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Stress Generation Hypothesis in Internalizing Psychopathology: A Review

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Abstract

Much research has gone into how stress is involved in the development of internalizing psychopathology. Hammen (1991) posed a different view that depressed individuals are actively involved in creating stressful situations, which would subsequently influence the depressive symptoms. This was named the Stress Generation Hypothesis. Since the publication of this original view, many researchers have studied this hypothesis in depression, and expanded it to other internalizing disorders such as anxiety and eating disorders. Some researchers even moved beyond the original definition and searched for possible underlying vulnerabilities that accounted this stress generation effect. The current study reviewed a number of articles investigating the stress generation hypothesis and found that there is overall evidence for the stress generation hypothesis in depressed individuals, with depressive symptoms remaining on of the strongest predictors of stress generation. Furthermore, there was also some evidence for other internalizing disorders, but the results were more mixed and seem to point towards other underlying mechanisms. Various pre-existing, personality, cognitive, and interpersonal vulnerabilities were identified. Sex differences were also found, but this needs to gain more attention in future studies. The direct behavioral, cognitive, emotional, and physiological stress responses lack in research and future research should include ecological momentary assessments to gain more insight into the specific actions of individual that cause stress generation. Untangling the specific components of stress generation can help establish a comprehensive model of the relationship between stress and internalizing disorders that can direct future intervention development.

Keywords: Stress generation hypothesis, internalizing psychopathology, vulnerabilities, stress responses, dependent events, independent events

Stress Generation Hypothesis in Internalizing Psychopathology: A Scoping Review

Stress is a well-studied phenomenon, that can have a debilitating effect on people and can cause depression and anxiety (i.e., internalizing psychopathology). Stress can cause physiological, behavioral, emotional and cognitive responses (Chrousos, 2009; Gross; 2015; Lupien, 2009; Seyle, 1950), that can also influence one another (Barrett, 2017; Lazarus & Folkman, 1984) and can cause subsequent psychopathology (e.g., anxiety or eating related disorders; Chrousos, 2009; Torres & Nowson, 2007). Many researchers have tried to uncover the relationship between stress and depression. Post (1992) posed a theory that tried to explain the recurrence of depression, the Kindling effect. This theory posed that after the first onset of depression after experiences a stressful, an individual becomes more sensitive, when reacting to subsequent stressors. This would mean that a less severe stressor can trigger the onset of a following depressive episode (Post, 1992). This may be due to a genetic predisposition that makes people more sensitive to stressful events (Kendler et al., 1995). Another theory is the Diathesis-Stress Model, originally developed in the 1960s by Paul Meehl to explain schizophrenia. The theory poses an interaction in which certain genetic predisposition vulnerabilities combined with environmental stressors can result in the onset of a disorder (Meehl, 1962; Monroe & Simmons, 1991). Both these theories (Monroe & Simmons, 1991; Post, 1992) investigate how stress can result in subsequent depression. The biopsychosocial model expands this view by posing those not only genetic vulnerabilities, but also cognitive and social vulnerabilities can interact with stressors, resulting in a depressive episode (Abramson et al., 1999; Beck, 1967, 1983; Zuckerman, 1999). In the light of this theory, Michl et al. (2013) found that rumination is a cognitive vulnerability that links stressful events to depression and anxiety. Another diathesis-stress theory is the ‘hopelessness theory of depression’ (Abramson et al., 1989), which suggests that stress interacts with a negative inferential style (i.e., a cognitive thinking pattern in which the individual sees the world as

stable, global and internal; Abramson et al., 1978), causes subsequent feelings of hopelessness that in turn causes depressive symptoms.

Hammen (1991) posed a different view. She tried to explain the recurrence of depression with the Stress Generation Hypothesis (SGH). Hammen hypothesized that depressed individuals, through their own behavior, cause stressful events. This would have important implications, as it would suggest that people play an active role in the course of their disorder, which could help motivate people (Alloy et al., 2010). Hammen (1991) found that women with a unipolar depression experienced more dependent life stressors, but not independent stressors, compared to bipolar, medically ill and control group (Hammen, 1991). Dependent life stressors are stressful events that at least partly caused by the behaviors or characteristics of the individual and independent stressors are outside the control of the individual (Hammen, 2020). Since its introduction in 1991, lots of research has gone into evaluating this hypothesis, and trying to understand the underlying mechanisms and expanding its use to other related disorders. Meyer & Curry (2017) explored whether and how the SGH expands to anxiety related disorders and Kwan & Gordon (2016) investigated if the SGH was also applicable to eating disorders. Recently, more research has also gone into underlying predictors of stress generation, such as coping style, childhood maltreatment, and cognitive styles. Bahji et al. (2021) went one step further and explored the possibility of underlying genetic markers of the SGH. These underlying predictors expands the meaning of SGH from the original research (Hammen, 1991) to a more comprehensive model that takes elements of the diathesis-stress theory, Beck's cognitive model and other previous mentioned theories into account (e.g., Abramson et al., 1989; Beck, 1967; Post, 1992).

This poses the question what the current status is of the SGH? Does evidence exist for the original SGH in internalizing disorders? What factors and characteristics influence this relationship and how are these are related to one another? How has the meaning of stress

generation evolved over the course of 30 years? The current study will review articles regarding the SGH to answer these questions and give an overview of the possible components of stress generation. This will give insight into the gaps that future research needs to fill and boundaries of the hypothesis. Based on the results, recommendations for future directions and potential intervention areas are given.

Method

Protocol

For this review, an updated form of the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines was used to select eligible articles (Page et al., 2020).

Eligible Criteria

Inspired by the criteria used by Bahji et al. (2021) stress generation was operationalized as stressful life events (SLE), occurring within a specific period and assessed using a validated instrument. The study should specifically investigate dependent life events or make a distinction between dependent or independent life events. Furthermore, internalizing psychopathology should be included within the study. Internalizing psychopathology is defined as disorders where the core pathology has internalizing characteristics, such as depression and anxiety. Since the core pathology of eating disorders is the overevaluation of body image and weight, eating disorders are also included (Fairburn et al., 2003). All primary study designs are considered (e.g., cross-sectional, retrospective, prospective). Secondary studies, such as review articles, commentaries, and dissertations, were excluded, as well as studies without an English or Dutch translation.

Search Strategy and Selection of studies

On PUBMED and PsycINFO, “Stress generation hypothesis [Title/Abstract]” were entered and all results were collected. Using the PRISMA guidelines (Page et al., 2020), the

resulted articles are reviewed for eligibility. The initial search was conducted in January 2023 and a repeat search was done in March 2023. Afterwards, backward searches were carried out to find additional articles. This includes adding the original article introducing SGH (Hammen, 1991), after which recommended articles by PUBMED were also included. Furthermore, reference lists of literature reviews on SGH were examined for additional eligible studies. Also a few grey articles were included, mostly articles that were recommended when retrieving other articles.

Data collection process and Synthesis of Findings

After identifying eligible articles, the articles were read globally and organized according to overlapping topics, to create a clear outline for the review. Given the number of studies and the scope of the research, a full systematic review of every article was not feasible. Instead, important characteristics were extracted from each study (i.e., authors and title, sample, design, findings, evidence for SGH). This information is then summarized in descriptive tables and a thematic figure.

