Empirical Research Paper

Volatility in Expectations While Awaiting Important News

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Abstract

Waiting for important news is uniquely anxiety provoking, and expectations for one's outcome fluctuate throughout the wait. Emotional volatility is typically associated with negative outcomes, but little is known about volatility in expectations. In Study 1, law graduates ($N = 248$) estimated their chances of passing the bar exam every 2 weeks during the wait for results. Greater volatility in expectations, operationalized as the frequency with which outcome expectations changed during the wait, was associated with greater worry and more negative emotionality throughout the wait. Study 2 partially replicated these findings in a sample of Trump and Biden supporters ($N = 444$) awaiting the result of the 2020 presidential election. Study 2 also demonstrated a causal link between constrained (vs. volatile) expectations and worry. Our findings have implications for how best to manage one's expectations while awaiting important news, with the goal of minimizing worry and other negative emotions.

Keywords

uncertainty, waiting, expectations, volatility, well-being

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The experience of waiting for important news is often riddled with anxiety about the uncertain outcome. In part as a response to fluctuating anxiety, people's expectations for a good outcome are likely to change over the waiting period while awaiting important news, like the results of a medical test or a callback following a job interview (Shepperd et al., 1996; Sweeny & Andrews, 2014; Sweeny & Howell, 2017). How often and how much these expectations change may be consequential and varies by individual (Sweeny & Krizan, 2013), but how this expectation "rollercoaster" affects well-being is unknown. This article examines links between volatility in people's expectations during waiting periods and emotional well-being.

Expectation Volatility

Waiting for news regarding a consequential outcome can be a stressful and anxiety-provoking experience (see Sweeny, 2018). Waiting periods are dynamic, such that worry and anxious feelings are highest at the start and end of uncertain waiting periods, and one's coping efforts change accordingly (Howell & Sweeny, 2016; Sweeny & Andrews, 2014; Sweeny et al., 2016). Thus, the psychological experience of waiting for uncertain news varies over time, even when it appears that nothing is changing (e.g., the exam or interview is over) and nothing further can be done to alter the awaited outcome. This variability in psychological experience is evident from numerous studies that have documented fluctuations in expectations while waiting for news (e.g., Shepperd et al., 1996; see Sweeny et al., 2006, and Sweeny & Krizan, 2013, for reviews).

Changes in expectations are not arbitrarily volatile; in fact, studies have identified common patterns of changes in expectations over the course of various waiting periods. Most commonly, individuals tend to lower their expectations as the wait for news comes to a close and the moment of truth nears, in an effort to brace for bad news (Sweeny et al., 2006). People shift away from optimistic expectations at this time, especially when the outcome is uncontrollable and relevant to their self-concept (Sweeny et al., 2006). Even the most ardent optimists show this loss of confidence as news approaches (Sweeny & Falkenstein, 2015). A meta-analytic review of 71 samples that compared expectations reported relatively far and relatively close to some kind of personal feedback showed an overall downward shift in expectations as feedback approached, confirming that expectations can shift in response to changes in one's perception of a performance and its outcomes (Sweeny & Krizan, 2013).

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These findings held even in studies that focused on waiting periods during which nothing could be done to alter the performance or its outcome.

Other studies have linked expectations to emotional experiences during the wait for news, although these investigations have focused on how emotions might inform expectations rather than expectations affecting emotions. That is, people lower their expectations in anticipation of news in part as a response to current mood states (Sweeny et al., 2006). One study examined the role of anxiety in expectations in a sample of undergraduates waiting for the results of a verbal assessment. When participants attributed their anxiety about their score to their uncertainty about the outcome, expectations for a positive outcome fell at the moment of truth. When participants were led to misattribute their anxiety to caffeine they believed they had consumed, expectations remained optimistic throughout (Shepperd et al., 2005). These findings suggest that fluctuations in emotions, when attributed to one's performance, can influence expectations. However, the current investigation focuses on the reverse association: how changes in expectations might influence one's emotional experience during a stressful waiting period.

Emotional Volatility

Although the findings described above point to the potential importance of fluctuations in expectations over time (particularly the linear decline characteristic of bracing for bad news), as well as the role of emotions in these fluctuations, no study to date has examined how general volatility in expectations might be associated with well-being. Psychologists have examined volatility in a variety of constructs (e.g., self-esteem; Kernis et al., 1993), but perhaps the most commonly studied is affect or emotional volatility.

As a concept, emotional volatility is closely tied to the Big Five personality trait of neuroticism, or emotional instability (John & Srivastava, 1999; cf. Kalokerinos et al., 2020). Neuroticism is linked to higher reactivity to stressors (Bolger & Schilling, 1991; Mroczek & Almeida, 2004) and the perception that stressors are more severe and detrimental to one's life (Espejo et al., 2011). Those higher in neuroticism are also more likely to view a stressor as relatively out of their control (Leger et al., 2016), which is a common and salient feature of uncertain waiting periods. These negative outcomes associated with emotional instability point to the possibility that instability in expectations might also have negative consequences for well-being.

