., Sahl et al., 2009; Tolpin, Cohen, Gunthert, & Farraehi, 2006). The participants excluded from analysis did not differ from participants included in the analysis on gender, age, ethnicity, BDI-II, CSQ-I, CSQ-C, SRIS-I, or SRIS-SR (see Table 5.1). Given the number of *t*-tests I ran, the Bonferroni method was used to correct for inflation of Type I error rates and none of the results were found to be significant at the significance level of .006

(Shaffer, 1995).

Table 5.1

Study 2: T-tests of Included and Excluded Participants

Variable	<i>t</i> - value
Gender	1.29
Age	.12
Ethnicity	-.69
BDI-II	-.78
CSQ-I	2.15
CSQ-C	1.36
SRIS-SR	-.96
SRIS-I	.35

Note. BDI-II = Beck Depression Inventory-II; CSQ-I = Cognitive Styles Questionnaire-Internal subscale; CSQ-C = Cognitive Styles Questionnaire-Composite scores; SRIS-SR = Self-Reflection and Insight Scale – self-reflection subscale; SRIS-I = Self-Reflection and Insight Scale – insight subscale.

****** $p < .01$

Data Analysis Plan

I conducted my analyses using hierarchical linear modeling (HLM; Raudenbush & Bryk, 2002) in the HLM 7 program (Raudenbush et al., 2011). HLM allows for the examination of repeated measures in intensive longitudinal studies (e.g., daily diary methods), by looking at idiographic (i.e., within-subject variables; Level-1) and nomothetic (i.e., between-subject variables; Level-2) effects, where data are interdependent (i.e., nested). In addition, HLM is robust to missing data, which is expected in daily diary studies where participants are required to respond over multiple days or sometimes multiple times within days.

In this study, I examined individual change with a two-level hierarchical model. There are two equations in this model, the Level-1 (i.e., within-subject) and Level-2 (between-subject) model equations. The Level-1 equation models the within-subject change in variables that I

repeatedly measured over time (e.g., inferential style), shown by an individual growth trajectory. These repeated measures for each individual (i.e., Level-1) are nested within the person (i.e., Level-2). Researchers can center the Level-1 variables (i.e., day, inferential style) by group-mean (i.e., the mean of the cluster the case belongs to; Enders & Tofighi, 2007) or grand-mean. In these analyses, I centered my Level-1 variables by group-mean since this type of centering is recommended when examining Level-1 variables as predictors, as with my research questions (Enders & Tofighi, 2007). Group-mean centering is appropriate when the interest is in the Level-1 variables because it provides an estimate of the within-cluster regression coefficient, removing the between cluster variance (Enders & Tofighi, 2007). In contrast, grand-mean centering includes the between cluster variance, which can bias the estimates (Enders & Tofighi, 2007). As well, group-mean centering provides “a more accurate estimate of the slope variance” (Enders & Tofighi, 2007, p. 128) compared to grand-mean centering.

In addition, group-mean centering is more appropriate than grand-mean centering when examining whether control variables (Level-2) influence the relation between Level-1 variables and the dependent variable (i.e., cross-level interactions; Enders & Tofighi, 2007), which is of interest in my study. This is again because the Level-1 variable in grand-mean centering is a combination of within and between-cluster variation (e.g., the Level-1 inferential style is a combination of the inferential style level 1 scores and inferential style Level-2 means), which can provide significant results when none exist (Enders & Tofighi, 2007). For example, when examining the interaction effect between Level-1 inferential style score and Level-2 BDI-II score, the grand-mean centering results would be influenced by an interaction of the within – cluster variation (i.e., interaction between Level-1 variation in inferential style score and BDI-II) and the between-cluster variation (i.e., interaction between BDI-II and inferential style means).

This would result in an “uninterpretable mixture of two different influences on the outcome” (Enders & Tofighi, 2007, p. 133). In contrast, group-mean centering removed the between-cluster variation in the Level-1 variables so it provides “a pure estimate of the moderating influence that a Level-2 predictor exerts on the Level-1 association between X and Y” (Enders & Tofighi, 2007, p. 133).

For the Level-2 model, the Level-1 variables become the dependent variables and the equation models the impact of person-level characteristics (e.g., BDI-II) on the Level-1 variables. The Level-2 equations can either use the raw metric of the variables (e.g., the BDI-II raw metric can range from zero to 63) or be grand mean centered (Enders & Tofighi, 2007). Grand mean centering is recommended when scales do not include a zero value that is meaningful (such as CSQ-I, ranging from 1 to 7) and it is recommended that centering always be used with multilevel modeling (Bickel, 2007). As such, the Level-2 variables were all grand mean centered. Specifically, for each variable I subtracted the total mean (i.e., overall group mean) across participants from each participant’s score for that variable.

In addition, a Poisson regression is typically used when the dependent variables are counts of events, since count variables commonly violate assumptions required for ordinary least squares (OLS) regressions including the assumption of normality and homoscedasticity of the errors (Coxe, West, & Aiken, 2009). Specifically, the assumption of normality is often violated because count data tend to have many zeros or low count data and cannot have negative integers, which tends to result in a positive skew (Coxe et al., 2009). As well, the assumption of homoscedasticity tends to be violated when the mean score of an outcome count variable is small (i.e., less than 10), since this produces biased standard errors and inaccurate significant tests in OLS regressions (Coxe et al., 2009). In addition, the conditional variance will tend to increase

with the predictor value in count data, which violates the assumption of constant variance (Coxe et al., 2009). As a result, the power to detect effects can be affected and the potential for a Type I error may be greater than the expected Type I error rate, which is usually alpha equal to .05 (Coxe et al., 2009). In contrast, Poisson regression belongs to the generalized linear model family; it has a discrete distribution that includes only nonnegative integers and the distribution is typically positively skewed, which is particularly appropriate for count variables (Coxe et al., 2009). As such, I ran Poisson regressions to test each of my hypotheses. However, comparisons of the results of both methods (i.e., Poisson and OLS) revealed they did not differ for any of the Level-1 or Level-2 analyses. As such, I present models using the normally distributed, OLS regressions here for ease of interpretation, which is consistent with the reported results in previous daily stress generation studies (e.g., Cummings et al., 2010; Sahl et al., 2009).

Results

Preliminary Analyses

I examined all variables of interest for accuracy of data entry, missing values, skewness, kurtosis, and outliers. There were no missing data for any of the variables. The CSQ-I, CSQ-C, SRIS-I, and SRIS-SR did not have significant skewness or kurtosis. BDI-II had significant skewness and kurtosis, which I corrected using a square root transformation (see Table 7.1). However, the results of all analyses were the same for the non-transformed BDI-II and the transformed BDI-II, so I used the non-transformed BDI-II scores in my analyses.