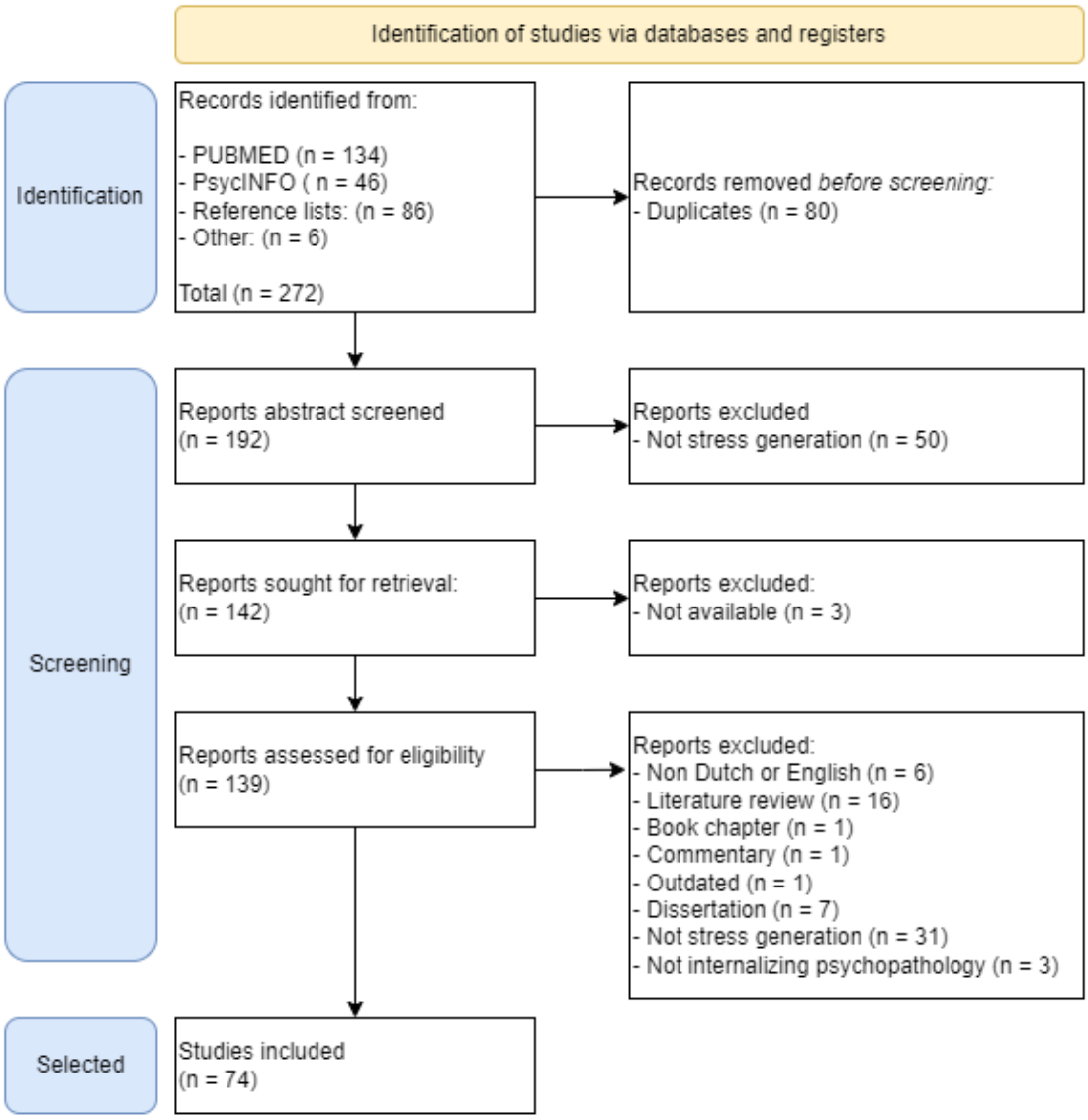
Results

Screening

Using the PRISMA guidelines (Page et al., 2020), useful articles were selected. Initial search resulted in a total 272 articles, of which eighty were removed because of duplicates before screening. Abstracts of the remaining 192 articles were scanned and fifty articles were excluded as there did not involve Stress Generation Hypothesis. Of the 142 remaining articles, three articles did not have a full-text version available and were excluded. 139 articles were subsequently assessed for eligibility, of which sixty-five were removed due to various reasons, which can be found in figure 1. The final articles that were included consists of seventy-four articles (Figure 1).

Figure 1

PRISMA-guidelines of selected articles



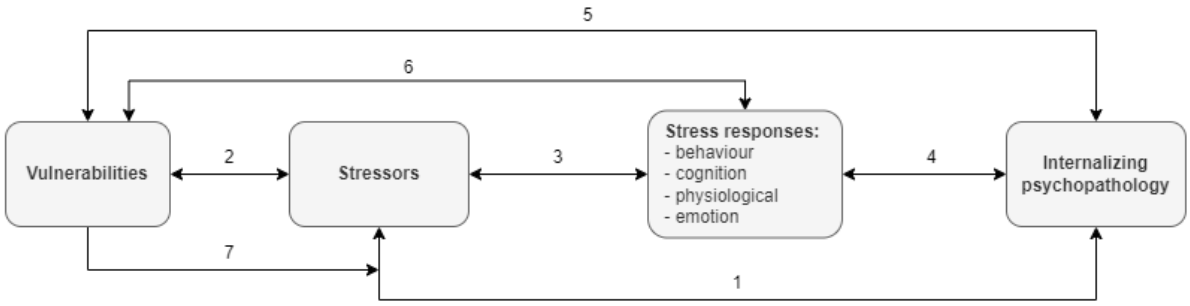
Findings

For a complete overview of all articles, see Appendix A. Figure 2 is a simplified graphical model to visualize the relationships found in the articles (Figure 2). 'Vulnerabilities' indicate all the potential risk factors, moderators and mediators that were found in the literature. These consist of pre-existing vulnerabilities (e.g., childhood adversity, attachment styles, genetic markers), cognitive vulnerabilities (e.g., negative cognitive style, coping mechanisms, hopelessness), behavioral/interpersonal vulnerabilities (e.g., social skills, reassurance-seeking) and other traits or risk factors of internalizing psychology (e.g.,

neuroticism, self-criticism). Stressors can be subdivided into number of categories (e.g., dependent/independent, achievement/interpersonal, chronic/episodic). ‘Stress responses’ are the direct behaviors, cognition, emotion, or physiological responses to a stimulus. ‘Internalizing psychopathology’ contains all internalizing disorders and symptomology described in the articles (e.g., uni- and bipolar depression, anxiety, [comorbid] depressive and anxiety symptoms, eating disorder symptomology). The pathways between the components are numbered to support the results and discussion discussed below.

Figure 2

Simplified summary model of findings about the stress generation hypothesis



Overview of demographics

Most of the articles consisted of mainly or only females. Eleven articles did not include participants of the male gender (e.g., Daley et al., 1997; Davila et al., 1995; Harkness & Luther, 2001; See Appendix A). Most articles consisted of a university / young adult sample (39 studies) or adolescents (29 studies). Only two studies included children (Adrian & Hammen, 1993; Cole et al., 2006). Fourteen studies included older adults or included a wide range or ages (e.g., Goodman et al., 2023; Harkness et al., 2013; Philips et al., 2015). Most samples consisted of Caucasian participants. One study included a sample of African American adolescents (Wingate & Joiner, 2004) and one study included only Japanese students (Hasegawa et al., 2022). Both studies did not find evidence for the SGH.

Original Stress Generation Hypothesis

In the original papers the stress generation hypothesis (SGH) was described as the process in which depressed individuals contribute to the experience of stressful events, which are at least partly due to their own behaviors (Hammen, 1991; Harkness et al., 1999). This pathway is numbered ‘1’ in Figure 2. The current study found several articles exploring this original relationship between depression or depressive symptoms and subsequent generation of dependent event, and mostly found positive evidence (e.g., Conway et al., 2012; Harkness et al., 2013; Joiner et al., 2005; Orth et al., 2009; Williamson et al., 1995). Some articles did not find evidence for the SGH in depression (e.g., Hasegawa et al., 2022; Liu & Spirito, 2019).

Over the years, researchers have investigated whether the SGH was also applicable to other internalizing psychopathology. Some found evidence for SG in anxiety related symptomatology (e.g., Goodman et al., 2023; Philips et al., 2015; Shapero et al., 2013). Others did not (Joiner et al., 2005; Uhrlass & Gibb, 2007; Wingate & Joiner, 2004). Conway et al. (2012) found that panic disorders reduces exposures to interpersonal stress, potentially acting as a protective factor against stress generation. Comorbid anxiety and/or depression was found to be a strong predictor of SG (Bodell et al., 2012; Harkness & Luther, 2001; Rudolph et al., 2000). In eating disorders, bulimic and depressive symptoms have been found to be associated with SG (Bodell et al., 2012; Kwan & Gordan, 2016; Kwan et al., 2017). Results for bipolar were a bit more diverse. For example, Bender et al. (2010) found and overall effect of bipolar on stress generation, Grandin et al. (2007) did not find evidence for the SGH. Bender et al. (2010), also found that hypomania was more related to both negative and positive interpersonal stress generation.

