

# A Longitudinal Examination of the Effect of Daily Emotions on Mental Health: The Moderating Role of Meaning Salience

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Received: October 22, 2020; Accepted: November 03, 2020; Published: November 10, 2020

## Abstract

**Objective:** The relationship between emotions and various mental health outcomes is well-established. However, must negative emotions always lead to poorer mental health? The current study built on the recent idea of meaning salience to examine if a well-designed intervention could ameliorate the effect of negative affect.

**Method:** We designed and implemented an intervention aimed at increasing mental health by focusing on an individual's meaning in life. For 5 days, participants either listed their daily activities (Control Condition:  $n = 25$ ) or additionally assigned meaning to each hour of their days (Experimental Condition:  $n = 26$ ).

**Results:** As expected, Day 1 negative affect predicted decreased anxiety on Day 5 in the control group. In addition, the intervention reduced the strong effects of negative emotions such that those in the intervention experienced a weaker effect of negative affect on anxiety and no effect of negative affect on general mental health.

**Conclusions:** In all, the intervention directly increased mental health and moderated the effect of negative affect in the desired direction. Researchers and practitioners may consider this simple intervention to improve mental health on a daily basis.

**Keywords:** *Mental health; Anxiety; Depression; Negative affect; Meaning salience*

## 1. Introduction

Do we have control over our emotions, or do they control us? The influence that emotions have on people's lives has strong support in the literature with specific evidence for emotions predicting mental health [1,2]. Negative affect, in particular, is known to be associated with a range of health issues [3-5]. However, much still needs to be understood about how we can overcome these often-deleterious effects of our negative emotions to live healthy lives regardless of our present mood. In the current research, we attempt to do just that with an intervention aimed at increasing people's mental health.

**Citation:** Klussman K, Nichols AL, Langer J. A Longitudinal Examination of the Effect of Daily Emotions on Mental Health: The Moderating Role of Meaning Salience. *J Anxiety Depress.* 2020;3(2):126.

## **1.1 Negative affect and mental health**

Affect (i.e., experienced emotion) and its relationship with various mental health outcomes has been researched extensively for decades [1,2]. Importantly, empirical evidence distinguishes between positive affect and negative affect. Trait positive and negative affect are not opposite ends of the same continuum, as we often think of emotions, but are independent and have different associated predictors and outcomes [6,7]. In this paper, we focus on negative affect due to its relationship with a host of negative mental health outcomes.

Increased negative affect is strongly related to poorer health and well-being [8]. Research supports relationships between negative affect and increased suicidal ideation, emotional distress, anxiety, and post-traumatic stress disorder [9,10]. Further, research suggests that lower ratings of negative affect predict increased mental health and flourishing [8]. In line with these findings, we predict that negative affect at the beginning of the study will predict anxiety, depression, and overall mental health at the end of the week.

*Hypothesis 1: Greater negative affect at Day 1 will predict greater Day 5 anxiety, depression, and less general mental health.*

## **1.2 Meaning salience**

Researchers have highlighted the benefits of meaning in life for a variety of health outcomes [11-15]. In fact, some researchers consider meaning in life the polar opposite of mental pain [16]. Further, the presence of meaning in one's life negatively predicts depression and anxiety [17]. Two separate studies, in different populations, found that increased meaning in life was associated with decreased suicidal ideation and self-harm [18,12]. More generally, having a sense of meaning in life predicts increased mental health and well-being [19,20] as well as less emotional distress [9]. In addition to the presence of meaning in one's life, meaning salience, defined as the degree to which individuals are aware of what makes their lives meaningful at a given moment, has emerged as an important part of the relationship between meaning and mental health [21]. Often, the value of daily experiences fades into obscurity as people go through their day [22], and researchers note that this lack of awareness may be detrimental for well-being [23]. In contrast, there are numerous positive health outcomes observed when meaning is made salient. In particular, preliminary evidence suggests that meaning salience may decrease anxiety and depression [24] and increase motivation for physical activity [25]. Additionally, meaning salience increases other aspects of well-being, including quality of life [25], self-esteem, [26], positive affect, and ability to cope with stress [27].

