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Does How You Feel Depend on Who You Are?

The Moderating Role of Personality on Emotional Context Effects

By

Ryan Stewart Lundell-Creagh

A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Philosophy

in

Psychology

in the

Graduate Division

of the

University of California, Berkeley

Committee in charge:

Professor Oliver P. John, Chair

Professor Iris Mauss

Professor Dacher Keltner

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Abstract

Does How You Feel Depend on Who You Are?

The Moderating Role of Personality on Emotional Context Effects

By

Ryan Stewart Lundell-Creagh

Doctor of Philosophy in Psychology

University of California, Berkeley

Professor Oliver P. John, Chair

There is a plethora of literature linking Extraversion to the experience of positive emotions and Neuroticism to the experience of negative emotions. Further, it has been argued that these relationships have important consequences for well-being. In addition to these main effects of the trait, research on person-situation interactions has shown that individuals have differential reactivity to emotional situations, even identifying some direct causal links using experiments, based on their underlying Extraversion and Neuroticism. However, much less is known about how this differential reactivity might generalize outside of the lab, to naturalistic situations. In Study 1, we test this claim by capitalizing on the natural lockdown that occurred as a result of the COVID-19 pandemic, asking how emotion experience changed due to this lockdown, and whether these changes were moderated by Extraversion, Neuroticism, and the less studied but important trait of Agreeableness. Further, we add an investigation of these potential interactions using facet-level personality. These constructs represent a more specific level of personality analysis than personality traits and have received almost no attention in the literature on the relationships between personality and emotion. However, this increased specificity allows for important clarifying hypotheses about the relationships between personality and emotion to be tested, such as whether the associations between Extraversion and positive emotions are due more to social contact or behavioral activation. In Study 1, we showed that individuals did respond differently to the lockdown based on their underlying Extraversion, Neuroticism, and (to a lesser extent) Agreeableness. Further, we showed that the relationship between Extraversion and positive emotions is likely due to behavioral activation more so, or even in place of, social contact. In Study 2, we ask whether these results generalize to a more traditional in lab emotional situation manipulation, using a sad film clip. We capitalize on modern statistical techniques, namely multilevel modeling, to advance the existing work in this area and show that both our results from Study 1, as well as the findings from previous work, which made use of difference scores as dependent variables instead of multilevel models, both generalized well. We discuss the implications of these findings for personality theory, emotion theory, and person by situation interactions, as well as highlight some suggestions for future research.

Keywords: personality, emotion, reactivity, person-situation interactions, COVID-19

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College students, who are typically between 18 and 22 years old, are in a particularly important and vulnerable developmental period, as they are going through the challenging transition from adolescence into adult roles of work and relationships (Caspi & Roberts, 2001). They make vital choices that will impact the direction of the rest of their lives, such as marriage, selecting a career, and family planning (Roberts et al., 2004). Further, there is evidence that this period represents a pivotal time in one's personality development. We see rapid increases in Agreeableness and Conscientiousness, and decreases in Neuroticism, consistent with evidence of growing socio-emotional maturity (Srivastava et al., 2003).

As both their social lives and their academic work were centered on a physical university campus, the COVID-19 pandemic disrupted the lives of individuals in this age group even more severely than for other age and professional groups, many of whom could stay in their homes and work. The students studied in this dissertation attended the University of California, Berkeley, which followed local health directives and closed down the campus in mid-March of 2020, with all instruction moving online. In the words of one participant:

"I returned home on March 15 because spring break was around the corner anyways… Since then, I have left my house very few times, only for walks and to pick up food occasionally. I miss my friends… I used to be very active and am now forced to be a homebody. I had to cancel my graduation photo shoots, spring break plans, and my job start date has been delayed. I feel a personal responsibility to protect my grandfather, that being said, I feel trapped at home." (Quote from May 2020)

In short, the COVID-19 pandemic severely narrowed and limited the students' experiences and social activity, bringing changes to their lives that none of them would have ever predicted. The substantial and widely shared effects of the pandemic provide the unique opportunity to study how a naturalistic radical change in the environment affected emotional states, and whether individual differences in the Big Five personality traits could moderate these emotional changes. This dissertation will focus on the unique effects of the first eight weeks of lockdown as many studies have suggested that this was the most tumultuous time (e.g., Daly & Robinson, 2021; Willroth et al., 2021). It will investigate how lockdown impacted the experience of specific positive and negative emotions in college students (Study 1). Subsequently, it will move to an investigation of whether the results observed in the naturalistic setting can generalize to an in-lab manipulation of emotions, designed to mimic the effects of lockdown, namely, a very sad film clip that is devoid of positive emotions (Study 2).

Individual Differences in Emotion Experiences

Emotions play an exceptionally important role in the lives of human beings. Not only do they contain a large biological component (Ekman, 1992), but they are also used to inform decision-making (Lerner et al., 2015) and serve important social roles such as regulating both romantic relationships (Richards, Butler, & Gross, 2003) and friendships and cultural groups (Keltner & Haidt, 1999). For example, Tracy and Robins (2007) note that via direct interpersonal comparisons, pride likely evolved to allow individuals to infer their social status, particularly with reference to immediate social circles. Further, Keltner and Anderson (2000) have shown that embarrassment is particularly useful for repairing social relationships that have gone wrong,

and Beames et al., (2019) have shown that successful regulation of anger facilitates more harmonious social interactions. With recent evidence pointing to the existence of up to 28 unique emotional states which can be discerned in facial-bodily expressions of others (Cowen & Keltner, 2020), harnessing our understanding of the interpersonal functioning of emotions has never been more vital. But what happens to emotional experiences when access to social interactions is closed off entirely, or at least severely restricted, and are there individual differences in these emotional experiences, or did the pandemic have a similar effect on everyone?

The Big Five Personality Traits

One of the most widely accepted frameworks of personality is the Big Five personality traits. These are: Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (Costa & McCrae, 1992). Each of these traits can be thought of as a continuum, with an opposite pole. Thus, participants will fall somewhere along this continuum, and both their overall location, as well as their location relative to others, provides important individual differences information.

There is a plethora of work linking Extraversion and Neuroticism to positive and negative affect. Several studies (summarized below) have shown that these two personality traits carry large affective associations. Agreeableness has also been linked to certain negative emotions such as anger/aggression (Meier, Robinson & Wilkowski, 2006), and interpersonal emotions such as compassion (Di Fabio & Saklofske, 2021). The other two traits (Conscientiousness and Openness) are much less related to affective experiences (Pytlik Zillig et al., 2002). Thus, when examining individual differences in emotions, it made sense to zoom in and focus solely on Extraversion, Neuroticism, and Agreeableness. The other two traits will not be considered further in this dissertation.

Extraversion and Positive Affect

The Positive and Negative Affect Schedule (PANAS) (Watson, Clark & Tellegen, 1988) is the most widely used measure of positive affect, having been cited over 49000 times. Although it measures both positive and negative affect, these two constructs are considered as uncorrelated, and often investigated independently. One of the major issues with the PANAS is its over-reliance on high-arousal emotions. In fact, in their original paper, they defined Positive Affect as *"the extent to which a person feels enthusiastic, active, and alert" (*p.1063). As a personality trait, Extraversion actually has an Energy Level facet, indicating that one's energy is a major component of Extraversion (the other two facets are Sociability and Assertiveness). Therefore, it makes sense that almost every study which has measured both the PANAS and Extraversion has shown that they are highly correlated, usually in the 0.60 range (e.g., Watson & Clark, 1992; Lundell-Creagh & John, in prep).

Neuroticism and Negative Affect

Domain-level Neuroticism and general negative affect are also highly correlated. This is to be expected as Anxiety and Depression are both facets of Neuroticism (Soto & John, 2017), and thus these constructs should share substantial amounts of variance. This literature is once again dominated by the PANAS. Correlations between Neuroticism and PANAS-NA tend to range from 0.60-0.65 (e.g., Watson & Clark, 1992; Lundell-Creagh & John, in prep). There are

also several studies that report large associations between Neuroticism and specific negative emotions such as sadness, fear, guilt, and disgust (Watson & Clark, 1992; Gross et al., 1998; Lundell-Creagh & John, in prep). A literature review on the topic estimates the correlation between Neuroticism and negative affect at anywhere between 0.35 and 0.65, citing large methodological differences between studies as the reason for a large range estimate (Wilson & Gullone, 1999).

High Arousal Positive versus Low Arousal Positive Emotions

Restricting one's investigation of affective experiences to the use of the PANAS completely omits an important category of positive emotions: Low Arousal Positive (LAP) emotions. Although these emotions share a valence (positive) with High Arousal Positive (HAP) emotions, they differ in the degree to which they cause physiological arousal. Some examples of LAP emotions include calm, peaceful, and relaxed, whereas some examples of HAP emotions include excitement, elation, and (to a slightly lesser extent) joy. This distinction was first proposed by Tsai and colleagues (2006) who note that LAP emotions are very important and beneficial to the individual. However, they further note that these two categories of emotions behave in very different ways, making them susceptible to large degrees of individual differences, particularly in how much they are valued. The authors found that HAP emotions are much more valued by Western cultures, whereas LAP emotions are much more valued by Eastern cultures.

Linking HAP, LAP, Extraversion, and Neuroticism

Extraversion correlates to various degrees with each of the specific emotions on the Dispositional Positive Emotion Scale (DPES) (Shiota et al., 2006). The largest of these correlations is the HAP emotion of joy at around $r = 0.70$, and the smallest of these is with amusement, at $r = 0.25$ (the other emotions on the scale are: love, pride, contentment, awe, and compassion). Further, it has been shown that Extraversion can predict positive affect in response to a variety of positive films (Larsen & Ketelaar, 1991). In a study that we conducted (Lundell-Creagh & John, in prep), we found large correlations between Extraversion and several specific HAP emotions, including enthusiastic, happy, and entertained. By contrast, LAP emotions like peaceful correlated less than 0.30. Interestingly, the correlations between LAP emotions and Neuroticism were negative and much higher. This indicates that whereas HAP emotions are more about the presence of Extraversion, LAP emotions are more about the absence of Neuroticism. The same study found strong positive correlations between Neuroticism and all of the specific negative emotions that were measured. Taken together, these differences in the locations of the specific emotions within the Big Five personality framework highlight the potential for individual differences in emotional experiences, both as a result of the COVID-19 lockdown (Study 1) and in response to an emotional manipulation such as a film clip (Study 2).

Affect Level and Affect Reactivity Responses

Another convincing argument for the potential for individual differences in emotional responses to the pandemic comes from a paper by Gross, Sutton, and Ketellar (1998). In this study, the authors sought to investigate whether the relationships between Extraversion and positive affect and Neuroticism and negative affect were due to individual differences in average levels of emotional experiences (affect level) or differences in reactivity to emotional situations (affect reactivity --- essentially a person by situation interaction). After completing a baseline

measure of personality and dispositional affect, participants watched one of four emotion-inducing films: disgust, sadness, amusement, or fear. They then measured dispositional affect again. The results found support for both the affect level AND affect reactivity hypotheses. Supporting the affect level hypothesis, greater Extraversion resulted in greater average levels of positive emotion experiences, and greater Neuroticism resulted in greater average levels of negative emotion experiences. More importantly, supporting the affect reactivity hypothesis, greater Extraversion predicted stronger responses to the amusement film, and greater Neuroticism predicted stronger negative responses to all three negative films. Notably, this study was done in the laboratory. However, the COVID-19 pandemic represents the perfect opportunity to test this theory using a naturalistic manipulation of context and check whether these individual differences in reactivity can truly generalize beyond the lab to everyday life (Study 1). Further, the original study made use of difference scores as a measure of reactivity. These scores carry several limitations (Cronbach & Furby, 1970), which can be solved using multilevel modeling. Thus, in Study 2, we ask whether the results of both the naturalistic manipulation in Study 1 and the initial lab experiment by Gross et al (1998) would generalize to an in-lab manipulation of emotion when analyzed using these more sophisticated models.

Extraversion: The Behavioral Approach System (BAS)

How might situational factors more directly influence individual differences in emotional experiences? Some researchers have taken a more biological perspective to studying Extraversion and have suggested that as a construct, it represents individual differences in a physiological system called the Behavioral Approach System (BAS) (Gray, 1991; Carver & White, 1994). The BAS is a physiological system that activates in response to any stimuli or situations that are characterized as rewarding. Its function is to trigger the individual to approach these situations (hence the name --- approach system). It actively seeks these situations out in order to achieve high positive arousal. Effectively, it is the "fun-seeking" system of the body. Approaching these situations is a large source of positive emotions and motivates us to engage in them further, resulting in strong positive associations between BAS and the experience of HAP emotions such as excitement and joy (Carver & White, 1994). Higher BAS activation predicts higher engagement in social activities, as well as increased levels of social support and confidence in social situations (Hundt et al., 2010). Indeed, many of the situations which the BAS targets are social in nature. For example, we laugh and joke in the presence of others, feel elated at group accomplishments, and take interest in the world around us. With the social distancing restrictions brought on by the pandemic, these rewarding social situations became nonexistent. In other words, the main category of situations for the BAS to approach (social situations) was completely blocked. As a result, this theory would predict large drops in positive emotions due to the pandemic, particularly for those identifying as extraverted. Importantly, Watson and colleagues (1999) have argued that rather than being associated with feelings of positive emotions, this approach system is literally positive affect. Although positive affect is distinct from Extraversion, these authors would likely make the same prediction about positive emotions decreasing due to the COVID-19 pandemic.

Positive Emotions and Sociability

For a long time, research on the correlates of positive emotions has pointed to social situations. For example, social situations are rated as overwhelmingly more pleasant than non-social situations (Lucas & Diener, 2001), and happy people have stronger social relationships,

with their close friends, family, and romantic partners (Diener & Seligman, 2002). Further, happy people spend more time talking to others (Mehl et al., 2010; Milek et al., 2018), and a direct causal link between positive moods and social behavior has been established (Whelen & Zelenski, 2012).

However, recently, Lucas et al., (2008) have suggested that there is more to positive emotion experience than just sociability. The authors showed using both momentary assessments of positive affect and daily reports of positive affect, that sociability could explain only about 35% of the relationship between Extraversion and these variables. In other words, there is a strong direct association between Extraversion and positive affect that exists independently of their relationship with social activities.

One plausible explanation is that some (and perhaps more) variance is captured by an individual's physiological activation, as the BAS would suggest. Given that Extraversion has facets of Sociability and Energy Level, our study is well set up to directly test this claim. When entered into a model simultaneously, we can check which facet is the better predictor of positive emotion experience and differences in positive emotions as a result of the pandemic (Study 1) or an in-lab emotion manipulation (Study 2).

Broaden and Build Theory of Positive Emotion

A well-known important contributor to psychological well-being is the experience of positive emotions (Armeta, Fritz, & Lyubomirsky, 2017). Longitudinal, cross-sectional, and experimental evidence have converged to illustrate numerous paths (including several causal ones) by which general positive affect, and the specific emotion of happiness, benefit the individual (for a review, see Lyubomirsky, King & Diener, 2005). These associations make the scientific study of positive emotions particularly important. Accordingly, it is also important to study situations in which positive emotions might be reduced, such as the COVID-19 pandemic.

In an attempt to explain the associations between positive emotions and well-being, Barbara Fredrikson has proposed the Broaden and Build Theory of positive emotions (Fredrikson, 2001). This theory contends that we use positive emotions to *"broaden thought-action repertoires"* (p.3). These newly enhanced repertoires allow the individual access to more resources, such as greater social support, which in turn provide long-term benefits. This process is cyclical, whereby the consequences of experiencing positive emotions can lead to an increase in (or reliance on) future positive emotions. In essence, we use positive emotions as tools through which we can interact with the world. Thus, positive emotions are less about direct physiological activation (like the BAS argues), and more about *how* the individual learns from their experiences. Consider how in their youth, children are encouraged to expand their horizons and try new things. Fredrickson (2001) argues that the pathway to doing so (which continues into adulthood) is through positive emotions. We use positive emotion experiences to select new situations that we want to interact with, hence the "broaden" component, (e.g., rock climbing gave me joy, maybe I'll also like skydiving) and learn new solutions to problems, hence the "build" component, (e.g., this solution worked and the situation was rewarding, I want to do it again). Notably, however, this cyclical process of experiencing and learning from positive emotions requires new situations. Once a lesson is learned, we get limited utility from interacting with the exact same situation again. Rather, individuals strive to generalize these lessons to new situations and consequently broaden their positive emotion experience. With the pandemic severely limiting the opportunity to interact with the world, the opportunity to broaden and build

decreased significantly, and therefore this theory would argue that positive emotion experience should drop as well and should remain low up to a point when individuals are again allowed to properly interact with the world in meaningful ways (which only began to occur in an extremely limited fashion close to a year after the onset of the pandemic).

Set-Point Theory of Well-Being

Another relevant theory is the hedonic treadmill theory, which argues that all individuals have a biologically predetermined "set-point" for well-being, to which we will return, regardless of the situation, if given enough time (Brickman, 1971). Thus, even after experiencing a global pandemic which shuts down the world, this theory would postulate an eventual return to baseline (i.e., any observed differences are just short-term impacts). Notably, however, the hedonic treadmill theory has recently been revised and now includes two important amendments: the biologically determined set points can change permanently given a strong enough situation, and there is considerable individual variability in the degree to which this change occurs (Diener, Lucas, & Scollon, 2009). These two amendments raise exceptionally interesting questions with regard to the COVID-19 pandemic. It can easily be argued that a virus that shuts down the entire world is a very strong situational force. Therefore, this pandemic represents the perfect opportunity to revisit the later amendment and ask: given the extremely strong situational impacts of the pandemic, for whom are changes from baseline in components of well-being such as positive and negative emotion experiences most prevalent?

Negative Emotions and Previous Pandemics

Researchers have asserted that *"the COVID-19 pandemic and associated lockdown could be considered a perfect storm"* (Shanahan et al., 2020, p.1), *"will have a dramatic impact"* (Kleinberg, van der Vegt, & Mozes, 2020, p.1), and *"will contribute to widespread emotional distress"* (Pfefferbaum & North, 2020, p.510). However, research on previous pandemics and natural disasters has revealed less severe negative emotional consequences than anticipated. According to Conservation of Resource Theory, loss of resources is at the heart of negative symptomology, particularly stress (Hobfoll, 1989). Consequently, unless the access to resources, particularly those which have relevance for survival (e.g., food), of an individual has been immediately impacted, they are unlikely to show large increases in negative emotion experience.

Several studies support this conclusion. Following the earthquake in Loma Prieta in 1989, for example, depressive symptoms among the general population did not increase. However, students from families who were directly and significantly impacted by the wreckage did show increases in both depressive and stress symptoms (Nolen-Hoeksema & Morrow, 1991). In an assessment that took place 1 year after Hurricane Hugo, subjects who self-reported minimal exposure had psychological distress symptoms no different from national norms. However, as immediate exposure increased, so did these symptoms (Hardin, Weinrich, Weinrich, Hardin, & Garrison, 1994). Additionally, several studies have shown that the negative health consequences of Hurricane Katrina were most severe for those with low access to resources (e.g., Galea et al., 2007; Rhodes et al., 2010). Similarly, a recent review of the effects of quarantine, which included studies from both the SARS outbreak in 2002-2003 and the H1N1 outbreak in 2009, has suggested that the longer people are forced to quarantine (thereby limiting access to resources), the more severe the psychological impacts (Brooks et al., 2020).