Risk factors and Vulnerabilities

Although the SGH was initially meant to explain the relationship between depression and subsequent dependent stressors, a multitude of risk factors and vulnerabilities have been

related to the concept of stress generation (SG). This is mostly represented by pathway 2 in Figure 2. An number of cognitive vulnerabilities were identified, such as avoidance coping (i.e., cognitive or behavioral efforts to avoid dealing with stressors; Elliot et al., 2011; Holahan et al., 2005), looming cognitive style (i.e., bias to overestimate of threat growth of mentally simulated events) and anxiety sensitivity (i.e., the belief that anxiety symptoms have negative consequences; Riskind et al., 2010, 2013), negative inferential styles (i.e., the tendency to belief that negative stress events are stable, global and internal; Keser et al., 2020; Lui et al., 2014c), and rumination (McLauglin & Nolen-Hoeksema, 2012; Shapero et al., 2013).

Some of interpersonal vulnerabilities that were found were problem solving skills (Davila et al., 1995) and excessive reassurance seeking (e.g., Potthoff et al., 1995; Shahar & Auerbach, 2010). There is currently little evidence for the relationship between social skills and stress generation (Segrin, 2001). A pre-existing vulnerability that was found to predict stress generation was child emotional abuse (Lui et al., 2013). This relationship was subsequently found to be mediated by both negative inferential styles (Lui et al., 2013) and rejection sensitivity (i.e., having a higher fear of being rejected and overly reactive to rejection; Hernandez et al., 2016). Genetic markers appear to interact with low security, depression and interpersonal childhood adversity to predict stress generation (Hernandez et al., 2016; Huang & Starr, 2020). Neuroticism, autonomy, self-criticism, dependency and sociotropy were a few of the personalities traits found to predict stress generation (Shahar et al. 2004; Shih, 2006; Shih & Auerbach, 2010; Starrs et al., 2010; Uliaszek et al., 2011). Autonomy and self-criticism are two highly related concepts that describe the tendency of an individual to extremely focus on personal independence and achievements (Ouimette et al., 1994). Dependency and sociotropy both refer to individuals who are overly invested in maintaining relationship with others because of a high need of sense of relatedness and

closeness (Ouimette et al., 1994; Starrs et al., 2010). Conversely, sociotropy was also related to lower dependent personal stress (Shih & Auerbach, 2010).

Potential moderators were also proposed (pathway 7, Figure 2). Genotype 5-HTTLPR was found to interact with depression to predict stressful events (Starr, et al., 2012). Maternal emotional maltreatment and sexual maltreatment interact with short allele of the 5-HTTLPR gene to predict interpersonal life events (Harkness, et al., 2015). There is also accumulating evidence for sex differences in stress generation (e.g., Auerbach et al., 2012; Bender et al., 2010; Isometsä, 1995; Lui & Kleiman, 2012; Safford et al., 2007; Shih, 2006). Some evidence was found for age effect and (Morris et al., 2014) and pubertal timing effect (Rudolph, 2008).

Discussion

Original Stress Generation Hypothesis

The stress generation hypothesis (SGH) was proposed in 1991 by Hammen and suggested that depressed people play an active role in the generation of stressful events, and she found evidence for this view in women with unipolar depression (Hammen, 1991). Looking at the original meaning of SGH, most research on stress generation in depression provided evidence for the hypothesis (e.g., Conway et al., Harkness et al., 2013; Orth et al., 2009; Joiner et al., 2005; Rudolph, 2008). There were some articles that did not find evidence for the SGH in depression (Liu & Spirito, 2019; Hasegawa, 2022). It is possible that these findings indicate an underlying mechanism that are related to depression that actually account for the stress generation effect, such as rumination or negative inferential style, which were both found to be related to more dependent stressors (Lui et al., 2014; Keser et al., 2020; Shapero et al., 2013). This is depicted as pathway 5 and 2 in Figure 2. One of the studies that did not find evidence only consisted of Japanese students (Hasegawa, 2022). This could indicate cultural differences in the stress generation effect. However, too little research into cultural influences has been done and most samples currently exist mainly of Western

participants. Future research should include more non-Western cultures to investigate whether cultural differences exist. Another interesting finding was that in some studies it was found that first onset depression was more strongly related to stress generation than depression recurrences (Harkness et al., 2008; Morris et al., 2014). This effect may be explained by the kindling effect (Post, 1992). After the first onset, individuals become more sensitive to subsequent stressors, increasing the risk of depression recurrences. This would mean that overtime, the threshold for depression caused by stressors is lowered and the kindling effect become more pronounced than the stress generation effect. It is also possible that after the first onset, the stressors remain more chronic instead of episodic, causing the stressors to be quite stable over time. This would impede the stress generation effect. Indeed, Uliaszek et al. (2011) did not find evidence for stress generation in chronic life stress. A similar effect is seen in Cole et al. (2006), in which trait depression seems more stable over time than state depression, which seems to be influenced by age. Future research should therefore distinguish between chronic and episodic stressors too clearly understand the relationship between chronic and episodic stress and stress generation.

Stress Generation in Other Internalizing Psychopathology

Researchers have examined whether the SGH would also apply to other internalizing disorders, such as anxiety, bipolar, eating disorder and comorbid depression and anxiety. For anxiety, mixed results were found. Whereas some found an even stronger effect of anxiety on stress generation than depression (Philips et al., 2015), others failed to find an effect (Joiner et al., 2005; Wingate et al., 2004; Uhrlass & Gibb, 2007). One study found that the association between anxiety and dependent stress vanishes over time (Harrison et al., 2022). Again, one explanation could be that an underlying mechanism is at play that links anxiety to stress generation, such as low perceived control, looming cognitive style and anxiety sensitivity (Auerbach et al., 2012; Riskind et al., 2010), which were both found to be related to anxiety.

Over time, other underlying characteristics may influence the stress generation more, overwriting the effect of anxiety itself. An interesting finding was that panic disorder appeared to protect against stress generation in the interpersonal domain. This is most likely due to the tendency to avoid social situations (Conway et al., 2012), which will lower the chance of encountering interpersonal stress. This may also explain the findings by Farmer et al. (2015). They found that individuals with social anxiety disorder have a reduced stress generation effect on days following intense negative emotional experiences. After such experience, they potentially avoid interaction in order to prevent potential subsequent negative experiences (Farmer et al., 2015).

In bipolar, most research did not find evidence for the SGH (Grandin et al., 2007; Hammen, 1991). Bender et al. (2010) did find an overall effect of bipolar symptoms on dependents events, and suggest that the heterogenous nature of bipolar disorder accounts for this finding (Bender et al., 2010). They also found a polarity specificity effect on stress generation, namely hypomania. Hypomania in men was associated with more interpersonal events (Bender et al., 2010). For both genders, hypomanic symptoms predicted positive achievement events and tended to predict negative achievement events. This suggests that hypomanic symptoms may both cause negative and positive life events (Bender et al., 2010).

Not much research has been done on eating disorders, so the findings are preliminary. The research suggests that bulimic and depressive symptoms are related to the causation of interpersonal stress (Bodell et al.,2012; Kwan & Gordan, 2016; Kwan et al., 2017). This could suggest that depressive symptomology may be a strong predictor of stress generation. How bulimic symptoms are related to interpersonal stress should be investigated more. One explanation could be that bulimic symptoms are known to induce depressive symptoms, so the depressive symptoms are actually the underlying mechanism (Kwan & Gordon, 2016). Future research should look into the behavioral and cognitive characteristics of eating

disorders to understand how stress generation play a role in the maintenance or onset of eating disorders.

Overall, comorbid anxiety and depression seem to have the strongest stress generation effect, which was found in multiple studies (Bodell et al., 2012; Harkness & Luther, 2001; Goodman et al., 2023; Rudolph et al., 2000). Daley et al. (1997) even found an effect for only comorbid depression, not pure depression. This could indicate that underlying mechanisms that are related to both depression and anxiety account for the stress generation effect.

Vulnerabilities

Moving beyond the original definition of the stress generation, a multitude of vulnerabilities were found. Most vulnerabilities were found in the cognitive domain, but also interpersonal, characteristic and pre-existing vulnerabilities were identified. The found vulnerabilities either acted as mediators (pathway 2, Figure 2) or moderators (pathway 7, Figure 2). Some vulnerabilities were specifically related to certain internalized disorders (pathway 5, Figure 2).

