

Navigating the Nexus: The Impact of Daily Stressors on Rumination and Depression

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Abstract

This systematic literature review examines the relationship between daily stress, rumination and depressive symptoms, with a particular focus on the differences between depressed and healthy individuals. Key findings highlight the fact that depressed participants experience a higher frequency of stressful events and feel more stress. The correlation between stress and rumination is not significant. Rumination is identified as a response to stress that occurs in both healthy and depressed individuals, yet it is more prominent among the latter. It shows a varied mediating impact on the relationship between stress and depression, but this impact is not always significant. These findings underscore the importance of confronting ruminative tendencies and stress reception in therapeutic interventions such as CBT and mindfulness to improve stress management strategies and general coping strategies, particularly in depressed patients.

Keywords: ecological momentary assessment, depression, daily stress, rumination

Navigating the Nexus: The Impact of Daily Stressors on Rumination and Depression

Depression has emerged as the most prevalent psychiatric disorder in the twenty-first century, associated with a wide array of symptoms that range from persistent sadness and loss of interest in previously enjoyable activities to physical ailments and inflammation (Kessler et al., 2003; Nami, 2024). In today's world, at least 16% of individuals will experience depression, otherwise known as Major Depressive Disorder (MDD), at some point in their lifetime; this is a trend more prominent in women than in men (Kuehner, 2017). Moreover, depression is often recurrent, meaning that those affected by the disorder will likely have another episode of depression in the future. The prevalence of depression throughout age, gender and population makes it a crucial subject of investigation. Both the onset and lifetime course of depression are widely studied topics, and have been confirmed to be influenced by factors such as genetic predispositions, cognitive processes and environmental stressors (for an overview, see Mah, 2011; Monroe & Simons, 1991).

Rumination is a particularly peculiar cognitive process defined as repetitive negative self-referential reflection about the past with little constructive regard (Teissman et al., 2012). It is peculiar because it is not just a cognitive process — interestingly enough, it also occurs in response to stressful life events, making it a maladaptive emotion regulation strategy (Smith & Alloy, 2009; Garnefski et al., 2001). This is an interesting phenomenon: more than a mere cognitive default, rumination serves a purpose that is emotional and in this way negatively impactful, especially in response to daily stressors. These day-to-day hassles, though apparently minor, could have a real compounding impact on mental health. Understanding the way in which daily stress impacts rumination — especially in relation to depression — is therefore crucial.

Daily Stress and Depression

Daily stressors are events that are characterized as minor, routine challenges and demand that individuals encounter regularly, such as work pressure, interpersonal conflicts, and financial worries (Lazarus, 1999). Though seemingly trivial when contrasted against major life events, the

cumulative impact of these daily stressors on individual mental health can be very significant. Research consistently indicates an association between the experience of daily stress and the onset and perpetuation of depression (Parrish, Cohen & Laurenceau, 2011; Wisco & Nolen-Hoeksema, 2008). Specifically, daily stress might exacerbate depressive symptoms already experienced by individuals and thus onset a vicious cycle (Hammen, 2005): when depressed individuals encounter daily hassles, these invoke certain negative emotional and cognitive responses specific to depression that lead to a worse mental state and more depressive symptoms. In turn, this makes the depressed individual more susceptible to further stress. A stress sensitivity feedback loop is created: the depressed individual encounters more stressors, which leads them further down the path of depression. Conversely, healthy individuals often possess better coping mechanisms, which enables them to manage daily stressors in a much more effective way, thus also staving off depressive symptoms (Carver, Scheier, & Weintraub, 1989; Folkman & Moskowitz, 2004).

Daily stressors are typically assessed using self-report measures that record the frequency and intensity of stressors one encounters in day to day life. Research demonstrates that individuals with higher levels of daily stress are more likely to report depressive symptoms (Schlotz et al., 2011). According to the transactional model of stress and coping, the actual impact of stress on mental health is mediated by coping strategies and cognitive appraisal (Lazarus & Folkman, 1984). Individuals who perceive stressors to be overwhelming or insurmountable and employ maladaptive coping strategies, such as rumination, are at greater risk for developing depression. A more thorough understanding of this relationship is crucial for developing strategies that help mitigate the experience and elaboration of daily stress, especially in individuals suffering from depression.