Table 7.1

Study 2: Examining Skewness and Kurtosis for Level-1 and Level-2 variables

Measure	Skewness	Kurtosis
BDI-II	4.74**	5.38**
CSQ-I	-0.87	-0.36
CSQ-C	-0.23	0.15
SRIS-I	0.98	-0.90
SRIS-SR	-1.38	-0.72
Inferential style	-1.88	9.55**

Note. BDI-II = Beck Depression Inventory-II; CSQ-I = Cognitive Styles Questionnaire-Internal

subscale; CSQ-C = Cognitive Styles Questionnaire-Composite scores; SRIS-I = Self-Reflection

and Insight Scale – insight subscale; SRIS-SR = Self-Reflection and Insight Scale – self-

reflection subscale; Inferential style = aggregated score of inferential style across the 7-days.

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

In addition, inferential style had significant kurtosis. I performed a reverse scored square root transformation, which corrected for kurtosis. However, the significant findings for all analyses were the same for the non-transformed inferential style and the transformed inferential style, so I used the non-transformed inferential style scores.

Descriptive Statistics

I presented the means and standard deviations for the self-report measures including inferential style (difference scores), BDI-II, CSQ-C, CSQ-I, SRIS-I, and SRIS-R in Table 7.2.

The mean score on the BDI-II was 16.07 ($SD = 8.37$), which is classified as mild depression (Steer & Clark, 1997). Overall, the majority of participants (40%, or 41 participants) were in the minimal depression range (i.e., a score of 0-13), 34% were in the mild range (i.e., a score of 14-19), 19% were in the moderate range (i.e., a score of 20-28), and 7% were in the severe range (i.e., scores 29-63; Beck et al., 1996).

Table 7.2

Study 2: Descriptive Statistics for Symptom Measures and Life Events

Measure	<i>M</i>	<i>SD</i>	Range	
			Potential	Actual
BDI-II	16.07	8.37	0-60	3-52
CSQ-C	3.77	1.04	1-7	1.15-6.65
CSQ-I	4.99	0.79	1-7	2.67-6.67
SRIS-I	28.92	6.78	8-48	16-45
SRIS-SR	52.83	9.81	12-72	27-71
Inferential style	-.29	.76	$-\infty$ - $+\infty$	-2.5-+2
Daily Negative Events Checklist				
Daily Observer Dependent Events	3.53	3.56	0- ∞	0-23
Daily Actor Dependent Events	1.52	1.88	0- ∞	0-13
Daily Observer Independent Events	3.03	3.50	0- ∞	0-27
Daily Actor Independent Events	2.03	2.97	0- ∞	0-29

Note. BDI-II = Beck Depression Inventory-II; CSQ-I = Cognitive Styles Questionnaire-Internal

subscale; CSQ-C = Cognitive Styles Questionnaire-Composite scores; SRIS-I = Self-Reflection

and Insight Scale – insight subscale; SRIS-SR = Self-Reflection and Insight Scale – self-

reflection subscale; Inferential style = aggregated score of inferential style across the 7-days.

I also examined the correlations between the self-report measures (see Table 7.3). Given the number of correlations I ran, I used the Bonferroni method to correct for inflation of Type I error rates; I only considered results significant if they reached a significance level of .008 (Shaffer, 1995). BDI-II and CSQ-C showed a significant positive relation, indicating a relation exists between depressive symptoms and a negative cognitive style (e.g., Gibb et al., 2006). As well, BDI-II was significantly positively correlation with CSQ-I.

Table 7.3

Study 2: Intercorrelations Between Symptom Measures

Measure	1	2	3	4	5
1. BDI-II	-				
2. CSQ-I	.29**	-			
3. CSQ-C	.53***	.48***	-		
4. SRIS-I	-.37***	-.06	-.36***	-	
5. SRIS-SR	.24*	.04	.09	.15	-
6. Inferential style	.21*	.34***	.21*	-.04	.13

Note. BDI-II = Beck Depression Inventory-II; CSQ-I = Cognitive Styles Questionnaire-Internal subscale; CSQ-C = Cognitive Styles Questionnaire-Composite scores; SRIS-I = Self-Reflection and Insight Scale – insight subscale; SRIS-SR = Self-Reflection and Insight Scale – self-reflection subscale; Inferential style = aggregated score of inferential style across the 7-days.

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

There was a negative correlation between depressive symptoms and SRIS-I, which is consistent with previous research that used other measures to assess the relation between SRIS-I and depressive symptoms (e.g., Grant et al., 2002; Haga et al., 2009). In addition, there was a positive correlation between the CSQ-C and CSQ-I. CSQ-I was also positively correlated with an internal inferential style for real-life daily events. I anticipated this finding, since it is assumed that internal attributions for hypothetical life events (CSQ-I) would be consistent with an individual’s attributions for real-life events (i.e., the independence difference score). Last, CSQ-C and SRIS-I were negatively correlated, suggesting that individuals presenting with a greater negative cognitive style display lower trait level insight into their thoughts, feelings, and behaviours, and vice versa.

Main Analyses

Test of self-monitoring as a predictor of inferential style. First, I conducted my exploratory analyses that examined whether self-monitoring influenced inferential style over time, across the 7-day period. I tested this with a linear growth curve analysis.

Using HLM, I estimated a regression equation for each participant. I represented the analysis of the Level-1 variable by the following regression equation that estimated inferential style:

$$I_{ij} = \pi_{0i} + \pi_{1i} (T_{it}) + e_{it}$$

Variable I_{ij} represents inferential style on day t for participant i , associated with T_{it} , time, or day of measurement. In the equation, π_{0i} represents the intercept that denoted the inferential style score for the participant i on the first day of measurement. π_{1i} represents the growth rate or number of units that inferential style changes for each additional time of measurement (i.e., day), and the random error in inferential style on day t is represented by e_{it} . The day-inferential style slope was not significant. This indicates that, for the sample as a whole, there was no relation between self-monitoring and change in daily inferential style.

The unconditional Level 2 model that does not include any predictors was:

$$\pi_{0i} = \beta_{00} + r_{0i}$$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

The above equations show that both the intercept (π_{0i}) and slope (π_{1i}) for Level-1 are able to vary across individuals at Level-2. In the equation, β_{00} represents the estimated mean intercept, which is the overall average inferential style on day 1; β_{10} represents the mean growth rate, which is the overall average change in inferential style across the week.