Cognitive Vulnerabilities

Emotion-focused coping mediated the relationship between depressive symptoms and interpersonal stress events (pathway 5 to 2, Figure 2; Keser et al., 2010). This suggests that specific characteristics of depression are underlying mechanisms that contribute to stress generation, though depressive symptoms remained significant predictors of life stress, even after controlling for these underlying mechanisms (Conway et al., 2012). The relationship between avoidance coping and depressive symptoms was mediated by interpersonal stressors (pathway 1 to 2, Figure 2; Elliot et al., 2011; Flynn et al., 2011; Holahan et al., 2005). As mentioned in the hopelessness theory by Abramson et al (1989), hopelessness may be caused by an interaction between negative cognitive styles and interpersonal stressors, subsequently causing depressive symptoms. Joiner et al. 2005 found a mediation effect of hopelessness

between stress generation and depression (pathways 5 to 2, Figure 2). Other vulnerabilities that were found were negative urgency (i.e., a tendency to act rash when stressed; Liu & Kleiman, 2012), rumination (Kercher & Rapee, 2009; McLauglin & Nolen-Hoeksema, 2012; Shapero et al., 2013) and rejection sensitivity (Lui et al., 2014b). These tendencies likely cause stress responses that subsequently both cause stress generation and internalizing symptoms (pathways 1 - 6, Figure 2).

Negative cognitive style was found to predict (interpersonal) dependent events across multiple studies, mostly related to depressive symptoms (Lui et al., 2014c; Keser et al, 2014; Shapero et al., 2013). Its effect on interpersonal stress was augmented by the presence of a high looming cognitive style (pathway 7, Figure 2; Kleiman & Riskind, 2014). Looming cognitive style also interacted with anxiety sensitivity, more specifically the mental incapacitation (i.e., fear of mental impairment) and physical facets (i.e., fear of catastrophic outcomes) of anxiety sensitivity (Riskind et al., 2010, 2013). It is hypothesized that these facets of anxiety sensitivity deplete the mental resources of a person, which subsequently leads to less control over stress responses, causing potential behavioral responses that causes interpersonal stress (pathway 6 to 3, Figure 2; Riskind et al., 2013). Since looming cognitive styles augment both a depressive related vulnerability and an anxiety related vulnerability, a preliminary suggestion is that a looming cognitive style plays a significant underlying role in stress generation. This could potentially explain why comorbid anxiety and depression predicts a stronger stress generation effect than either disorder by itself.

Furthermore, self-esteem was related to depression only as a risk-factor (pathway 5, Figure 2; Orth et al., 2009), or a mediational factor between insecure attachment and depressive symptoms (Hankin et al., 2005), so self-esteem does not appear to be a mechanism underlying stress generation. Another curious finding is that low self-perceived academic and appearance competence was associated with stress generation, but not low self-perceived

social competence (Lui et al., 2014a, 2014c). This is noteworthy, as overall stress generation was mostly found in the interpersonal domain. One explanation posed by Lui et al. (2014c) was that perceived social competence is nonlinearly related to dependent stress, meaning that for both individuals high (more interpersonal connections, more assertive behaviors) or low on social competence (greater difficulties in interactions) might be at risk for stress generation, cancelling out its effect.

An enhancing attributional style was identified as a potential protective factor against stress generation (Kleiman et al., 2013). An enhancing attributional style is a the tendency to see positive events, instead of negative events, as global and stable. How this cognitive style serves as a resiliency factor is unknown, but Kleiman et al. 2013 hypothesized that the enhancing attributional style may decreases levels of depression. It may also be that they act in ways that are in line with their expectations, creating more positive experiences.

Interpersonal vulnerabilities

Interpersonal vulnerabilities were also found relate to stress generation. Most notably, excessive reassurance seeking was related to dependent stressors (Lui et al., 2014c; Potthoff, et al., 1995; Shahar et al., 2004; Shih & Auerbach, 2010). Shahar et al. (2004) found this effect only in spouse-related stress, Shih and Auerbach (2010) found this effect only in women and Lui et al. (2014c) only found this effect in the interpersonal domain. Reassurance seeking also mediated the effect between bulimic symptoms and interpersonal distress (Kwan et al., 2017). Taken together, reassurance seeking appears to be a key component in stress generation, though its effect is moderated by several factors.

There is limited evidence that social skills predict stressful life events (SLE; Segrin et al., 2001). Rather, the relationship appears reversed. The experience of SLE may predict lower social skills (i.e., competence and efficacy). This could also explain why no association between perceived social competence and interpersonal stress was found (Lui et al., 2014c).

Higher perceived communication quality mediated the relationship between rumination and peer victimization (interpersonal stressor; McLauglin & Nolen-Hoeksema, 2012). This seems counterintuitive, but perceiving communication as of higher quality potentially increases interaction. More interaction together with ruminative behavior increases the likelihood of a stressful interaction (McLaughlin & Nolen-Hoeksema, 2012).

Personality Traits

Trait autonomy or self-criticism was found to predict (episodic) dependent stress (Daley et al., 1997) and neuroticism partially accounts for stress generation in depression and anxiety (pathway 2 & 5, Figure 2; Uliaszek et al., 2011). Dependent stress mediated the relationship between dependency and depression (pathways 1 & 2, Figure 2; Starrs et al., 2010). For sociotropy, mixed results were found. Safford et al. (2007) and Shih (2006) found that sociotropy predicted more life stressors in women, but another study found that sociotropy predicted less interpersonal stress events in women (Shih & Auerbach, 2010). The reason for different outcomes may be due to the broad nature of the concept of sociotropy. According to Sato and McCann (2007), sociotropic people are more nurturing to people they are not close with to gain a sense of relatedness, but act more coldhearted towards people they are close with, as they already have that sense of relatedness (Sato & McCann, 2007). Therefore, depending on the study, one type of interpersonal relationship may have become more salient, influencing the outcome. Future studies should investigate the effect of sociotropy on stress generation by specifying the types of interpersonal stressors (e.g., friends, family, acquaintances, colleagues). In line with Sato and McCann (2007), it would then be hypothesized that stress generation would be most profound in close relationship interpersonal events. This is in line with Shahar et al. (2004), who found that dependency interacted with specifically friends or family related stress to predict depression. For non-close relationships, a protective stress generation effect would then be expected.

Pre-existing Vulnerabilities and Moderators

Genetic predispositions, childhood adversity and attachment style were some of the pre-existing vulnerabilities found across the studies. Insecure attachment was related to stress generation in both depression and anxiety (Hankin et al., 2005). In depression, this effect was mediation by dysfunctional attitudes and low self-esteem (Hankin et al., 2005). In less severely depressed individuals, insecure attachments moderated the stress generation effect (Bottonari, 2007). This could indicate another underlying mechanism in severely depressed people that overpowers the effect of attachment styles. For example, severely depressed people may endure more chronic stress, which may undermine the stress generation effect. Depressive symptomology itself may also underly this undermine this effect (Conway et al., 2012).

Childhood emotional abuse (but not physical or sexual) predicted greater (interpersonal) dependent stress, and was found to be mediated by negative inferential styles (Liu et al,. 2013) and rejection sensitivity (Hernandez et al., 2016). General childhood adversity predicted adolescent interpersonal dependent stress (Huang & Starr, 2020). Furthermore, maternal emotional maltreatment or sexual maltreatment interacted with a short allele on the 5-HTTLPR gene to predict dependent (interpersonal) life events (Harkness et al., 2015). Childhood adversity (especially emotional abuse) may therefore be an important underlying risk-factor for stress generation. The short allele on the 5-HTTLPR gene also interacts with depression and low security (two-way and three-way) to predict stress generation (Starr et. al., 2013), and is therefore also a potential risk-factor for stress generation.

Sex differences were also found across a number of studies (Auerbach et al., 2012; Bender et al., 2010; Davila et al., 1997; Isometsä, 1995; Lui & Kleiman, 2012; Safford et al., 2007; Shih, 2006). Most evidence was found for stress generation in women (e.g., Davila et

al., 1995; Harkness & Luther, 2001; Shih & Eberhart, 2008; Bodell et al., 2012). For men, the results were mixed. Bender et al. (2010) found that found hypomania is bipolar was related to more interpersonal stress and Auerbach et al. (2012) found physical anxiety symptoms in boys are related to stress. In a number of article, however, no stress generation effect was found in men (e.g., Lui & Kleiman, 2012; Safford et al., 2007; Shih & Auerbach, 2010). This could be due to difference in the expression of certain characteristics in men and women (Shih, 2006). Future research should entangle specific character differences in women and men to further investigate how stress generation processes differ in men and women, as this can have significant implications for interventions.