The COVID-19 Pandemic

As the pandemic unfolded, researchers across the globe became fascinated by its psychological effects. As expected, it had some marked consequences on mental health, with rates of anxiety, depression, and distress increasing across the board, in some countries as high as 25% since onset (for a review, see Aknin et al., 2022). In the USA specifically, the first months of the pandemic have been shown to be particularly problematic. Daly & Robinson (2021) found an increase in psychological distress of 0.27 standard deviations after two months of lockdown, and Vanderwelle and colleagues (2021) showed that mental and physical health and financial and material stability both decreased by close to an entire scale point after four months.

Interestingly however, the results of the impact of the pandemic in the literature are rather mixed, and in many places counterintuitive. For example, to assess how people feel about the pandemic, Kleinberg, van der Vegt, & Mozes (2020) asked British adults in a one-time online study to rate their feelings about the pandemic (notably distinct from general emotion experience measured in the present study) in early April 2020. As expected, of the three major negative emotions, *anxiety* was the one people felt most intensely. However, even for anxiety, the mean rating was far from the most intense level, averaging only 6.5 on their 9-point rating scale, which corresponds to 69% of the maximum. Sadness was also elevated, but only to 57% of the maximum. Positive emotions about the pandemic were rather scarce, and the rating for happiness was at 33% of the maximum.

So, how badly did people really feel during the initial lockdowns of the pandemic? To truly evaluate the impacts of the pandemic on emotional experiences at the individual level requires a longitudinal design with a pre-pandemic baseline, and a need to assess both positive and negative emotions. Zachier and Rudolph (2020) used the Positive and Negative Affect Schedule and reported that, in middle-aged adults in Germany, general positive affect declined from a pre-pandemic baseline as predicted, but general *negative* affect following the pandemic *declined* as well. In contrast, a study in Poland found that general negative affect had increased, while general positive affect decreased as in the German study (Bojanowska et al., 2020). Notably, these two studies measured only overall positive and general negative affect, using the PANAS.

Increasing the specificity of the emotion dependent variables, Willroth et al. (2021) used workers from MTurk and found an increase in negative emotion experiences lasting approximately six weeks before returning to baseline (but notably with a rather small effect size). They also found a depletion of positive emotion experiences which remained lower than pre-pandemic levels. As for individual specific emotions, one longitudinal study conducted in Zurich reported that anger and perceived stress had increased, but anxiety and depression had not (Shanahan et al., 2022).

The Present Research

All studies reported above made use of individuals from the general population. However, given the importance of emerging adulthood as a developmental period, it is vital to investigate the similarities and differences that this group may have with adults in their emotional experiences with the pandemic. Further, Study 1 restricted its analysis to the first eight weeks of lockdown, as this was shown to be the most troubling time for many individuals. In Berkeley during that time, nobody was allowed on campus. All students were either sheltering in place, with in person interactions forcibly restricted to those who they were living with, or had already returned home to shelter with their families.

The previously highlighted theories provide some competing hypotheses for how individuals might respond emotionally to the pandemic. For example, both Broaden and Build Theory and the Behavioral Activation System would argue that positive emotions should drop substantially, and Conservation of Resource Theory suggests either no change in negative emotions, or a substantial increase, depending on how directly the individual was impacted by the pandemic. Given the conflicting nature of these hypotheses, an investigation of the trajectories of emotion experience using a longitudinal sample with a pre-pandemic baseline is needed. Additionally, we wanted to diversify the literature and expand on existing studies by clarifying how exactly the experience of certain emotions, such as the commonly neglected LAP emotions like contentment and interpersonal emotions like compassion, have changed from a pre-pandemic baseline.

As for individual differences in emotion experiences, several theories (the BAS, affective reactivity, and the location of HAP emotions in the facet level Big Five framework) point to the notion that extraverts should be more impacted than introverts. Further, given the large associations between Neuroticism and negative emotions, Neuroticism was also expected to play a role. Based on this literature, the following hypotheses were pre-registered for Study 1:

 a) Extraverts should suffer more from the lockdowns in the early pandemic than introverts, as represented by greater drops in positive emotions and greater increases in negative emotions, and b) People low in Neuroticism should move into "vigilant mode" represented by greater increases in negative emotions

Study 1: Individual Differences in Emotional Responses to the COVID-19 Lockdown

Methods

Participants

Participants were Berkeley undergraduate students who were enrolled in introductory psychology classes and thus eligible to participate in the Research Participation Pool (RPP) in exchange for partial course credit; they provided baseline data on personality traits and emotion experiences in the third week of January (T0), well before the onset of the pandemic in the United States and the cancellation of in-person classes on the Berkeley campus on March 10, 2020.

These students were then recontacted, along with other eligible students from the Research Participation Pool (RPP) to complete an extensive COVID survey as a follow-up to the baseline assessment; this took place in late April and early May, on average, about 2 months (66 days) after the shelter-in-place order was issued in California. It is therefore referred to here as the May 2020 pandemic follow-up assessment (T1). At the time of this follow-up, the entire state of California was still in full lockdown, with a stay-at-home order in place and all non-essential businesses closed.

We conducted both sets of data collection as independent studies but explicitly recontacted participants from T0 to participate in the T1 study. The full sample size from T0 was 530 and from T1 was 582. Participants who failed one or more attention checks, as well as those who selected the same answer for more than 95% of the questions at either time point were excluded from the sample. Based on these criteria, 32 participants were removed from the sample, and combining this with our longitudinal retention rate of 53% yielded a final

longitudinal sample size of 279. These exclusion criteria (as well as the hypotheses) were preregistered. The final sample contained 190 females, and 67 males (and 22 decline to answer). The ethnic breakdown was as follows: 140 Asian, 56 European American, 32 Latinx, and 36 other (and 15 decline to answer).

Personality: Domains and Facets as Predictors Before the Pandemic

Personality was measured with the 60 item BFI-2 (Soto & John, 2017). The BFI-2 is a self-report inventory that was used to assess the Big Five personality traits of Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. This instrument requires participants to rate the extent to which they believe each of the 60 statements applies to their personality, on a scale from 1 (disagree strongly) to 5 (agree strongly). The instructions do not include any reference to stability or time frame:

"Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please use the scale below to indicate the extent to which you agree or disagree with each statement."

This paper focuses on the domain level scores for Extraversion, Agreeableness, and Neuroticism. Each of these traits is measured with 12 items on the BFI-2. The means, standard deviations, and scale reliability for each scale from our study are provided in Table 1. These numbers are comparable to the original scale paper (Soto & John, 2017).

In addition to the Big Five personality traits, the BFI-2 allows for an investigation of facet level personality. A facet is a specific aspect of a domain level trait (like a subscale). To obtain one's domain level score, all of the facets are added together. Facets allow for increased specificity in a discussion of individual differences. In this study, the facets of Extraversion are key to distinguishing between the effects of sociability (using the facet of Sociability) and lower behavioral activation (using the facet of Energy Level) as a result of the pandemic. This study uses facet level personality for Extraversion (facets of Sociability, Energy Level, and Assertiveness) and Neuroticism (facets of Anxiety, Depression, and Emotional Volatility) to test its competing hypotheses and compare their effects. Listed in Table 1 are the facets, their scale reliabilities, means, and standard deviations from our sample, as well as an example item. These values are comparable to the original scale paper (Soto & John, 2017).

Situation: The COVID-19 Pandemic

This longitudinal study investigates the impact of the COVID-19 pandemic on an individual's experience of emotions, and whether these effects might be moderated by underlying personality traits. The initial assessment (T0) took place before the shelter in place lockdown was issued. Students were living with friends in the dorms or in nearby off-campus housing, socializing and engaging in extracurricular activities, and attending all of their classes in person. The follow-up assessment (T1) took place approximately two months after the shelter in place order was issued in Berkeley, California. The university shut down its dorms, and with international borders closing to non-essential travel, many students returned home (either to a different country or somewhere else in the USA) to shelter with their families. The participants who did stay in Berkeley were attending all of their classes online and were confined to their homes, with severely limited social interactions and minute opportunities for behavioral activation.

Measuring Positive and Negative Emotion Experiences

We measured 6 positive and 5 negative emotions both before the pandemic and during the pandemic by asking participants to rate the extent to which they felt each of the emotions, on a scale from 1 (not at all) to 5 (extremely). Temporal instructions for T0 stated *"in the last six months"*, and for T1 they were *"since the onset of the pandemic"*.

For positive emotions, we measured High Arousal Positive (HAP) experiences using amused, energetic, interested, and humorous (alpha = 0.76 before the pandemic and 0.79 during lockdown). We also included a marker for Low Arousal Positive (LAP) experiences in the item contented. Finally, we had an interpersonal marker: compassion.

For negative emotions, we included two composites: a general negative experience composite, with the items of sad, anxious, and annoyed (alpha = 0.72 before the pandemic and 0.70 during lockdown) and an exploratory sadness composite with the items of sad, down, and gloomy (alpha = 0.86 before the pandemic and 0.91 during lockdown).

The data from T0 was originally to be used for a completely different purpose. Participants were recruited for an in-lab study in which manipulation of one or more of the eleven emotions from this list was to take place, and therefore this list of eleven emotions is not comprehensive. That lab study could not be run because of the pandemic. However, this emotion list includes at least one marker item for anxiety, anger, and sadness on the negative side, and on the positive side at least one marker for HAP, LAP, and social emotions, thus providing a basic picture of changes in emotion experience during the early months of the pandemic due to the pre-pandemic nature of T0.

Loneliness During the Pandemic

In order to control for the effects of loneliness, we included a short form of the UCLA loneliness scale (Russell, 1996) in the T1 assessment. This scale had a reliability of 0.83, with a mean of 1.81 and a standard deviation of 0.71.

Research Design and Analyses

In this design, baseline personality and situation were the two main predictors and emotion experience was the dependent variable. We were interested in the main effects of both personality and situation, but their interaction was of greatest theoretical interest. Because we used a prospective longitudinal design, emotion experience was a repeated-measures variable and moderated multiple regression was thus not applicable. Therefore, we used Multilevel Modeling (MLM) to test the two main effects and their interaction in a single design. Previous studies on personality and emotion in the laboratory (e.g., Gross et al., 1998) have solved the problem by decomposing personality effects into a baseline effect (here before the pandemic), and then the interaction effect (reactivity) is modeled as a change score from baseline. However, difference scores have a number of statistical problems (e.g., Cronbach & Furby, 1970), including that they are not independent of the baseline (i.e., by definition, they are negatively correlated with the baseline value), and they have lower reliability than the two scores that comprise them. The strength of modern MLM approaches is that they can estimate all effects in a single model.

In addition to these basic effects of personality and situation, we conducted two sets of exploratory analyses. First, we used two theoretically relevant facets of Extraversion (Sociability and Energy Level) to test whether the effects of Extraversion are due to sociability or the behavioral approach system; here we ran analyses separately for each facet as well as included both facets and their interactions with the situation in a joint analysis to test if one of the two facets had a unique effect. In the second analysis, we explored whether the trait-by-situation effects could be explained by individual differences in loneliness during the pandemic. Specifically, we added the main effect of loneliness and its interaction with the situation to the simpler models (e.g., with Extraversion) described above to test whether the personality-by-situation effects remained significant when loneliness was controlled for.

Results

We tested our primary hypotheses using multi-level models (MLM) predicting students' emotion experience (i.e., the dependent variable) from three predictors: (a) the situation (pre-pandemic vs. during lockdown), (b) the particular personality trait (Extraversion, Agreeableness, or Neuroticism) measured *before* the pandemic, and (c) the personality-by-situation interaction. In this model, the MLM estimates all effects at the same time and takes into account that the dependent variable (emotion experience) was measured longitudinally (i.e., the repeated-measures design). We begin with the effects for extraversion.

Extraversion and Situation Effects for High Activation Positive (HAP) Emotions

We begin with Extraversion as the personality predictor and our *high activation positive* (HAP) emotion composite as the dependent variable. The HAP composite included four emotions (amused, interested, energetic, humorous) and alphas were 0.76 before the pandemic and 0.79 during the lockdown. In the MLM, we predicted the HAP emotion composite from three predictors: Extraversion as the personality trait, situation (pre-pandemic vs. during lockdown), and their interaction. In this model, all effects are estimated at the same time and the repeated measures design of the dependent variable is represented appropriately.

First, the situation had a pronounced effect on HAP, as expected: participants dropped substantially from pre-pandemic levels to the lockdown period of the pandemic. In fact, the Cohen's d was 1.30, indicating a rather substantial effect size. The coefficient for the main effect of the situation is captured with a $B = -1.05$, $p < .001$, in the MLM as shown in Table 2.

Second, the main effect of personality was also significant, $B = 0.59$, $p < .001$, as shown in Figure 1, panel a. More extraverted participants reported higher levels of HAP, both before the pandemic and during the lockdown.

However, the situation clearly influenced the size of the personality effect, as shown in Figure 1, panel a. Before the pandemic, participants who scored one standard deviation above the mean reported 4.11 on the HAP scale, whereas participants one standard deviation below the mean on Extraversion scored 3.29 on the HAP scale. This difference of 0.82 captures the substantial and well-known effect of Extraversion on HAP, with a d of 1.32. This personality difference was substantially reduced during the lockdown: more extraverted participants scored 2.88 whereas participants low in Extraversion scored 2.42, differing only by 0.46, with a d of 0.51. This effect is shown in the MLM by the coefficient for the interaction term, $B = -0.18$, $p = <.001$. Given the longitudinal nature of the design, we can also interpret this interaction effect as

indicating that more extraverted participants dropped more substantially from pre-pandemic to the lockdown (with a drop of 1.23) than the more introverted participants (with a drop of 0.87).

To compare our findings to earlier research, we computed difference or *change scores*, which were commonly used to index person-environment interactions in terms of *differential reactivity* by computing the individual's change from baseline. Here, this difference would be computed as pre-pandemic HAP *minus* lockdown HAP. Consistent with the main effect of the situation in the MLM above, these change scores were overwhelmingly negative and averaged -1.05, which is over a full point on our 1 to 5 rating scale.

However, students' individual change scores differed substantially, as indicated by the standard deviation of the change scores, which was 0.95. In fact, 78% of the students showed the expected drop but 22% did not. As expected, and consistent with the MLM analyses, Extraversion predicted the individual differences in these change scores, with a positive and significant correlation, $r = 0.42$, *95% CI* [0.32,0.51] indicating that students high in Extraversion dropped *relatively* more in HAP than students low in Extraversion. In contrast to the MLM analyses, this correlation does not control for the initial level of HAP and, due to the lower reliability of change scores, represents an underestimate of the true effect size. Moreover, this correlational analysis cannot tell us whether only more extraverted students dropped in HAP whereas more introverted students stayed the same or even increased. In contrast, the parameters of the MLM analysis, illustrated in Figure 1, panel a, resolve that ambiguity, showing that both introverted and extraverted students decreased but the latter decreased much more.

Extraversion and Situation Effects for a Low Activation Positive Emotion: Contentment

Did the interaction effect for situation and personality occur only for HAP, or did it also capture the low arousal positive emotion studied here, contentment? In a new MLM, we predicted contentment from three predictors: Extraversion as the personality trait, situation (pre-pandemic vs. during lockdown), and their interaction.

As expected, the situation had a pronounced effect on contentment: participants dropped substantially from pre-pandemic levels to the lockdown period of the pandemic. The Cohen's *d* was 0.76, indicating a large effect size. The coefficient for the main effect of the situation is captured with a $B = -0.83$, $p < .001$, in the MLM as shown in Table 2.

The main effect of personality was also significant, $B = 0.57$, $p < .001$, as shown in Figure 1, panel b. More extraverted participants reported higher levels of contentment, both before the pandemic and during the lockdown.

Again, the situation clearly influenced the size of the personality effect, as shown in Figure 1, panel b. Before the pandemic, participants who scored one standard deviation above the mean reported 3.88 on contentment, whereas participants one standard deviation below the mean on Extraversion scored 3.24. This difference of 0.64 captures the effect of Extraversion on LAP emotions, with a *d* of 0.57. This personality difference was substantially reduced during the lockdown: more extraverted participants scored 2.80 whereas participants low in Extraversion scored 2.65, differing only by 0.15, with a *d* of only 0.12. This effect is shown in the MLM by the coefficient for the interaction term, $B = -0.25$, $p = .001$. Given the longitudinal nature of the design, we can also interpret this interaction effect as indicating that more extraverted

participants dropped more substantially from the pre-pandemic to the lockdown situation (with a drop of 1.08) than the more introverted participants (with a drop of 0.59).

We again sought to use the change score method to compare our findings to earlier research. Here, this difference would be computed as pre-pandemic contentment *minus* lockdown contentment. Consistent with the main effect of the situation in the MLM above, these change scores were overwhelmingly negative and averaged -0.85.

However, students' individual change scores differed substantially, as indicated by the standard deviation of the change scores, which was 1.28. In fact, 60% of the students showed the expected drop but 40% did not. As expected, and consistent with the MLM analyses, Extraversion predicted the individual differences in these change (drop) scores, with a positive and significant correlation, $r = 0.20$, *95% CI* [0.09,0.31], indicating that students high in Extraversion dropped *relatively* more in contentment than students low in Extraversion.

Extraversion and Situation Effects for Compassion

Here the MLM indicated only main effects. We found a main effect of the situation, whereby students decreased in compassion by the eighth week of the lockdown, suggesting evidence for the phenomenon of compassion fatigue, $B = -0.44$, $p = .001$. Further, extraverts were higher in compassion than introverts, $B = 0.22$, $p = .001$.

However, we found no interaction between Extraversion and the situation for compassion. The change from pre-pandemic to the lockdown was the same for introverts and extraverts as shown in Figure 1, panel c. These findings for compassion provide some boundary conditions for the interaction effects for Extraversion. Indeed, Extraversion was also not correlated with difference scores on compassion.

Extraversion and Situation Effects for Negative Emotion

Although most accounts of Extraversion emphasize the link to positive emotions, Extraversion is also related to negative emotion (e.g., Rusting & Larsen, 1997; Lundell-Creagh & John, in prep), though that effect is much smaller than for positive emotion. The results are shown in Table 2 and Figure 2, panel a.

These effects are efficiently summarized in the MLM. As expected, extraverted students scored slightly lower on the negative emotion composite, $B = -0.47$, $p < .001$. Intriguingly, the main effect of the situation was not significant, indicating that mean levels of negative emotions did not change from pre-pandemic to lockdown. This conundrum is partially resolved by examining the interaction term. The lack of mean level change for negative emotions was due to differential change in extraverted and introverted students, where the extraverts *increased* in negative emotions (from 2.93 to 3.11) and the introverts *decreased* slightly (from 3.45 to 3.22), $B = 0.21$, $p < .001$. This partially supports our preregistered hypothesis that extraverts would increase in negative emotion experience, but we did not predict that introverts would also decrease. Consistent with these findings, Extraversion was negatively correlated with change scores, $r = -0.22$, *95% CI* [-0.33 to -0.11]. In our sample, 55% of participants reported increases in the negative emotion composite.