The results from this model show that participants varied significantly in their initial score on inferential style ($\chi^2_{(101)} = 246.65, p < .001$, see Table 7.4). The fixed effect for the growth rate (or day) was not significant, but the random effect was significant, which indicates there was significant variation in participants' change rates in inferential style but self-monitoring was not associated with consistent changes in inferential style over time.

Table 7.4

Study 2: OLS Test of self-monitoring as a predictor of inferential style

Parameter	Fixed Effect			Variance	Random Effect	
	<i>b</i>	<i>SE</i>	<i>t</i>		<i>df</i>	χ^2
Intercept	-.30	.044	-6.88***	.12	101	246.65***
Day slope	-.02	.016	-1.28	.01	101	136.17*
Level-1 error				.45		

Note. Intercept = mean initial status; Day slope = mean growth curve.

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

Test of inferential style as a predictor of stress generation. I evaluated a daily stress generation model by examining internal inferential style (i.e., difference score) as a predictor of daily dependent events. I anticipated that inferential style would be positively associated with daily dependent events. I also examined whether inferential style would be associated with change in independent stressors, since researchers found mixed results in the literature regarding independent stressors (e.g., Hammen 1991; Harkness & Stewart, 2009).

I examined daily stress generation as classified by observer ratings for the dependence of life events. As mentioned, I obtained the observer ratings for the events from a previous study, in order to be consistent with previous stress generation research (Cummings et al., 2010; Sahl et al., 2009). However, I also examined the events as classified by the actors (or participants) in order to see if there was a difference and to account for participants' perceptions. As such, I

tested four Level-1 models for (a) daily observer dependent events; (b) daily observer independent events; (c) daily actor dependent events; and (d) daily actor independent events.

I centered the Level-1 (i.e., inferential style, day) variables by the group mean by subtracting the mean inferential style for each participant from his or her inferential style each day. The analysis of the Level-1 variables was represented by the following regression equations that estimated the number of daily observer dependent events, daily observer independent events, daily actor dependent events, or daily actor independent events respectively:

$$OD_{ij} = \beta_{0j} + \beta_{1j} (T_{ij}) + \beta_{2j} (I_{ij}) + e_t$$

$$OI_{ij} = \beta_{0j} + \beta_{1j} (T_{ij}) + \beta_{2j} (I_{ij}) + e_t$$

$$AD_{ij} = \beta_{0j} + \beta_{1j} (T_{ij}) + \beta_{2j} (I_{ij}) + e_t$$

$$AI_{ij} = \beta_{0j} + \beta_{1j} (T_{ij}) + \beta_{2j} (I_{ij}) + e_t$$

The variable OD_{ij} represents the number of observer dependent events on day t , OI_{ij} represents the number of observer independent events on day t , AD_{ij} represents the number of actor dependent events on day t , and AI_{ij} represents the number of actor independent events on day t . I predicted each of the variables by T_t , the time or day, and I_{ij} , the inferential style score on day t . In each equation, β_{0j} represents the intercept that denoted the baseline number of daily observer dependent events, daily observer independent events, daily actor dependent events, or daily actor independent events respectively for participant (j). β_{1j} and β_{2j} represents the slope coefficients for the number of daily observer dependent events, daily observer independent events, daily actor dependent events, or daily actor independent events across time and inferential style respectively. Specifically, the coefficients represent the number of units that the respective event type

increases, for each additional unit of time (β_{1i}) or inferential style (β_{2i}). Finally, e_t represented the random error for each event type on day t .

The inferential style-observer dependent event slope was not significant, which indicates no relation between inferential style and daily observer dependent stressful events (see Table 7.5).

Table 7.5

Study 2: OLS Test of inferential style as a predictor of daily observer dependent events

Parameter	Fixed Effect			Variance	Random Effect	
	b	SE	t		df	χ^2
Intercept	3.84	0.25	15.23***	5.64	101	782.27***
Day slope	-0.50	0.06	-7.92***	.166	101	188.40***
Inferential Style	0.03	0.16	0.19			
Level-1 error				5.01		

Note. Intercept = mean initial status; Day slope = mean growth curve.

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

However, the inferential style-observer independent event slope unexpectedly showed a positive relation, indicating that higher inferential style scores (i.e., more internal ratings) were associated with more observer independent stressful events (see Table 7.6).

Table 7.6

OLS Test of inferential style as a predictor of daily observer independent events

Parameter	Fixed Effect			Variance	Random Effect	
	b	SE	t		df	χ^2
Intercept	1.67	.136	12.28***	1.603	99	595.13***
Day slope	-0.23	.031	-7.28***	.024	99	120.83
Inferential Style	0.27	.086	3.12**	.079	99	131.54*
Level-1 error				1.70		

Note. Intercept = mean initial status; Day slope = mean growth curve.

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

The inferential style-actor dependent event slope showed a positive relation and indicated that higher inferential style scores were associated with more daily actor dependent stressful events (see Table 7.7).

Table 7.7

OLS Test of inferential style as a predictor of daily actor dependent events

Parameter	Fixed Effect			Random Effect		
	<i>b</i>	<i>SE</i>	<i>t</i>	Variance	<i>df</i>	χ^2
Intercept	3.31	0.25	13.42***	5.52	99	870.51***
Day slope	-0.43	0.06	-7.33***	0.14	99	153.24***
Inferential Style	1.48	0.23	6.60***	3.19	99	170.25***
Level-1 error				4.21		

Note. Intercept = mean initial status; Day slope = mean growth curve.

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

Last, the inferential style-actor independent event slope showed a negative relation, indicating that higher inferential style scores were associated with fewer actor independent stressful events (see Table 7.8).

Table 7.8

OLS Test of inferential style as a predictor of daily actor independent events

Parameter	Fixed Effect			Random Effect		
	<i>b</i>	<i>SE</i>	<i>t</i>	Variance	<i>df</i>	χ^2
Intercept	2.22	.237	9.34***	5.34	99	1373.49***
Day slope	-0.29	.036	-7.97***	0.02	99	90.00
Inferential Style	-0.93	.117	-7.93***	0.43	99	106.89

Note. Intercept = mean initial status; Day slope = mean growth curve.

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

In all four of these models, day was also a significant predictor of daily events (i.e., observer dependent and independent, actor dependent and independent), indicating that the number of observer and actor events decreased over the seven days of study (Tables 7.5-7.8).

Impact of control variables on the stress generation relations. I evaluated whether control variables influenced the intercept and slope of the Level-1 variables in the stress generation models. Thus, the Level-1 equations here are the same as the ones in the previous section. I added the Level-2 (between subject) equations here, which control for the effect of BDI-II, CSQ-C, CSQ-I, SRIS-I, and SRIS-SR. As previously mentioned, I grand mean centered the Level-2 variables. Given the number of correlations I ran for each event model, I used the Bonferroni method to correct for inflation of Type I error rates. I considered each event model a family of comparisons and results for each event type were only considered significant if they reached a significance level of .008 (Shaffer, 1995).