Lastly, some age differences were found, but as most research was done on either adolescents or young adults, too little evidence for this effect yet (Morris et al., 2014; Rudolph et al., 2008).

Limitation and Recommendations

The current study is also subjected to some limitations. Firstly, due to the scope and the nature of the master thesis, a complete systematic literature review was not feasible. Therefore, the search for articles was not exhaustive and was limited to two search engines (i.e., PUBMED and PsycINFO). Furthermore, the used 74 studies were not thoroughly scanned upon all methodological issues and limitations. The purpose of this study was mainly focused on investigating the general consensus within the research of stress generation and finding potential gaps for future research.

On overarching finding was that most stress generation was found in the interpersonal domain. Some studies even found different stress generation effects within subtypes of the interpersonal domain (Hosang et al., 2012; Shahar et al., 2004). Therefore, future research should distinguish between the types of dependent stressors in to establish further specificity within stress generation. This will also potentially help uncover the influence of gender on

stress generation (ref.). The same implies for specificity in symptomology or vulnerability concepts. For example, Auerbach et al. (2012) found that stress generation is only related to anxiety in boys when looking at physical anxious symptoms. For girls, this was related to overall anxiety symptoms (Auerbach et al., 2012). Specifying can help pinpointing the underlying symptoms or characteristics that cause the stress generation effect, helping the development of more focused interventions. Also introducing more age ranges or developmental stages, potential age-related influences can be established.

Most research used either self-reports or interviews to gather the information of interest. Self-reports are easier to carry out, but are at risk of being subjected to interpretation biases (Alloy et al., 2010). People with depression or anxiety may be more likely to see certain events as being stressful or as dependent on their own behavior, when in reality this is not the case. Furthermore, as most self-reports consists of checklists whether certain events happened, the line between dependent and independent may become blurred as context is not taken into account (Alloy et al., 2010). Though these weaknesses are more accounted for in interview-based assessment, in which multiple independent researchers examine the more contextual sensitive responses of participants with pre-made coding schema's, the intervals are sometimes rather long (e.g., six months up to a year) or are of a retrospective nature. This can lead to a recall bias, which may influence outcomes. For interviews to improve recall accuracy and establish better temporal precedence, assessments should be prospectively over a set period of time with, with more assessments moment and less time in between the assessments (Alloy et al., 2010). A downside of interview-based assessment is that they are highly intensive, especially when a large enough sample is used to ensure significant power.

There is also considerable amount of evidence for internalizing symptomology, interpersonal and cognitive vulnerabilities playing a role in stress generation. However, there is still not a lot of research on specific stress responses that cause the stress generation effect

(pathways 3, 4 and 6, Figure 2). By establishing more behavioral and/or cognitive patterns that directly link to stress generation, intervention can also focus more on tackling these underlying patterns. One tool that may help untangling these patterns is by assessing mood, events and other characteristics using Ecological Momentary Assessment (EMA; Shiffon et al., 2008). EMA is an assessment method in which participants are repeatedly asks to reported on their experiences, behaviors, and emotions in real time. It is designed to minimize recall biases and more specific information can be gained about certain emotions/behaviors (Shiffon et al., 2008). If researchers were to apply this more the SGH, it would allow for in depth information about the temporal precedence of events and what kind of behaviors, emotions, cognition and/or physiological reactions causes and is caused by the events. The reciprocal relationship between internalizing symptomology and stressful life events (and underlying factors) can be identified more specifically. Furthermore, experiments in which people with specific levels of a characteristics are placed can give more insight in moderating effects.

In conclusion, people with depressive symptoms seem to generate more dependent stress events, supporting the original stress generation hypothesis by Hammen (1991). However, there seems to be much more underlying mechanisms that make this relationship far more complex (Alloy et al., 2010). There is some evidence for stable underlying cognitive vulnerabilities that cause stress generation. Future research should investigate the specific processes of stress generation more by distinguishing between the types of dependent stress events and specific stress responses that are caused by internalizing psychopathology and other vulnerabilities and how gender also influences this effect. By also integrating other theories of stress in disorders, a comprehensive model can be created to explain all the interactions between stress, stress responses, internalizing psychopathology and vulnerabilities. Ultimately, this information can help the development of more focused-

interventions. Ecological Momentary Assessment may be a useful tool for gaining such insight.

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Appendix A

Table 1

Table Showing Summaries of Selected Articles

Author	Sample*	Design	Dependent Variable	Findings	Relation-ship**	Evidence SGH?
Hammen (1991)	14 unipolar women, 11 bipolar women, 13 women with chronic illness, 22 healthy women	Longitudinal prospective	SLE (dependent, interpersonal, independent, total)	Unipolar women have more interpersonal stress and tended to have more dependent stress, with significant differences for healthy people and medically ill, and a tendency for bipolar.	1	Yes
Adrian & Hammen (1993)	children with unipolar, bipolar, medically ill and healthy mothers (N = 11; 9; 12; 21)	Longitudinal prospective	SLE, stress threat levels	Significant difference between unipolar with normal and bipolar on family stress events, not with medically ill. Significant differences peer conflict unipolar with normal and medically ill, not bipolar.	1, 2, 7	Yes
Davila et al. (1995)	140 women (age 17-19)	Longitudinal prospective	Depression symptoms, IPS scores, Episodic and chronic stress	Initial depressive symptoms and poor interpersonal problem solving each led to higher levels of interpersonal stress; interpersonal stress, in turn, led to further symptoms of depression.	1, 2	Yes
Isometsä (1995)	71 suicide victims with diagnosed unipolar depression (45 female); 31 (18 male) suicide victims with bipolar I	Retrospective	SLE	No difference between uni- and bipolar in timing and type of events. In bipolar victims, 88% likely due to own behavior. in unipolar 66%. Among bipolar victims, sex differences in stress events were found (m =86%; f=37%)	1	Yes
Potthoff et al. (1995)	267 college students (165 female)	Prospective longitudinal	Reassurance-seeking, depressive symptoms, Minor social stressors	Dependent life stress mediated the link between initial reassurance-seeking style and subsequent de-pressive symptoms. Depressive symptoms related to subsequent minor stressors	1, 2	Yes
Williamson et al. (1995)	39 adolescent (age 12-18) with diagnosed MDD and 35 controls	Cross-sectional	SLE, depression symptoms, illness severity	Depressed adolescents had significantly more dependent stressful life events during the previous year than did the normal controls. Less severe depression was associated with more dependent life events in	1	Yes

				adolescents compared to more severe depression.		
Daley et al. (1997)	134 late adolescent women (age 16 – 19)	Longitudinal	Diagnoses (Depression, Comorbid, No) SLE, chronic stress scores, family psychopathology, sociotropy-autonomy score	Depressed women experience more dependent, but not independent stress than controls. Participants with comorbid depression experienced greater levels of dependent stress and interpersonal conflict stress than did participants with depression alone. Women with pure depression did not go on to experience greater levels of interpersonal conflict stress than women controls. Risk for SLE with parental psychopathology is mediated through personal psychopathology. Even when controlling for previous chronic stress, psychopathology still remains a significant predictor of future episodic stress. Trait autonomy predictor of future episodic stress.	1, 2, 5	Yes
Davila et al. (1997)	154 newlywed couples (Wives age 18 – 35)	Longitudinal	Depressive symptoms, chronic marital stress, social support behavior, social support perception,	Evidence of marital stress generation among wives, and social support processes functioned as a mechanism of stress generation for wives. For husbands, social support perception and behavior was product of marital stress. Higher levels of stress associated with negative social support.	2, 3	No
Harkness et al. (1999)	59 (43 female) participants with no previous episode (n = 28), one (n = 10), at least two (n = 21)	Cross-sectional	Depression symptoms, SLE and severity	Participants with recurrent depression experienced significantly more total dependent events than first onset depressives in the 12 months, but not the 3 months, preceding their episode.	1	Yes
Rudolph et al. (2000)	88 clinically referred youngsters and caregivers (depressed n =19; externalizing n = 22; comorbid internalizing/externalizing n = 15; clinical controls n = 18)	Cross-sectional	Episodic life stress, chronic life stress, depressive symptoms	Child depression was associated with interpersonal episodic and chronic stress, which was stronger for boys. Comorbid children associated with highest level of stress.	1	Yes