Some studies have investigated emotional volatility beyond the construct of neuroticism using longitudinal designs. Eaton and Funder (2001) conducted a time-series analysis of emotional experience in a sample of undergraduates. They found that the rate of change in emotions over time was related to more fear and hostility toward others, and greater intraindividual variability in emotions was related to an unwillingness to deal with life's challenges (Eaton & Funder, 2001). Furthermore, greater intraindividual variability in positive emotion on a weekly and daily basis has been linked to poorer mental health and well-being (Gruber et al., 2013) and may even dampen immune responses to vaccination (Jenkins et al., 2018). A meta-analysis of 79 studies addressing short-term emotion dynamics and well-being revealed that regardless of how intraindividual variability in emotions was measured, variable and unstable emotions often co-occurred with poor psychological well-being (Houben et al., 2015).

The Current Investigation

Research on emotional volatility reveals the benefits of stability and apparent negative consequences of instability. During uncertain waiting periods, individuals actively manage their expectations about the uncertain outcome, and expectations can also fluctuate in response to anxiety and emotional state. Given clear ties between expectations and emotions (e.g., Shepperd et al., 2005; Sweeny et al., 2006) and considerable evidence of meaningful variability in expectations during uncertain waiting periods (Sweeny & Krizan, 2013), the aim of the present studies was to examine such volatility in expectations in relation to well-being during the wait for uncertain news across two contexts. We hypothesized that greater variability in expectations would be associated with poorer well-being while awaiting uncertain news, parallel to the findings regarding emotional volatility.

Study 1

Method

Participants. Law graduates ($N = 248$; 61% women; $M_{age} = 27.6$; 67% White, 25% Asian or Pacific Islander, 7% Latinx, 1% Black or African American) took part in a longitudinal study regarding their experience with the California bar exam. The law graduates were recruited through student bar associations, alumni offices, and relevant listservs. The sample size reflects the number of law graduates we were able to recruit prior to the bar exam in July 2013.[1]

Procedure. Participants completed the first survey while they were preparing to take the bar exam, approximately 2 weeks prior to the start of the exam ($M = 14$ days pre-exam, range: 0–16 days). After taking the exam, participants completed a total of eight surveys, once every 2 weeks over the 4-month waiting period. Participants completed the final survey after their results were posted online and they knew whether they had passed or failed.[2] For the purpose of this investigation, we focus on the initial survey (in which individual differences and demographics were assessed) and eight waiting surveys only.

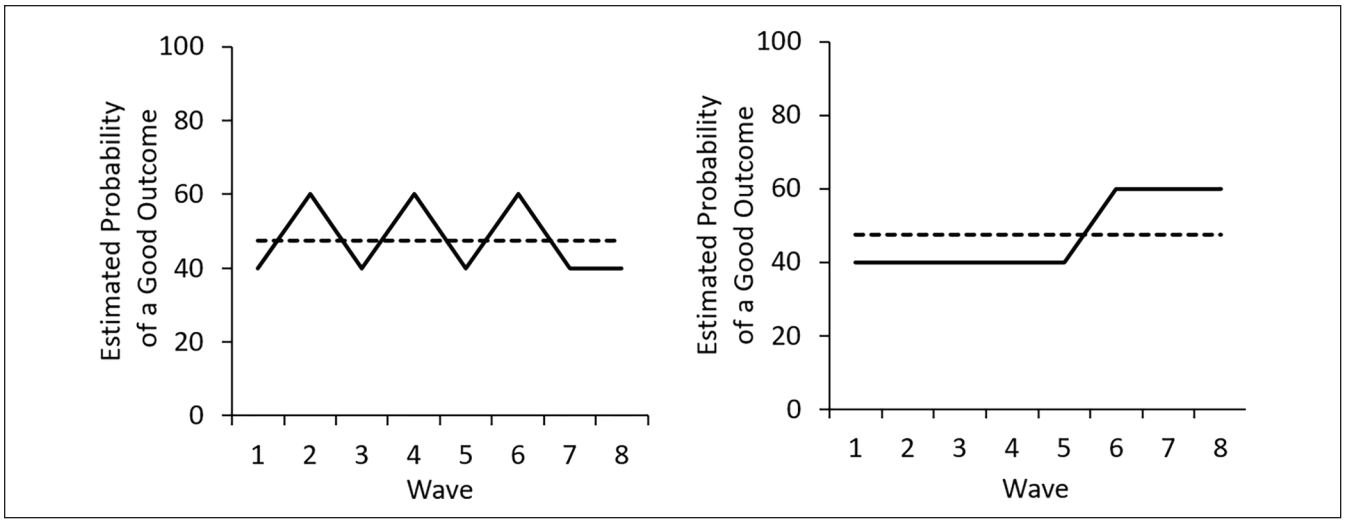

Figure 1. Two Hypothetical Cases With Equal Within-Person Standard Deviations.
Note. These hypothetical graphs each have a within-person standard deviation of 10.35; however, the first graph can be considered to have high within-person variability (WPV), whereas the second has low WPV. This illustrates the issue with using solely within-person standard deviation to measure WPV (i.e., it does not account for ordering of observations).

These data were collected as part of a broader investigation into well-being during the wait for bar exam results. All materials are available on the Open Science Framework. We report all measures there, and we have no exclusions to report. This study was not preregistered. This study was reviewed and approved by the authors' Institutional Review Board.