Rumination

Rumination is a cognitive process characterized by a repetitive and passive focus on one's distress and the possible causes and consequences of that distress (Nolen-Hoeksema, 2000). It involves persistent and often intrusive thoughts that impede cognitive ability such as cognitive

problem-solving, and amplifies negative emotions. As a maladaptive coping strategy, rumination is closely related to depression — not only as a predisposing cognitive factor, but also as a perpetuating mechanism (Luca, 2019). The rationale for this is that individuals who suffer from depression tend to ruminate more than their healthy counterparts, which then results in a prolonged and intensified experience of depressive symptoms (Michl et al., 2013; Nolen-Hoeksema, 2008). The relationship between rumination and daily stress is also remarkably interesting: stress, in this instance, functions as a catalyst for ruminative thinking, which in turn could increase stress levels and thereby contribute to the development and perpetuation of depression.

Rumination consists of two key components: reflective pondering and brooding (Treyner et al., 2003). The former is purposeful — it helps guide the individual towards problem-solving. It can be adaptive, as it allows for reflection on one's own problems in a potentially constructive manner which then allows for a solution to be found. However, though it might seem positive, this type of rumination still has the potential to be maladaptive if engaged in excessively or the reflection becomes endlessly negative. The latter type of rumination, brooding rumination, solely involves a maladaptive and specifically passive focus on one's own distress. It involves repetitive self-critical thought processes that do not serve any constructive purpose but instead lead to feelings of helplessness and hopelessness. It is worth noting that the majority of current research exclusively focuses on the latter type of rumination and does not discern between the two components (Teismann et al, 2012). This is because brooding rumination is particularly detrimental to one's mental health, as it has the potential to exacerbate the severity and longevity of depressive symptoms (Treyner et al., 2003). Following the majority of current literature, a referral to “rumination” in this review will be a direct referral to brooding rumination.

Interestingly, individuals who report using more rumination following stress report higher levels of depressive symptoms over the following weeks and months — even after accounting for pre-stressor levels of depressive symptoms (Nolen-Hoeksema, McBride & Larson, 1997).

Moreover, rumination has been found to be a mediator in the longitudinal relationship between stressful life events and symptoms of depression (Michl et al., 2013). There are several reasons as to why this might be the case. One idea supported by empirical research is that rumination directly that rumination directly increases the negative emotions and symptoms that are central to emotional disorders such as depression (Andrews & Borkovec, 1988; McLaughlin et al., 2007). It could also heighten sensitivity through its influence on human behavior: through rumination, individuals increase maladaptive coping behaviors like social withdrawal, general inactivity, and avoidance, all of which in turn further perpetuate depressive symptoms (Wisco & Nolen-Hoeksema, 2008). Finally, another theory is that rumination “keeps the stressor alive”, and thus prolongs the effect of that stressor — even after that stressor has already ended (Verkuil et al., 2010).

The Added Value of Ecological Momentary Assessments in Measuring Stress

Ecological momentary assessment (EMA) is an ambulatory data collection method in which participants respond to cues and report on their experiences multiple times per day (Wenze & Miller, 2010). Herein lies its strength: collecting multiple measurements per day allows for processes to be examined as they occur within the individual over a period of time. This unique quality makes EMA particularly useful when measuring daily stress, stressors and rumination. Not only does it provide a plethora of measurements on each variable, solidifying results, but it also allows for a direct measurement after stressors and in moments of particular stress in moments that organically come up for people, perhaps giving way to a better, more ecological measurement of daily stress than a specifically designed experiment that will never be able to replicate the real world.

The use of EMA in depressed samples has yielded interesting results. Depressed individuals have been found to report more negative events and mark these events as more stressful than their health counterparts (Bysma, Taylor-Clift & Rottenberg, 2011). They also exhibit amplified negative emotional response to stressors, but this effect has only been found in some studies (Balsam et al.,

2011; Peeters et al., 2003). The ambiguity of previous findings solidifies the need for a review of the current evidence, especially in studies that use EMA to gather their data as it allows for an organic and plentiful method of collecting evidence.

Overview

The body of research findings on daily stress, rumination and their workings in depressed as opposed to healthy individuals is available, yet vast in its size. Research has especially shown that daily stress plays a significant role in the onset and perpetuation of rumination (Nolen-Hoeksema, McBride & Larson, 1997); it has also pointed out the probability of this relationship — specifically rumination — being of influence on the onset and maintenance of depression (Michl et al., 2013). This literature aims to summarize the existing literature on this topic. In doing so, it allows for the identification of key trends and patterns in the interactions between daily stress, rumination, and depression. Understanding these interactions will allow for greater insights into the impact of daily stress on rumination, their combined interplay with mental health, and — perhaps more importantly — for the identification of potential targets for intervention and treatment in order to help those who are affected by depression. This review seeks to discover how daily stress influences rumination, in healthy individuals and compared to those with depression.