We also examined a second negative emotion composite which focused on sadness, with items of sad, down, and gloomy. The patterns were identical to those observed for the general

negative composite, with similar effects (see Figure 2, panel b). For full details of this model, see Table 2.

Agreeableness and Situation Effects for HAP Emotions

We now turn to the other interpersonal trait from the Big Five framework: Agreeableness. How did Agreeableness relate to positive emotions pre-pandemic and during lockdown? We ran the same MLM discussed in the HAP section, replacing Extraversion with Agreeableness.

First, the situation effects replicated as expected: participants dropped substantially from pre-pandemic levels to the lockdown period of the pandemic. The coefficient for the main effect of the situation is captured with a $B = -1.05$, $p < .001$, in the MLM as shown in Table 3.

Second, the main effect of personality was also significant, $B = 0.19$, $p = .04$, as shown in Figure 3, panel a. More agreeable participants reported higher levels of HAP, both before the pandemic and during the lockdown.

However, we found no interaction effect. That is, individuals both high and low in Agreeableness decreased similarly in HAP as a result of the pandemic. Consistent with this finding, Agreeableness was not correlated with HAP difference scores.

Agreeableness and Situation Effects for LAP (Contentment)

What is the relationship between Agreeableness and our LAP marker of contentment? Higher Agreeableness predicted higher experiences of contentment, $B = 0.39$, $p = .002$. As shown in Table 3 and Figure 3, panel b, the situation also impacted the size of the personality effect: individuals scoring one standard deviation above the mean reported a pre-pandemic contentment level of 3.81, decreasing to 2.84 during the lockdown. This decrease was larger, with marginal significance, $B = -0.14$, $p = .07$, than those who scored one standard deviation below the mean, reporting an average contentment level of 3.30 pre-pandemic, and 2.60 during lockdown. The effect sizes were $d = 0.49$ pre-pandemic and $d = 0.12$ during lockdown. Agreeableness was not correlated with contentment difference scores.

Agreeableness and Situation Effects for Compassion

As expected and consistent with prior research, Agreeableness showed the highest association with compassion. Higher Agreeableness led to higher compassion, $B = 0.46$, $p < .001$. This model also showed the same situation effect as discussed for Extraversion. However, as shown in Figure 3, panel c, there was no interaction between Agreeableness and the situation. Further, it was not correlated with difference scores on compassion.

Agreeableness and Situation Effects for Negative Emotion

The patterns for Agreeableness and negative emotions closely resembled those that we observed for Extraversion. As shown in Figure 4, panel a, we found a main effect of Agreeableness, whereby higher Agreeableness led to lower experiences of negative emotions, $B = -0.41$, $p < .001$. We also found no effect of the situation, but a significant interaction, such that those scoring one standard deviation above the mean on Agreeableness increased in negative emotions as a result of the pandemic, whereas those scoring one standard deviation below the mean decreased, $B = 0.21$, $p < .001$. The results for our exploratory sadness composite were almost identical. Details of this model can be found in Table 3, and Figure 4, panel b.

Neuroticism and Situation Effects for HAP Emotions

Next, we examined the effects of Neuroticism. We ran the same MLM discussed in the HAP sections above, replacing Extraversion with Neuroticism. The results are shown in Table 4.

First, the situation effect on HAP was the same as in the earlier analyses for Extraversion.

Second, the main effect of personality was also significant, $B = -0.38$, $p <.001$, as shown in Figure 5, panel a. More neurotic participants reported lower levels of HAP, both before the pandemic and during the lockdown.

However, the situation again clearly influenced the size of the personality effect, as shown in Figure 5, panel a. Before the pandemic, participants who scored one standard deviation above the mean reported 3.36 on the HAP scale, whereas participants one standard deviation below the mean on Neuroticism scored 3.96. This difference of 0.60 captures the well-known effect of Neuroticism on HAP, with a d of -0.86. This personality difference was substantially reduced during the lockdown: more neurotic participants scored 2.44 whereas participants low in Neuroticism scored 2.80, differing only by 0.36, with a d of -0.40. This effect is shown in the MLM by the coefficient for the interaction term, $B = 0.11$, $p = .04$. Given the longitudinal nature of the design, we can also interpret this interaction effect as indicating that more neurotic participants dropped less from the pre-pandemic to the lockdown situation (with a drop of 0.92) than the less neurotic participants (with a drop of 1.16). As for change scores, Neuroticism correlated with differences in HAP at $r = -0.12$, *95% CI* [-0.23,-0.01].

Neuroticism and Situation Effects for LAP (Contentment)

Did the HAP effects generalize to our LAP emotion marker of contented? In fact, they were even stronger: Higher Neuroticism predicted lower experiences of contentment, $B = -0.78$, $p <.001$. As shown in Figure 5, panel b, the situation also impacted the size of the personality effect: individuals scoring one standard deviation above the mean reported a pre-pandemic contentment level of 2.86, decreasing to 2.29 during lockdown. This decrease was significantly smaller, $B = 0.21$, $p <.001$, than those who scored one standard deviation below the mean, reporting an average contentment level of 4.13 pre-pandemic, and 3.08 during lockdown. The effect sizes were $d = -1.30$ pre-pandemic and $d = -0.75$ during lockdown. Neuroticism also correlated negatively with contentment difference scores, $r = -0.16$, *95% CI* [-0.27,-0.04].

Neuroticism and Situation Effects for Compassion

Subsequently, we ran an MLM predicting compassion from Neuroticism, situation, and their interaction. Here, we found no significant results for the trait. That is, Neuroticism was not associated with levels of compassion pre or post pandemic and did not interact significantly with the situation. However, we did replicate the situation effect from the Extraversion model: individuals are experiencing compassion fatigue eight weeks into the pandemic, and decreased in compassion overall from a pre-pandemic baseline, as shown in Figure 5, panel c, $B = -0.45$, $p <.001$

Neuroticism and Situation Effects for Negative Emotion

Next, given the well-established associations between Neuroticism and negative emotion, it made sense to run the MLM with the negative emotion composite discussed above, replacing Extraversion with Neuroticism. Here, we had predicted that individuals high in Neuroticism

would not increase substantially from baseline, whereas those with low Neuroticism would show substantial increases in negative emotions. The results of the MLM are shown in Table 4 and Figure 6, panel a.

As the results show, higher Neuroticism predicted higher scores on the general negative composite, $B = 0.85$, $p < .001$. Further, we replicated the lack of main effect for the situation: general negative emotions did not change from a pre-pandemic baseline. However, we also replicated the trait by situation interaction that we observed in the Extraversion model: individuals who scored one standard deviation above the mean on Neuroticism *decreased* in negative emotions, from 3.92 to 3.62, whereas those one standard deviation below the mean *increased*, from 2.57 to 2.80, $B = -0.24$, $p < .001$. The effect sizes were $d = 2.33$ pre-pandemic and $d = 0.97$ during lockdown. With regards to change scores, Neuroticism correlated with them at $r = 0.25$, *95% CI* [0.14,0.36].

The models using the exploratory sadness composite illustrated the same patterns, with a slightly larger interaction effect. For full details of these models, see Table 4 and Figure 6, panel b.

Gender and Situation Effects on Emotion Experience

What about the effect of gender? Previous research has shown that women and men do not differ much in their positive emotion experience (e.g., Gard & Kring, 2007), and that was true in this study as well. Moreover, both women and men decreased about equally in HAP. As shown in Figure 7, panel a, the drop was 1.05 for women and 1.03 for men, indicating no interaction of gender with the situation. In an MLM, the coefficient for the gender main effect was $B = -0.04$, $p = .86$, and for the interaction, it was $B = 0$, $p = .96$. The same patterns were obtained for contented and compassion. That is, men and women experienced similar drops in positive emotions, and compassion fatigue as a result of the pandemic. For details of these models, see Table 5 and Figure 7.

For the general negative emotion composite, we found the common gender difference: women scored somewhat higher at baseline ($M = 3.30$, $SD = 0.84$) than men ($M = 2.85$, $SD = 0.82$), $B = 0.50$, $p = .03$. However, again, we found no evidence for a person by environment interaction; women and men reacted to the pandemic in the same way, as shown in Figure 8.

Robustness Checks on the Extraversion-by-Situation Interaction Effects

Gender robustness checks. Although we showed that men and women responded to the pandemic similarly, we also included sex and its interaction with the pandemic situation in all of the interaction models for Extraversion discussed above as a robustness check. All main effects and interaction effects remained significant, and the effect estimates did not change much. For details of this model, see Table 6.

Loneliness during the lockdown. One possibility is that the extraverted students felt lonelier during the pandemic, thus accounting for their decrease in positive emotion and increase in negative emotion experience. To test this hypothesis, we included three more predictors in the MLM, namely the main effect of loneliness, and its two-way interactions with the situation and with each trait (Extraversion, Agreeableness, and Neuroticism, separately). The parameter estimates for these more complex models are shown in Table 7, separately for HAP, LAP, compassion, the general negative composite, and the sadness composite. The results were

consistent: In all of these more complex MLM analyses, the main effects of personality and time as well as their interactions remained significant and with comparable effect sizes to the simpler models. In fact, in many cases, the effects of the traits actually increased. That is, after accounting for loneliness, the main effects of the trait, as well as its interaction with the situation, became more pronounced. For example, for HAP, the estimate for the main effect of extraversion changed from $B = 0.59$, $p <.001$ in the simpler analysis to $B = 0.64$, $p <.001$ in the more complex analysis where loneliness and its interactions were included. More importantly, the interaction of Extraversion and the pandemic situation was $B = -0.25$, $p <.001$ in the more complex analysis, compared to $B = -0.18$, $p <.001$ in the earlier simpler analysis.

In these analyses, loneliness generally had a negative interaction with the situation. For HAP, this interaction indicated that students who were lonelier during the lockdown decreased more in HAP from before the pandemic to the lockdown than students who were less lonely. In other words, the effect of loneliness on HAP was more pronounced during lockdown than before the pandemic, as one would expect given that loneliness was measured during lockdown. This pattern is illustrated in Figure 9, panel a. The patterns were similar for the other emotions, and as expected, the sign reversed for the negative emotions (higher loneliness leads to higher experiences of negative emotions)

Breaking Down the Extraversion Effect into Two Facets: Sociability and Energy Level

Next, we tested the Lucas et al. (2008) hypothesis that the relationship between positive emotions and Extraversion cannot be explained entirely by Sociability. We ran separate MLM analyses for the three major facets of Extraversion measured on the BFI-2, namely Sociability, Energy Level, and (for completeness) Assertiveness. The findings for Sociability and Energy Level are of greatest theoretical interest and thus the results of the simple models (when only one facet is used as the predictor) are illustrated in Figure 10. These facets test competing hypotheses about the mechanisms behind the experienced drops in positive emotion. Higher effects for Sociability would indicate that the drops in positive emotions are largely due to a lack of social contact, whereas higher effects for Energy Level would indicate that the drops are due more to a lack of behavioral activation. Our results indicate support for the latter. Although the effects of Sociability (and its interactions with the situation) were significant in the simple model (i.e., with only Sociability as the predictor, see Table 8), as shown in Table 9, when both facets are entered into the MLM as predictors, the effects of Sociability and its interaction with the situation are not significant for any of the emotions. In contrast, the main effects of Energy Level remain significant for all emotion dependent variables. At both time points, higher Energy Level predicted higher values for HAP, contentment, and compassion, and lower values on both negative emotion composites, even after accounting for Sociability. Further, the facet by situation interaction was also significant for HAP and trended significance for contentment. Those scoring higher on Energy Level experienced sharper drops in these emotions. As for the negative composites, the facet by situation interaction was significant for the sadness composite, and trended significance for the general negative composite (see Table 9). Those scoring higher on Energy Level experienced sharper increases in negative emotions. For completeness, we also ran the effects of a simple model with Assertiveness (the third facet of Extraversion on the BFI-2). For the results of this model, see Table 10.

Neuroticism Facet Level Predictors

One final comparison that can be made is to break down the effects of Neuroticism into its facets of Anxiety, Depression, and (for completeness) Emotional Volatility. Anxiety and Depression are of greatest theoretical relevance as they each capture one of the big three negative emotions included in our general negative composite. Thus, we included the facet level scores on Anxiety and Depression, as well as their potential interactions with the situation, in the same series of MLM discussed above. As shown in Table 11, we found that across all positive emotion models, Depression was the much better predictor. The main effects of Anxiety and its interaction with the situation were not significant when accounting for Depression in the positive emotion models. For the general negative composite, we found a significant main effect for both Anxiety and Depression, but again Depression was the better predictor. Interestingly, only the Depression by situation interaction was significant in this model (the Anxiety by situation interaction disappeared after controlling for Depression). For the effects of the simple models with Anxiety and Depression (and of Emotional Volatility), see Table 12.

Having shown that individual differences can reliably predict and interact with a strong naturalistic emotional situation (the pandemic lockdown) to produce unique emotional experiences, we then sought to generalize these results to a more standard in-lab emotional manipulation, designed to mimic the pandemic as closely as possible. This was the topic of Study 2.

Study 2: Individual Differences in Emotional Responses to a Sad Film Clip

Methods

Participants

Participants were Berkeley undergraduate students who were enrolled in introductory psychology classes and thus eligible to participate in the Research Participation Pool (RPP) in exchange for partial course credit; they provided baseline data on personality traits and how they were currently feeling before viewing a sad film (the experimental sadness manipulation). To disguise the purpose of the study, participants completed a plethora of unrelated items and tasks between the personality assessment and the viewing of the film. Participants who failed one or more attention checks, as well as those who selected the same answer for more than 95% of the questions were excluded from the sample. After exclusions, the final sample size was 141. These exclusion criteria (as well as the hypotheses) were preregistered. The sample contained 103 females, and 35 males (and 3 non-binary/other). The ethnic breakdown was as follows: 56 Asian, 30 European American, 22 Latinx, and 28 other (and 5 decline to answer).

Personality Traits as a Predictor of Reactivity

Personality was again measured with the 60 item BFI-2 (Soto & John, 2017).

Situation: Sad Film

To manipulate sadness, all participants watched an excerpt from the 1979 film "The Champ". In this clip, a young boy learns the news of his father's passing. This film has been previously validated as an experimental manipulation of sadness (Gross & Levenson, 1995). It has also been shown to be devoid of positive emotions (participants report almost no positive emotions after watching this film). We selected this film to most closely mimic the emotional effects of the pandemic; many people experienced personal losses. Further, in Study 1, we

showed a marked decrease in positive emotions as a result of the lockdown, which made a film devoid of them a good selection for an experimental manipulation designed to mimic the emotional effects of lockdown.

Measuring Positive and Negative Emotion Experiences

We measured the same 6 positive and 5 negative emotions as in Study 1. For positive emotions, we measured High Arousal Positive (HAP) experiences using amused, energetic, interested, and humorous. We also included a marker for Low Arousal Positive (LAP) experiences in the item contented. Finally, we had an interpersonal marker: compassion.

For negative emotions, we included two composites: a general negative experience composite, with the items of sad, anxious, and annoyed, and an exploratory sadness composite with the items of sad, down, and gloomy.

Research Design and Analyses

This study used the same design and analysis plan as Study 1. Baseline personality and situation were the two main predictors and emotion experience was the dependent variable. We were interested in the main effects of both personality and situation, but their interaction was of greatest theoretical interest. To analyze the data, we again made use of Multilevel Modeling (see Study 1 for an explanation of the benefits of this type of analysis). We also repeated our same set of exploratory analyses from Study 1, using the facets of Sociability and Energy Level for Extraversion and Anxiety and Depression for Neuroticism.

Results

We tested our primary hypotheses using multi-level models (MLM) predicting students' emotion experience (i.e., the dependent variable) from three predictors: (a) the situation (pre- vs. post-film), (b) the particular personality trait (Extraversion, Agreeableness, or Neuroticism) measured *before* the film, and (c) the personality-by-situation interaction. In this model, the MLM estimates all effects at the same time and takes into account that the dependent variable (emotion experience) was measured longitudinally (i.e., the repeated-measures design). We begin with the effects for Extraversion.

Extraversion and Situation Effects for High Activation Positive (HAP) Emotions

We begin with extraversion as the personality predictor and our *high activation positive* (HAP) emotion composite as the dependent variable. In the MLM, we predicted the HAP emotion composite from three predictors: Extraversion as the personality trait, situation (pre vs post-film), and their interaction. In this model, all effects are estimated at the same time and the repeated measures design of the dependent variable is represented appropriately.

First, the situation had a pronounced effect on HAP, as expected: participants dropped substantially from pre-film levels to post-film. In fact, the Cohen's *d* was 0.84, indicating a large effect size. The coefficient for the main effect of the situation is captured with a *B* = -0.63, *p* <.001, in the MLM as shown in Table 2.

Second, the main effect of personality was also significant, *B* = 0.40, *p* <.001, as shown in Figure 1, panel d. More extraverted participants reported higher levels of HAP, both before and after the film

However, the situation clearly influenced the size of the personality effect, as shown in Figure 1, panel d. Before the film, participants who scored one standard deviation above the mean reported 2.52 on the HAP scale, whereas participants one standard deviation below the mean on Extraversion scored 2.02 on the HAP scale. This difference of 0.50 again captures the well-known effect of Extraversion on HAP, with a d of 0.64. This personality difference was substantially reduced after the film: more extraverted participants scored 1.74 whereas participants low in Extraversion scored 1.54, differing only by 0.20 with a d of 0.39. This effect is shown in the MLM by the coefficient for the interaction term, $B = -0.15$, $p = <.001$. Given the longitudinal nature of the design, we can also interpret this interaction effect as indicating that more extraverted participants dropped more substantially from the pre-film HAP baseline.

Extraversion and Situation Effects for a Low Activation Positive Emotion: Contentment

Did the interaction effect for situation and personality occur only for HAP, or did it also capture the low arousal positive emotion studied here, contentment? In a new MLM, we predicted contentment from three predictors: Extraversion as the personality trait, situation (pre vs post-film), and their interaction.

As expected, the situation had a pronounced effect on contentment: as a result of the film, participants dropped substantially from pre-film levels of contentment. In fact, the Cohen's d was 0.95, indicating a rather substantial effect size. The coefficient for the main effect of the situation is captured with in the MLM with $B = -1.02$, $p <.001$, as shown in Table 2.

The main effect of personality was also significant, $B = 0.24$, $p <.001$, as shown in Figure 1, panel e. More extraverted participants reported higher levels of contentment, both before and after the film. However, we found no person by situation interaction for contentment in this situation. That is, the sad film appears to have impacted levels of contentment similarly for introverts and extraverts.

Extraversion and Situation Effects for Compassion

Here the MLM also indicated only main effects. We found an interesting main effect of the situation, whereby students increased in compassion after viewing the sad film (perhaps indicating they felt compassion for the child who was in anguish), $B = 0.45$, $p <.001$. This is the opposite of the compassion fatigue main effect that we found in the longer-term situation of Study 1. Further, extraverts were higher in compassion than introverts, $B = 0.29$, $p = .001$. However, we found no interaction between Extraversion and the situation for compassion. The increase in compassion from pre-film occurred for both introverts and extraverts, as shown in Figure 1, panel f.