This was an exploratory analysis so I followed the recommendations of Tabachnick and Fidell (2013) for exploratory analysis with multilevel models. First, I conducted independent HLM analyses for each of the potential control variables to explore whether they predicted each type of event. This ensured that I did not overlook any contributing variables that could potentially show up as non-significant in a full-scale model due to overlapping variance. However, there were no significant findings for any of the control variables with any event model, at the alpha level chosen.

Discussion

The purpose of Study 2 was to address the following research questions: “Does self-monitoring (i.e., tracking over multiple days) the dependence/independence of events at the daily level relate to changes in inferential style over a 7-day span;” and “Does inferential style relate to daily stress generation (i.e., dependent events)?”

Self-monitoring and Inferential Style

The first exploratory analysis of this study, regarding whether self-monitoring the dependence/independence of daily events related to changes in inferential style over a 7-day span, showed that self-monitoring was not significantly associated with inferential style. As previously discussed, findings examining the impact of self-monitoring on behaviour change have been mixed. For example, researchers showed self-monitoring influenced smoking frequency and duration (McFall, 1970), alcohol consumption (Helzer et al., 2002), eating and exercising (Helsel et al., 2007), and repetitive motor behaviours (Hutzell et al., 1974). In contrast, self-monitoring has not been associated with problem drinking (Hufford et al., 2002). As well, monitoring sadness for 7-days, by reporting mood each morning in an online questionnaire, did not influence next day mood reports of sadness by undergraduate students (Sahl et al., 2009). Further, self-monitoring was not associated with adaptive cognitive changes (i.e., increases in insight) in a study comparing responses of undergraduate students who regularly kept journals, to those who did not keep journals (Grant et al., 2002). Thus, it seems possible that self-monitoring does not influence inferential style.

Alternatively, the participants in my study monitored their thoughts and behaviours only for 7-days and it is possible that a longer span of time is required for self-monitoring to impact inferential style. However, the participants included in my study reported low numbers of daily events, even at Day 1, which resulted in very few events for participants to rate over time. This likely interfered with my ability to examine a potential association between self-monitoring and inferential style.

Self-monitoring and Stress Generation

Interestingly, day slopes indicated that all actor and observer event types decreased over the days of study. One possible explanation for this finding is that participants were fatigued by the daily requirement and did not report events they were experiencing. Further, requiring participants to respond to the same questions numerous times over a short time span can become problematic. In particular, participants may start to report only what is unique to each situation and not report what is redundant across situations (Schwartz, 2012) or respond by only including the amount of information he or she believes is necessary or limiting responses to a certain amount of effort (Barta et al., 2012).

Alternatively, participants might actually be experiencing fewer numbers of events over time and are not just presenting with a reporting bias. If participants are experiencing fewer numbers of events, this might indicate that self-monitoring does influence daily stress generation, leading to decreases in daily stressful events. This would be consistent with studies showing that self-monitoring is associated with a change in behaviour (e.g., Hessel et al., 2007; Helzer et al., 2002; Hutzell et al., 1974; McFall, 1970). Notably, self-monitoring was associated with a decrease in events reported but was not associated with changes in inferential style over the 7-day span.

This interesting difference might indicate that the reactive effects of self-monitoring are specific to behaviour (Kanfer, 1970; McFall, 1970) and do not influence other variables, such as cognitions (e.g., inferential style). For example, Helzer and colleagues (2002) conducted a study on alcohol consumption, which required participants to self-monitor their alcohol consumption by responding to relevant questions every day for 2 years. Specifically, the participants were required to call into an automated telephone system each day, which asked them to respond to a

series of scripted questions about alcohol consumption (e.g., “How many beers did you drink yesterday?”) and they responded using the telephone keypad. Each day the researchers also asked participants questions about non-alcohol related factors including cigarettes smoked, mood, physical health, and stress (e.g., “Rate your highest level of stress yesterday on a scale of 0 to 10, with 0 being no stress and 10 being the highest stress you’ve ever experienced”). The results showed that self-monitoring only influenced alcohol consumption and was not associated with changes in non-alcohol related measures. This study asked many more alcohol related questions (i.e., either seven or eight questions, which were dependent on response pattern) than non-alcohol related questions (i.e., only one question per variable) but the authors suggest their findings might indicate that these non-behaviour variables (e.g., mood) are not responsive to reactivity effects. This would explain the findings of previous studies that did not find a significant impact of self-monitoring on mood (Sahl et al., 2009) or cognitions (Grant et al., 2002). Thus, it is possible that self-monitoring does not influence inferential style.

Another possible, but related, explanation could be that self-monitoring affects only what you are *actually* monitoring. For example, Fall (1970) required college students to self-monitor different aspects of their smoking behaviour to determine whether different effects would result from two kinds of self-monitoring instruction. One group of students was instructed to monitor the number of cigarettes smoked during class (i.e., smoke group) and another group was instructed to monitor occurrences of when they felt an urge to smoke a cigarette but did not (i.e., no-smoke group). The students’ smoking behaviour was monitored without their awareness, before their own self-monitoring, in order to establish a baseline of their smoking behaviour that was not affected by their own self-monitoring. Results showed the students’ rates of smoking behaviour changed when they started self-monitoring and the two groups significantly differed in

the way their behaviour changed. Specifically, the smoke group increased their smoking rate, while the no-smoke group decreased their rate. This suggests that self-monitoring specifically influences the behaviour that one's attention is directed to focus on, consistent with the theory of objective self-awareness.

In regards to my study, this supports my findings that self-monitoring was associated with a decrease in events reported but was not associated with changes in inferential style, given that my participants were only required to monitor their daily life events. Further, the participants in my study were not asked to monitor their inferential style. Therefore, it is not surprising that inferential style did not change over time. These findings highlight the methodological issues associated with self-monitoring. Specifically, researchers should consider how the phrasing of their questions directs the participants' attention when using daily self-monitoring measures.

This pattern of decreasing rates of events over time would have also decreased the *opportunity* for participants to rate the dependence of events. That is, variance in inferential style would decrease. In turn, this would have reduced the ability to detect an effect of self-monitoring on inferential style and, as such, a possible explanation for this finding is that there were too few ratings to adequately observe the impact of self-monitoring on inferential style.