Method

Protocol and Registration

This study was designed and written following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guidelines (Page et al., 2021). To ensure a transparent research process, the review method, search strategy, screening procedure, and plans for data extraction were specified and documented in a protocol a priori, which is registered with OSF and accessible via <https://osf.io/24auc>.

Search Strategy

A systematic literature search was conducted in Web of Science searching Core Collection and MEDLINE databases, and PsycINFO through EBSCOhost. This search included three main components: stress, the mental health outcome, and the use of a daily measures design.

In order to search for these components, various query strings were used and combined using the “AND” prompt. For the stress concept, the strings included the following search terms: stress*, or “life event*”, or “negative event*”, or hassles, or trauma*, or abuse, or neglect, or "child* maltreatment", or "child* experiences", or violence, or disaster*. Meanwhile, for the mental health outcome, the following query strings were used: psychopathol*, or "mental disorder*", or anxiety*, or depress*, or "CIDI", or "DSM", or phobia*, or "ptsd", or "panic disorder*", or "GAD", or "MDD", or "MDE". Finally, for the daily measure design, the query strings that were used consisted of: diary, or daily, or "time series", or "time-series", or "experience sampling", or "ESM", or "ecological momentary assessment*", or "EMA", or "intensive longitudinal", or ambulatory, or "micro-longitudinal". These strings were searched in the abstract or title. Validation procedures were not used to conduct this literature search.

Eligibility Criteria

This review considered only empirical studies. Dissertations, reviews, comments, opinion articles, books, book chapters, and others of similar nature were excluded. Protocols were included at the first stage to facilitate automatic prioritization in ASReview, but excluded during data extraction. Case studies (i.e. studies with a single participant) were also excluded. To be included in this review, articles had to use ambulatory measurements that were collected at least once a day for at least several consecutive days (i.e. ≥ 2 days in a row). These measures could include but were not limited to self-reported subjective measures, subjective measures reported by others, or objective measures (through a smartwatch or a similar device). If variables were measured daily but they only reflected a treatment that was administered daily (e.g. medication administration), or if the daily

measurements came in the form of Intensive Care Diaries (ICD) taken by nurses on the general state of participants, the study was excluded. Finally, if daily measures were not measured in human participants but solely focused on global statistical reports (e.g. crime reports), the study was also excluded. This review only included human participants. During the full-text screening, articles were excluded if they were: not in English, if not empirical, if the full text was not available, or if the study had no daily measure. This way, articles wrongfully selected by included were taken out. If relevant information was missing from a certain study, the author of the article was contacted once, according to the protocol.

Data Collection Process

Before the data collection, a pilot extraction was conducted in ASReview using automatic prioritization. The pilot extraction phase consisted of 15 sources. Based on the pilot screening sheet, the information to be extracted was adjusted. A data extraction sheet was developed in Google Spreadsheets where the characteristics of the selected studies were extracted and recorded. In the primary data extraction phase, twelve extractors were involved. The extractors had a training phase, after which they worked independently. During the extraction phase, extractors had the opportunity to ask their project leader questions formed as comments in the datasheet or during the weekly meetings. The process of data extraction was supervised by the project leaders.

The following population characteristics from the included studies were extracted: country, sample size, age (mean or range), population type, population subtype, physical health (problem/diagnosis), and mental health (diagnosis). In addition to this, the following ambulatory variables were extracted: sampling frequency/day, type of report (self-report, objective measures, or both), stress, affect/emotions, cognition, physiology, behavior, coping, mental health concept and its measurement, and other variables measured daily. All of the variables that were measured ambulatorily were also extracted cross-sectionally, with the exception of sampling frequency (as this category only considered cross-sectional or one-time measurements).

From the database yielded through the data extraction process, a further selection of studies was made. Studies for this literature review were initially chosen using the following variable selection:

1. For the ambulatory variable measurement of “stress”: “one item stress”; “SRRS-S”; “distress”; “DASS”; “perceived stress”; “subjective stress”; “stress”; “PSS” OR “feeling stressed”.
2. For the ambulatory variable measurement of “cognition”: “rumination”; “co-rumination”; “5-items rumination” OR “daily rumination about emotions”.
3. For the measurement of depression, either an ambulatory or cross-sectional variable selection of “mental health concept” as “depression” OR a population that had a mental health diagnosis of depression, coded as “MDD” OR “depression Dx”.