Measures

Expectations. Participants provided a specific estimate from 0 to 100 of the likelihood that they had passed the bar exam ("Please estimate the probability that you will pass the bar exam, between 0% and 100%"). Participants were asked to report their expectation estimates in all eight waiting period surveys ($M_{overall}$ = 66.62, $SD_{overall}$ = 19.37).

Neuroticism. Participants completed the eight-item neuroticism subscale of the Big Five Inventory once in the pre-exam baseline survey (John & Srivastava, 1999; e.g., "I am someone who . . . can be moody"; 1 = *strongly disagree*, 5 = *strongly agree*; M = 2.93, SD = .76, α = .83).

Well-Being. Well-being was operationalized in three ways: worry about one's bar exam result and general positive and negative emotions. These variables were assessed in each of the eight waiting surveys. Worry about the bar exam was measured using three items. Two items assessed anxiety ("I feel anxious every time I think about my bar exam results"; "I am worried about my bar exam results"; 1 = *not at all*, 5 = *extremely*) and one item assessed perseverative thought ("I can't seem to stop thinking about my bar exam results"; 1 = *strongly disagree*, 5 = *strongly agree*). These three items were averaged to create a composite that incorporates both the affective and cognitive aspects of worry ($M_{overall}$ = 2.86, $SD_{overall}$ = .89, $\alpha_{average}$ = .86).

To assess current state emotions, we used a novel list of positive and negative emotions, intended to capture high and low arousal and valence, that followed the general format of the Positive and Negative Affect Schedule (PANAS; Watson & Clark, 1988). Participants reported the extent to which they felt six positive emotions (e.g., grateful, happy, content; $M_{overall}$ = 2.90, $SD_{overall}$ = .62, $\alpha_{average}$ = .87) and nine negative emotions (e.g., ashamed, upset, afraid; $M_{overall}$ = 1.96, $SD_{overall}$ = .66, $\alpha_{average}$ = .92) over the past 2 weeks (1 = *very slightly or not at all*, 5 = *extremely*).

Analytic Approach. We operationalized within-person variability in expectations in four ways to extract as much information as possible from the data regarding changes in expectations over time. First, we took the most common approach and calculated within-person standard deviations (WPSD) in expectations for each participant. Because it is an average, the WPSD calculation was not affected by missing data in expectations. Although this approach captures the average degree of variation in a person's expectations across consequent surveys, it does not take into account the ordering of the observations (Segerstrom et al., 2017). For example, a WPSD does not differentiate between a person who reports an expectation of 40% likelihood of a good outcome at Time 1, 60% at Time 2, and 40% at Time 3, and a person who reports an expectation of 40% at Time 1, 40% at Time 2, and 60% at time three. Graphically, it is apparent that the difference in these two scenarios is vast from the standpoint of assessing volatility (see Figure 1).

For this reason, we chose to quantify within-person variability in expectation estimates with several additional metrics. A second within-person variability metric, root mean

Table 1. Study 1 Descriptive Statistics and Correlations Among Key Variables.

Variable	*M*	*SD*	WPSD	RMSSD	Total changes	Total changes > 5	Neuroticism
WPSD	5.91	5.48					
RMSSD	6.18	5.74	.86**				
Total changes	0.46	0.30	.48**	.56**			
Total changes > 5	0.22	0.24	.68**	.71**	.60**		
Neuroticism	2.94	0.75	.27**	.30**	.15*	.31**	
Average expectation	66.62	19.45	−.20**	−.14**	−.03	−.27**	−.14*

Note. Correlations between all four variability metrics and average outcome predictions (i.e., average expectation estimates) in Study 1. Total Changes = the sum of any change of 1 percentage point or higher between consecutive observations, divided by the total number of observations minus one; Total Changes > 5 = the sum of any change of 5 percentage points or higher between consecutive observations, divided by the total number of observations minus one. WPSD = within-person standard deviation; RMSSD = root mean squared successive difference.
*$p < .05$. **$p < .01$.

squared successive difference (RMSSD), does take the ordering of observations into account. This measure is calculated by first squaring the difference between consecutive observations. The RMSSD is the square root of the mean of these squared differences. In this way, the RMSSD captures components of both variability and temporal dependency of measures over time. We calculated the RMSSD metric using the varian package for R (v.0.2.2; Wiley, 2016).

Although some argue that measures of variability should capture both the magnitude of variations and their temporal dependency (Jahng et al., 2008; Larsen, 1987) as the RMSSD does, we opted for a third measure of variability that focuses on the frequency of variability from one observation to the next without attention to magnitude. Our third measure of within-person variability, termed Total Changes, sums the number of times that a participant changed expectations (at least one point on the measurement scale, in both studies a 0%–100% percentage scale) from one survey to the next. To account for missing data, this value was then divided by one less than the number of expectation time points each participant reported. Put another way, this operationalization of within-person variability reflects the number of times that a participant was inconsistent in their estimates from survey to subsequent survey as a percentage of each participant's possible changes.