Harkness & Luther (2001)	74 women with MDD (M age = 37.30 years, SD = 11.16)	Retrospective cross-sectional	Diagnosis, Depression severity, SLE	Presence of comorbid dysthymia and anxiety was associated with higher levels of dependent stress, but not independent stress. Either comorbid dysthymia or anxiety did not differ from group with neither risk factor.	1	Yes
Jones et al. (2001)	Families (119 mother, 96 fathers, 119 adolescents)	Prospective	Depressive symptoms, perceived marital stress, perceived parent-adolescent stress	Maternal depressive symptoms predicted more perceived marital and parent-adolescent stress. Also other way around. Maternal depressive symptoms influence adolescent depressive symptoms. Only marital stress influenced adolescents. Father reported family stress associated with greater adolescent depressive symptoms.	1, 2, 5	Yes
Segrin (2001)	S1: 1667 university students S2: 93 students	S1: Cross-sectional S2: Longitudinal	Social skills, SLE	Limited evidence that socials skills are negatively related to subsequent negative life events.	9	No
Chun et al. (2004)	313 treated depressed patients (55.4% female) and 332 demo-graphically matched community controls (54.5% female)	Longitudinal	Depressive symptoms, SLE	Individuals with unipolar depression experience more dependent (non)interpersonal stressors compared to controls.	1	Yes
Shahar et al. (2004)	198 undergraduates (M age = 19.9 years; 107 female)	Prospective	Dependency, self-criticism, excessive reassurance seeking, SLE, depressive symptoms	Dependency interacted with family and friends-related stress to predict increased depression. Second, self-criticism had a longitudinal effect of depression, which was mediated by life stress. Third, whereas self-criticism predicted a wide range of stress, reassurance-seeking behavior predicted only spouse-related stress.	1, 2, 7	Yes
Wingate & Joiner (2004)	1766 African American adolescents (age 13-18 years; 1348 females)	Longitudinal	Depressive symptoms, anxiety symptoms, externalizing symptoms, SLE	Depressive symptoms were related to (in)dependent stress events, anxiety and conduct disorder not. Stress also predicted later occurrence of depression.	1	No
Hankin et al. (2005)	233 undergraduate psychology student (73 male)	Longitudinal	Depressive symptoms, anxiety	Mediation effect of interpersonal stress between insecure attachment and later	1, 2, 5	Yes

			symptoms, SLE, attachment styles	depressive and anxiety symptoms. Relationship between insecure attachment dimensions and increases in depressive symptoms was mediated by both dysfunctional attitudes and low self-esteem, not for anxiety.		
Holahan et al. (2005)	1211 participants (41% female: M age = 61 years)	Longitudinal	Avoidance coping strategies, dependent SLE, depressive symptoms	Avoidance coping associated with more life stressors 4 years later. Life stressors mediated baseline avoidance coping and depressive symptoms 10 years later, controlling for the influence of initial depressive symptoms.	1, 2, 3, 6	Yes
Joiner et al. (2005)	S1: 178 psychology students (99 men); s2: 95 participants (35 men); s3: 97 students (40 men)	Longitudinal	depression symptoms, SLE, hopelessness scale (s2), Anxiety (s2), self-esteem (s3)	s1: replication of SGH s2: replication and hopelessness as potential mediator, anxiety did not predict SLE s3: hopelessness mediator between depression implicated in the generation of actual stress.	1, 2	Yes
Smith et al. (2005)	4923 (59,6 % female; age 14-18)	Longitudinal	violence victimizations, peer victimization, psychological distress	Peer victimization and relationship violence victimization significantly mediated by internalizing symptomology.	1	Yes
Cole et al. (2006)	S1: 708 adolescents S2: 508 children	Longitudinal	Depressive symptoms, SLE, latent trait-state error	When the state depression factor was modelled as predicting stress, support for the stress generation model appeared to increase with age. When trait depression factor was modelled as the predictor of stress, support for the stress generation model did not vary with the child's age.	1, 2, 3, 4, 5	Yes
Shih (2006)	99 college students (50 females; M age =19.08 years)	Prospective	Sociotropy and autonomy scores, SLE, depression symptoms	Females scoring high on sociotropy predicted more life stressors, mediating partially the relationship between sociotropy and depressive symptoms. No sex difference in experience of interpersonal stress due to depression. No stress generation effect found in men.	1, 5, 7	No

Bottonari et al. (2007)	68 clinically depressed individuals (48 female, M age = 40.1 years)	Prospective	Attachment style, depression severity, Life events	Attachment style and depressive severity interacted to prospectively predict threat associated with the generation of interpersonal and dependent life events, but not achievement or independent life events. For less severely depressed patients, insecure attachments predicted threat associated with interpersonal and dependent events.	1, 7	Yes
Grandin et al. (2007)	155 with biopolar disorder (93 female) and 155 controls (93 female) Ages 18 to 24	Retrospective	Childhood SLE, depression symptoms, mania symptoms,	Bipolar spectrum diagnosis did not predict the number of total childhood stressors, particularly events dependent on one's behavior occurring after the bipolar individuals' age of onset, only for achievement failure stress and independent events.	1	No
Safford et al. (2007)	76 undergraduates with high (65.8% female) and 81 undergraduates with low cognitive style (67.9% female)	Longitudinal	Depression episodes, SLE	Individuals with negative cognitive styles generated more negative life events (dependent/interpersonal, but not more independent/ achievement related events), but only for women. History of depression was not predictive of SLE	1, 2, 3, 6, 7	No
Uhrlass & Gibb (2007)	208 undergraduates (148 female; M age = 19.6 years)	Longitudinal	Emotional maltreatment, SLE, depressive symptoms, anxiety symptoms	Initial depressive symptoms, but not anxiety symptoms, contributed to prospective changes in negative life events. Changes in recent negative events mediated, rather than moderated, the link between reports of childhood emotional maltreatment and changes in depressive symptoms.	1, U5	Yes
Harkness et al. (2008)	58 adolescents with depressive symptoms (ages of 13–18)	Cross-sectional	Diagnosis, depressive symptoms, SLE, Child abuse and neglect	A history of childhood abuse and neglect was associated with a significantly higher level of interpersonal stressful life event threat following depression episode onset than prior to depression onset. The generation of interpersonal stress was stronger for first time onset than among those with a recurrent episode.	1, 5, 7	Yes

Rudolph (2008)	158 youth (82 females; M age = 12.39 years) and caregivers	Prospective	Depressive symptoms, life stress, pubertal maturation	Depression predicted prospective increases in the generation of interpersonal stress. Pubertal timing, but not chronological age or pubertal status, amplified the interpersonal stress-generation process in depressed youth. Early pubertal timing related to more stress generation.	1, 7	Yes
Shih & Eberhart (2008)	51 college women (M age = 19.08 years)	Prospective	Problematic interpersonal behaviours, SLE, depressive symptoms, depression diagnoses	Prior major depression status and stress generation was accounted for by higher levels of subclinical depressive symptoms. Prior depression predicted the behavior "too caring", which in turn predicted interpersonal stress generation. This behavior only marginally mediated between depression and stress.	1, 3, 4	Yes
Kercher & Rapee (2009)	756 young adolescents (M age = 12,8 years; 50,6% boys)	Longitudinal	Depressive symptoms, Cognitive styles, rumination, life events	Initial depressive symptoms and cognitive vulnerability predicted the occurrence of stressful life events that were at least partly dependent on the adolescent's behavior, which in turn predicted depression symptoms.	1, 2, 5, 7	Yes
Kercher et al. (2009)	896 adolescent girls (M age = 12.3 years)	Longitudinal	Depressive symptoms, neuroticism, life events, automatic negative thoughts	Initial levels of depression predicted dependent negative events, negative automatic thoughts and subsequent depressive symptoms. Initial depression was also associated with later independent life events. Dependent negative life events and failure beliefs mediate the relationship between initial levels of neuroticism and later depressive symptoms, controlling for initial depressive symptoms.	1, 2, 4, 5, 6	Yes
Orth et al. (2009)	S1: 359 individual (59% female, M=18.3 years) S2: 249 trainees (36% female; M age = 18.0 years) S3: 2,403 individuals (50% female; M	Longitudinal	Self-esteem, depression symptoms, SLE	Depression, but not self-esteem, was found to be reciprocally related to stressful events. Self-esteem risk-factor for depression. No interaction between stressful events and self-esteem was found.	1, 2, 5, 7	Yes