Because there were not enough studies that satisfied these criteria, two studies were added after replacing the “stress” variable selection with the operationalization of the “stressor” variables while still using the same “cognition” and “mental health concept” variable selection.

From this, a series of 15 articles appeared to meet the inclusion criteria. However, 6 of these articles were excluded because they met the following exclusion criteria:

1. Participants were under 18 years of age (Hilt et al., 2017; Hruska et al., 2015).
2. Sample was solely made up of transgender participants (Pucket et al., 2022).
3. Sample was solely made up of parents (Johnson et al., 2024).
4. Less than two participants (Stavropoulos et al., 2023).
5. The aim of the article included a mental disorder other than depression (Tng & Yang, 2023).

Through snowballing from sources in the selected studies, one additional article was found that met all the aforementioned inclusion criteria and did not meet the aforementioned exclusion criteria (Jiaxuan et al., 2018).

Data Extraction and Synthesis

Data extraction of the selected studies for this literature was performed using a standardized form based on the database to include key information from each study, including

- Author and publication year.
- Sample characteristics.
- Variable operationalization measures used for daily stress/stressors, rumination, and depression.
- Main findings related to the relationship between daily stressors, rumination and depression.

The ten included studies were analyzed using a narrative synthesis approach, which involved summarizing the findings of each study to subsequently identify common themes and patterns. The analysis focused on the relationship between daily stress and rumination, the relationship between daily stress and depressive symptoms, the relationship between rumination and depressive symptoms, and the differences in findings across depressed populations and non-depressed populations.

Results

For this literature review, screening for papers was conducted using ASReview on Web of Science searching Core Collection and MEDLINE databases, and PsychINFO. The search yielded a total of 18368 records. After removing duplicates (4881 records) and records marked as ineligible by automation tools (1017 records), 4195 records were screened. Of these, 1227 were sought for retrieval. 15 studies were not retrieved, which left 1212 reports to be assessed for eligibility. After applying the inclusion and exclusion criteria listed previously, 1159 studies were included in the database and thus subjected to full-text review. For this study, 15 studies out of this database were identified as relevant. Further assessment resulted in the final inclusion of 9 studies in the review.

One additional study was included through snowballing techniques. The selection process is summarized in a flowchart and is visible in Figure 1.