Extraversion and Situation Effects for a General Negative Emotion Composite

To compare our results with those obtained from the pandemic in Study 1, we also checked the moderating effects of Extraversion on our negative emotion composite and our exploratory sadness composite. The results are shown in Figure 2, panels c and d.

These effects are efficiently summarized in the MLM. As expected, extraverted students scored slightly lower on the negative emotion composite, $B = -0.33$, $p <.001$. We also found a main effect of the situation on the general negative composite, indicative of a successful manipulation of sadness, $B = 0.15$, $p = .05$.

As for the Extraversion by situation effects, we replicated the results of the pandemic. The interaction was significant for the general negative composite, $B = 0.19$, $p = .01$. As shown in Figure 2, panel c, the introverts scored 2.38 at baseline and decreased to 2.34 following the film, whereas the extraverts scored 2.10 pre-film and increased to 2.45 after the film.

Extraversion and Situation Effects for Sadness

In exploratory analyses, we also investigated a sadness composite. Extraversion had a significant effect on this composite, of a comparable size to its effects on the general negative composite, $B = -0.37$, $p = .01$. Given that our film targeted sadness specifically, we found a substantial situation effect for this sadness composite, $B = 0.83$, $p < .001$, showing that the manipulation was successful. As for the interaction, Figure 2, panel d shows that both introverts and extraverts increased in scores on this sadness composite, but extraverts increased slightly more, $B = 0.22$, $p = .01$.

Agreeableness and Situation Effects for HAP Emotions

How did Agreeableness relate to positive emotions after viewing a sad film? We ran the same MLM discussed in the HAP section, replacing Extraversion with Agreeableness.

First, the situation effects replicated as expected: participants dropped substantially from pre-film levels after viewing the sad film. The coefficient for the main effect of the situation is captured with a $B = -0.63$, $p < .001$, in the MLM as shown in Table 3.

However, as shown in Figure 3, panel a, we found no significant effect of personality, nor its interaction with the situation. That is, those scoring high and low on Agreeableness showed similar levels of HAP pre and post-film and were impacted by the film in the same way.

Agreeableness and Situation Effects for LAP (Contentment)

What is the relationship between Agreeableness and our LAP marker of contentment after viewing a negative film? Replicating Study 1, higher Agreeableness predicted higher experiences of contentment, $B = 0.37$, $p = .003$. As shown in Table 3 and Figure 3, panel e, the situation also impacted the size of the personality effect, again replicating Study 1: individuals scoring one standard deviation above the mean reported a pre-film contentment level of 3.02, decreasing to 1.79 after the film. This decrease was larger, $B = -0.22$, $p = .01$, than those who scored one standard deviation below the mean, reporting an average contentment level of 2.72 pre-pandemic and 1.92 after the film.

Agreeableness and Situation Effects for Compassion

Consistent with Study 1, Agreeableness again showed an association with compassion. Higher Agreeableness led to higher compassion, $B = 0.31$, $p = .05$. This model also showed the same situation effect discussed for Extraversion. However, as shown in Figure 3, panel f, there was no significant trait by situation interaction. That is, everyone increased approximately equally in compassion after watching a sad film clip, showing compassion for the child whose father had died.

Agreeableness and Situation Effects for Negative Emotions

The main effects for Agreeableness and negative emotions closely resembled those that we observed for Extraversion. As shown in Figure 4, panel c, we found a main effect of

Agreeableness, whereby higher Agreeableness led to lower experiences of negative emotions, B = -0.47, p <.001. We also found a significant effect of the situation, whereby viewing the sad film increased negative emotions, B = 0.15, p = .05. Further, there was a significant trait by time interaction such that higher Agreeableness led to greater increases in negative emotions following the film clip, B = 0.26, p <.001. These results were even more pronounced for the sadness composite, which was expected as the film targeted sadness. For full details of this model, see Table 3 and Figure 4, panel d.

Neuroticism and Situation Effects for HAP Emotions

Next, we examined the effects of Neuroticism on emotions following a sad film clip. For HAP, the situation effects replicated as expected: participants dropped substantially from pre-film levels after viewing the sad film. The coefficient for the main effect of the situation is captured with a B = -0.63, p <.001, in the MLM as shown in Table 4. The main effect of personality was also significant, B = -0.44, p <.001, as shown in Figure 5, panel d. More neurotic participants reported lower levels of HAP.

However, the situation again clearly influenced the size of the personality effect, as shown in Figure 5, panel d. Before the pandemic, participants who scored one standard deviation above the mean reported 2.56 on the HAP scale, whereas participants one standard deviation below the mean on Neuroticism scored 1.98. This difference of 0.58 captures the well-known effect of Neuroticism on HAP, with a d of 0.69. This personality difference was substantially reduced during the film: more neurotic participants scored 1.51 whereas participants low in Neuroticism scored 1.76, differing only by 0.25, with a d of 0.45. This effect is shown in the MLM by the coefficient for the interaction term, B = 0.16, p = .007. Given the longitudinal nature of the design, we can also interpret this interaction effect as indicating that more neurotic participants dropped less in HAP as a result of the film.

Neuroticism and Situation Effects for LAP (Contentment)

Did the HAP effects generalize to our LAP emotion marker of contented? Replicating Study 1, the effects were even stronger. Higher Neuroticism predicted lower experiences of contentment, B = -0.61, p <.001. The effect of the situation was also significant. Participants reported lower contentment after watching the sad film, B = -0.99, p <.001. However, the situation again did not influence the personality effect. All participants dropped similarly in contentment.

Neuroticism and Situation Effects for Compassion

In this study, we found a main effect of personality such that higher Neuroticism was linked with lower scores on compassion, B = -0.33, p = .04. We again found a situation effect, but no trait by situation interaction, whereby all individuals increased in compassion a similar amount after watching the film. Details of this model can be found in Table 4 and Figure 5, panel f.

Neuroticism and Situation Effects for a General Negative Emotion Composite

Our final analyses for Neuroticism pertained to its relationship with negative emotions. Here, we had predicted a stronger increase in negative emotions for individuals low in Neuroticism. The results of the MLM are shown in Table 4 and Figure 6, panel c.

As the results show, higher Neuroticism predicted higher scores on the general negative composite, $B = 0.71$, $p < .001$. We also replicated the effect for the situation: scores on the general negative composite increased from baseline, $B = 0.15$, $p = .05$. Further, we replicated the trait by situation interaction that we observed in the Extraversion model: individuals who scored one standard deviation above the mean on Neuroticism *decreased* in negative emotions, from 2.64 to 2.46, whereas those one standard deviation below the mean *increased*, from 1.84 to 2.30, $B = -0.32$, $p < .001$. The effect sizes between groups were $d = 0.98$ at baseline and $d = 0.20$ after the film. These partially supported our hypothesis. Technically, low Neuroticism individuals did increase more in negative emotions, as we had predicted. However, we did not predict that high Neuroticism individuals would decrease.

The models using the exploratory sadness composite illustrated mostly the same patterns, with much larger effects for the situation (to be expected since the situational manipulation targeted sadness). One notable difference from the general negative composite was that all individuals increased in sadness after watching the film (as opposed to just the low Neuroticism individuals). However, the trait by situation interaction was still significant, $B = -0.25$, $p = .001$. Low Neuroticism individuals increased in sadness more than those high in Neuroticism. For full details of this model, see Table 4.

Breaking Down the Extraversion Effect into Two Facets: Sociability and Energy Level

Next, we again tested the Lucas et al. (2008) hypothesis that the relationship between positive emotions and Extraversion cannot be explained entirely by sociability. The Extraversion facets of Sociability and Energy Level test competing hypotheses about the mechanisms behind positive emotion experience. Thus, they were entered into an MLM together, predicting each of our emotion DVs. Higher effects for Sociability would indicate that positive emotion experience is more about social contact, whereas higher effects for Energy Level would indicate that it refers more to behavioral activation. As in Study 1, our results again indicate support for the latter. As shown in Table 13, when both facets are entered into the MLM as predictors, the effects of Sociability and its interaction with the situation were not significant for HAP, compassion, the general negative composite, or the sadness composite. Further, we found a suppressor effect for contentment, such that the sign for Extraversion flipped to negative, indicating that higher Sociability predicted lower contentment when accounting for the effects of Energy Level, $B = -0.32$, $p = .04$. In contrast, the effects of Energy Level remain significant for all emotion DVs (see Table 13 for the model values). Higher Energy Level predicted higher levels of HAP, contentment, and compassion, and lower levels of the general negative composite and sadness composite, after accounting for Sociability. Further, the facet by situation interaction was significant for contentment and the general negative composite. Those scoring higher on Energy Level experienced sharper drops in contentment, and sharper increases in negative emotions as a result of the sad film.

Neuroticism Facet Level Predictors

One final comparison that can be made is to break down the effects of Neuroticism into its facets of Anxiety and Depression, as in Study 1. Here, we included the facet level scores on Anxiety and Depression, as well as their potential interactions with the situation, in the same series of MLM discussed above. As shown in Table 14, for positive emotions, we found that Anxiety was a slightly better predictor of HAP, whereas Depression was a slightly better predictor of contentment in response to the short-term situational manipulation of a sad film clip.

Interestingly, the only significant interaction with positive emotions was with Anxiety and HAP, where higher Anxiety predicted higher HAP, $B = 0.16$, $p = .02$, perhaps capturing the physiological activation piece.

For the general negative composite, we found a significant main effect for both facets, but Depression was the slightly better predictor. Further, the Depression by situation interaction was significant, $B = -0.22$, $p = .02$, and the Anxiety by situation interaction trended significance at an approximately equal value, $B = -0.19$, $p = .06$. For the sadness composite, only the Depression interaction trended significance, $B = -0.22$, $p = .06$.

General Discussion

The findings from these two studies have important implications for personality theory, especially Extraversion, Agreeableness, and Neuroticism, and emotion theory, especially positive emotions and negative emotions. Finally, we address issues of generalizability from Study 1 to Study 2, as well as limitations and future directions.

Implications for Personality Theory

Theories About Extraversion

Previous work on the relationship between personality traits (like Extraversion) and emotions comes largely from three camps: differential reactivity to an experimentally manipulation emotion (e.g., Larsen & Ketelaar, 1991, Gross, Sutton & Ketelaar, 1998), correlational self-report studies on its association with emotion experiences "in general" (e.g., Watson & Clark, 1994; Verduyn & Brans, 2012) or EMA studies which report on the association between traits and daily experience of emotions (e.g., Lucas & Diener, 2001; Lucas, Le, & Dyrenforth, 2008). Our Study 1 is well situated at the intersection of these camps, extending the previous research into a naturalistic "field" experiment where a global health pandemic powerfully changed the situation for our participants. In Study 2, we then asked whether the findings from this naturalistic field experiment would generalize to an in-lab experiment where the emotional manipulation was selected to mimic the effects of the pandemic as closely as possible.

First, we replicated the well-known Extraversion effect on HAP emotions, whereby extraverts score higher in HAP. In both studies, the mean levels of HAP experiences were higher for extraverts both before and after the emotional situation occurred. We also found a strong impact of the situation: in Study 1, everybody decreased significantly in HAP as a result of the pandemic, and in Study 2, this result replicated following watching a sad film. Further, we found support for our hypothesis that extraverts would drop more than introverts in HAP as a result of the pandemic. In Study 2, extraverts also dropped more in HAP as a result of watching the sad film.

For our LAP marker of contented, we replicated the known associations with Extraversion in both studies whereby the extraverts were scoring slightly higher. We also supported our hypothesis that the larger drops in HAP for extraverts would also be found for contentment because of the pandemic. In the shorter term in lab manipulation of Study 2, there

was no significant interaction between Extraversion and situation for contentment. That is, extraverts and introverts dropped in contentment to a similar degree after viewing the sad film.

For compassion, higher Extraversion predicted higher compassion scores in Study 2, and with marginal significance in Study 1. Interestingly, we found opposing effects of the situation in the two studies. That is, after 8 weeks of lockdown, individuals had decreased experiences of compassion, showing compassion fatigue. However, after viewing a short film where a child was told of his father's death, everyone increased in compassion, sharing the pain of the child. Finally, we found no significant interaction with the situation in either study. These findings highlight some discriminant validity in Extraversion's relationship with positive emotions.

As for negative emotions, we found the expected trait effect whereby extraverts exhibited slightly fewer negative emotions overall in both studies. In Study 1, we also found no effect of the situation. That is, mean levels of negative emotion experience did not change from before the pandemic to during the lockdown. However, we did find a significant interaction between Extraversion and the situation. Our hypothesis was partially supported, in that extraverted individuals did increase in their negative emotion experiences during lockdown; but supplementally, we found the unexpected effect that those who identify as introverted decreased in negative emotion experiences. In Study 2, the situation effect was significant. Everyone experienced drops in negative emotions after viewing the sad film, illustrating that the manipulation was successful. Further, we again found a significant interaction between Extraversion and the situation. Our hypothesis that extraverts would increase more in negative emotions as a result of viewing the film was supported.

What is driving these observed effects of Extraversion? In Study 1, one possibility is a decrease in opportunities for social contact. With social distancing regulations imposed by the pandemic, the opportunities to engage in social contact became extremely limited. Meeting new people and building one's social network, an important developmental task during emerging adulthood, became near impossible. Another possibility is decreased opportunity for behavioral activation. This system, which is normally responsible for actively seeking out and approaching rewarding situations, had much less opportunity to do so. The novelty and excitement vanished quickly from our environments, as activities became restricted exclusively to essential services. In other words, for many people who could normally enjoy being on vacation, going to a happy hour with friends, or participating in sports, the maximum amount of excitement that they could get in a day shrank to a visit to the grocery store.

Our design provided an opportunity to test these potential explanations by including both the facets of Sociability and Energy Level together in the MLM as predictors. Overall, our findings agreed with the theories by Lucas et al. (2008) that there's more to the relationship between Extraversion and positive emotions than just sociability. Here, we argue that the "something more" is the behavioral activation system. In every model that we ran, the Energy Level predictor outperformed Sociability. In fact, when controlling for Energy Level, the effects of Sociability on both positive and negative emotions disappeared entirely. Contrarily, when controlling for Sociability, the effects of Energy Level consistently remained, with rather pronounced effects on both positive and negative emotions. Higher Energy Level led to greater

experience of HAP emotions, greater contentment, greater compassion, and lower negative emotions. Further, the interactions between Energy Level and situation remained significant in all models except for compassion. That is, higher Energy Level led to greater drops in HAP and contentment, and greater increases in negative emotions as a result of social distancing. In sum, blocking the behavioral activation system leads to both decreased positive and increased negative emotion experiences, even after controlling for (lack of) social encounters. For the most part, these results also generalized to Study 2, with the exception that the facet by situation interactions mostly disappeared (though the one for contentment remained---higher energy level led to greater drops in contentment after the sad film). These results are to be expected, given that the situational manipulation from Study 2 is much shorter and weaker than the global pandemic which was investigated in Study 1.

Theories about Agreeableness

Though often neglected in the literature on the relationship between the Big Five personality traits and emotions, researchers would be remiss to exclude Agreeableness from their analyses as it does have some important associations with emotions. One reason for its neglect may be an overreliance on HAP emotions in the literature. Indeed, though Agreeableness can have some minor associations with HAP, as we found in Study 1, these associations tend to be much smaller than those between HAP and Extraversion (Lundell-Creagh & John, in prep). However, it does have an important link with LAP emotions like contentment. In both studies, we found that higher Agreeableness predicted higher contentment. Further, we found significant interactions with both situations (the pandemic in Study 1 and the sad film in Study 2), such that higher Agreeableness led to greater drops in contentment in response to the situation (though it must be mentioned that the results trended significance in Study 1). Finally, and most importantly, Agreeableness was heavily linked to our interpersonal emotion of compassion in both studies. That is, higher Agreeableness predicted higher experiences of compassion. These interpersonal emotions appear to be where Agreeableness is at its strongest as a predictor.

Accordingly, we also found that Agreeableness negatively predicted both our general negative composite and our sadness composite. That is, higher Agreeableness led to lower experiences of negative emotions overall. Further, we found a significant interaction with the situation in both studies. Higher Agreeableness led to greater increases in negative emotions in response to lockdown (Study 1) and in response to a sad film clip (Study 2). These results are consistent with the conceptualization of Agreeableness as an interpersonal trait: a greater ability to foster close relationships leads to less negative emotions overall. Additionally, the significant interactions with the situation may highlight the interpersonal relevance of some negative emotions. For example, in Study 2, individuals higher in Agreeableness may have felt greater sadness *for* the child who had just lost his father.

Theories about Neuroticism

As for Neuroticism, in both studies we replicated the well-known Neuroticism effect on HAP emotions, whereby high Neuroticism led to less experiences of HAP emotions. We also found a strong impact of the situation: in Study 1, everybody decreased significantly in HAP as a

result of the pandemic, and in Study 2, everybody decreased significantly in HAP as a result of watching the sad film. Further, we failed to support our hypothesis that there would be no interactions with the situation in Study 1. In fact, in both Study 1 and Study 2, we found a significant interaction whereby those scoring higher on Neuroticism experienced less of a drop in HAP.

For our LAP marker of contented, in both studies we replicated the known associations with Neuroticism whereby high neurotics were scoring lower. Contrary to our hypothesis, we again found a significant interaction with the situation in Study 1, where highly neurotic participants dropped less on contentment than low neurotics. However, this interaction did not generalize to the short-term situation manipulation of Study 2. Neither the main effect of Neuroticism, nor its interaction with the situation, was significant for compassion in Study 1. In Study 2, we did find a main effect of Neuroticism, whereby high Neuroticism was associated with lower compassion, but again there was no interaction.

As for negative emotions, we found the expected trait effect in both studies: high neurotics exhibited higher negative emotions overall. We also found no effect of the situation in Study 1. That is, mean levels of negative emotion experience did not change from before the pandemic to during lockdown. However, we did find a significant interaction between Neuroticism and the situation. Our hypothesis that high Neuroticism individuals would not increase substantially in negative emotions was partially supported. Although they did not experience substantial increases, they actually decreased in negative emotion experience, which we did not predict. We correctly predicted the pattern for low Neuroticism individuals of a substantial increase in negative emotions as a result of the lockdown. Given that high Neuroticism manifests as a propensity to identify a large degree of environmental stimuli as threatening, one potential explanation for these findings is that with less diversity of environments during lockdown (i.e., everybody working from home all the time), these individuals had less environmental stimuli to classify as a threat overall. Consequently, they experienced less anxiety (and other negative emotions) than they normally would being surrounded by potential stressors. This interaction generalized to the short-term situational manipulation of Study 2, where our hypothesis that low Neuroticism individuals would show a stronger negative reaction to the film was supported. Despite this, we again had an unexpected finding: the individuals high on Neuroticism decreased in general negative emotions after viewing the film, similar to the patterns in Study 1. When restricting the negative emotions to sadness (which was the target of the Study 2 manipulation), the interaction remains significant. All individuals do increase in sadness after the film, but the high Neuroticism individuals increased less. As the situational manipulation of Study 2 was much weaker than Study 1, these results may be indicative of the fact that high Neuroticism individuals require stronger situational manipulations in order to experience large amounts of sadness.