We also calculated a Total Changes metric with a more conservative change criteria. In the case of Total Changes > 5, rather than count any change of one point or more from one observation to the next, we only counted changes greater than five points in magnitude. Again, this sum was then divided by each participant's potential number of changes (number of observations minus one). Whereas the WPSD quantifies solely the average magnitude of changes and the RMSSD combines this information with the order of observations, the Total Changes metrics allow for the differentiation of participants who report frequent changes and those who report infrequent changes. As would be expected, the WPSD and RMSSD are correlated with the Total Changes metrics (Table 1) but clearly capture unique features of expectation volatility (see Table 1). Taken together, our varied operationalizations of within-person variability provide a fairly complete picture of variations in participants' expectations across the waiting period.

Results

We used linear multiple regression models to determine whether each metric of within-person variability in expectations (WPSD; RMSSD; Total Changes; Total Changes > 5) predicted well-being over the waiting period.[3] Time-varying well-being outcomes (worry, positive emotion, negative emotion) were averaged across the waiting period.[4] Each model included neuroticism and participants' average level of expectations across the waiting period as covariates (see Table 1 for correlations among key variables). Neuroticism was included in the model to control for the effect of emotional instability on within-person variability, given that neuroticism was correlated with all metrics of expectation volatility. Average expectations were included in the model to control for the effect of general optimism or pessimism on well-being. Participants who completed only the baseline survey ($n = 18$) or completed only one waiting survey ($n = 4$) were removed from the dataset prior to analysis (total excluded: $n = 22$).[5] Results of the multiple regression analyses for all four models (each with a different within-person variability metric as a predictor) are presented in Table 2 (code is available on the Open Science Framework).

All measures of expectation volatility significantly predicted worry during the wait for bar exam results. All measures of expectation volatility except Total Changes > 5 significantly predicted negative emotion during the wait. Although positive emotion was negatively associated with all metrics, only Total Changes significantly predicted positive emotion. In all cases, the Total Changes metric of expectation volatility was the strongest predictor of well-being. In sum, greater volatility in expectations for passing the bar exam predicted heightened worry and negative emotions and dampened positive emotion during the wait for bar exam results.

Table 2. Study 1 Regression Coefficients Predicting Well-Being From Within-Person Variability in Expectations.

	Within-person standard deviation (WPSD)			Root mean square successive difference (RMSSD)		
Well-being outcomes	WPSD β [95% CI]	Neuroticism β [95% CI]	Average expectation β [95% CI]	RMSSD β [95% CI]	Neuroticism β [95% CI]	Average expectation β [95% CI]
Worry	0.14* [0.02, 0.26]	0.22** [0.10, 0.34]	−0.38** [−0.49, −0.25]	0.13* [0.01, 0.25]	0.22** [0.09, 0.34]	−0.38** [−0.50, −0.27]
Positive emotion	−0.02 [−0.15, 0.11]	−0.22** [−0.35, −0.09]	0.38** [0.25, 0.50]	−0.04 [−0.17, 0.09]	−0.21** [−0.34, −0.08]	0.38** [0.25, 0.50]
Negative emotion	0.13* [0.01, 0.24]	0.30** [0.18, 0.42]	−0.35** [−0.46, −0.23]	0.17 [0.05, 0.29]	0.28** [0.16, 0.40]	−0.35** [−0.46, −0.24]
	Total changes in expectations			Total changes in expectations > 5		
Well-being outcomes	Changes β [95% CI]	Neuroticism β [95% CI]	Average expectation β [95% CI]	Changes > 5 β [95% CI]	Neuroticism β [95% CI]	Average expectation β [95% CI]
Worry	0.20** [0.08, 0.31]	0.22** [0.11, 0.34]	−0.39** [−0.50, −0.27]	0.13* [0.01, 0.26]	0.22** [0.09, 0.34]	−0.36** [−0.48, −0.24]
Positive emotion	−0.13* [−0.26, −0.01]	−0.20** [−0.33, −0.08]	0.38** [0.26, 0.50]	−0.001 [−0.14, 0.13]	−0.22** [−0.35, −0.09]	0.38** [0.25, 0.51]
Negative emotion	0.18** [0.07, 0.30]	0.31** [0.19, 0.42]	−0.36** [−0.47, −0.25]	0.12 [−0.01, 0.24]	0.30** [0.18, 0.42]	−0.34** [−0.45, −0.22]

Note. WPSD = within-person standard deviation; RMSSD = root mean squared successive difference; CI = confidence interval.
*$p < .05$. **$p < .01$.

Study 2

Study 1 provided initial evidence of a relationship between volatility in expectations and poorer well-being during a professional waiting period. The goal of Study 2 was to replicate and extend the findings of Study 1 by examining the relationship between within-person variability in expectations and well-being outcomes in a different context: the wait for the outcome of the 2020 U.S. presidential election. A second goal of Study 2 was to investigate the directionality of the observed relationship via an experimental manipulation intended to constrain variability in expectations.