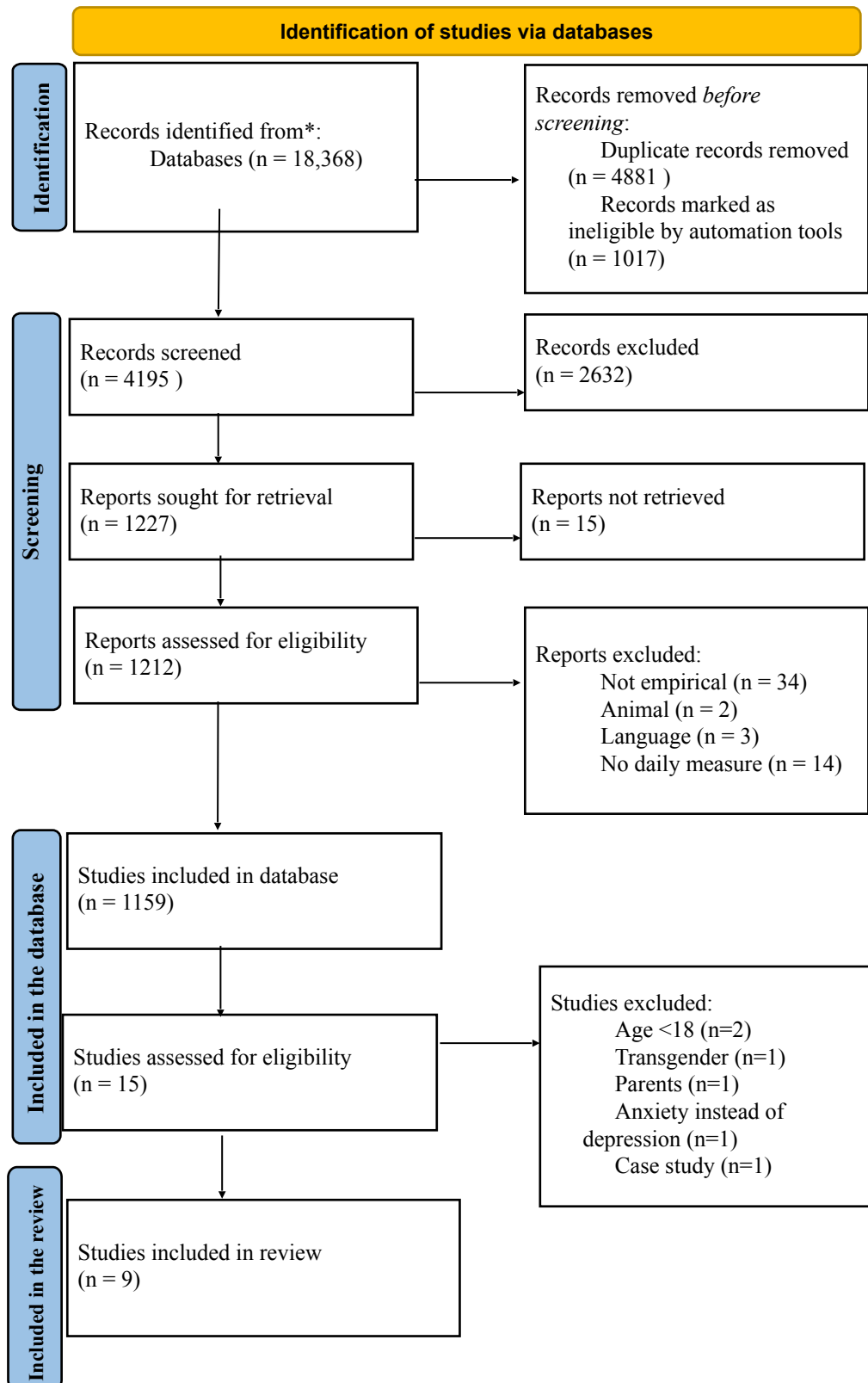


Figure 1

Identification of studies via databases

Study characteristics

Sample sizes of the included studies varied from 44 to 313 participants per study ($m = 141$). Various age groups were included, ranging from an average of 19 on average to 45 years old. In clinical samples (i.e. samples that included participants with a mental health diagnosis), a distinction was made between depressed participants and health controls. Most studies included more female than male participants ($m = 67\%$). Methodologies of the studies all included ecological momentary assessments (EMA) to measure stressors, stress, and rumination. Some studies measured depression through momentary depressive symptoms (e.g. Connolly & Alloy, 2017; Jiaxuan et al, 2018), whereas others used cross-sectional questionnaires to assess depression (e.g. Li, Star & Hershenberg, 2017; Moberly & Watkins, 2008). Sampling measurements were taken with a frequency ranging from once to 8 times per day ($m = 4$ per day).

The operationalizations of the variables included in this analysis were included in the table. Stressors, stress, and rumination were all measured ambulatorily, whereas depression was measured variably: again, some studies measured depression through ambulatory measurements whereas others used correctional questionnaires or prescreened depressed participants. The characteristics of included studies and their measures are summarized in Table 1.

Table 1.
Sample characteristics & measures

Author (year)	Population				Measures					
	Country	N	Female, %	Age, mean \pm SD	Sample type	Measurement frequency/day	Daily stressors	Daily stress	Daily rumination	Depression (daily)
Baik & Newman (2023)	USA	63	70	19 \pm 1.46	clinical	8	negative event	one item "how unpleasant was this event for you?"	one item "to what extent were you repetitively thinking about the possible causes and consequences of past stressful events?"	BDI-II; DIAMOND
Connolly & Alloy (2017)	USA	121	69	22 \pm 5.21	general	4	school, work, social, financial, health stressor	-	SRRS-S; MSRI-A	SDS; BDI-II (SADS-L)
Huffziger et al. (2013)	Germany	353	70	45 \pm 7.86	clinical	1	stressful events	-	two items	BDI-II; MADRS
Jiaxuan et al. (2018)	China	100	55	21 \pm 2.79	general	5	-	two items	one item "I'm recalling all my shortcomings, failures, and things I did wrong"	(three items)

Table 1. (Continued)

Author (year)	Population				Measures					
	Country	N	Female, %	Age, mean \pm SD	Participant sample	Measurement frequency/day	Daily stressors	Daily stress	Daily rumination	Depression (daily)
Li, Star & Hershenberg (2017)	USA	157	80	20 \pm 1.23	general	1	daily hassles	DASS	brooding rumination RRS items	QIDS (DASS)
Lischetzke et al. (2021)	Germany	313	74	30 \pm 14.9	general	1	-	one item "how did you feel today?"	one item "I thought over and over again about my emotions"	(PHQ-9)
Moberly & Watkins (2008)	UK	139	72	27 \pm 13.30	general	8	negative events	-	RSQ	BDI-II
Rosenbaum et al. (2021)	Germany	45	78	26 \pm 5.95	clinical	2	stressful event	one item "how stressed were you in the last 5 hours?"	brooding rumination RRS items; PCQ	BDI-II
Rosenbaum et al. (2022)	Germany	44	78	26 \pm 5.95	clinical	2	stressful event	one item "how stressed were you in the last 5 hours?"	RRS; PCQ	BDI-II; SCID