Is there a particular facet of Neuroticism which is driving these effects? To compare the effects of facet level Depression and Anxiety, we included both of these facets as predictors in the MLM at the same time. In these models, Depression was the stronger predictor. In Study 1, it had significant main effects on HAP and contentment, after controlling for Anxiety. Further, the

interaction with the situation was significant for contentment, such that higher Depression scores led to sharper drops in contentment. This did not hold for compassion. The main effects and situation interactions with Anxiety on HAP and contentment disappeared after controlling for Depression. These results suggest that the (negative) relationship between Neuroticism and positive emotions may be driven by anhedonia. That is, increased levels of Depression lead to lower energy levels and a decreased desire to engage with the world, which in turn could lead to a decrease in positive emotions.

As for negative emotions, both Anxiety and Depression were significant predictors of general negative emotion experience (though Depression was slightly stronger). Despite this, only the Depression by situation interaction was significant for negative emotions, such that higher Depression scores led to a smaller drop in negative emotions.

In the sad film manipulation of Study 2, the effects of Anxiety after controlling for Depression were more pronounced. It was a better predictor of HAP, and also significantly predicted contentment. However, the effects of Depression still remained as well, with similar patterns to Study 1. One explanation for the discrepancies between studies is that after 8 weeks of lockdown, individuals may have adopted a mindset similar to one of learned helplessness. They no longer felt very anxious about the impacts of the pandemic but were depressed about the potential of long-term changes such as lack of social contact and limited activities (indeed, after 8 weeks, nobody knew how long the imposed restrictions would last).

Implications for Emotion Theory

Positive Emotions in the Face of Strong Situational Stressors

What can we learn about positive emotions as a result of the lockdown? The students in Study 1 experienced substantial drops in HAP and contentment. These drops were widespread, with 78% of students dropping in HAP, and 60% in contentment. That is, in the face of a strong negative situational force, positive emotions seem to reliably decrease. To replicate this situation as closely as possible, in Study 2, we made use of a video which has previously been validated to be devoid of positive emotions. Here, we found that 73% of participants dropped in HAP, and 69% decreased in contentment.

Why does this drop occur? One explanation is that the lockdown caused an inability to broaden and build (Fredrickson, 2001). Our students had the pivotal developmental period of emerging adulthood completely disrupted. They had no opportunity to build their social networks, missed out on important life experiences like graduation, and could not take vacations. Many were also faced with the additional stressor of navigating the job market during these uncertain times. Thus, there were no opportunities to broaden and build, leading to decreased positive emotion experiences. Another possibility is that the pandemic may have decreased the potential for the positivity offset. This theory explains that individuals interpret neutral situations as having a small degree of positivity. However, in the face of a deadly pandemic that claimed millions of lives, individuals may have shifted more toward negativity bias (the opposite of positivity offset). Notably, there is a large degree of individual differences in the degree to which individuals engage in positivity offset or negativity bias (Norris et al., 2011). These individual

differences may explain why we were able to show that personality significantly moderated emotional experiences, both during lockdown and in response to a sad film.

Complexity of Negative Emotions

One of the most puzzling findings from Study 1 comes in the form of the lack of situation effect for negative emotions. Mean levels of negative emotions did not change as a result of lockdown. There are several potential explanations for this. First, it is possible that we missed the initial increase in negative emotions due to the onset of the pandemic, as we did not collect follow-up data until 8 weeks in. Willroth et al., (2021) have shown in a study tracking emotions week by week that most of the action is in the first 6 weeks of the pandemic, and negative emotions begin to revert to baseline after week 6. Thus, it is possible that our participants had already adjusted to their new situations by the 8-week follow-up. It is also possible that these negative emotions such as fear and anxiety require a reversion to baseline by nature. That is, human beings may not be able to maintain an extended period of hypervigilance physiologically and necessitate a return to baseline to "recharge" these systems. Next, it is possible that our students engaged in comparative regulation. Indeed, open-ended responses to how they felt about the pandemic showed strong themes of *"I'm better off than most"*. Students may have been comparing themselves to others around the world who were much less fortunate (i.e., experiencing difficulties in access to basic needs) and thus our students did not feel so bad about their current situations.

Finally, it is possible that the complexity of negative emotions produced truly divergent experiences, which averaged to no mean level change. Although positive emotions have been shown to have similar evolutionary functions, the functions of negative emotions tend to be more diverse. For example, embarrassment serves appeasement functions following a social norm breach (Keltner, 1995), whereas contempt may have evolved to signal social exclusion (Fischer & Roseman, 2007). As such, in our study, we observed that individual differences were reliably associated with differential negative emotion experiences. For example, students high in Extraversion increased in overall negative emotion experience, whereas students who identified as more introverted decreased. Further, those identifying as highly neurotic decreased in negative emotion experience, whereas the low neurotics increased. It appears as though the increased evolutionary complexity of negative emotions may provide a suitable environment for individual differences at the trait and facet level to emerge as predictors. We captured these differences using a general negative composite, with markers for each of the big three negative emotions: sadness, anxiety, and anger. The associations between trait and facet level personality and differing patterns of emotional responses for each discrete negative emotion individually is an interesting direction for future research.

Theories about Situations and Person-Situation Interactions

In general, person by situation interactions in which the situational forces are weak or ambiguous leave greater room for individual differences (based on underlying personality traits) to exert their effects (Snyder & Ickes, 1985). In other words, the stronger a situation, the less

individual differences emerge (i.e., strong situations have relatively similar effects on everybody).

The pandemic represented a very strong situational force. There were clear local rules about what was sensible and what was not, applied universally to everybody. Everyone was forced to socially distance under similar restrictions, and work from home became the new norm across the globe. Therefore, as expected, we found that during lockdown, the trait effects on emotional experiences were reduced. For example, the effect of Extraversion on HAP went from a d of 1.32 pre-pandemic to 0.51 during lockdown. These findings fit with the general theories on person by situation interactions that strong situations compress individual differences.

However, just as in experimental studies, even though the situation was a strong force does not mean that individuals perceived or experienced it in exactly the same way. We have shown several examples of how underlying personality traits such as Extraversion and Neuroticism, and facets such as Sociability and Energy Level, differentially determined an individual's emotional response to the pandemic. Thus, despite the strong situation, individuals did not perceive or experience the pandemic lockdowns in the same way. These findings also generalized to the weaker situational manipulation of Study 2, showing the importance of person-situation interactions.

Here we've focused on *reactive* person by situation effects, showing that students with particular personalities reacted to the pandemic lockdown (Study 1) and a sad film (Study 2) in different ways. Our multilevel model analyses are an important extension of previous work, which focused on "reactivity" such as the study by Gross et al., (1998) which showed that high Extraversion resulted in reacting more positively to a positive film clip, and high Neuroticism resulted in reacting more negatively to a sad film clip. Our first study used more sophisticated methods to show that these differences in reactivity hold in natural contexts rather than experimentally manipulated ones. We then illustrated that very similar patterns occur in response to experimental manipulations of sadness. We also found evidence of a cross-over effect, whereby high Extraversion (and high Agreeableness) people showed greater negativity in response to lockdown in Study 1 and a sad film in Study 2.

George Kelly (1955) called this construal effects, individuals construe the same environment in different ways. Emotion researchers call it appraisal effects: individuals will appraise the same situation differently (e.g., Gross & John, 2003; Kuppens & Tong, 2010). What might explain Extraversion's reactivity effects on positive emotions? One possibility is Entringer and Gosling's (2022) hypothesis that high Extraversion people became lonelier during the pandemic. However, we tested that hypothesis directly by controlling for loneliness, and the effects of Extraversion on both positive and negative emotions still remained. We also tested this hypothesis more directly in a model that included both the Sociability and the Energy Level facets of Extraversion, and Energy Level was consistently the better predictor.

Comparing Study 1 to Study 2: From the Field to the Lab

We did our best to replicate the naturalistic effects of the pandemic using an in-lab manipulation. However, some differences are worth noting. First, in Study 1, the follow-up

assessment took place after 8 weeks of lockdown, whereas in Study 2, baseline personality and emotion ratings were collected approximately 30 minutes before viewing the film. Thus, we are comparing the longer-term effects of a natural setting (the lockdown) with a short-term emotional situation in the lab. Second, there were slight differences in the baseline instructions for the emotions. In Study 1, participants were asked at baseline to rate the extent to which they felt each of the emotions in the last 6 months. In Study 2, consistent with the more short-term manipulation, we adopted a short-term approach to the instructions, and asked participants at baseline to rate how they were feeling *"right now"*. Based on these differences, readers should consider our findings as supplements to one another, rather than direct replications. In fact, this framing makes the robustness of the moderating role of personality that we found much stronger, as we were able to show that findings held for both long- and short-term emotional contexts. Despite these differences in design, the majority of our findings were similar and held in both studies, illustrating the powerful potential of personality as a moderator of experiences with emotional contexts. One interesting discrepancy between the studies which highlights the differences in design was the situation effects for compassion. In Study 1, we found evidence of compassion fatigue, whereby individuals decreased in compassion from baseline after 8 weeks of lockdown. In contrast, in Study 2, we found increases in compassion. Individuals felt compassion for the child who had lost his father and increased from their baseline levels as a result.

Limitations and Future Directions

One limitation of Study 1 is that although we were able to control for loneliness, it was measured during the pandemic. It would have been ideal to have a pre-pandemic measure of loneliness as our control variable, but much like the rest of the world, we could not have predicted the global scale or impact of the virus.

Additionally, it would have been nice to have a community sample for comparison with our student sample. Many other longitudinal studies make use of community samples, and it would be nice to compare our results directly to theirs. However, we argue that our student sample is better suited to test our particular hypotheses related to person by situation interactions as they are more homogeneous in terms of what their environments were like both before and during the pandemic. They were all taking classes full time and in-person prior to the pandemic, as opposed to a community sample where some people may have one kid to support, versus others having three, and some people may have already been working remotely, versus having to go into the office every day (we could continue to list the numerous ways in which the lives of members of a community sample differ for several pages).

As for Study 2, one limitation is that the video manipulation was unique to the emotion of sadness. The pandemic brought many more negative emotions than just sadness, and it would be ideal to have used multiple videos targeting different sad emotions to more closely resemble this. However, we were worried about statistical power if we used too many videos, and thus chose to focus on the prototypical negative emotion of sadness. Future work should attempt to replicate these results using videos that target emotions other than sadness.

Finally, the emotion list that was included in the pre-pandemic baseline was not perfect. It would have been nice to include more than one marker for Low Arousal Positive emotions and for interpersonal emotions, as well as additional markers for other major negative emotions (for example, having anger instead of annoyed would be ideal). To remain as close to the design of Study 1 as possible, we carried the same emotion list into Study 2. However, future work on the power of reactive person by situation interactions and context effects should attempt to replicate our results using a more diverse and representative emotion set.

Another interesting direction for future work is to measure appraisals in response to these strong situation forces directly. How exactly are people thinking about the pandemic? It is possible that high Extraversion people appraised the lockdown (and lack of socialization) as a greater loss than low Extraversion people. Further, high Neuroticism people may have experienced it as a welcome reduction in life stress or anxiety. With no need to go out or interact with others, the potential for stressors is severely limited. Future work should address these questions directly.

Conclusion

Though the relationships between Extraversion and Neuroticism and positive and negative emotions are well-established at the trait level, research has been scarce when investigating these relationships at the more specific facet level, and in response to naturalistic settings. Our findings provide several important updates to these existing theories. First, despite the extreme strength of the pandemic lockdown situation, which would normally suppress individual differences, we showed that people still differentially responded to lockdown (an event that occurred naturally) based on their underlying personality traits. This explains some inconsistencies in the literature on the emotional consequences of the pandemic, particularly for negative emotions. Further, we showed that the trait of Agreeableness has important associations with emotions that should be considered in any study on the relationship between traits and emotions. We also showed that increasing the specificity of the analysis and investigating personality at the facet level can provide some important insights into why these relationships between personality and emotion might occur. Finally, we found that both established differences at the trait level, and novel ones at the facet level, between personality and emotion also hold in a traditional in-lab manipulation of emotion, when analyzed using modern statistical techniques which account for individual differences in baseline emotion experience. Altogether, these findings provide important and novel insights into the relationships between personality and emotion.

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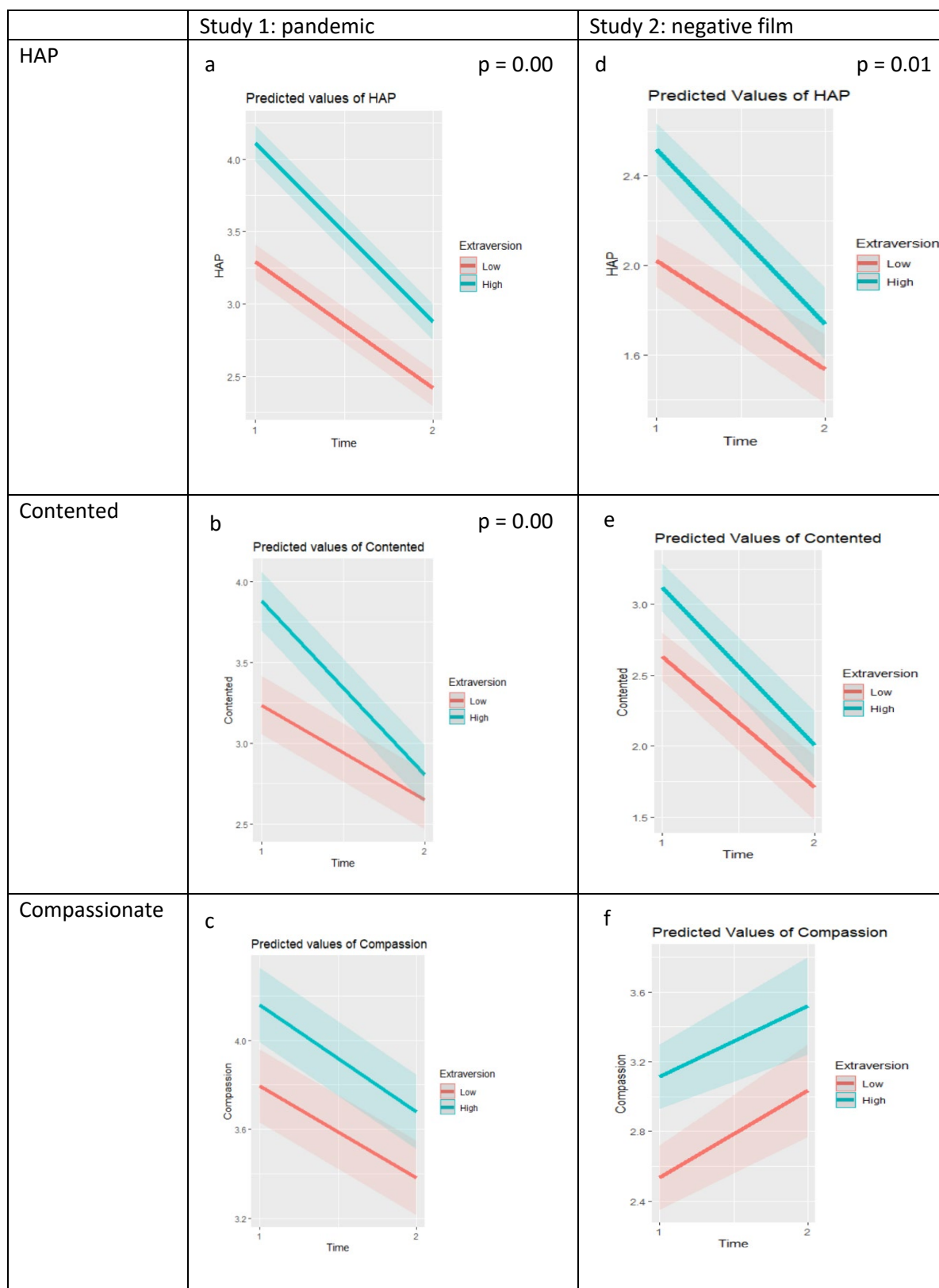
Figure 1. Moderating role of Extraversion on positive emotion experiences during negative contexts. High Extraversion is shown in green and low Extraversion in red. Panel (a) HAP differences due to the pandemic, (b) contentment differences due to the pandemic, (c) compassion differences due to the pandemic, (d) HAP differences after a sad film, (e) contentment differences after a sad film, (f) compassion differences after a sad film.