Relations Between Inferential Style and Stress Generation

My hypothesis that inferential style would be related to daily stress generation was not supported for observer dependent events, but was supported for actor dependent events. Specifically, higher levels of internal inferential style were associated with more actor dependent events, or daily stress generation. This inconsistency in the relation between inferential style and observer versus actor dependent events again, as with Study 1, highlights the importance of considering the participants' perspectives of the stressfulness and dependence of life events, in

addition to the rating teams'. Further, focusing on actor ratings recognizes that the impact of an event will vary across individuals, such that some individuals might find a particular event stressful and others not. I discuss this further in the General Discussion.

An internal inferential style also predicted increases in observer independent events and decreases in actor independent events. As previously discussed, in Study 1, the increase in observer independent events is not a rare finding in the stress generation literature and it is possible the context of an individual's life increases her/his risk of exposure to more independent stressful events (see Harkness & Stewart, 2009). However, the participants themselves are not identifying more independent events over time.

One possible explanation for these findings is that the participants are indeed experiencing more events that are dependent and less independent events, and the raters are missing some key contextual information when making their ratings. That is, researchers should perhaps consider the participants' reports as more "accurate." Another possible explanation is that the instructions, provided to the participants, could have elicited an inward self-focused attention (i.e., considering whether the event was dependent on the individual, rather than whether the event was dependent on other external factors) that resulted in the participants rating events more internally. Specifically, the instructions in Study 1 were:

Sometimes we have influence over the events that we experience, whereas other times we have no influence over the events that happen. I would like you to rate each event you've experienced [experimenter will remind participant of events], indicating how much **you influenced** that event's occurrence (i.e., 1 = *totally independent/nearly totally independent of you* to 5 = *totally dependent/influenced by you*).

In Study 2, the participants were asked to rate the dependence of the events on the following scale: 1 = *the event was totally independent of me or I had no influence or control* to 5 = *the event was totally dependent on me or influenced by me*. The theory of objective self-awareness (Duval & Wicklund, 1972; Duval & Wicklund, 1973) would anticipate that individuals would provide greater internal ratings due to the wording of these questions. In addition, the raters included in my studies were required to rate the dependence of the events, focusing on the role of the typical individual. Specifically, in Study 1 and 2, I instructed the raters to rate the dependence of each event for the typical individual from 1 (*completely independent*) to 5 (*completely dependent*). As such, the theory of objective self-awareness would also anticipate that the team's ratings would be more dependent (or internal) on the typical individual. Despite the fact that I directed the focus of both actors and observers towards the actor or typical actor, the participants still showed greater internal causal ratings compared to the team.

A possible explanation provided by the theory of objective self-awareness (Duval & Wicklund, 1972; Duval & Wicklund, 1973) is that individual differences also naturally exist in self-focused attention, which could influence inferential style. In particular, the theory posits that some individuals might obsessively think about themselves and criticize their own behaviours and thoughts, whereas other individuals might have no understanding about how others perceive them or how they feel (Fenigstein et al., 1975). Thus, it is possible that individuals with greater internal ratings simply have a tendency to criticize their own behaviours and thoughts.

Alternatively, the individuals might be engaging in self-blame for some events that are not within their control. Self-blame is considered adaptive in instances where a person believes he or she has control and can change outcomes in his or her life, which is termed "behavioral self-blame" (Janoff-Bulman, 1979). For example, if an individual failed a test and attributed it to

his or her lack of studying, then he or she would believe that he or she could improve the outcome in the future by studying harder. However, self-blame is maladaptive when a person blames himself or herself for their problems in a self-deprecating manner, reflecting self-criticism, low self-esteem, and depressive symptoms (Beck, 1967). Specifically, the individual attributes the cause to his or her character, which is termed “characterological self-blame” (Janoff-Bulman, 1979). For example, if an individual failed a test and attributed it to a lack of ability to succeed, then he or she would believe he or she could not improve the outcome in the future. Characterological self-blame is shown to occur more often in individuals with depression than those without, whereas behavioural self-blame is not shown to differ between the two (Janoff-Bulman, 1979). The significant findings, between inferential style and actor dependent events, suggest that inferential style might be an important factor in the generation of stressful events. Given that these are the first studies examining the relation between inferential style and stress generation, it will be important for researchers to conduct more research in this area.

SRIS Trait Relations with Inferential Style and Stress Generation

My exploratory analyses of trait level measures of self-reflection (SRIS-SR) and insight (SRIS-I) showed that both traits were not related to inferential style. As well, neither trait significantly influenced the relation between inferential style and daily stressful events. Although one must be careful interpreting null findings, one possible explanation for these results is that trait level self-reflection and insight are not related to daily inferential style or stress-generation. In particular, this might indicate that there are differing levels of function of insight at daily and macro levels. I review future directions from this research under the General Discussion.

Chapter 4: General Discussion

My dissertation aimed to further the literature on stress generation and cognitive styles by examining whether internal cognitive styles for hypothetical events related to inferential styles associated with real-life events. In both studies, I found that CSQ-I showed a small positive correlation with inferential style but was not related to actor or observer dependent or independent events. In contrast, inferential style was associated with actor dependent events in both studies. These results suggest individuals' attributions for hypothetical events are somewhat consistent with their attributions for real-life events, indicating that these different measurement methods display some similarity. However, given their differential associations with stress generation, additional research is needed to further understand the similarities and differences between hypothetical versus real-life measurement of internal cognitive style/inferential bias.

As well, I aimed to further stress generation literature by examining whether a relation existed between stress generation, inferential style, and self-monitoring of real-life events. Both of my studies showed that inferential style positively correlated with actor rated dependent events (i.e., stress generation) but did not relate to observer rated dependent events. This was surprising given that actor- and observer dependent and independent events were significantly correlated, suggesting consistency in their classifications of events. None of my independent variables in either study correlated with observer or actor rated dependent events except, in Study 1, depressive symptoms positively correlated with actor dependent events.

In Study 2, there was no effect of self-monitoring on inferential style but self-monitoring was significant associated with daily events, such that all event types decreased over the 7 days of study. Overall, the results of Study 2 lend further understanding of stress generation at the daily level and shows that other researchers can examine inferential style at the daily level.

As well, in both studies I found that CSQ-I positively correlated with inferential style but was not related to actor or observer-identified dependent or independent events. In contrast, inferential style was associated with actor-identified dependent events in both studies. These results suggest individuals' attributions for hypothetical events are consistent with their attributions for real-life events, indicating that these different measurement methods are similar. However, given their differential associations with stress generation, additional research is needed to further understand the similarities and differences between hypothetical versus real-life measurement of internal cognitive style/inferential bias.