Method

Participants. Prolific survey respondents ($N = 444$; $M_{age} = 35.38$; 52% female; 75% White/Caucasian, 8% Hispanic/Latino, 7% Asian, 5% Black or African American, 4% American Indian) were asked about their expectations for the outcome of the 2020 U.S. presidential election and their well-being during the wait for the outcome. In this sample, 180 participants preferred that Donald Trump win the election and 241 participants preferred that Joe Biden win the election. We aimed for 200 participants in each group to ensure more than sufficient power for our primary analyses,[6] but we could not control the distribution of voter preferences.[7] All participants indicated that the United States was their current country of residence. Participants were compensated with $4 for an initial survey, $1 for additional weekly surveys ($3 total), and $2 for a post-election survey. Participants who completed all surveys were rewarded with a $1 bonus payment. Because reactions to the election outcome are not relevant to the present investigation, the post-news survey is not examined in this article.

Procedure. Participants completed a baseline survey on October 12, 2020 (approximately one month prior to Election Day), which measured candidate preference, neuroticism, expectations for the election outcome, and well-being. After reporting their preferred candidate in the baseline survey, Biden supporters and Trump supporters were separated into two groups. Within these groups, participants were randomly assigned to an experimental condition (*constrained condition*) and a control condition (*unconstrained condition*). Participants then completed three weekly surveys prior to Election Day on November 3, 2020, which assessed expectations for the election outcome and well-being. Those in the *constrained* condition read an additional set of instructions prior to reporting their expectations that their preferred candidate would win. These instructions were intended to constrain variability in expectations by prompting participants to consider their expectation from the previous week ("Last week, you provided estimates of how likely Donald Trump and Joe Biden are to win the presidential election. Please think back and try to recall the estimates you provided. Now, please complete the next items."). The *unconstrained* condition did not receive these instructions in their survey.

Table 3. Study 2 Descriptive Statistics and Correlations Among Key Variables.

Variable	*M*	*SD*	WPSD	RMSSD	Total changes	Total changes > 5	Neuroticism
WPSD	6.42	5.64					
RMSSD	8.03	7.38	.94**				
Total changes	0.76	0.34	.45**	.45**			
Total changes > 5	0.43	0.38	.68**	.70**	.54**		
Neuroticism	2.13	0.96	−.01	−.04	−.01	−.02	
Average expectation	68.71	16.77	−.01	.01	.02	.05	−.20**

Note. Correlations between all four variability metrics and average outcome predictions (i.e., average expectation estimates) in Study 2. Total Changes = the sum of any change of 1 percentage point or higher between consecutive observations, divided by the total number of observations minus one; Total Changes > 5 = the sum of any change of 5 percentage points or higher between consecutive observations, divided by the total number of observations minus one. WPSD = within-person standard deviation; RMSSD = root mean squared successive difference.
*$p < .05$. **$p < .01$.

These data were collected as a part of a broader investigation into well-being during the wait for the outcome of the 2020 U.S. presidential election. All materials are available as on the Open Science Framework. We report all manipulations, measures, and exclusions in this study. This study was not preregistered. This study was reviewed and approved by the authors' Institutional Review Board.

Measures. Participants completed the same measures as in Study 1, with updated wording in some cases to reflect the context of the U.S. presidential election. As in Study 1, participants provided a specific estimate from 0 to 100 of the likelihood that their preferred candidate would win the election ("Please estimate the probability that [preferred candidate name] will win the presidential election, between 1% and 100%."). Participants were asked to report their expectations in all four pre-election surveys ($M_{overall}$ = 68.71, $SD_{overall}$ = 16.77). In this study, participants were also asked to provide expectations of the likelihood that their non-preferred candidate would win the presidential election ($M_{overall}$ = 37.53, $SD_{overall}$ = 18.33). The current investigation will focus on expectations for participants' preferred candidate only (using the alternative expectation measure yielded nearly identical results).

Participants completed the same worry measure as used in Study 1 with updated wording to reflect the context of the U.S. presidential election (e.g., "I feel anxious every time I think about the outcome of the presidential election"; $M_{overall}$ = 4.19, $SD_{overall}$ = 1.55, $\alpha_{average}$ = .87).

Participants completed the same measures for neuroticism (M = 2.13, SD = .96, α = .80). In this study, we used a modified version of the GRID instrument (emotion words only; Fontaine et al., 2007) to assess positive emotion ($M_{overall}$ = 3.93, $SD_{overall}$ = 1.1, $\alpha_{average}$ = .89) and negative emotion ($M_{overall}$ = 2.59, $SD_{overall}$ = 1.07, $\alpha_{average}$ = .94).

Results

Within-person variability was operationalized in the same way as in Study 1, using the WPSD, RMSSD, Total Changes, and Total Changes > 5 metrics. As in Study 1, our measures of within-person variability were correlated with each other (Table 3). Participants who completed only our baseline survey (n = 29) were removed from the dataset prior to analysis.[8] As in Study 1, multiple regression analyses included neuroticism and average expectations in each model to account for the effect of emotional instability and general optimism or pessimism, respectively. Results of the multiple regression analyses for all four models (each with a different within-person variability metric as a predictor) are presented in Table 4 (code available on the Open Science Framework).

The two Total Changes metrics of expectation volatility significantly predicted worry and negative emotion during the wait for the presidential election outcome. Total Changes did not significantly predict positive emotion, though this association was negative as in Study 1. The WPSD and RMSSD metrics did not significantly predict worry, negative emotion, or positive emotion in this study, though effects were in the expected direction for worry and negative emotion. In sum, more frequent changes in expectations during the wait for election results predicted greater worry and negative emotions, replicating our results from Study 1. The relationships between the WPSD and RMSSD metrics and well-being in Study 1 failed to replicate in this study.