Table 1. (Continued)

Author (year)	Population				Measures					
	Country	N	Female, %	Age, mean ± SD	Participant sample	Measurement frequency/day	Daily stressors	Daily stress	Daily rumination	Depression (daily)
Ruscio et al. (2015)	USA	71	68	32 ± 11.38	clinical	8	positive and negative events	one-item "how stressful was this for you?"	three items	DSM-IV

Note. PHQ-9: Patient Health Questionnaire-9; RSQ: Response Styles Questionnaire; BDI-II: Beck Depression Inventory II; RRS: Ruminative Responses Questionnaire; PCQ: Psychological Capital Questionnaire; SCID: Structure Clinical Interview for DSM-V; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders IV; DIAMOND: Diagnostic Interview for Anxiety, Mood, OCD and Related Neuropsychiatric Disorders; SRRS-S: Stress-Reactive Rumination Scale; MSRI-A: Momentary Self-Focus Inventory Abbreviated; SDS: Self-Rating Depression Scale; SADS-L: Schedule for Affective Disorders and Schizophrenia-Lifetime; MADRS: Montgomery-Asberg Depression Rating Scale.

Study results

Daily Stress, rumination, and depressive symptoms

The direct relationship between stress and rumination was only found to be significant by Lischetzke et al. (2021); all other studies did not find a significant correlation between the two variables. Stressors were however found to significantly predict depressive symptoms in all five general sample studies except by Moberly & Watkins (2008). The latter study did not find any significant results across any of the variables. Connolly & Alloy (2017) found, in addition to this, that experiencing aggregated stress (i.e. “compounded” stress) to significantly predict increases in depressive symptoms over time.

Findings on rumination as a mediator in the relationship between stress and depressive symptoms are mixed. Connolly & Alloy (2017) found no mediator (though they did report that higher daily stress combined with high rumination did predict increases in depressive symptoms), whereas Jiaxuan et al. (2018) did discover rumination as a significant mediator between stress and rumination. The summary statistics of the general studies can be found in Table 2.

Depression versus control

Clinically prescreened depressed participants reported a significantly higher frequency of stressful life events as compared to their healthy counterparts; they also reported these negative life events to be much more unpleasant as compared to their healthy counterparts (Baik & Newman 2023; Rosenbaum et al., 2021). In general, depressed participants reported more daily stress than controls (Rosenbaum et al., 2022).

Depressed participants reported much more stress and rumination than controls did. Huffziger et al. (2013) found no significant relationship between rumination on stress levels measured through cortisol for either depressed individuals or controls, whereas Ruscio et al. (2015) did find a strong correlation between stress and rumination for both depressed and healthy individuals. Both Rosenbaum et al. (2021 & 2022) and Ruscio et al. (2015) found high levels of

daily rumination to be associated with high stress across the sample; these levels were even higher for depressed individuals.

Baik & Newman (2023) found that depressed individuals tended to focus on the negative to prepare for negative outcomes — even in positive situations — whereas controls did not. Stressors turned out to be different for depressed individuals than for healthy controls: depressed individuals rated social interactions, internal stress and private appointments to be significantly more stressful than their counterparts. Depressed individuals also tended to have a much more cognitive emotion regulation strategy (i.e. rumination) than healthy controls, who more often opted for coping strategies such as mindfulness (Rosenbaum et al., 2022).

Both studies conducted by Rosenbaum (2021 & 2022) only reported analysis results and did not include descriptive data of stress and rumination, hence why only analysis results showing significance of the correlations is shown. A summary of the results for clinical samples can be found in Table 3.