Next, I discuss strengths and limitations of my dissertation as well as reflections on my research experience and recommended future directions for research. These sections refer to my dissertation broadly and holistically; whereas specific strengths and limitations, as well as interpretations of study results, were addressed in the Discussion sections for Study 1 and Study 2.

Strengths

Inclusion of actor reports of stress generation. Strengths that were consistent across both studies include the measurement of actors' ratings of events, rather than only measuring observers' ratings. This enabled me to create a difference score between participant and team ratings for the dependence of events, which was termed inferential style. Additionally, by obtaining the participants' ratings, I was able to observe differences in the way individual difference factors related to actor- versus observer stress generation.

The current approach taken by stress generation research is to primarily consider the impact of the environment and context surrounding life events on the typical person. Stress generation researchers effectively use teams of raters to categorize events and control for the

potential confounding effects of participants' moods and cognitions. This is a useful method when a researcher is simply interested in identifying the types of events that typically are associated with psychopathology and considered stressful and dependent for the "typical person."

However, this approach to studying stress generation does not adequately account for the individual's own personality, psychopathology, and/or cognitive appraisals that interact with the environment. As well, researchers have criticized the method for treating subjective experiences as invalid information that needs to be reinterpreted by researchers (Stoppard, 2010), which undermines the different ways individuals experience similar events due to their life circumstances.

Further, actor ratings are important to consider if researchers are looking to identify areas for intervention and reduce the generation of SLEs. This is evident given that I found inferential style was differentially related to actor and observer events. Further, other researchers found perceived stress was an important factor associated with psychopathology, even after controlling for initial symptoms of psychopathology (e.g., Cohen, 1986; Hewitt, Flett, & Mosher, 1992). As well, actor- and observer stress generation were significantly correlated suggesting that actors and observers are consistent in their classification of events and that actor ratings could possibly be used alternatively to observer ratings.

Discourse of stress generation. As previously discussed, the language used in this dissertation (e.g., actor and observer rather than objective and subjective) critically advances stress generation research. Specifically, language has meaning and previous stress generation research uses language that is not neutral. Instead, the language suggests participants make inaccurate subjective ratings that need to be reinterpreted by teams of raters who are believed to

make accurate objective ratings (Stoppard, 2010). The language contributes to the belief that team ratings can be used to evaluate the accuracy of a participants ratings and it undermines the different ways individuals experience similar events based on their life circumstances. The language I chose is role related and does not imply superiority or importance of the coding team over participants' ratings. Further, I chose the term inferential style over accuracy, realism, or bias, to acknowledge that it is only possible to measure systematic patterns in individuals' responses across situations, when comparing their ratings to a team of raters. This change in language still recognizes that individuals with internal patterns likely make some attributions accurately (i.e., when situations were consistent with their inferential style) and others inaccurately (i.e., when situations were inconsistent with their inferential style) but is not as critical.

Limitations

Restricted samples. One limitation consistent across both studies was the use of samples that were restricted on some characteristics. First, the participants were predominantly female. Thus, the results likely will not generalize to male samples. This is consistent with other stress generation research, which has been primarily focused on women or utilized samples with majority female participants. There is limited stress generation research on men in general and this is an important area for ongoing research. Second, I conducted both studies with undergraduate participants recruited from an Introductory Psychology subject pool and as such; the findings are not generalizable to community or clinical samples or potentially students in other fields of study. However, as reviewed in my Introduction, 31% of research on stress generation relies upon these samples (Cummings, 2015). Thus, my results are comparable to a portion of previous stress generation work.

Third, the majority of participants in both studies identified as Caucasian (i.e., Study 1: 67%, Study 2: 62.1%) and the second largest ethnic group were individuals identifying as Asian (i.e., Study 1: 19.8%, Study 2: 17.5%). A meta-analytic review on cultural differences in self-serving attributional bias found that Asian individuals living within the United States (US) displayed similar self-serving biases to Caucasian US samples (Mezulis et al., 2004). In contrast, individuals living within Asian cultures displayed significantly smaller self-serving attributional biases compared to US or Western samples (Mezulis et al., 2004). As I did not collect detailed background information on the participants included in my studies, it is unclear whether the individuals identifying as Asian were raised within Canadian culture or, for example, recently moved to Canada from an Asian culture for university. Therefore, it is possible that the responses of Asian participants could have influenced my results. However, it is unclear whether individuals from Asian cultures would display different patterns in negative cognitive styles compared to Western samples. As such, it is possible that the attributional styles of Asian participants included in this sample influenced the results but the direction of this influence is unclear.

Fourth, my samples had restricted ranges of depressive symptoms and were predominantly non-depressed or had mild symptoms only. However, this is consistent with much of previous stress generation research using undergraduate samples. Although this was a purposeful choice, it did not allow me to conduct comparisons between groups such as, between individuals with clinical diagnosis of depression, subsyndromal depressive symptoms, and no depressive symptoms (e.g., Krackow & Rudolph, 2008), or between individuals with negative cognitive styles versus positive cognitive styles (e.g., Safford et al., 2007), as some previous stress generation has done. As well, inferential style scores also had restricted ranges and it was

not possible to make comparisons between high and low inferential styles. Related, I did not ask participants whether they had a history of depression, which is a limitation since a history of depression is shown to be associated with stress generation (e.g., Daley et al., 1997; Hammen, 1991) and is helpful to consider when individuals are not currently reporting depressive symptoms.

Limitations associated with coding teams. One potential limitation associated with my use of a coding team is that I did not examine whether team members' own psychopathology (specifically depression) influenced team ratings. Some research on individual rating patterns show that psychopathology influences ratings. For example, Alloy and Ahrens (1987) found that depressed and non-depressed individuals displayed similar forecasts when predicting the likelihood of future positive and negative events. Specifically, both groups predicted that they were more likely to succeed than fail, and predicted that others were more likely to succeed than fail. However, the depressed group's predictions of success for self and others consistently were lower compared to the non-depressed group's predictions (Alloy & Ahrens, 1987). As well, the depressed group's predictions of failure for self and other were consistently higher than the non-depressed group's, indicating that the depressed group was more pessimistic than the non-depressed group. In addition, when researchers compared ratings for self versus other, the depressed group was evenhanded in their forecasts (i.e., similar pessimistic ratings for both the self and others), whereas the non-depressed group displayed a self-enhancing bias (i.e., overestimating their success and underestimating their failure relative to their predictions for others; Alloy & Ahrens, 1987).