	age = 15.5 years)					
Bender et al. (2010)	75 BSD patients, 88 controls; age range 18 – 24 years	Prospective	SLE, bipolar episodes	BSD had overall increases in dependent life events, with polarity specifity. Hypomania in men associated with more interpersonal dependent events. Interpersonal stress generation not found in depressive symptoms.	1	Yes
Riskind et al. (2010)	72 undergraduates (78% female; M age = 20.7)	Longitudinal	Depressive symptoms, anxiety symptoms, Anxiety sensitivity, looming cognitive style, negative life events	Looming Cognitive Style and Anxiety Sensitivity augmented each other in predicting an increase in stressful life events over time. Each factor was positively associated with stressful events under high levels of the other, but not under low levels.	1, 2, 5	Yes
Shih & Auerbach (2010)	206 college students (139 female)	Longitudinal	Excessive reassurance seeking, sociotropy, daily depressive affect, daily life stressors	Reassurance seeking and sociotropy predicted dependent interpersonal stress in women but not men. Reassurance seeking predicted a greater likelihood of interpersonal stress generation, high sociotropy predicted a lower likelihood of interpersonal stress generation. Interpersonal predictors did not predict achievement dependent stress or independent stress in men or women.	1, 2, 3, 6, 7	No
Starrs et al. (2010)	655 adolescents (313 females; ages 15-18)	Cross-sectional retrospective	Self perception, depressive symptoms, neuroticism, SLE, current or past affective disorder	Higher levels of dependency, self-criticism, neuroticism, and low self-perceived competence were all related to a greater likelihood of dependent stress, after controlling for lifetime diagnosis of depression and current depressive symptoms.	1, 2, 5	Yes
Wu & Anderson (2010)	Stage II or III breast cancer women (n=113; M age = 50.58 years)	Randomized trial, longitudinal	Depression symptoms, SLE	Stress generation was observed in the first 2 years following cancer diagnosis but not from 2 to 5 years after diagnosis. In first 24 months depressive symptoms related to stress.	1	Yes
Elliot et al. (2011)	260 undergraduates (170 females ; M age = 19.54 years)	Longitudinal	Avoidance personal goals, Subjective well-being, negative	Avoidance personal goals were a positive predictor of life stressors. Stress generation partially mediated the influence	1, 2, 3, 6	Yes

			affect, life stressors, avoidance coping	of avoidance goals on longitudinal change in SWB. Avoidance coping partially mediates the link between avoidance goals and life stressors, and validated a sequential meditational model in which avoidance coping and life stressors serve as joint mediators of the longitudinal relation between avoidance goals and SWB.		
Flynn et al. (2011)	167 adolescents (86 girls; M age =12.41 years) and their female caregivers	Longitudinal	Stress responses, life stress, depression and anxiety symptoms	Less engagement coping and more involuntary reactions to stress predicted subsequent dependent interpersonal stress and, in turn, depression. These stress responses also predicted noninterpersonal stress, but only interpersonal stress mediated the association between stress responses and depression.	1, 2, 3, 5, 6	Yes
Uliaszek et al. (2011)	627 adolescents (M=16.91 years; 195 males)	Longitudinal	Depression and/or anxiety diagnosis, depression and anxiety symptoms, life stress, extraversion, neuroticism, concern and sensitivity to negative outcomes	Neuroticism partially accounted for the stress generation relationship between depression and anxiety, with only moderate to severe episodic stressors in depression. No evidence for stress causation, for both interpersonal and non-interpersonal chronic life stress in both depressive and anxiety disorders.	1, 2, 5, 7	Yes
Auerbach et al. (2012)	105 adolescents (63 females; M age = 15.12 years)	Longitudinal	Anxiety symptoms, SLE, perceived control	In girls, low perceived control contributed to a greater occurrence of dependent interpersonal but not noninterpersonal stressors, which then triggered higher levels of both social anxiety as well as total anxious symptoms. For boys, the stress generation pattern only emerged when examining physical anxious symptoms.	1, 2, 3, 4, 6, 7	Yes
Bodell et al. (2012)	190 undergraduate women (M age = 18.7 years)	Prospective	Anxiety, ED, depressive symptoms, SLE	Increased depressive mood associated with SLE, not other symptoms of ED.	1	Yes

Conway et al. (2012)	705 15-year-olds	Longitudinal	internalizing, externalizing disorders, acute stressful events, chronic stress	Internalizing symptoms with interpersonal dependent stress, externalizing with noninterpersonal dependent stress. Presence of panic disorder predicted reduced exposure to interpersonal dependent stress. Dysthymia was associated with an excess of noninterpersonal dependent stress. Major depression predicted increased rates of interpersonal conflict stress above and beyond the effect of the internalizing dimension.	1	Yes
Hosang et al. (2012)	512 BD (339 females; M age = 47.95 years), 1448 with unipolar depression (1007 females: M age = 47.32 years) over 1346 controls (756 females; M age =37.04 years)	Cross-sectional	depression symptoms, SLE	Financial crisis was more strongly related to bipolar disorder rather than unipolar depression. Independent events were only related to unipolar depression and not bipolar disorder.	1	Yes
Liu & Kleiman (2012)	201 undergraduates (84.1% female; M age = 20.47 years)	Longitudinal	Depression symptoms, impulsivity, SLE	Female gender and depression symptoms predicted higher levels of negative dependent events. Negative urgency correlates with dependent events, but not with independent events.	1, 2, 3, 5, 6, 7	Yes
McLaughlin & Nolen-Hoeksema (2012)	1065 adolescent (ages 11-14; 545 boys)	Longitudinal	Rumination, Interpersonal stress, perceived peer support, internalizing symptoms	Higher perceived communication quality partially mediated the association between rumination and exposure to peer victimization. Greater exposure to all three types of victimization mediated the longitudinal relationship between rumination and internalizing symptoms.	1, 2, 3, 4, 5, 6	Yes
Starr et al. (2012)	356 adolescents (57% female, M=14.5 years)	Prospective	Depressive symptoms, SLE, genotype,	Genotype did not correlate directly with number or ratings of stressful life events. 5-HTTLPR genotype interacted with depression at age 15 to predict dependent stressful events at age 20.	1, 7	Yes
Harkness et al. (2013)	68 adult outpatients with major depression	Prospective	Depression severity, Chronic	Residual depression symptoms following treatment	1	Yes

	(42 women; age 18–60)		and acute stressors	significantly predicted exposure to severe life events. Residual symptoms, episodic and chronic stressors predicted recurrences of depression through dependent difficulties.		
Judah et al. (2013)	112 undergraduaties (74.1% female; M age = 19.4 years)	Prospective	Depression symptoms, anxiety symptomology, worry, SLE	Depression mediated relationship between somatic anxiety and stress generation .	1, 4	Yes
Kleiman et al. (2013)	167 females students (M=20.5 years)	Longitudinal	Depression symptoms, enhancing cognitive style, SLE	Enhancing attributional style predicted decreased levels of stressful events over the following four weeks, even when controlling for depression symptoms.	1, 2, 5	Yes
Liu et al. (2013)	66 with history of depression (51 female; M=19.86 years)	Longitudinal	Life events, depression (symptoms), cognitive style, childhood trauma (physical, sexual, emotional abuse)	Childhood emotional abuse, but not sexual or physical abuse, prospectively predicted greater stress generation. Negative inferential styles mediated this relation.	1, 2, 5	Yes
Riskind et al. (2013)	99 females students (M age=21.25 years)	Longitudinal	Life events, psychopathology symptoms, looming cognitive style, anxiety sensitivity	LCS and AS magnified each other's impact on stress generation. Significant interactions between LCS and the Mental Incapacitation and Physical facets of AS but not the Social facet.	1, 2, 5	Yes
Shapero et al. (2013)	356 youths (57% female, M=14.5 years)	Prospective	stressors, negative cognitive styles, dysfunctional attitudes, rumination, co-rumination, anxious/avoidant attachtment, positive and negative emotionality, depressive and anxiety symptoms, conduct problems	Higher levels of depressive symptoms led to increases in dependent stressors, and increases in all stressors led to prospective fluctuations in depressive symptoms for both boys and girls. Baseline interpersonal vulnerabilities, psychopathology, temperament, and some cognitive vulnerabilities and interpersonal vulnerabilities predicted dependent stress (achievement and interpersonal) over time.	1, 2	Yes
Starr et al. (2013)	354 Caucasian participants (217 female)	Prospective	Secure relational style, depression symptoms, SLE, genotype	Short allele predicted increased stress generation at age 20 among those with low age 15 security, but decreased stress	1, 2, 7	Yes