	Study 1: pandemic	Study 2: negative film
General Negative Composite		
Sadness Composite		
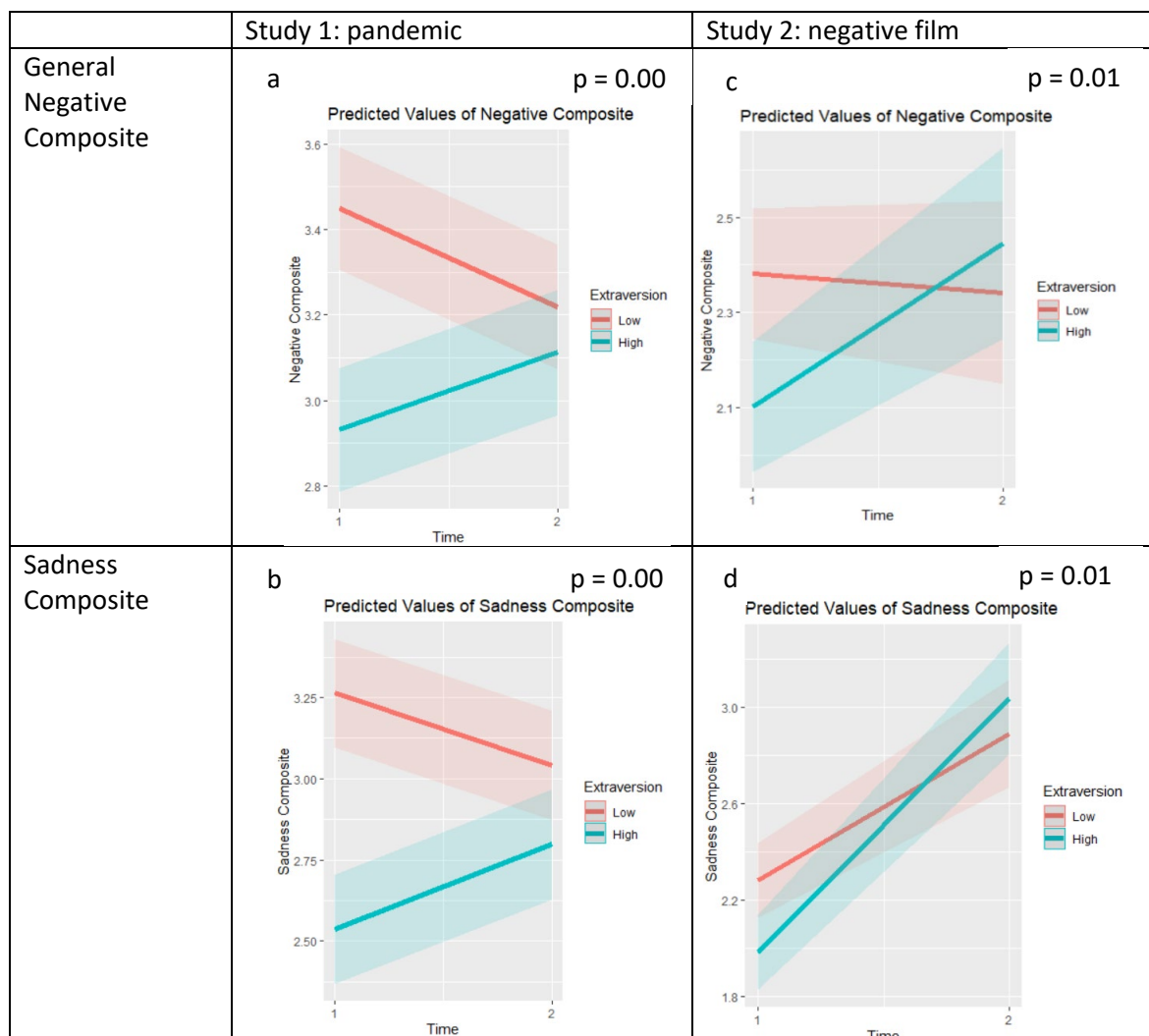
Figure 2. Moderating role of Extraversion on negative emotion experiences during negative contexts. High Extraversion is shown in green and low Extraversion in red. Panel (a) general negative composite differences due to the pandemic, (b) general negative composite differences due to the pandemic, (c) general negative composite differences after a sad film, (d) general negative composite differences after a sad film
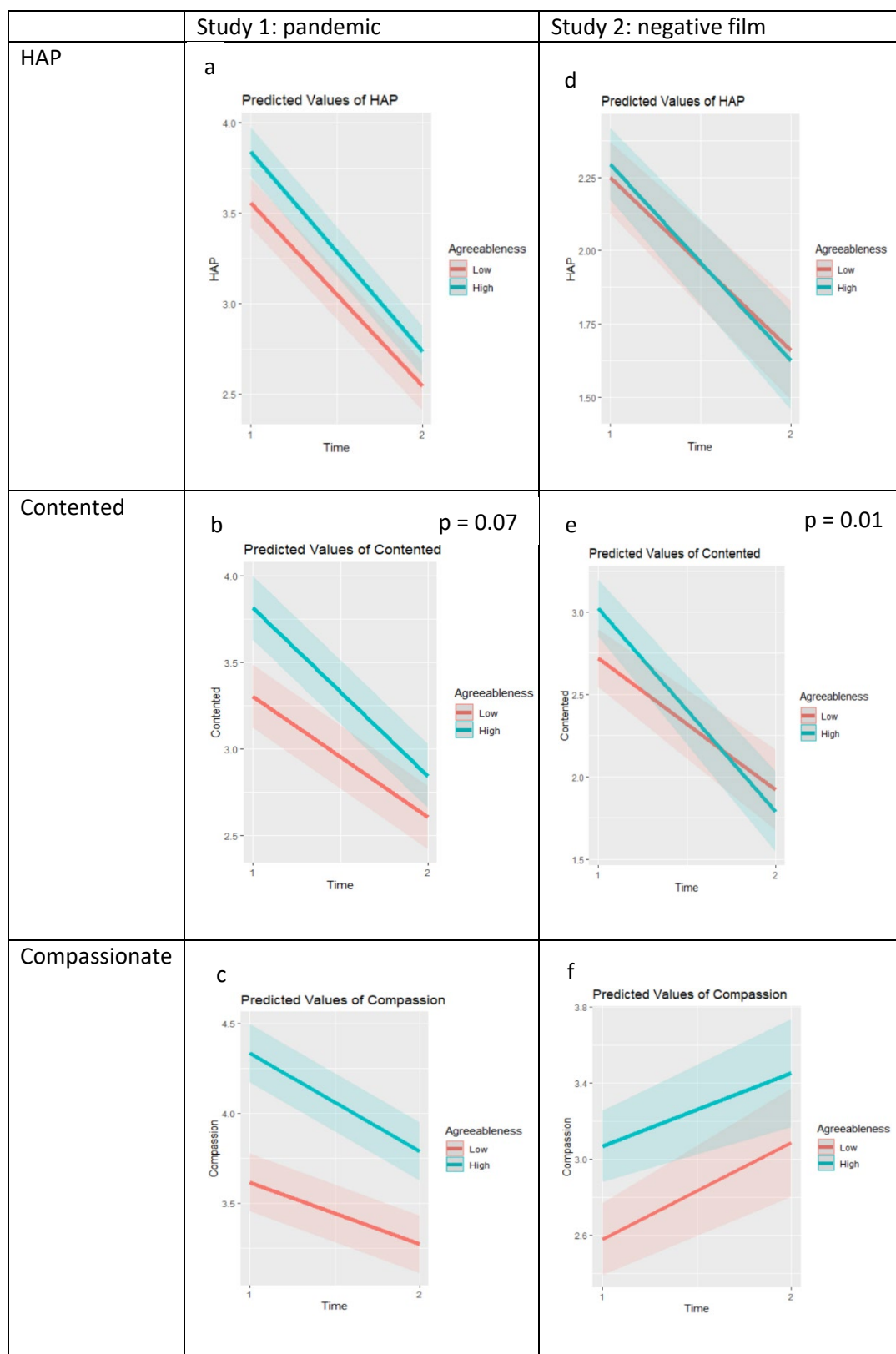
Figure 3: Moderating role of Agreeableness on positive emotion experiences during negative contexts. High Agreeableness is shown in green and low Agreeableness in red. Panel (a) HAP differences due to the pandemic, (b) contentment differences due to the pandemic, (c) compassion differences due to the pandemic, (d) HAP differences after a sad film, (e) contentment differences after a sad film, (f) compassion differences after a sad film

	Study 1: pandemic	Study 2: negative film
General Negative Composite		
Sadness Composite		
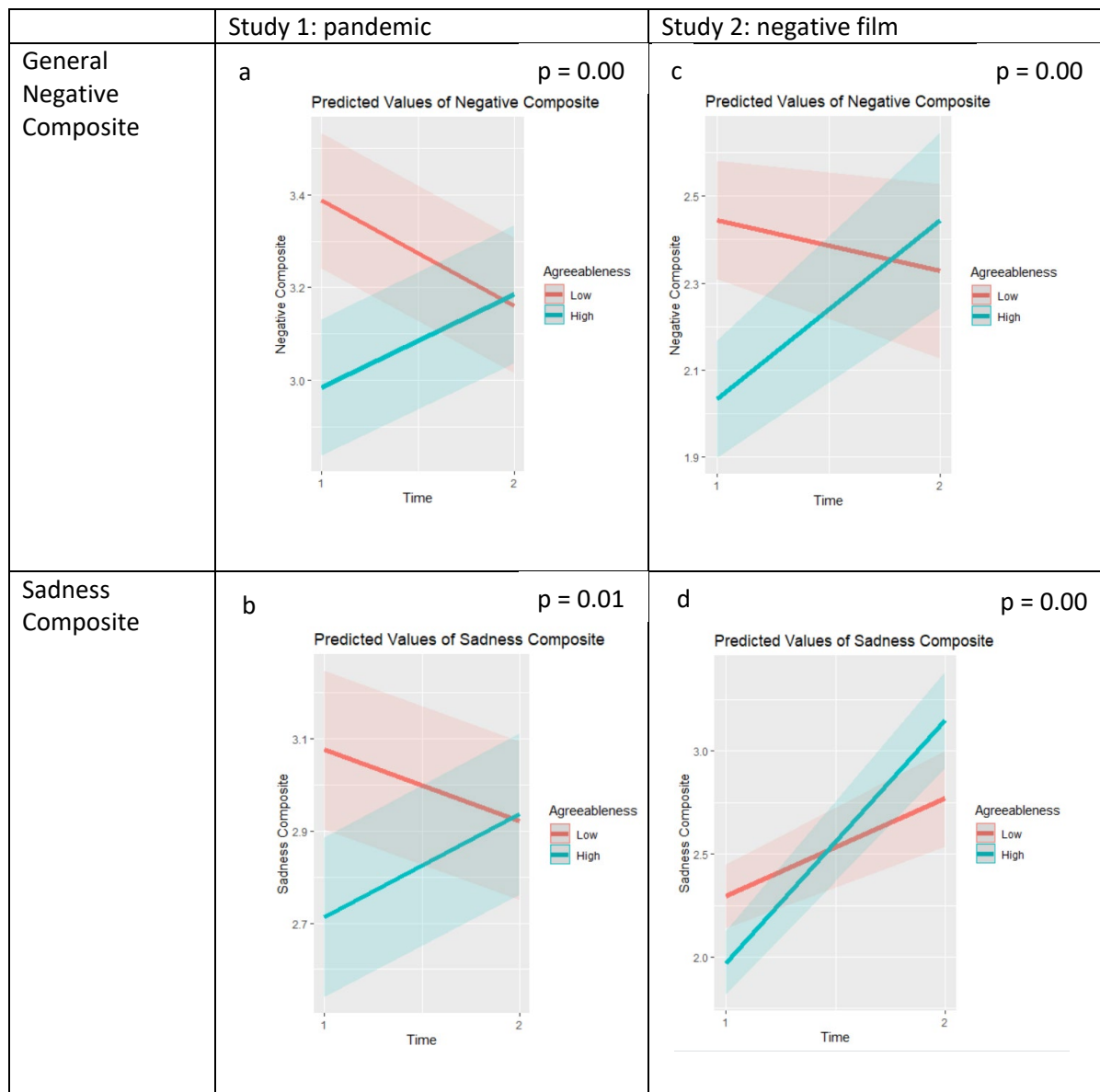
Figure 4. Moderating role of Agreeableness on negative emotion experiences during negative contexts. High Agreeableness is shown in green and low Agreeableness in red. Panel (a) general negative composite differences due to the pandemic, (b) general negative composite differences due to the pandemic, (c) general negative composite differences after a sad film, (d) general negative composite differences after a sad film
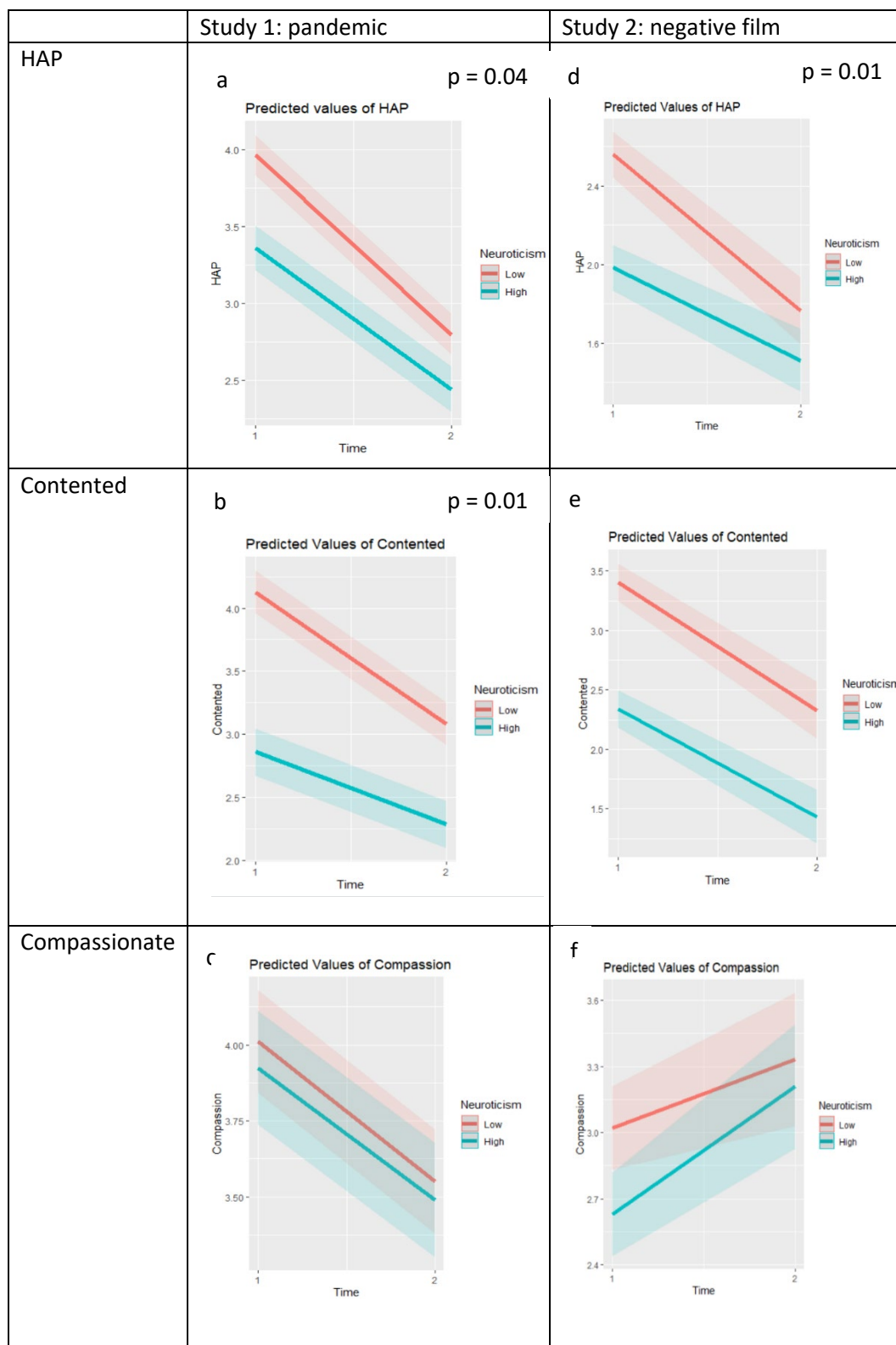
Figure 5. Moderating role of Neuroticism on positive emotion experiences during negative contexts. High Neuroticism is shown in green and low Neuroticism in red. Panel (a) HAP differences due to the pandemic, (b) contentment differences due to the pandemic, (c) compassion differences due to the pandemic, (d) HAP differences after a sad film, (e) contentment differences after a sad film, (f) compassion differences after a sad film

	Study 1: pandemic	Study 2: negative film
General Negative Composite		
Sadness Composite		
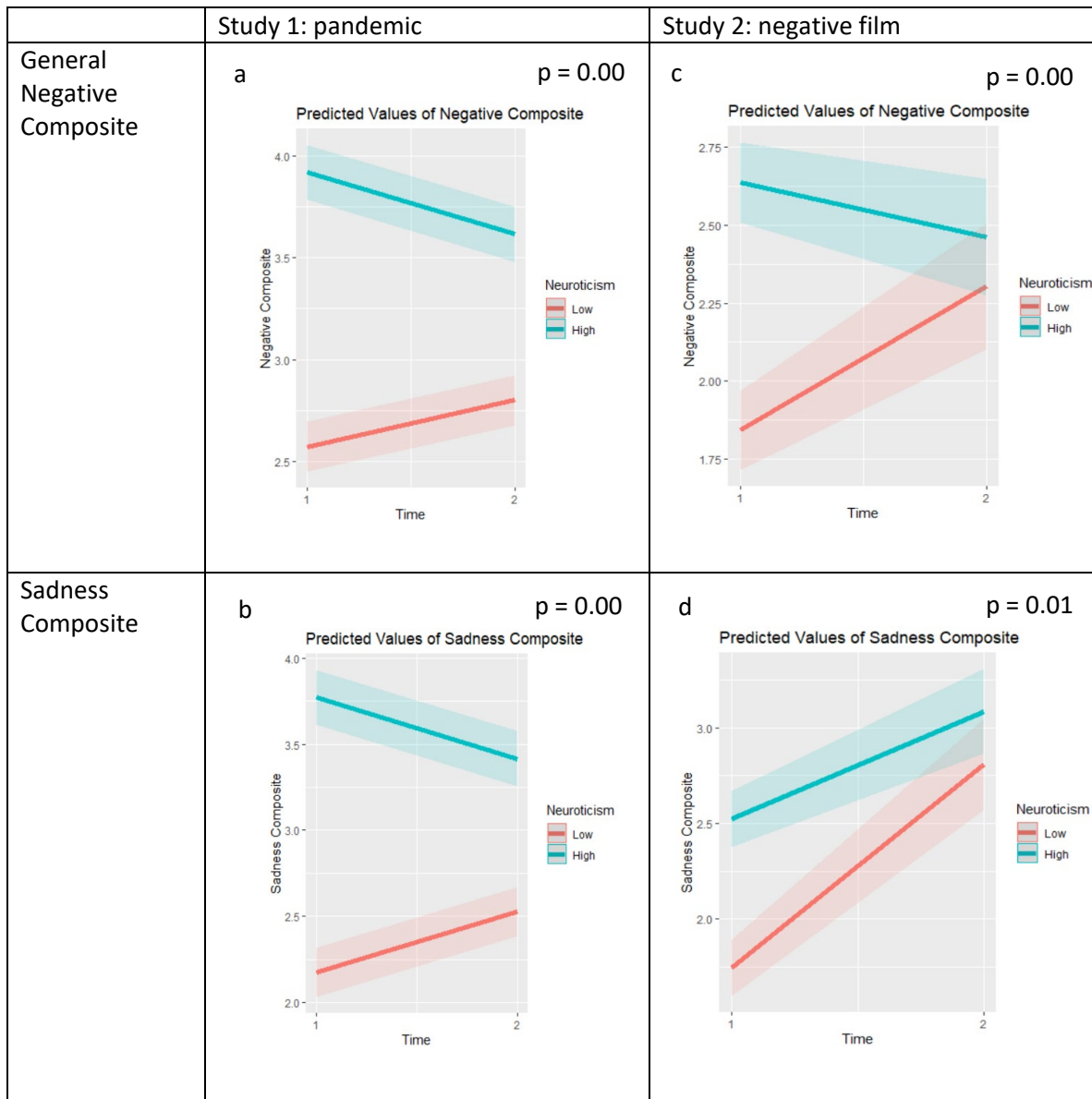
Figure 6. Moderating role of Neuroticism on negative emotion experiences during negative contexts. High Neuroticism is shown in green and low Neuroticism in red. Panel (a) general negative composite differences due to the pandemic, (b) general sadness composite differences due to the pandemic, (c) general negative composite differences after a sad film, (d) general sadness composite differences after a sad film