## **1.3 Current research**

Inducing meaning salience appears to be fairly simple. Some methods include making meaning salient by asking participants to photograph meaningful moments in their lives [27], reading or writing about meaningful experiences [28], and even simply taking a questionnaire about current meaning in life [29]. Further, researchers have found daily diaries and journaling to be useful tools for increasing various types of awareness [30-32]. Based on the relationship between meaning, meaning salience and mental health, an intervention that makes one aware of the daily meaning in his/her life should also benefit mental health.

*Hypothesis 2: Reporting the meaning of each daily hour will result in a decrease in anxiety, depression, and an increase in general mental health as compared to only listing one's hourly activities.*

Furthermore, such an intervention may successfully alleviate the negative effects of negative affect by decreasing the relationship between negative affect and mental health. Garland and colleagues [23] assert that, without effort, awareness of our lives may fade into the background. We believe that the general presence of meaning in one's life is not enough to consistently decrease the effects of negative affect. One must also be actively aware of the meaning in their lives. In fact, meaning salience is theorized to increase both psychological and physical health [11,21]. We assert that the more salient meaning is, the less impact negative affect will have on mental health. That is, individuals who are made aware of the meaning in their lives will be less impacted by initial negative affect than those who are not aware of their meaning in life.

*Hypothesis 3: The effects of negative affect on anxiety, depression, and general mental health will be moderated by meaning salience. Specifically, the relationship between negative affect and mental health will be weaker for those engaged in the intervention, as compared to the control.*

In the current study, we examine the daily data from a longitudinal intervention study. The intervention required people to record the activities they engaged in each hour and rate how meaningful that hour was. We expected that this would bring salience to the meaning already present in their lives. The control condition recorded their daily activities without assigning meaning to each hour. We then measured their affect and mental health each day for five days. In addition to general mental health, we examined the effects on anxiety and depression to understand how the intervention affected specific aspects of participants' mental health.

## **2. Methods**

The data reported here were part of a larger intervention study designed to increase health and well-being. Specifically, we report here the daily data gathered over the course of the five-day intervention week. An a-priori power analysis suggested that a total sample size of 52, across the three groups, was sufficient to detect a medium effect size ( $f = .25$ ), with a power of 80% and an alpha of  $p = .01$ . Due to concerns regarding attrition, we set out to recruit a total of 100 participants (i.e., ~33/group). After obtaining approval from IntegReview IRB (protocol # CONNECT\_MOMENT), we sent out a total of 1424 emails via FindParticipants.com, a website designed to match researchers with prospective participants.

As part of the larger study, we assigned participants to one of three groups - a control or one of two interventions. In addition to the task completed by the meaning salience intervention group (see below), participants in the third group also made plans to create meaning in their lives and enacted that plan throughout the week. Due to our current focus on meaning salience, we excluded the third group that was designed as an active change group. As such, we focus the current investigation on only the first intervention and compare it to the control group. In particular, we examined the momentary effects on mental health within the intervention week.

### **2.1 Participants**

Of the 100 participants that originally signed up, 81 provided complete responses on the pre-test survey (i.e., completed the informed consent and finished the survey). 51 of these participants were assigned to either the control or meaning salience group. This initial sample had an average age of 33.30 ( $sd = 9.42$ ). They mostly identified as female (56.9%) and white (78.4%),

with most having completed a bachelor's degree (54.9%). The majority reported an annual salary of at least \$50,000, (29.4% from \$50,000-74,999; 21.6% from \$75,000-99,999; 21.6% from \$100,000-149,999) and lived in either a suburban (51.0%) or urban (35.3%) neighborhood.

## 2.2 Procedure

Starting Monday and ending the following Friday, participants received a link to that day's questionnaire. At the end of each day, participants first completed questions related to anxiety, depression, affect, and general mental health (see Measures). After completing the survey portion of the questionnaire, participants indicated the hours in which they were awake that day and listed all activities/tasks they participated in during each of those hours. Specifically, we presented them with blank spaces for each hour they reported being awake. They then reported up to ten activities they engaged in during that hour. The experimental group additionally rated the meaningfulness of each hour (e.g., "How meaningful was the 3-4 pm hour to you?"). In all, participants earned \$30 for completing the entire week's activities. The instructions that each group received follow.