Table 2.*Summary statistics of general samples*

Author (year)	N	Outcome measures			Results
		Stress and rumination	Stress and depression	Rumination and depression	
Connolly & Alloy (2017)	121	$B = .17$	$B = .47^{***}$	$B = .45^{***}$; rumination did not significantly predict depression	Stressors significantly predicted depressive symptoms. Experiencing aggregated stress (i.e. a greater overall proportion of stressors) also significantly predicted increases in depressive symptoms over time. High ruminative focus on the self while a stressor was present was highly associated with later depressive symptoms. Rumination was not found to mediate the relationship between stress and depressive symptoms, but higher daily stress with high rumination together predicted increases in depressive symptoms.
Jiaxuan et al. (2018)	100	$B = .07$	$B = .33^{***}$	$B = .206^*$	Higher levels of stress predicted subsequent depression at the later time. Rumination significantly mediated the relationship between stress and depression: if people experienced higher levels of stress, they would experience higher rumination at the next time, and then experience more depression. However, stress and rumination by themselves were not significantly correlated.
Li, Star & Hershberg (2017)	157	-	$B = .12^{***}$	$B = .46^{**}$	Daily stressors and rumination significantly predicted depression. Rumination interacted with daily stressors to predict depressive symptoms. Greater baseline depressive symptoms predicted greater later daily stressors.

Table 2. (Continued)

Author (year)	N	Outcome measures		Results
		Stress and rumination	Stress and depression	
Lischezke et al. (2021)	313	$\rho = .12^{***}$	$\rho = .57^{***}$	Stress and rumination are directly correlated. Higher daily stress was also significantly correlated to subsequent depressive symptoms, just as rumination was significantly correlated to depressive symptoms. Rumination exacerbates stress to such an extent that participants found it somewhat harder to reach calmness in the evening.
Moberly & Watkins (2008)	139	$B = 0.028$	$B = 0.169$	Different ruminative styles yield different results. Brooding rumination and depression were associated with higher levels of momentary ruminative self-focus, but not significantly. Stress was not significantly associated with either brooding rumination or depression.

Note: * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 3.
Summary statistics of clinical samples

Author (year)	N		Outcome Measures				Results		
	D	C	Mean stress (SD)		Mean rumination (SD)				
			D	C	D	C		p	
Baik & Newman (2023)	37	26	3.84 (1.13)	1.53 (0.73)	<.001***	3.27 (1.2)	1.53 (.73)	<.001***	Depressed participants had a significantly higher frequency of negative life events compared to their healthy counterparts; they also reported these negative life events to be much more unpleasant than controls. Depressed participants reported much more worry and rumination than controls. They endorsed focusing on the negative to prepare for negative outcomes (even when reportedly happy) whereas controls did not.
Huffziger et al. (2013)	31	32	6.98 (5.57)	7.94 (5.33)	.032*	B = .02 (.02)	B = -.02 (.03)	.08	There was no significant between brooding on stress levels measured through cortisol. This was not the case for depressed participants nor for healthy controls. The only significant result was that depressed individuals had lower cortisol levels than controls.
Rosenbaum et al. (2021)	22	23	-	-	<.001***	-	-	<.001***	High levels of daily rumination were associated with high stress and increased affect across all, but especially across the depressed participants. Depressed participants also reported more stressful events than controls.

Table 3. (Continued)

Author (year)	N		Outcome Measures				Results		
	Mean stress (SD)		Mean rumination (SD)		p	p			
	D	C	D	C					
Rosenbaum et al. (2022)	21	23	-	-	<.001***	-	<.001***	Rumination was a common response to stress for all, but depressed participants used it much more than controls. Depressed participants reported more daily stress than controls. They also had significantly worse coping efficacy than their healthy counterparts.	
Ruscio et al. (2015)	38	33	1.32	.49	<.017**	.59	1.70	<.001***	Rumination as a response to stress after a stressor was a common response in all groups, but was reported much more often by depressed participants (80 %) than by controls (55 %). There was a strong correlation between stress and rumination. Group differences remained significant, even after adjusting for event stress.

Note. D: Depressed; C: Control.
* $p < .05$; ** $p < .01$; *** $p < .001$.

Discussion

This literature review aimed to investigate the relationship between daily stress, rumination, and depression. Previous research pointed towards the idea that people suffering from depression experience more stress; this idea is confirmed by the findings. Depressed individuals do experience more stressful events and report these events to be much more stressful than their healthy counterparts (Huffziger, 2013). This can also be seen in the fact that depressed individuals rate common day-to-day events such as social interactions or private appointments as major stressors, whereas healthy controls did not (Rosenbaum, 2022). This places the research findings in a larger web of similar results, such as Parrish, Cohen & Laurenceau (2011) and Wisco & Nolen-Hoeksema (2008). The vicious cycle possibly perpetuated by daily stress and the onset and maintenance of depression that was discussed previously finds confirmation in the included findings. Connolly & Alloy (2017), in addition to this, found that experiencing aggregated stress (i.e. “compounded” stress) to significantly predict increases in depressive symptoms over time.