Effects of Condition

Manipulation Check. We next tested the effectiveness of our manipulation with an independent samples t test on the four metrics of variability between conditions (*constrained* vs. *unconstrained*). Participants in the constrained condition had significantly lower within-person variability in expectations than those in the unconstrained condition for three of our four metrics of variability: Total Changes (*constrained:* M = .73, SD = .35, *unconstrained:* M = .80, SD = .31), $t(383) = 2.17$, p = .03; WPSD (*constrained:* M = 5.64, SD = 4.94, *unconstrained:* M = 7.20, SD = 6.18), $t(370) = 2.75$, p = .006; and RMSSD (*constrained:* M = 7.04, SD = 6.24, *unconstrained:* M = 9.00, SD = 8.25), $t(355) = 2.62$, p = .009. When within-person variability was measured using

Table 4. Study 2 Regression Coefficients Predicting Well-Being From Within-Person Variability in Expectations.

	Within-person standard deviation (WPSD)			Root mean square successive difference (RMSSD)		
Well-being outcomes	WPSD β [95% CI]	Neuroticism β [95% CI]	Average expectation β [95% CI]	RMSSD β [95% CI]	Neuroticism β [95% CI]	Average expectation β [95% CI]
Worry	0.06 [−0.03, 0.15]	0.39** [0.30, 0.49]	0.03 [−0.07, 0.12]	0.06 [−0.03, 0.16]	0.39** [0.30, 0.49]	0.05 [−0.04, 0.15]
Positive emotion	0.04 [−0.05, 0.13]	−0.43** [−0.52, −0.35]	0.20** [0.11, 0.29]	0.06 [−0.03, 0.14]	−0.44** [−0.53, −0.35]	0.19** [0.10, 0.28]
Negative emotion	0.08 [−0.01, 0.16]	0.61** [0.53, 0.69]	−0.001 [−0.08, 0.08]	0.05 [−0.03, 0.13]	0.61** [0.53, 0.69]	0.02 [−0.07, 0.10]
	Total changes in expectations			Total changes in expectations > 5		
Well-being outcomes	Total changes β [95% CI]	Neuroticism β [95% CI]	Average expectation β [95% CI]	Changes > 5 β [95% CI]	Neuroticism β [95% CI]	Average expectation β [95% CI]
Worry	0.18** [0.09, 0.27]	0.39** [0.30, 0.49]	0.02 [−0.07, 0.12]	0.10* [0.00, 0.19]	0.39** [0.30, 0.49]	0.02 [−0.07, 0.12]
Positive emotion	−0.01 [−0.09, 0.08]	−0.43** [−0.52, −0.35]	0.20** [0.11, 0.29]	0.04 [−0.05, 0.12]	−0.43** [−0.52, −0.35]	0.20** [0.11, 0.29]
Negative emotion	0.09* [0.01, 0.17]	0.61** [0.53, 0.69]	−0.001 [−0.08, 0.08]	0.09* [0.01, 0.16]	0.61** [0.53, 0.69]	−0.004 [−0.08, 0.08]

Note. WPSD = within-person standard deviation; RMSSD = root mean squared successive difference; CI = confidence interval.
*$p < .05$. **$p < .01$.

Total Changes > 5, the differences between the constrained condition ($M = .41$, $SD = .37$) and unconstrained condition ($M = .46$, $SD = .38$) were not statistically significant, $t(387) = 1.43$, $p = .15$ (albeit in the expected direction). Thus, the manipulation successfully constrained volatility in expectations as measured by three of our four variability metrics.[9]

Effects of the Manipulation. Given the results above, we focused our test of the effect of condition on well-being via within-person variability in expectations on two potential mediation models: condition predicting worry and negative emotions via Total Changes.[10] We conducted mediation analyses using the PROCESS macro for R (v.4.0.3; Hayes, 2020). This method uses bootstrapping procedures to test the indirect effect of the independent variable (condition) on the dependent variable (worry; negative emotion) through the mediator (Total Changes).

First, we ran a mediation model with average worry as the dependent variable (Figure 2). Total Changes mediated the indirect effect of condition on worry, $b = −0.06$, 95% CI [−0.13, −0.01], such that those in the *constrained* condition reported fewer Total Changes than those in the *unconstrained* condition, and in turn, fewer Total Changes predicted less worry. Although the total effect of condition on worry was not significant, $b = −0.07$, 95% CI [−0.38, 0.24], it is possible to detect an indirect effect of a theoretically relevant mediator in the absence of a significant total effect (Rucker et al., 2011). We then ran a mediation model with average negative emotion as the dependent variable (Figure 2). The