In another study, depressed individuals were shown to display greater accuracy, compared to non-depressed individuals, in their estimates of contingency between their response

(i.e., pressing a button or not pressing) and non-contingent outcomes (i.e., a green light turning on or not turning on). Non-depressed individuals displayed an illusion of control (or optimistic bias), overestimating control for success, and an illusion of no control, underestimating control for failures (Alloy & Abramson, 1979). These studies suggest that individuals presenting with depressive symptoms and no depressive symptoms both display patterns in their response styles (i.e., pessimism and self-enhancement respectively). However, neither of these studies examined attributions for stressful life events and it is unclear whether these patterns would present for real-life events.

Stress generation researchers do not assess the level of depressive symptoms of their coding teams; unfortunately, I too did not measure the depressive symptoms of my rating team. It is unclear, as well, what research ethics issues might be raised by assessing depressive symptoms in research assistants/coding teams. Based on the findings described above, however, it is possible that the presence of psychopathology could impact team ratings, particularly if a team included only individuals presenting with depressive symptoms or if a study was using mixed teams (e.g., one team of all depressive symptoms versus a team with no symptoms). However, researchers have not studied this area and it could have important implications for interpreting stress generation results in the future.

Despite this possible limitation associated with not assessing levels of depression, researchers utilize the method of teams of raters (instead of only one rater) to ensure that individual biases do not influence the ratings. Specifically, each team member was trained to criterion (Intraclass correlation of .80) with sample events provided with the UCLA LSI manual and training materials to ensure that any biases they presented with were identified and addressed through providing them with feedback on the contextual information that supports a different

score. As well, when the team disagreed on a rating, they discussed the reasons behind each rating and determined the best rating via consensus.

However, it is possible that the instructions provided to the team potentially introduced bias. In particular, Jones and Nisbett's (1971) information processing theory provides a potential explanation for the differences in actor versus observer ratings, and suggests that this difference can be influenced by instructions provided to observers. Specifically, Jones and Nisbett (1971) stated that actors and observers process information related to events differently, based on the focus of their attention, which is associated with differences in their causal attributions. The actor is less likely to focus on their own behaviour, since many behavioural responses are automatic, and more likely to focus on the environmental factors that shaped his or her behaviour (Jones & Nisbett, 1971). In contrast, the observers are more likely to focus on the actor's behaviour or character and less on situational factors, which increases the likelihood of the cause being attributed to the actor (i.e., possibly more ratings of event dependence; Jones & Nisbett, 1971). This is consistent with the theory of objective self-awareness, which also anticipates that the focus of attention, either inward or outward, will determine the locus of causal attribution (Duval & Wicklund, 1972).

Jones and Nisbett (1971) noted that the purpose of the research could influence an observer's perspective. That is, the purpose of the research can direct the observer's attention to certain types of information and this can be achieved through the instructions provided to the observer. For example, in a study by Regan and Totten (1975), researchers found instructions provided to the observers altered the attributions they made towards actors' behaviours. In particular, raters provided with instructions to empathize with the actor made more situational and less dispositional attributions, compared to raters provided with standard instructions (Regan

& Totten, 1975). Jones and Nisbett (1971) presumed the more an observer is encouraged to empathize with the actor, the greater the similarity there would be between their attributions.

In stress generation research, including my studies, researchers provide the teams with instructions to rate the stressfulness and dependence of each event for the typical person under similar circumstances. Specifically, the team was asked to rate whether the event was independent or dependent on the individual's behaviour. Similarly, the participants were asked to rate whether the event was dependent on them or independent. Based on the information processing theory (Jones & Nisbett, 1971), these instructions likely increased the similarity in the actor and observer ratings, since their attention was directed towards the role of the individual. Despite potentially increasing the similarity of the ratings, the theory of objective self-awareness would suggest that these instructions potentially introduced a bias associated with greater dependent ratings made by both actors and observers.

Reflecting on my Research Decisions

Throughout the research process, I gained a thorough understanding of how to properly conduct research. After reflecting on my research decisions, I have identified a number of things I would do differently now. First, I would be more critical when reading the research literature on stress generation. For example, many of the studies using university samples claimed to be studying individuals with depression and I assumed this was true. I also assumed that I would be able to obtain a similar sample at my university, but the majority of my sample reported only mild depressive symptoms. In determining whether my study could contribute to existing literature, I examined the levels of depressive symptoms reported in many stress generation studies that used university samples and it became clear that the majority of studies were actually studying stress generation in predominantly non-depressed samples. Further, this critical

examination of the literature clarified that the results of many stress generation studies should not be generalized to depressed samples and, in the future, researchers should examine whether the same individual difference factors are associated with stress generation in community and clinical samples.

Second, I would spend more time optimizing my conceptualization of the term inferential style and its measurement. Before deciding on the term inferential style, I was initially interested in examining whether a person's insight or self-awareness into their behaviours was associated with stress generation. I conceptualized insight as a person's ability to (a) recognize that a negative interaction occurred; and (b) identify his or her role, if any, in the negative event. I believe this is important to clarify before looking further into the role of other individual difference factors (e.g., problem solving abilities when faced with negative events) since it is necessary for an individual to be able to identify that a problem exists before it is possible to change behavioural responses to negative events to reduce stress generation. The challenge with assessing insight is that it is a term that also suggests accuracy. Specifically, to examine whether individuals have insight into their behaviour, suggests that their classification of events (e.g., negative or positive; dependent or independent) can be correct or incorrect. As discussed by Alloy and Abramson (1988), it is currently not possible to evaluate accuracy in individuals' classifications of real-life events since there is not a true objective standard of which to compare them.

At this point, it is possible only to examine patterns or styles in the ways individuals classify events. This contributed to my choice of the term inferential style over insight. Inferential style only examines differences in individuals' internal/external ratings of real-life events compared to a team of raters and, based on the comparison, identifies an internal or

external pattern or style. This method of studying an individual's ability to identify their role in negative events is still severely limited. As such, in the future, it will be necessary to continue working towards refining methods to better capture real-life events and their contexts. However, it may never be possible to determine individuals' accuracy or insight into the life events they experience; we may only be able to attempt to get a close estimation.

Future Directions

My results combined with reflections upon my research experience raise a number of avenues for possible future research in this area. First, future researchers should include a demographic question clarifying international student status when using university samples and examine whether different cultural backgrounds influence patterns in cognitive styles. As well, researchers should study the relation between stress generation and inferential style in samples that they screen for larger difference scores (i.e., that represent inferential style). This will clarify whether differences in stress generation are associated with high versus low discrepancies in ratings of dependence.

In addition, my results provide the first evidence that CSQ-I and inferential style display a small positive correlation and are differentially related to stress generation, indicating that they are not exactly equivalent. As such, examining the similarities and differences between hypothetical versus real-life measurement of internal cognitive style/inferential bias could be a fruitful area for future research. As well, researchers should control for the potential impact of an enhancing cognitive style when examining stress generation, since it is associated with reduced stress generation (Kleiman et al., 2012) and is shown to moderate the relation between a negative cognitive style and depressive symptoms (Haefel & Vargas, 2011).