### 2.2.1 Control

*For the next week, we would like you to spend at least 30 minutes/day, for 5 days, writing about the details of your day. In your writing, we'd like you to be as objective as possible, by concentrating on the facts and details of how you spend your time. In particular, we would like you to detail each activity, or moment, of your day. All of your writing will be completely confidential. Don't worry about spelling, grammar or sentence structure.*

### 2.2.2 Experimental group

Text above plus: *Once you have completed this list, we would like for you to reflect on how meaningful each hour of your day was to you. Feel free to take some time to reflect on each hour, given the activities that you just listed, and think about how each of those activities added to or took away from the meaningfulness of that particular hour.*

## 2.3 Measures

**Negative Affect:** We assessed negative affect using Watson, Clark, and Tellegen's [33] Positive and Negative Affect Schedule (PANAS). We asked participants to rate the extent to which they felt ten negative emotions "**right now**" (e.g., "Guilty": 1= very slightly or not at all; 5= extremely). Higher scores for each subscale reflect greater negative affect.

**Anxiety and Depression:** We assessed anxiety and depression symptoms using Kroenke, Spitzer, and Williams' [34] Patient Health Questionnaire for Depression and Anxiety (PHQ-4). Participants reported on four items "**over the last day**"- two for anxiety and two for depression - on a four-point scale (e.g., "Feeling nervous anxious or on edge": 0= not at all; 3 = nearly every day). To compute each scale, we added responses to the two relevant questions. Higher scores reflect higher levels of anxiety and depression, respectively.

**General Mental Health:** To further assess daily health, we employed the 12-item version of the General Health Questionnaire (GHQ-12); [35]. For each of the 12 items, we asked participants to compare the **past day** to their "**usual**" (e.g., "Have you

been able to concentrate on whatever you're doing?": 1=Better than usual; 4=Much less than usual). We reverse-scored and aggregated the 12 questions so that higher scores reflect better health. See TABLE 1 for descriptive statistics and correlations between all key variables.

TABLE 1. Descriptive Statistics and Correlations Among All Variables of Interest.

	<i>M(sd)</i>	1	2	3	4	5	6	7	8
<b>Day 1</b>									
<b>1. Negative Affect</b>	1.33 (0.69)	.95							
<b>2. Anxiety</b>	0.67 (1.25)	.79	.83						
<b>3. Depression</b>	0.71 (1.43)	.69	.78	.89					
<b>4. General Mental Health</b>	3.17 (0.40)	-.53	-.67	-.72	.85				
<b>Day 5</b>									
<b>5. Negative Affect</b>	1.27 (0.63)	.87	.59	.73	-.25 <sup>x</sup>	.96			
<b>6. Anxiety</b>	0.52 (1.15)	.87	.57	.60	-.18 <sup>x</sup>	.89	.85		
<b>7. Depression</b>	0.33 (0.86)	.61	.61	.71	-.28 <sup>x</sup>	.72	.66	.89	
<b>8. General Mental Health</b>	3.27 (0.32)	-.30 <sup>x</sup>	-.28 <sup>x</sup>	-.38 <sup>x</sup>	.33 <sup>x</sup>	-.38	-.39	-.56	.85

Notes: <sup>x</sup> $p > .05$ ; Cronbach's alpha reliabilities are along the diagonal.

Day 1:  $n = 48$  for the GHQ and 49 for all other variables; Day 5:  $n = 48$ ; Across time:  $n = 46$  for the GHQ Day 1 and 47 for all other variables.