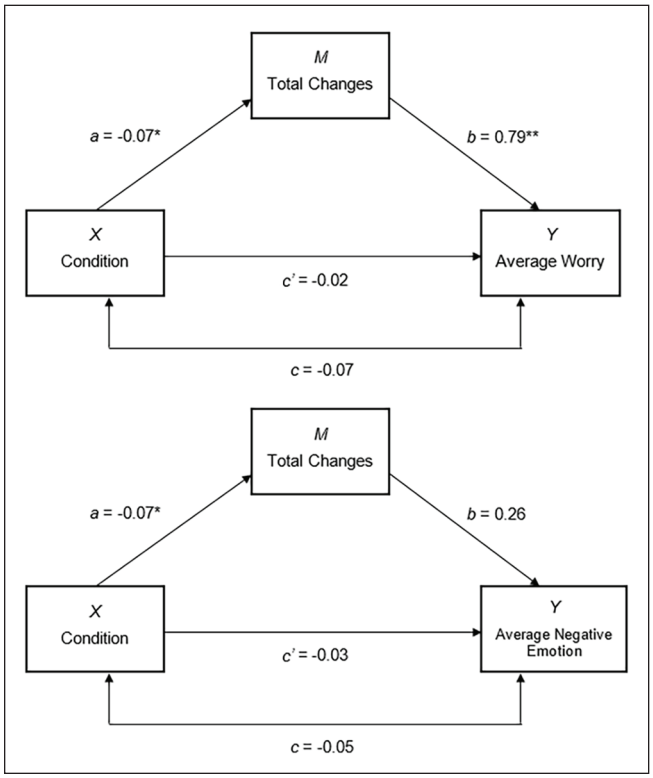

Figure 2. Study 2 Mediation Models.
Note. The indirect effect (*ab*) was significant for worry (95% confidence interval: −.13, −.006) but not negative emotion (95% confidence interval: −.05, .002).
*$p < .05$. **$p < .01$.

total effect of condition on negative emotion was not significant, $b = -0.05$, 95% CI [−0.27, 0.16], nor was the indirect effect of condition on negative emotion with Total Changes as the mediator, $b = -0.02$, 95% CI [−.05, .002].

Discussion

The focus of the present studies was to understand the nature and consequences of variability in expectations while awaiting important news. Based on the typical consequences of emotional instability, we hypothesized that greater variability in expectations would be associated with poorer well-being during waiting periods. The pattern of results in this investigation supports our hypothesis, particularly when defining variability as the frequency with which people change their expectations across weeks.

In Study 1, within-person variability in expectations was associated with negative outcomes, namely greater negative emotion and worry and, less robustly, lower positive emotion. Study 2 provided support for this pattern of results; however, results were less consistent in models that used the WPSD and RMSSD metrics of expectation volatility. The WPSD metric does not account for ordering of observations, and the RMSSD provides one metric that combines both magnitude and temporal dependency of observations. Although the RMSSD metric is more comprehensive and the WPSD metric is more common in investigations of within-person variability of various types, the Total Changes metrics more consistently predicted well-being in our study. Thus, it appears that the Total Changes metrics successfully capture a meaningful aspect of within-person variability, namely week-over-week volatility (however small in magnitude) in expectations. Aside from some discrepancies between the variability metrics, our overall pattern of results suggests that those with more volatile expectations experienced poorer well-being during the wait for an uncertain and important outcome across two distinct contexts.

The (partial) consistency of our findings is compelling, particularly when considering the differences in the two waiting periods we investigated. In Study 1, law graduates awaited the results of their performance on the bar exam for four months and were aware of the exact start and end date of the waiting period. In Study 2, the wait for U.S. presidential election results was less structured. Participants in our study were surveyed one month prior to Election Day, but their worry about the outcome may have begun prior to the initiation of our study—or perhaps had not yet escalated when the study began. Furthermore, participants may not have considered Election Day to be an end date to their waiting period, particularly given that major media outlets did not confirm results until several days after Election Day (a delay that was projected well in advance, given unusual reliance on mail-in ballots during COVID-19). The structure of these waiting periods is of theoretical importance, as research on uncertain waiting periods shows that worry and anxiety are highest as the wait begins and as the moment of truth nears (Sweeny & Andrews, 2014; Sweeny & Falkenstein, 2015).

Furthermore, our law graduate participants in Study 1 were likely highly invested in the outcome of their waiting period, given the significance of failing such a consequential professional exam. Participants in Study 2 were likely not as invested in the election outcome, on average. It may be that the stronger associations between volatility in expectations and well-being that emerged in Study 1, compared with Study 2, reflects this differential investment and personal significance. Despite differences in the structure and personal significance of the waiting periods examined here, we found evidence to suggest that more volatile expectations were associated with worse waiting experiences in both contexts.

Causal Directionality

In Study 2, we aimed to address the directionality of the association between expectation volatility and well-being by experimentally manipulating variability in people's expectations. It is possible that people who have a relatively calm waiting experience maintain more stable expectations as a result and that people who have an unpleasant waiting experience are led to question their expectations and thus frequently change them. This causal relationship (from poor well-being to volatility in expectations) would be consistent with theoretical and empirical work on "feelings-as-information," which argues that emotions are a source of information from which people draw inferences about the state of reality (Schwarz, 2012). In our case, perhaps people notice rising worry about an uncertain outcome and think, "uh-oh, maybe I'm overconfident and should adjust my expectations to brace for the worst"—or conversely, they notice a state of calm and think, "wow, maybe I've been overly pessimistic and should adjust my expectations to embrace optimism."