Interestingly enough, there were mixed results on the relationship between stress and rumination — both in healthy and depressed individuals. Litschzeke et al. (2021), Ruscio et al. (2015), Rosenbaum et al. (2021 & 2022) found strong correlations between stress and rumination for both depressed and healthy individuals. In these results, levels were higher for depressed individuals. Even when placed in the larger context of research, the precise mechanism underlying rumination and stress remains unclear. For example, a bidirectional association was found in a longitudinal study that measured stress and rumination on a weekly basis instead of a daily one (Everaert & Joormann, 2020). The different chronological setup of this study and its subsequent different results highlight the need for further investigation into this complex relationship.

To complicate matters even further, the relationship of rumination as a mediator between stress and depression also remains unclear. Connolly & Alloy (2017) did not find rumination to

serve a mediating role, but Jiakuan et al. (2018) did. This could be due to a plethora of methodological issues, such as the fact that the former study took American participants and the latter took Chinese participants. These two studies are, of course, not the first to have conflicting findings on the exact role of rumination in the relationship between stress.

The existing literature contains a plethora of knowledge regarding the use of coping mechanisms when confronted with daily stress and negative emotions. Healthy individuals often have better coping mechanisms than depressed individuals, which allows them to manage stress effectively (Carver, Scheier, & Weintraub, 1989; Folkman & Moskowitz, 2004). Previous research pointed out that this helps them stave off depressive symptoms. Regarding this topic, the current findings point out that depressed individuals often have cognitive-based emotion strategies (e.g. rumination or avoidance) whereas healthy individuals opt to constructively regulate their emotions through tactics such as mindfulness (Rosenbaum et al., 2022). In addition to this, again, depressed individuals rated events such as social interactions or private appointments but also internal affairs as major stressors, whereas healthy controls did not. In this context, the findings presented by Baik & Newman (2023) also offer valuable insight regarding these cognitive-based emotion strategies: depressed individuals focused on the negative in situations to prepare for negative events (even if they were at that moment quite happy or content). This is something healthy controls largely do not do, and it could perpetuate ruminative tendencies, further exacerbating depressive symptoms.

Limitations and Implications

There are several limitations to this literature that need to be taken into account. Coding was conducted by fourteen different coders. It is very possible that each individual coder each utilized a slightly different individual interpretation of the categories in which concepts were included in the database, leading to categorizations of papers that might differ slightly from individual to individual. For example, “stress” and “stressor” could have definitions for one person that do not overlap with another’s, leading one coder to put interpersonal stress in the “stress” category and

another to put it in “stressor”. Being that studies were selected using these categories, it is possible that papers were missed because they were categorized differently than this selection and analysis was employed. Additionally, the initial review process itself was conducted using ASReview with specific databases and keywords, which might have lead to the exclusion of relevant studies published in other journals not present in the databases used or those using different terminology.

Another issue with self-report measures is the introduction of bias due to social desirability and recall inaccuracies naturally present in people (Althubaiti, 2016). Finally, some studies were conducted on populations that only included college students, which may not accurately represent the broader population. Conversely, the fact that five of the studies included used both diagnosed depressed participants and healthy controls allows for stronger conclusions to be drawn about depressed populations in general.

The findings of this literature review have several important implications for practice and future research. The strong relationship between daily stress and rumination in individuals suffering from depression suggests a need for interventions that specifically focus on stress management and cognitive behavioral therapies (CBT) that promote altering maladaptive cognitive appraisal strategies (Mao, 2023). Concretely, CBT and mindfulness-based interventions both work to reduce tendencies to ruminate and improve stress management, and thus could be particularly effective for depressed individuals.

Conclusion

This systematic literature highlights the impact of daily stress on rumination, in particular for individuals suffering from depression. The true relationship between the three variables remains unclear, as different studies yielded different results regarding direction. This is not only clear from this literature review, but also from the existing literature. The relationship between daily stress and depression has been solidified through analysis of the findings, as well as the combined impact of daily stress and rumination on the onset and perpetuation of depression. Most of all, the findings

highlight a need for interventions that address stress management and cognitive vulnerabilities.

Cognitive-behavioral therapies and mindfulness-based interventions are recommended as first-line practical interventions in this context. Future research should utilize larger, more diverse samples, and incorporate objective measures to further bring to light the mechanism underlying the relationship between stress and rumination. Effective management of daily stress and targeted reduction of ruminative thinking are crucial steps in breaking the vicious cycle that perpetuates depression, an illness that affects a significant part of the population. For those affected, integrating these strategies into appropriate interventions will significantly improve their quality of life.

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