HAP	
Contented	
Compassionate	
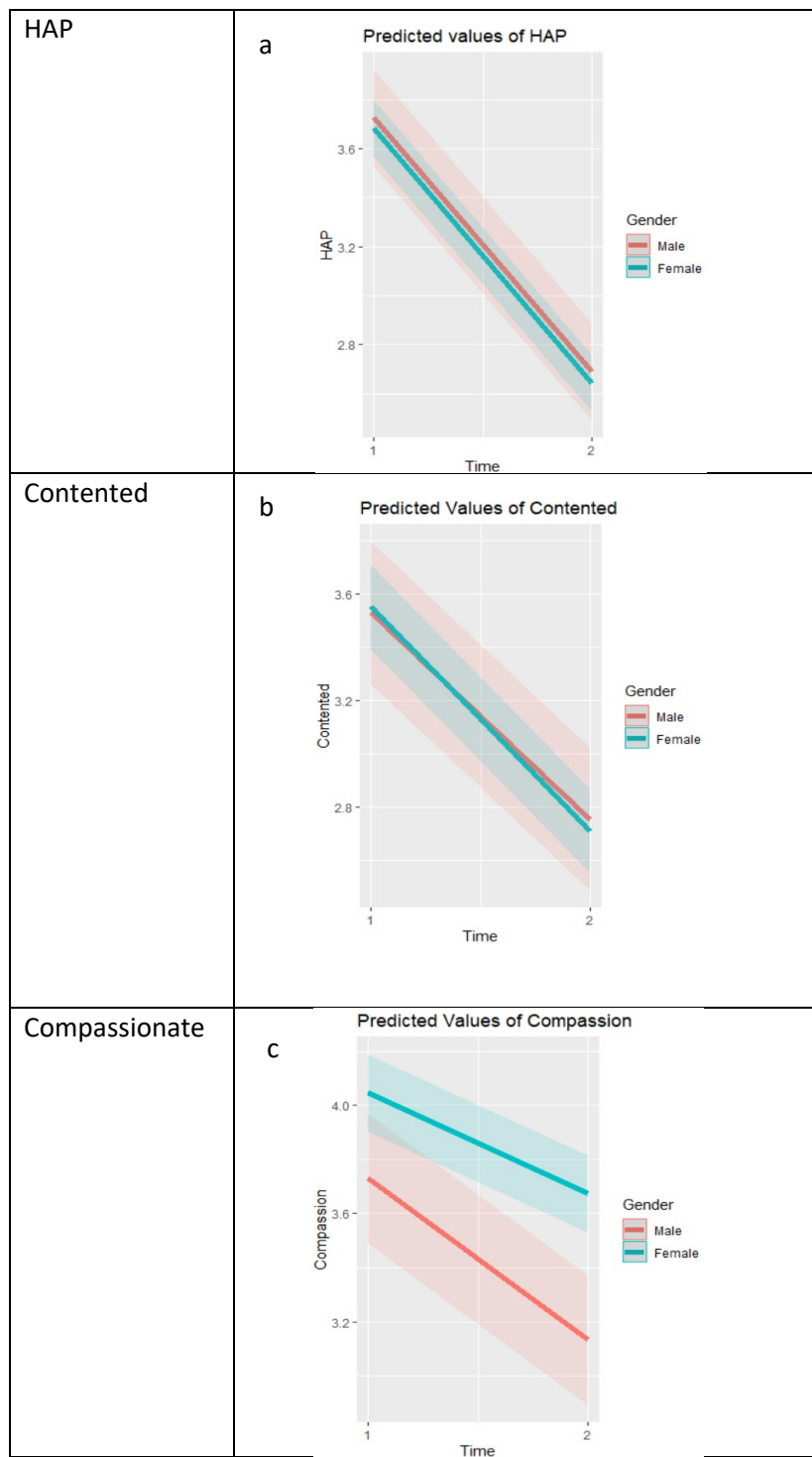
Figure 7. Moderating role of gender on positive emotion experiences during lockdown. Women are shown in green and men in red. Panel (a) HAP differences due to the pandemic, (b) contentment differences due to the pandemic, (c) compassion differences due to the pandemic

| General Negative Composite | a |
| Sadness Composite | b |
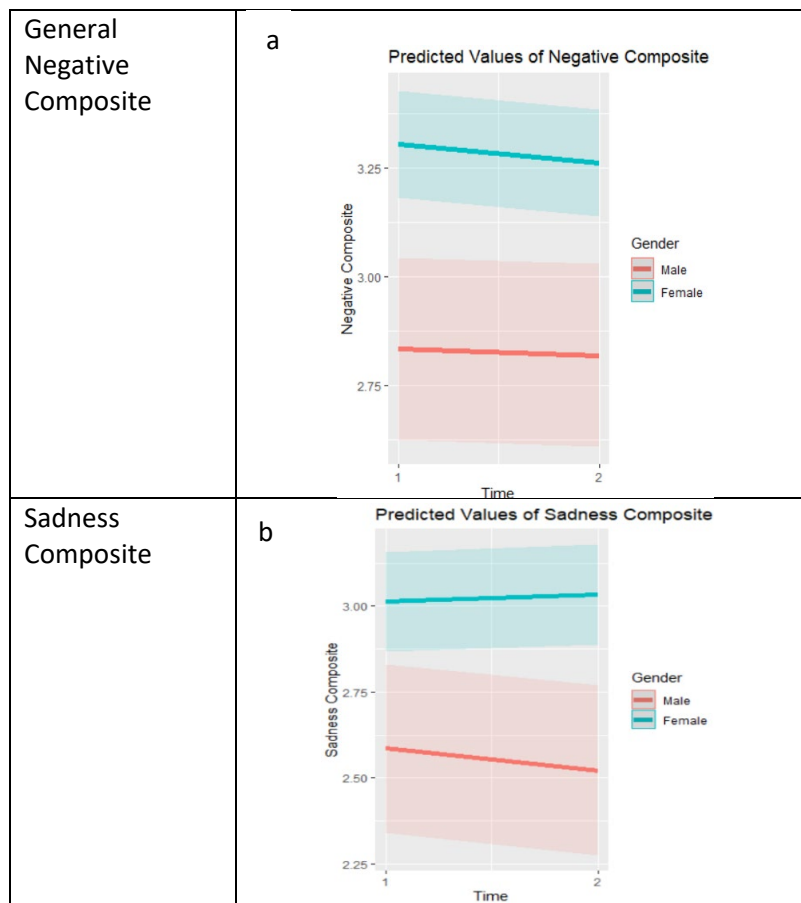
Figure 8. Moderating role of gender on negative emotion experiences during lockdown. Women are shown in green and men in red. Panel (a) general negative composite differences due to the pandemic, (b) general negative composite differences due to the pandemic

HAP	
Contented	
Compassionate	

General Negative Composite	e
Sadness Composite	f p = 0.09
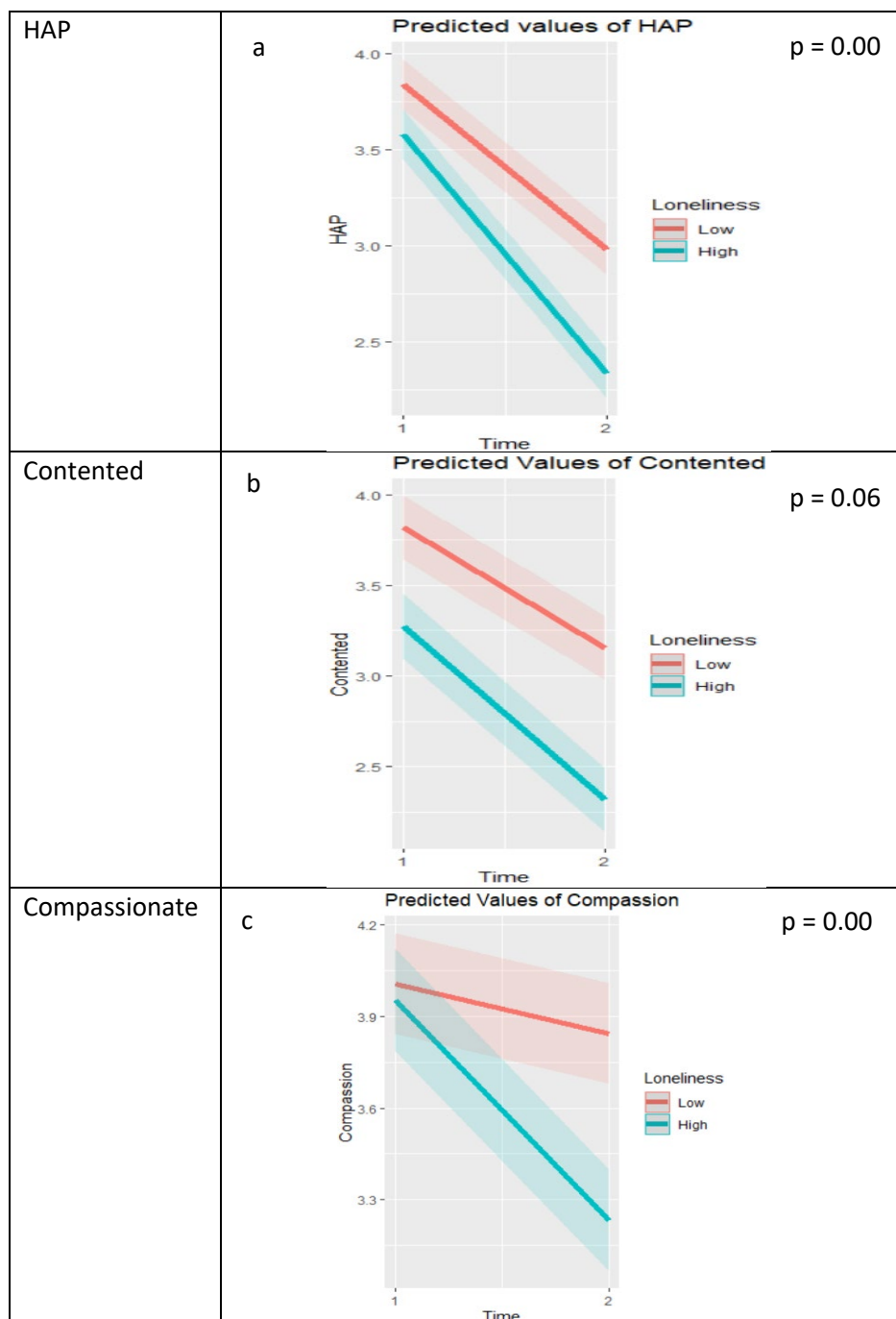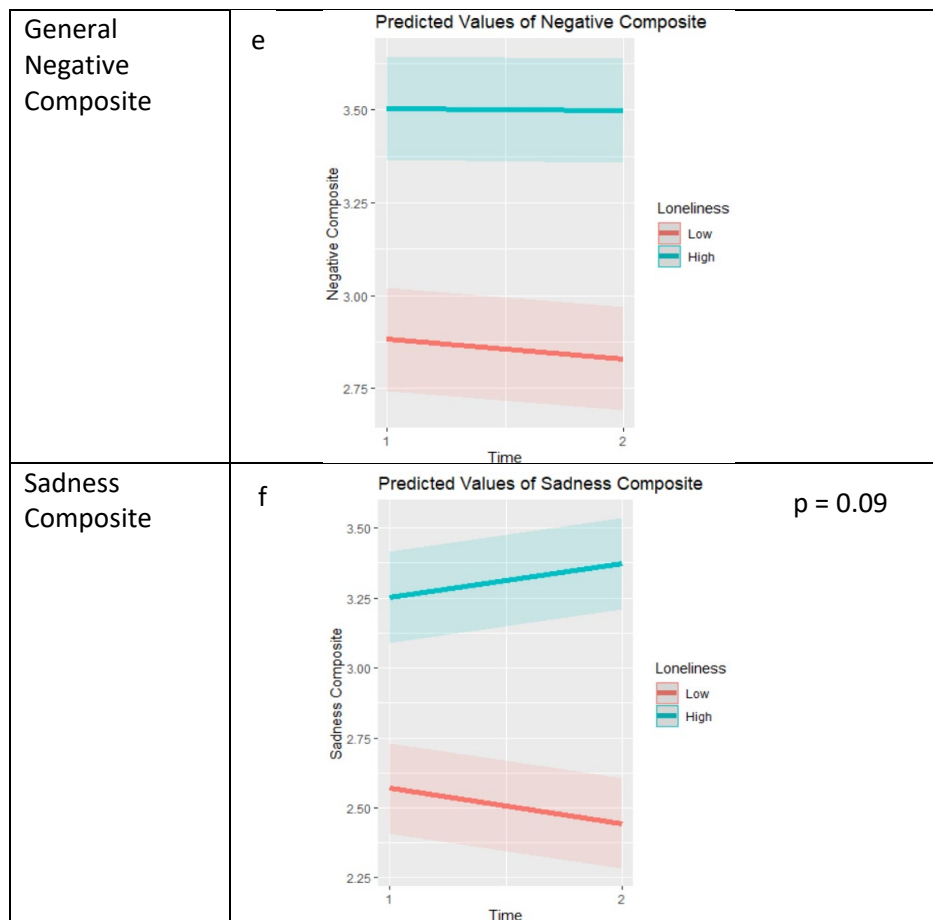
Figure 9. Moderating role of loneliness on emotion experiences during lockdown. High loneliness is shown in green and low loneliness in red. Panel (a) HAP differences, (b) contentment differences, (c) compassion differences, (d) general negative composite differences, (e) general negative composite differences. These graphs represent the results from the simple MLM, where loneliness was the only predictor

	Sociability	Energy Level
HAP	a p = 0.00	f p = 0.00
Contented	b p = 0.01	g p = 0.00
Compassionate	c	h

General Negative Composite		
Sadness Composite		
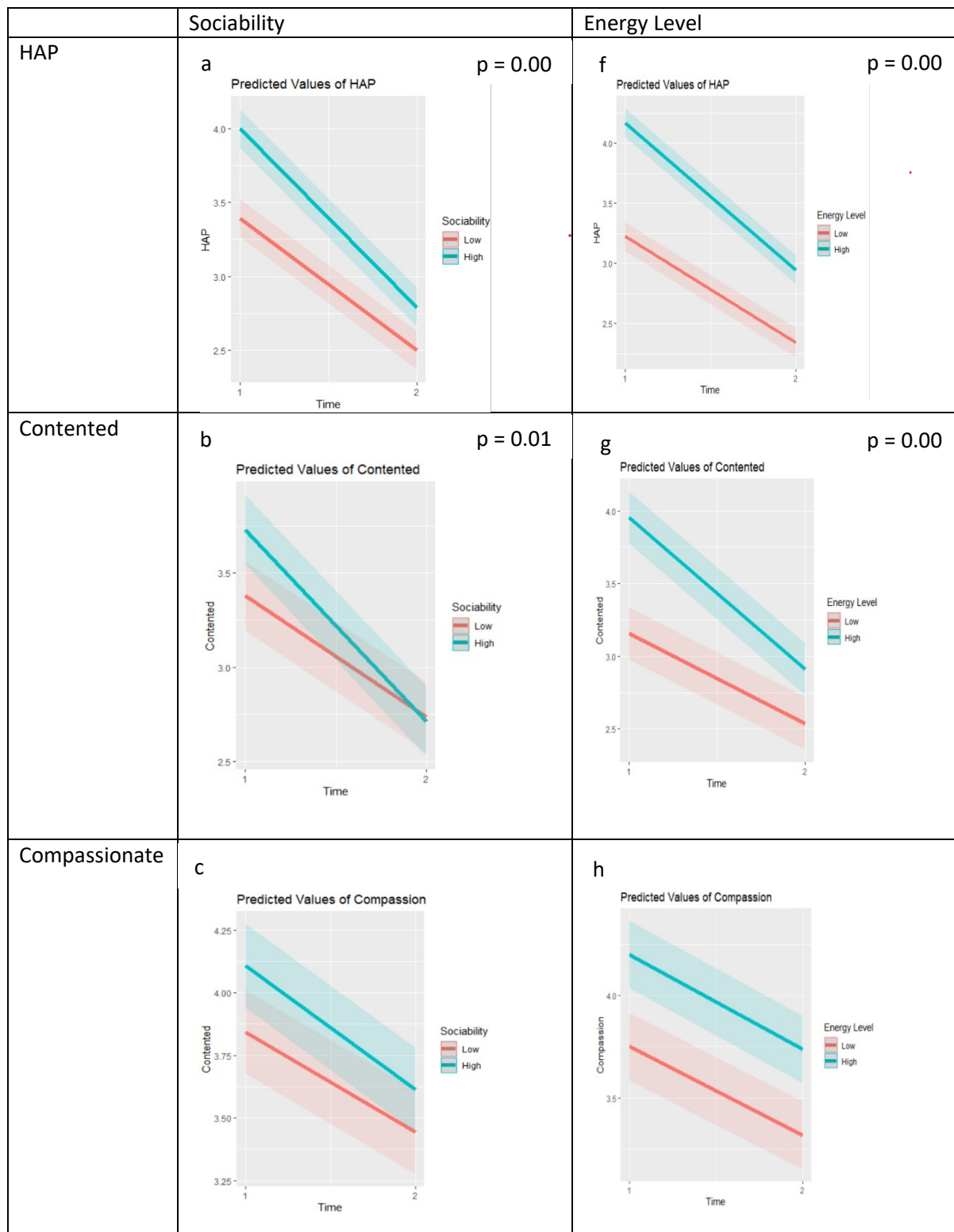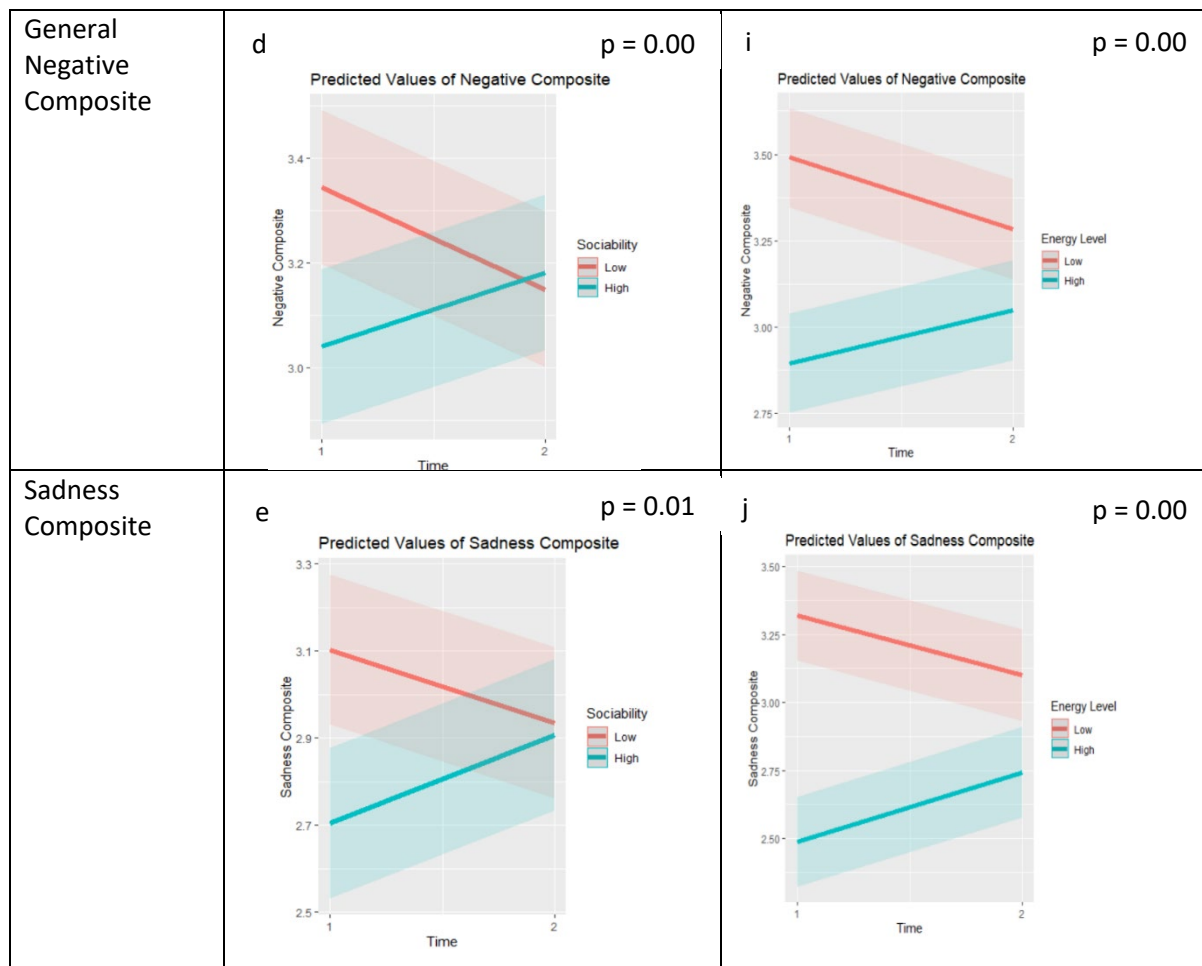
Figure 10. Moderating role of Sociability and Energy level on emotions during lockdown. Those high on Sociability are shown in green and those low in Sociability in red in panels a to e. Those high on Sociability are shown in green and those low in Sociability in red in panels f to k. These graphs are the results for the simple models (i.e., predicting the DV only from Sociability or Energy Level).