However, we suspected that the reverse causal relationship would emerge, perhaps in tandem with a feelings-as-information process, such that stability in expectations would be inherently soothing and instability inherently stressful. Thus, in Study 2 we attempted to experimentally constrain changes in expectations, with the goal of improving emotional experiences during the wait for news. Results of mediation analyses supported our hypothesis with respect to worry, and when assessing volatility as the frequency with which people changed their expectations even a small amount from week to week. That is, the manipulation constrained changes in expectations, which in turn predicted less average worry; if changes in expectations were not constrained, expectations were more volatile and participants in turn reported greater average worry. Although replication in other contexts and with stronger manipulation is warranted, these findings point to the possibility that expectation volatility causes heightened worry during stressful waiting periods.

Unanswered Questions and Limitations

Our investigation had several strengths, namely two real-world contexts, relatively robust sample sizes, four operationalizations of expectation volatility, and an experimental test of our hypothesis. Although our experimental manipulation of expectations in Study 2 was quite subtle, our results suggest that even artificially holding expectations stable may reduce worry.

Despite these strengths, a number of questions remain unanswered. First, Studies 1 and 2 assessed weekly and biweekly variability in expectations, respectively. The relationship between expectation volatility and well-being may differ in a study that measures expectations daily or monthly, or even minute-to-minute or over the course of years. It may be that with more frequent measurements, participants better remember their previous rating and either hold their expectations steady or effortfully change them. Conversely, measuring expectations more infrequently may allow participants to forget their past rating and answer solely based on their true expectations at that point in time. Future endeavors should explore the boundaries of this effect by utilizing different intervals between expectation measurements.

In addition, our participants came from a single country, and we only assessed two types of stressful waiting periods. Furthermore, the emotion measure used in Study 1 was not formally validated. We also did not preregister our predictions. Nonetheless, our findings paint a clear initial picture of the effect of expectation volatility on well-being, particularly worry, in the face of uncertainty.

Conclusion

In line with the literature on emotional volatility, expectation volatility was associated with worse experiences while waiting for important news. Although metrics such as the within-person standard deviation are commonly used to assess within-person variability, a count of the changes in expectations may provide additional valuable information regarding within-person variability of various kinds. Importantly, our findings suggest that constraining changes in expectations may reduce worry during the wait for news. Taken together, our findings point to a downside of riding an expectation rollercoaster during the wait for important news and suggest that seeking stability in expectations for the future might ease the stress of waiting.

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Notes

1. Our sample size was constrained by the challenges of recruiting participants who are preparing for a major professional exam. We also had little basis for determining an a priori effect size, and many recommend against calculating post hoc power (e.g., Gelman, 2019). However, our sample is more than sufficient for the multiple regression analyses that are central to our hypothesis tests.
2. In our sample, 183 participants reported passing the 2013 CA bar exam and 33 reported failing (pass rate of ~83%). This was substantially higher than the 55.8% overall pass rate in California for that particular year (https://www.calbar.ca.gov/).
3. Given that expectations could be the cause, consequence, or correlate of emotional states, we ran models in which variability in expectations was treated as outcomes of well-being. The differences between these models and the models testing our hypothesized predictive direction were inconsequential; thus, we focus here on models predicting well-being from variability measures.
4. Counterintuitively, the measures of within-person variability in expectations capture the waiting period as a whole rather than a time-varying metric (i.e., each person gets a single score for variability on each metric). Thus, the "matching" outcome variable is well-being across the waiting period, which is why we averaged those scores.
5. Over 80% of remaining participants completed all waiting surveys ($n = 182$). Over 90% of participants completed at least seven of eight waiting surveys ($n = 207$).
6. Here our sample size was constrained by the funds we had available for our study. Estimating power in mediation analyses is complex and even controversial (for an extreme recommendation, see Fritz & MacKinnon, 2007), and we had no basis for estimating the effect of our novel and low-touch experimental manipulation. However, our sample is more than sufficient for the multiple regression analyses that are central to our hypothesis tests.
7. Per Prolific terms of use policies, we used existing Prolific screening items to recruit 200 Democrats, 200 Republicans, and 75 participants who identified as Independent. After completion of the baseline survey, candidates were separated into two groups based on their preferred presidential candidate, regardless of party affiliation. Participants who preferred a third-party candidate or any alternative candidate to Donald Trump or Joe Biden were excluded from analyses ($n = 22$).

8. Participants who completed the baseline survey only (n = 29) were removed from our study because they reported their expectations only once and, therefore, had no expectation variability to measure. Sixteen of these participants were Biden supporters and 13 were Trump supporters. Fifteen were assigned to the *constrained* condition and 14 were assigned to the *unconstrained* condition.
9. We also examined differences in within-person variability in worry over time, as we did for expectation estimates, to evaluate the precision of our manipulation. There was no significant difference in within-person variability in worry between the constrained condition and the unconstrained condition, which suggests that our manipulation was precise in manipulating expectation stability alone.
10. That is, the *a* path (condition to within-person variation) was statistically significant for Total Changes, WPSD, and RMSSD, but neither WPSD or RMSSD predicted any well-being outcome (the *b* path). In the interest of thoroughness, we tested all 12 potential mediation models, but as anticipated, no additional mediation effects were significant aside from the one discussed next.

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