### 3. Results

To test our hypotheses, we performed three 2 (Condition: Control v. Experimental) X continuous (Negative Affect) analyses of covariance (ANCOVAs) for each of the three health outcomes. In each equation, we included Condition (0 = Control, 1 = Intervention), the Day 1 measure of negative affect, and the Day 1 measure of the outcome (to control for initial levels) as predictors. Of note, we calculated Type III Sums of Squares due to our focus on the interaction to test our hypotheses. A main effect of Day 1 anxiety,  $F(1,42) = 8.51, p = .006, \eta_{\text{partial}}^2 = .17$ , and Day 1 negative affect,  $F(1,42) = 92.32, p < .001, \eta_{\text{partial}}^2 = .08$ , predicted Day 5 anxiety. In addition, a significant interaction between negative affect and condition qualified these main

effects,  $F(1,42) = 6.10, p = .02, \eta_{\text{partial}}^2 = .13$ . In contrast, only a main effect of Day 1 depression predicted depression on Day 5,  $F(1,42) = 12.83, p < .001, \eta_{\text{partial}}^2 = .23$ . Finally, the interaction between negative affect and condition,  $F(1,42) = 6.02, p = .02, \eta_{\text{partial}}^2 = .13$ , predicted Day 5 general mental health. See TABLE 2 for detailed results.

TABLE 2. Complete ANOVA Results.

	<i>SS/MS</i>	<i>F</i>	<i>p</i>	$\eta_{\text{partial}}^2$
<b>DV= Anxiety - Day 5</b>				
<b>Anxiety – Day 1</b>	2.31	8.51	.006	.17
<b>Negative Affect - Day 1</b>	25.01	92.32	< .001	.69
<b>Condition</b>	1.00	3.70	.06	.08
<b>Negative Affect X Condition</b>	1.65	6.10	.02	.13
<b>DV=Depression - Day 5</b>				
<b>Depression - Day 1</b>	5.01	12.83	< .001	.23
<b>Negative Affect - Day 1</b>	0.41	1.04	.31	.02
<b>Condition</b>	0.09	0.23	.63	.006
<b>Negative Affect X Condition</b>	0.24	0.63	.43	.01
<b>DV=General Mental Health - Day 5</b>				
<b>General Mental Health - Day 1</b>	0.13	1.68	.20	.04
<b>Negative Affect - Day 1</b>	0.25	3.33	.08	.08
<b>Condition</b>	0.18	2.38	.13	.05
<b>Negative Affect X Condition</b>	0.46	6.02	.02	.13

Note: error *df* for anxiety and depression = 42, error *df* for general mental health = 41

To follow up on the significant interactions between condition and negative affect in the prediction of anxiety and general mental health, we performed simple slopes tests for negative affect within each condition. In the prediction of anxiety, the slope for negative affect was stronger in the control condition,  $t(42) = 9.61, p < .01$ , than in the experimental condition,  $t(42) = 4.11, p < .01$ , suggesting that the adverse effect of negative affect on anxiety was curtailed by the intervention (see FIG. 1). Regarding general mental health, the control condition demonstrated a normal trend,  $t(42) = -1.82, p = .08$ , while those in the experimental condition mainly avoided the detrimental effects of negative affect,  $t(41) = 1.82, p = .08$ , again pointing to the beneficial effects of the intervention and its ability to alleviate the generally problematic outcomes that result from increased negative affect (see FIG. 2).

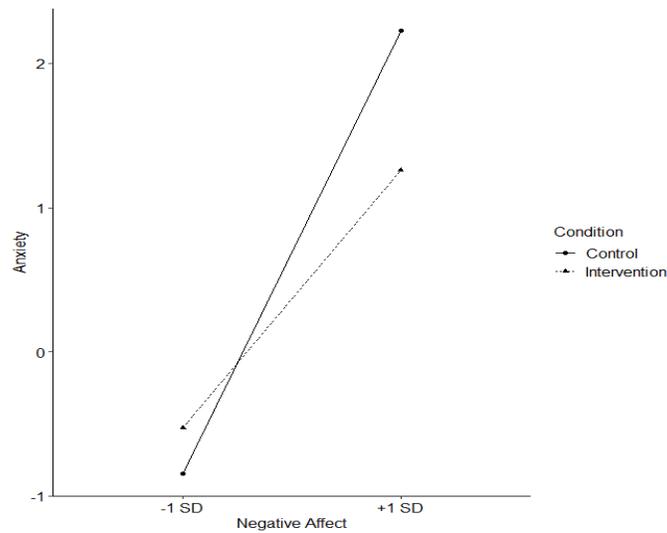


FIG. 1. Negative Affect - Day 1 X Condition Interaction on Anxiety - Day 5.