				generation among those with high security. Three-way interaction between depression, low insecurity and short allele on stress generation.		
Kleiman & Riskind (2014)	304 college students (M age =21.27 years; 75% female)	Prospective	Negative cognitive style, looming cognitive style, depression and anxiety symptoms, SLE	Negative cognitive style and looming cognitive style augment each other to predict negative interpersonal, but not achievement, life events	1, 2, 5	Yes
Liu et al. (2014a)	185 (M=19.65 years;75.7% female)	Prospective	Depression symptoms, history of clinical depression, self-perceived competence, SLE	Stress generation specificity was found for self-perceived competence in appearance and academic domains, but not for self-perceived social competence. Low self-perceived academic competence, but not appearance or social, prospectively predicted greater overall negative dependent, but not independent, events.	1, 2, 5	Yes
Lui et al. (2014b)	66 undergraduates with history of depression (77.3% female; M=19.86 years)	Prospective	Life events, depression symptoms, rejection sensitivity	Greater RS predicted higher rates of prospectively occurring dependent stressors, but not independent stressors. These stressors mediated the relation between RS and subsequent depressive symptoms.	1, 2, 3, 6	Yes
Lui et al. (2014c)	185 (M=19.65 years;75.7% female)	Prospective	Depression symptoms, history of clinical depression, self-perceived competence, negative life events, excessive reassurence seeking, negative feedback seeking	Negative inferential styles in achievement, interpersonal and appearance domains each prospectively predicting greater overall dependent, but not independent, stress. Low self-perceived academic competence prospectively predicted greater overall negative dependent, but not independent, events. Excessive reassurance-seeking predicted higher levels of dependent stress in the social, but not academic or appearance, domain.	1, 2, 5	Yes
Morris et al. (2014)	s1: 240 adolescents (M=11.86 years, 54.2% female) & mothers.	Longitudinal	depression symptoms, depressive disorders, life events	The relation of depressive symptoms to dependent stress levels peaked at a lag of 6 weeks. The relations of depressive symptoms to	1	Yes

	S2: 68 (M=23.39 years; 63% female)			dependent life stress levels diminished across successive depression recurrences. Higher levels of depressive symptoms predicted higher dependent, but not independent, stress levels. Relations of depressive symptoms to dependent stress levels were stronger in adolescents compared to the young adults, even after controlling for depression history.		
Farmer et al. (2015)	79 (40=SAD; 39 age-gender matched; 64.6% female; M=28.9 years)	Longitudinal	Diagnostic status, daily emotions, Daily self-esteem, Daily social events	Participants with SAD reported more frequent negative social events, as well as less frequent and meaningful positive social events in their daily lives. Participants with SAD displayed less prospective stress generation on days following more intense negative emotion experiences.	1, 2, 3, 4, 5, 6	Yes
Harkness et al. (2015)	297 (165 female; M=19.7 years)	Longitudinal	Diagnosis, childhood experience of abuse, life events and difficulties	Individuals with the risk s-allele of the serotonin transporter gene reported significantly higher rates of dependent and dependent-interpersonal life events than those homozygous for the l-allele, but only in the context of a history of maternal emotional maltreatment or sexual maltreatment.	2, 5	Yes
Phillips et al. (2015)	1008 (44% female; age range 44-63 years)	Longitudinal	Anxiety and depression symptoms, SLE	Stress generation was found for anxiety, less strong for depression in major life events	1	Yes
Hernandez et al. (2016)	185 undergraduates (M age = 19.65 years; 75.1% female)	Longitudinal	Depressive symptoms, history of child abuse, excessive reassurance seeking, rejection sensitivity, negative feedback seeking	Childhood emotional abuse prospectively predicted greater interpersonal dependent stress, but not non-interpersonal dependent or independent stress. Only rejection sensitivity mediated this relationship	2, 3, 6	Yes
Kwan & Gordon (2016)	374 undergraduates (163 male; M ages = 19.22 years)	Longitudinal	depressive symptoms, bulimic symptoms, dietary restraint, life hassles,	Bulimic symptoms predicted greater life hassles but not lower social support one month later. Baseline	1	Yes

			perceived social support	dietary restraint did not predict future life hassles or social support.		
Kwan et al. (2017)	539 undergraduates (M = 19.30; 65.1% female)	Longitudinal	Bulimic symptoms, reassurance seeking, stressful social interactions, depressive symptoms	Bulimic symptoms had a direct and an indirect effect on interpersonal distress, with reassurance-seeking as a mediator in the indirect effect.	1, 2, 5	Yes
Liu & Spirito (2019)	99 adolescent psychiatric inpatients (79.80% female; M age = 14.68 years)	Prospective	Depressive symptom severity, suicidal ideation, lifetime history of suicide attempts, and negative life events	No evidence for stress generation in depression symptoms	1	No
Huang & Starr (2020)	214 adolescents (130 female, M age =15.89 years) & primary caregivers	Retrospective	Childhood adversity, Depression symptoms, episodic stress, genotype	Interpersonal childhood adversity significantly predicted greater adolescent interpersonal dependent stress. Additionally, multilocus genetic profile score predicted a stronger association between interpersonal childhood adversity and interpersonal dependent stress.	2, 5	Yes
Keser et al. (2020)	313 undergraduates (251 female; M age = 20.27 years)	Cross-sectional	Depression symptoms, cognitive triad, coping style, conflict tendency	Emotion-focused coping and negative cognitive triad, the characteristic features of depressive symptoms, were related to interpersonal conflict tendency, which was associated with conflict frequency. Emotion-focused coping (submissive and helpless styles) is a mediator in the relationship between depressive symptoms and conflict tendency.	1, 2, 5	Yes
Duprey et al. (2021)	diverse, socioeconomically disadvantaged, depressed adolescent girls (N = 175) who were part of a depression treatment intervention.	Random controlled trial	Child maltreatment, SLE, suicide ideation, emotion regulation,	Exposure to interpersonal stressors in the past year exacerbated the association between child maltreatment and adolescents' suicide ideation. No significant association between SLE and SI.	1, 2, 5	No

Felton et al. (2022)	213 participants (M age = 15 years; 45% female)	Prospective	Depressive symptoms, Delay Discounting, SLE	DD predicted the growth in dependent, but not independent, negative life events over this time period, controlling for baseline levels of depressive symptoms.	1, 2, 3, 5, 6	Yes
Harrison et al. (2022)	136 participants (M age = 8.69; 55.9% female),	Prospective	anxiety symptoms, diagnosis, cognitive distortions, life events	Anxiety symptoms and cognitive distortions were significant predictors of one-year total dependent stress, but not six-year. Anxiety diagnosis and anxiety symptoms were significant predictors of one-year dependent interpersonal stress. Anxiety diagnosis and anxiety symptoms were significant predictors of six-year independent stress.	1, 2, 5	Yes
Hasegawa (2022)	201 Japanese students (117 women; M age = 20.20)	Prospective	Aggressive behaviours, Negative (in)dependent events, depressive symptoms, rumination	Aggressive behavior predicted dependent interpersonal stress. Baseline depressive symptoms were not significantly associated with any category of negative events experienced in the follow-up period.	1, 3, 5	No
Smith et al. (2022)	4,923 parrticipants (59.6% female, aged between 14 and 18 years old)	Prospective	Dating violence victimization, peer victimization, internalizing problems	The longitudinal association between peer victimization and dating violence victimization was significantly mediated by internalizing problems. Dating violence victimization was significantly predicted by previous internalized problems.	1	Yes
Goodman et al. (2023)	S1: 303 participants (66,2 % female; Mean age = 31.31 years) S2: 87 (60.9% = female; Mean age = 30.37 years)	Retrospective / cross-sectional	Social anxiety symptoms, depression symptoms severity, SLE (categorized by dependency)	Stress generation effect found in social anxiety. Stress generation in study 1 better explained by depression.	1	Yes

Note. SLE = Stressful Life Events; *Ages mentioned are at the start of the research;

**pathways displayed in Figure 2