Table 1

Descriptive Statistics and Example Items for Personality Traits and Facets from Study 1

Trait	Alpha	Mean	SD	Example Item
Extraversion	0.83	3.17	0.68	
Sociability	0.82	2.88	0.95	I am someone who is sociable, outgoing
Energy Level	0.67	3.60	0.77	I am someone who is full of energy
Assertiveness	0.72	3.16	0.86	I am someone who has an assertive personality
Neuroticism	0.90	3.03	0.83	
Anxiety	0.74	3.58	0.86	I am someone who can be tense
Depression	0.81	2.82	1.00	I am someone who often feels sad
Emotional Volatility	0.84	2.71	1.03	I am someone who is moody, has up and down mood swings
Agreeableness	0.81	3.82	0.60	I am someone who is compassionate, has a soft heart

Table 2

Moderating Role of Extraversion on Emotional Contexts

	Study 1: Pandemic		Study 2: Film	
	Estimate	p	Estimate	p
HAP Composite				
Extraversion	0.59	<.001	0.40	<.001
Situation	-1.05	<.001	-0.63	<.001
Extraversion*Situation	-0.18	<.001	-0.15	0.007
Contented				
Extraversion	0.57	<.001	0.34	0.006
Situation	-0.83	<.001	-1.02	<.001
Extraversion*Situation	-0.25	0.001	-0.09	0.27
Compassionate				
Extraversion	0.22	0.06	0.29	<.001
Situation	-0.45	<.001	0.45	<.001
Extraversion*Situation	-0.03	0.61	-0.04	0.67
General Negative Composite				
Extraversion	-0.47	<.001	-0.33	0.002
Situation	-0.03	0.64	0.15	0.05
Extraversion*Situation	0.21	<.001	0.19	0.01
Sad Composite				
Extraversion	-0.36	<.001	-0.37	0.007
Situation	0.02	0.79	0.83	<.001
Extraversion*Situation	0.24	<.001	0.22	0.01

Table note: These values are scaled for the trait

Table 3

Moderating Role of Agreeableness on Emotional Contexts

	Study 1: Pandemic		Study 2: Film	
	Estimate	p	Estimate	p
HAP Composite				
Agreeableness	0.19	0.04	0.06	0.45
Situation	-1.05	<.001	-0.63	<.001
Agreeableness*Situation	-0.04	0.4	-0.04	0.5
Contented				
Agreeableness	0.39	0.002	0.37	0.003
Situation	-0.83	<.001	-1.02	<.001
Agreeableness*Situation	-0.14	0.07	-0.22	0.01
Compassionate				
Agreeableness	0.46	<.001	0.31	0.05
Situation	-0.44	<.001	0.44	<.001
Agreeableness*Situation	-0.1	0.14	-0.06	0.6
General Negative Composite				
Agreeableness	-0.41	<.001	-0.47	<.001
Situation	-0.01	0.8	0.15	0.05
Agreeableness*Situation	0.21	<.001	0.26	<.001
Sad Composite				
Agreeableness	-0.37	<.001	-0.51	<.001
Situation	0.03	0.62	0.82	<.001
Agreeableness*Situation	0.19	0.007	0.35	<.001

Table note: These values are scaled for the trait

Table 4

Moderating Role of Neuroticism on Emotional Contexts

	Study 1: Pandemic		Study 2: Film	
	Estimate	p	Estimate	p
HAP Composite				
Neuroticism	-0.38	<.001	-0.44	<.001
Situation	-1.05	<.001	-0.63	<.001
Neuroticism*Situation	0.11	0.04	0.16	0.007
Contented				
Neuroticism	-0.78	<.001	-0.61	<.001
Situation	-0.83	<.001	-0.99	<.001
Neuroticism*Situation	0.21	0.005	0.09	0.34
Compassionate				
Neuroticism	-0.05	0.65	-0.33	0.04
Situation	-0.45	<.001	0.44	<.001
Neuroticism*Situation	0.01	0.86	0.13	0.27
General Negative Composite				
Neuroticism	0.85	<.001	0.71	<.001
Situation	-0.01	0.83	0.15	0.05
Neuroticism*Situation	-0.24	<.001	-0.32	<.001
Sad Composite				
Neuroticism	0.72	<.001	0.64	<.001
Situation	0.03	0.63	0.81	<.001
Neuroticism*Situation	-0.32	<.001	-0.25	0.009

Table note: These tables are scaled for the trait

Table 5

Gender and Emotions During Lockdown

	Estimate	p
HAP Composite		
Gender	-0.04	0.86
Situation	-1.05	<.001
Gender*Situation	0	0.96
Contented		
Gender	0.08	0.77
Situation	-0.78	<.001
Gender*Situation	-0.07	0.72
Compassionate		
Gender	0.09	0.73
Situation	-0.6	<.001
Gender*Situation	0.22	0.16
General Negative Composite		
Gender	0.5	0.03
Situation	0.01	0.96
Gender*Situation	-0.03	0.84
Sad Composite		
Gender	0.34	0.22
Situation	-0.15	0.62
Gender*Situation	0.08	0.61

Table 6

Gender and Extraversion as Predictors of Emotional Responses to Lockdown

	Estimate	p
HAP Composite		
Extraversion	0.56	<.001
Gender	-0.01	0.94
Situation	-1.01	<.001
Extraversion*Situation	-0.16	0.003
Gender*Situation	-0.02	0.89
Contented		
Extraversion	0.56	<.001
Gender	-0.03	0.89
Situation	-0.77	0.01
Extraversion*Situation	-0.23	0.003
Gender*Situation	-0.03	0.88
Compassionate		
Extraversion	0.2	0.09
Gender	0.25	0.32
Situation	-0.61	0.03
Extraversion*Situation	-0.01	0.89
Gender*Situation	0.09	0.56
General Negative Composite		
Extraversion	-0.45	<.001
Gender	0.5	0.01
Situation	0.05	0.84
Extraversion*Situation	0.19	0.001
Gender*Situation	-0.05	0.68
Sad Composite		
Extraversion	-0.57	<.001
Gender	0.39	0.12
Situation	-0.06	0.83
Extraversion*Situation	0.22	0.002
Gender*Situation	0.03	0.86

Table note: These values are scaled for the trait

Table 7

Moderating Role of Traits and Loneliness on Emotional Responses to Lockdown

	Extraversion			Neuroticism			Agreeableness	
	Estimate	p		Estimate	p		Estimate	p
HAP Composite								
Extraversion	0.64	<.001	Neuroticism	-0.45	<.001	Agreeableness	0.18	0.04
Loneliness	0.21	0.02	Loneliness	0.21	0.02	Loneliness	0.08	0.4
Situation	-1.05	<.001	Situation	-1.05	<.001	Situation	-1.05	<.001
E*Situation	-0.25	<.001	N*Situation	0.2	<.001	A*Situation	-0.07	0.21
Lone*Situation	-0.25	<.001	Lone*Situation	-0.26	<.001	Lone*Situation	-0.2	<.001
Contented								
Extraversion	0.59	<.001	Neuroticism	-0.83	<.001	Agreeableness	0.37	0.003
Loneliness	0.01	0.94	Loneliness	0.16	0.23	Loneliness	-0.1	0.45
Situation	-0.8	<.001	Situation	-0.8	<.001	Situation	-0.8	<.001
E*Situation	-0.32	<.001	N*Situation	0.3	<.001	A*Situation	-0.15	0.04
Lone*Situation	-0.22	0.004	Lone*Situation	-0.25	<.001	Lone*Situation	-0.16	0.04
Compassionate								
Extraversion	0.3	0.009	Neuroticism	-0.16	0.18	Agreeableness	0.49	<.001
Loneliness	0.32	0.005	Loneliness	0.33	0.007	Loneliness	0.32	0.004
Situation	-0.44	<.001	Situation	-0.44	<.001	Situation	-0.44	<.001
E*Situation	-0.12	0.08	N*Situation	0.14	0.05	A*Situation	-0.13	0.05
Lone*Situation	-0.31	<.001	Lone*Situation	-0.34	<.001	Lone*Situation	-0.3	<.001
General Negative Composite								
Extraversion	-0.42	<.001	Neuroticism	0.83	<.001	Agreeableness	-0.37	<.001
Loneliness	0.19	0.05	Loneliness	0.03	0.79	Loneliness	0.28	0.003

Situation	-0.03	0.55	Situation	-0.03	0.69	Situation	-0.03	0.71
E*Situation	0.22	<.001	N*Situation	-0.26	<.001	A*Situation	0.22	<.001
Lone*Situation	0.07	0.21	Lone*Situation	0.1	0.11	Lone*Situation	0.03	0.62
Sadness Composite								
Extraversion	-0.31	<.001	Neuroticism	0.7	<.001	Agreeableness	-0.36	0.002
Loneliness	0.27	<.001	Loneliness	0.1	0.04	Loneliness	0.22	0.05
Situation	-0.01	0.89	Situation	0	0.99	Situation	0	0.9
E*Situation	0.3	<.001	N*Situation	-0.44	<.001	A*Situation	0.22	0.002
Lone*Situation	0.19	0.007	Lone*Situation	0.25	<.001	Lone*Situation	0.12	0.08

Table note: These values are scaled for the trait and loneliness

Table 8

Model Estimates for Simple Models with Sociability and Energy Level as Predictors of Emotional Responses to Lockdown

	Sociability		Energy Level	
	Estimate	p	Estimate	p
HAP Composite				
Facet	0.46	<.001	0.64	<.001
Situation	-1.06	<.001	-1.06	<.001
Facet*Situation	-0.16	0.003	-0.17	0.001
Contented				
Facet	0.37	0.003	0.61	<.001
Situation	-0.83	<.001	-0.83	<.001
Facet*Situation	-0.19	0.01	-0.21	0.004
Compassionate				
Facet	0.18	0.12	0.24	0.03
Situation	-0.45	<.001	-0.45	<.001
Facet*Situation	-0.05	0.49	-0.01	0.82
General Negative Composite				
Facet	-0.32	0.001	-0.48	<.001
Situation	-0.02	0.8	-0.02	0.65
Facet*Situation	0.17	0.004	0.18	0.001
Sad Composite				
Facet	-0.38	<.001	-0.65	<.001
Situation	0.02	0.8	0.02	0.79
Facet*Situation	0.19	0.008	0.24	<.001

Table note: These are the model estimates when the facet is entered as the only predictor. They are scaled for the facet

Table 9

Sociability versus Energy Level as Predictors of Emotional Responses to Lockdown

	Estimate	p
HAP Composite		
Sociability	0.07	0.16
Energy Level	0.44	<.001
Situation	-1.05	<.001
Sociability*Situation	-0.09	0.14
Energy Level*Situation	-0.12	0.05
Contented		
Sociability	-0.05	0.5
Energy Level	0.43	<.001
Situation	-0.84	<.001
Sociability*Situation	-0.1	0.25
Energy Level*Situation	-0.16	0.07
Compassionate		
Sociability	0.02	0.81
Energy Level	0.22	0.002
Situation	-0.45	<.001
Sociability*Situation	-0.05	0.51
Energy Level*Situation	0.01	0.87
General Negative Composite		
Sociability	-0.08	0.43
Energy Level	-0.43	<.001
Situation	-0.02	0.65
Sociability*Situation	0.1	0.14
Energy Level*Situation	0.13	0.06
Sadness Composite		
Sociability	-0.05	0.71
Energy Level	-0.63	<.001
Situation	0.02	0.79
Sociability*Situation	0.08	0.33
Energy Level*Situation	0.2	0.02

Table note: These values are scaled for the facets

Table 10

Moderating Role of Assertiveness on Emotional Responses to Lockdown

	Estimate	p
HAP Composite		
Assertiveness	0.33	<.001
Situation	-1.06	<.001
Assertiveness*Situation	-0.11	0.04
Contented		
Assertiveness	0.4	0.001
Situation	-0.83	<.001
Assertiveness*Situation	-0.19	0.01
Compassionate		
Assertiveness	0.1	0.38
Situation	-0.45	<.001
Assertiveness*Situation	-0.02	0.82
General Negative Composite		
Assertiveness	-0.32	0.001
Situation	-0.03	0.65
Assertiveness*Situation	0.15	0.01
Sad Composite		
Assertiveness	-0.43	<.001
Situation	0.02	0.8
Assertiveness*Situation	0.16	0.02

Table note: These values are scaled for the facet

Table 11

Anxiety versus Depression as Predictors of Emotional Responses to Lockdown

	Estimate	p
HAP Composite		
Anxiety	-0.02	0.75
Depression	-0.3	<.001
Situation	-1.06	<.001
Anxiety*Situation	-0.02	0.09
Depression*Situation	0.13	0.72
Contented		
Anxiety	0.02	0.83
Depression	-0.66	<.001
Situation	-0.83	<.001
Anxiety*Situation	-0.13	0.23
Depression*Situation	0.34	0.001
Compassionate		
Anxiety	0.21	0.19
Depression	-0.24	0.13
Situation	-0.45	<.001
Anxiety*Situation	-0.03	0.75
Depression*Situation	0.03	0.74
General Negative Composite		
Anxiety	0.26	0.03
Depression	0.67	<.001
Situation	-0.02	0.82
Anxiety*Situation	-0.02	0.8
Depression*Situation	-0.23	0.002
Sadness Composite		
Anxiety	-0.09	0.52
Depression	1.23	<.001
Situation	0.03	0.61
Anxiety*Situation	0.12	0.17
Depression*Situation	-0.46	<.001

Table note: These values are scaled for the facets

Table 12

Model Estimates for Simple Models with the Facets of Neuroticism as Predictors of Emotional Responses to Lockdown

	Depression		Anxiety		Emotional Volatility	
	Estimate	p	Estimate	p	Estimate	p
HAP Composite						
Facet	-0.31	<.001	-0.22	<.001	-0.18	<.001
Situation	-1.05	<.001	-1.05	<.001	-1.05	<.001
Facet*Situation	0.11	0.04	0.06	0.23	0.12	0.03
Contented						
Facet	-0.65	<.001	-0.44	<.001	-0.42	<.001
Situation	-0.83	<.001	-0.83	<.001	-0.83	<.001
Facet*Situation	0.26	<.001	0.11	0.13	0.18	0.02
Compassionate						
Facet	-0.1	0.39	0.04	0.7	-0.06	0.6
Situation	-0.45	<.001	-0.45	<.001	-0.45	<.001
Facet*Situation	0.009	0.89	-0.01	0.89	0.03	0.68
General Negative Composite						
Facet	0.85	<.001	0.75	<.001	0.67	<.001
Situation	-0.02	0.78	-0.02	0.69	-0.02	0.67
Facet*Situation	-0.24	<.001	-0.19	<.001	-0.21	<.001
Sad Composite						
Facet	1.17	<.001	0.79	<.001	0.8	<.001
Situation	0.03	0.62	0.02	0.8	0.02	0.77
Facet*Situation	-0.37	<.001	-0.22	0.002	-0.26	<.001

Table note: These are the model estimates when the facet is entered as the only predictor. They are scaled for the facet

Table 13

Sociability versus Energy Level as Predictors of Emotional Responses to a Sad Film Clip

	Estimate	p
HAP Composite		
Sociability	0.06	0.54
Energy Level	0.42	<.001
Situation	-0.63	<.001
Sociability*Situation	-0.07	0.36
Energy Level*Situation	-0.12	0.11
Contented		
Sociability	-0.32	0.04
Energy Level	0.74	<.001
Situation	-1.02	<.001
Sociability*Situation	0.13	0.26
Energy Level*Situation	-0.25	0.02
Compassionate		
Sociability	-0.12	0.57
Energy Level	0.57	0.004
Situation	0.46	<.001
Sociability*Situation	0.09	0.56
Energy Level*Situation	-0.18	0.22
General Negative Composite		
Sociability	0.09	0.52
Energy Level	-0.47	<.001
Situation	0.15	0.04
Sociability*Situation	-0.03	0.79
Energy Level*Situation	0.24	0.01
Sadness Composite		
Sociability	0.01	0.94
Energy Level	-0.46	0.004
Situation	0.83	<.001
Sociability*Situation	0.06	0.61
Energy Level*Situation	0.21	0.07

Table note: These values are scaled for the facets

Table 14

Anxiety versus Depression as Predictors of Emotional Responses to a Sad Film Clip

	Estimate	p
HAP Composite		
Anxiety	-0.34	0.002
Depression	-0.19	0.08
Situation	-0.63	<.001
Anxiety*Situation	0.16	0.03
Depression*Situation	0.04	0.61
Contented		
Anxiety	-0.34	0.03
Depression	-0.41	0.008
Situation	-1	<.001
Anxiety*Situation	0.09	0.43
Depression*Situation	0.05	0.64
Compassionate		
Anxiety	-0.19	0.34
Depression	-0.2	0.34
Situation	0.45	<.001
Anxiety*Situation	0.16	0.29
Depression*Situation	-0.02	0.88
General Negative Composite		
Anxiety	0.36	0.008
Depression	0.5	<.001
Situation	0.14	0.04
Anxiety*Situation	-0.19	0.06
Depression*Situation	-0.22	0.02
Sad Composite		
Anxiety	0.23	0.17
Depression	0.59	<.001
Situation	0.81	<.001
Anxiety*Situation	-0.15	0.22
Depression*Situation	-0.22	0.06

Table note: These values are scaled for the facet