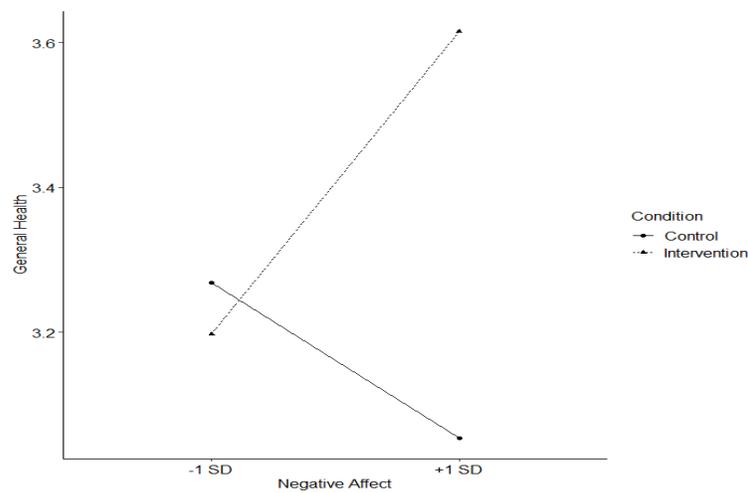


FIG. 2. Negative Affect - Day 1 X Condition Interaction on General Mental Health - Day 5.

#### 4. Discussion

The current intervention utilized meaning salience to improve a variety of health and well-being outcomes. We hypothesized that it would also mitigate the often-negative effects of experiencing negative emotions. In all, negative affect increased anxiety over time. As expected, the intervention reduced the strong effects of negative emotions such that those in the intervention were protected from the deleterious effect of negative affect on anxiety and general mental health.

##### 4.1 Implications

The moderating effect of the intervention is noteworthy. On its own, negative affect on Day 1 led to greater anxiety and poorer general mental health on Day 5. However, these effects were weaker for people who participated in the intervention. In fact,

these people trended toward reporting greater mental health as a result of Day 1 negative affect. Combined with the direct effect of the intervention on these outcomes, it is possible that this intervention allows people to disconnect their emotions from their health outcomes. The result is an elimination of the detrimental effects usually experienced as a result of negative affect.

One of the largest implications of these findings is the practical nature of the intervention. Whether it be self-administered or facilitated by a counselor or clinician, recollecting one's day, and thinking of the meaning gained from it are easy for most people to incorporate daily. In the current intervention, participants listed every activity they performed within each hour and assigned meaning to each hour. However, it is likely that a modified activity that simplifies the task may be just as effective. For example, one might list the most-performed activities or use a checklist to streamline the recall of activities followed by a simple global rating of the meaning in their day.

#### **4.2 Limitations and future directions**

These findings point to the need for future research to focus on the mechanisms by which the intervention increases people's health. Considering the small sample size utilized here, this should include examining larger and more diverse samples. Practitioners and researchers alike may also consider examining different lengths of the intervention (e.g., one day versus one month) and using a waitlist control. Although the intervention did last a week and was relatively easy to complete, any attempts to shorten it are welcome.

It would also be useful to understand what other outcomes the intervention affects and if it can mitigate the effects of other negative thoughts and behaviors on people's health. Also, useful would be examinations of how and when meaning salience may actually strengthen already beneficial effects. For example, might increases in mindfulness or meaning more strongly relate to greater well-being when meaning is made salient? Future research would benefit from considering the protective and facilitative effects of similar interventions on a host of both positive and negative outcomes.

#### **4.3 Conclusion**

Making meaning salient has the potential to provide additional benefits beyond the mere presence of meaning in one's life. In this study, simply reflecting on the meaning in one's day appeared to provide direct and indirect mental health benefits. After only five days of doing so, participants experience less anxiety and better general mental health. Meaning salience also lessened the harmful effects of negative affect on these outcomes. Although we are just beginning to understand meaning salience, future intervention research that focuses on bringing attention to the meaning in people's lives is promising.

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