Furthermore, future research on stress generation and inferential style should clarify whether participants are attributing the cause of internal ratings to characterological or behavioural factors, given that characterological self-blame is considered more maladaptive (Janoff-Bulman, 1979). Researchers should also conduct future research attempting to determine if the instructions have an impact on the ratings for the life events, which, in turn, could inform on the instructions that should be used in future research. This could be accomplished, for example, by providing two groups of participants with different instructions for rating the dependence of life events and comparing the results; as well as, providing two coding teams with different instructions for rating the dependence and comparing the results.

Researchers should also examine the relation between inferential style and stress generation within community and clinically depressed samples with micro and macro levels of events. This research could inform on whether the significant relations found here between actor- and observer events (i.e., showing consistency in their classification of events) change with samples that include a sufficient number of participants that have moderate to severe depressive symptoms.

I recommend that researchers examine the impact of self-monitoring on non-behavioural factors, including mood, inferential style, and other cognitions to determine whether the reactivity effects of self-monitoring are specific to behaviours. In particular, in future studies, researchers should not only require participants to monitor their daily life events but should also provide participants with feedback on their daily difference scores to examine whether self-monitoring of the difference score is associated with change in inferential style. This could inform research practices indicating whether it is necessary to control for potential reactivity effects on non-behavioural factors and potentially inform clinical practice. As well, self-

monitoring studies should require participants to monitor variables over longer time spans than 7-days, since reactivity effects are not always linear and people can show fluctuations in change over time (Barta et al., 2012).

Another area for exploration is in identifying the contextual factors associated with reports of greater independent events. Researchers have not formally studied this area. Rather, there is an expectation within the stress generation theory that factors of interest will be related to greater dependent events but not independent events. As such, when analyses of independent events are included in studies and are *not* significant, researchers identify the finding as further evidence of the stress generation effect (i.e., that relations existed with dependent events, showing generation of events, and not independent events). However, there have been an increasing number of stress generation studies reporting relations between individual difference factors and independent events, which suggest that this is an important area for further study.

Last, researchers have conducted extensive research on identifying individual difference factors associated with observer stress generation; however, no research has specifically focused on how to treat stress generation. Attempting to reduce stress generation seems like an obvious direction for stress generation research; given that stress generation is identified as a factor related to the relapse and recurrence of depressive symptoms. Further, the literature positions stress generation as a variable that is important to study in order to potentially intervene and prevent the cyclical relation between stress, depression, and/or other types of psychopathology. As such, future researchers should begin to focus on possible treatments to reduce stress generation. Further, researchers could consider measuring stress generation across time using both actor and observer ratings, to determine if the therapeutic techniques are associated with a reduction in actor- and/or observer stress generation.

Conclusion

The results of my studies provide some of the first evidence for the role of inferential style in actor stress generation at both macro and micro levels. However, inferential style was not associated with observer dependent events. This inconsistency in the relations between inferential style and actor versus observer-identified events is notable and highlights the necessity of considering the participants' subjective experience in subsequent stress generation research. In particular, the stressfulness of events is in itself believed to be subjective and influenced by individuals' cognitive appraisals (Lazarus & Launier, 1978). That is, what is considered stressful for one individual is not necessarily stressful for another (Lazarus & Launier, 1978). Further, research has found that perceived stress is an important factor associated with psychopathology, even after controlling for initial symptoms of psychopathology (e.g., Cohen, 1986; Hewitt, Flett, & Mosher, 1992). However, stress generation research does not consider participants' perceptions, instead the current method only uses team ratings to identify stress generation and, as such, does not adequately allow researchers to identifying areas for intervention to potentially reduce stress generation that individuals experience. A first step in moving stress generation research forward towards identifying potential areas for intervention will be for researchers to begin collecting actor ratings, in addition to observer ratings.

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Appendix A: Definitions

Term	Operational Definition
Inferential Style	Observer ratings of dependence were subtracted from actor ratings for each event on the UCLA LSI or Daily Negative Events Checklist to create a difference score. Then, a mean score for all events was calculated for each participant to obtain the inferential style score.
Hypothetical Internal Cognitive Style	A participant's mean score on the internal items of the Cognitive Styles Questionnaire (i.e., the CSQ Internal subscale).
Observer Dependent Events	Sum of events from the UCLA LSI rated by a team of coders as three or above on dependence and three or above on stress.
Observer Independent Events	Sum of events from the UCLA LSI rated by a team of coders as less than three on dependence and three or above on stress.
Actor Dependent Events	Sum of events from the UCLA LSI rated by a participant as three or above on dependence and three or above on stress.
Actor Independent Events	Sum of events from the UCLA LSI rated by participants as less than three on dependence and three or above on stress.
Daily Observer Dependent Events	Sum of events from the Daily Negative Events Checklist with an average rating by a team of coders of three or above on dependence.
Daily Observer Independent Events	Sum of events from the Daily Negative Events Checklist with an average team rating of one or two on dependence.
Daily Actor Dependent Events	Sum of events from the Daily Negative Events Checklist rated by a participant as three or above on dependence.
Daily Actor Independent Events	Sum of events from the Daily Negative Events Checklist rated a participant as one or two on dependence.

Appendix B: Measure

B.1 Study 1 & 2 Demographic Information Questions

Gender

- a) Female
- b) Male
- c) Prefer not to answer

Age? _____

Please indicate your ethnicity (check all that apply)

- a) Caucasian
- b) African American
- c) Hispanic/Latino
- d) East Asian
- e) South Asian
- f) Middle Eastern
- g) Other

B.2 Standardized Instructions for Participants Rating the Dependence of Events.

Participants were presented with the following scale (printed on an index card): 1 = totally independent/nearly totally independent; 2 = possible influence by participant but unlikely; 3 = mixed or unable to determine influence; 4 = probable influence/dependence; 5 = totally dependent/influenced. If the participant had difficulty responding to the question, these additional instructions were provided:

“The rating you provide indicates the amount you think you influenced the occurrence of the event. If you think you had no influence, you should respond 1 ‘totally independent.’ If you think you may have influenced the event slightly, you should respond 2. If you think it was an equal mixture of your influence and another factor or person, you should respond 3. If you think you had more influence on the event than another factor or person, you should respond 4. If you think the event was entirely influenced by you, then you should respond 5.”

If participants asked the experimenter for their opinion, the experimenter responded “There is no right or wrong answer; I’m just interested in what you think.”