Flourishing, Languishing, and Depressed Postdoctoral Fellows: Differences in Stress, Anxiety, and Depressive Symptoms

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Abstract

Based on the broaden-and-build theory of positive emotions, researchers discovered tipping points predicting whether individuals were flourishing, languishing, or depressed in life. These tipping points were based on a *positivity ratio*, calculated as the proportion of one's experienced positive and negative emotions. Individuals who were *flourishing* reported positivity ratios greater than 2.9, while *languishing* individuals reported scores at or below 2.9. Those who reported a ratio below 1.0 had clinically significant levels of depressive symptoms, and thus were classified as *depressed*. Studies have examined the utility of the positivity ratio, and findings supported these tipping points as related to a number of health indicators such as job performance, marital satisfaction, coping, and depression. The present study surveyed a sample of postdoctoral research fellows (*n* = 200) to determine if the classifications of positivity (viz., flourishing, languishing, and depressed) distinguished differences in reported stress, trait anxiety, and depressive symptoms. MANOVA results provided further support for the utility and generalizability of the positivity ratio, as the data revealed significant differences in stress, trait anxiety, and depressive symptoms among flourishing, languishing, and depressed postdocs. Flourishing postdocs demonstrated the lowest mean scores, while depressed postdocs recorded the highest.

Keywords: broaden-and-build theory*,* positivity, stress, emotions, anxiety, depression.

Introduction

According to the broaden-and-build theory of positive emotions, positive emotions have the ability to enhance one's health and quality of life (Fredrickson 2001, 2004, 2005). Individuals who experience higher frequencies of positive emotions—such as love, gratitude, contentment, and joy—are generally more adaptive to stressful situations (Tugade and Fredrickson 2004, Gloria *et al.* 2013), demonstrate greater resilience (Cohn *et al.* 2009), have reduced risks of morbidity and mortality (Fredrickson and Levenson 1998, Danner *et al.* 2001), and are more likely to flourish in life (Fredrickson and Losada 2005, Fredrickson 2006). In contrast, those who experience fewer positive emotions and more negative emotions—such as fear, anger, sadness, and shame—tend to be less satisfied with life, are more likely to develop physical as well as psychological illnesses (Kiecolt-Glaser *et al.* 2002, Gallo and Matthews 2003), and have increased absenteeism and reduced productivity at the workplace (Penney and Spector 2005).

Researchers have discovered that the proportion of one's experienced positive and negative emotions—referred to as *positivity ratio*—has a predictive ability in distinguishing between individuals who flourish or languish in life.

Fredrickson and Losada (2005) found that a positivity ratio of 2.9 served as a reliable cutoff score or a tipping point between flourishing and languishing individuals. Those who reported positivity ratios greater than 2.9 were classified as *flourishing* because they were satisfied with life, had a sense of fulfillment, were able to bounce back effectively from stressful situations, and felt as though things in their lives were going as or better than expected; in other words, having a positivity ratio above 2.9 was considered "the good life" (Fredrickson 2009). However, those who reported experiencing positivity ratios at or below 2.9 were considered to be *languishing* in life. These individuals described life as unsatisfactory, unfulfilled, or stagnating; they were burdened by feelings of being "stuck in a rut" or that "the grass was greener on the other side." Moreover, individuals who reported a positivity ratio less than 1.0—in which negative emotions were experienced more frequently than positive emotions—had a sense of being overwhelmed by difficult life conditions and described life as a struggle "to keep their heads above water." These persons typically have clinically significant levels of depressive symptoms and were therefore classified as *depressed* (Schwartz *et al.* 2002, Fredrickson 2009).

A growing number of studies using an array of settings and samplings continue to confirm the utility of the positivity ratio in identifying individuals who flourish, languish, or

are depressed. For instance, researchers have examined the utility of the ratio with samples of college students (Fredrickson 2006), employees (Rego *et al.* 2011), public school teachers, and military spouses (Faulk *et al.* 2012, 2013). These studies all found that the classifications of positivity significantly revealed differences in how individuals adapted to and bounced back from stressful situations, as well as differences in reported health and well-being. Further, in addition to individuals, the positivity ratio also has been useful in measuring interpersonal and organizational well-being (Fredrickson 2009, Fincham and Beach 2010). Researchers have found that long-lasting healthy marriages, as well as flourishing organizations, seem to follow a similar tipping point—a ratio greater than 2.9 (Fredrickson 2009).

To our knowledge, no studies have examined the applicability of the positivity ratio toward the population of postdoctoral research fellows (postdocs). Postdocs, ironically, are an overlooked and understudied population. It has been reported that the work and life conditions of postdocs are inundated by constant exposures to high levels of stress (Smaglik 2006, Small 2012). Often characterized as neither a faculty nor a student, postdocs tend to fall in the cracks and consequently receive neither the recognition nor the benefits that they feel are deserved (e.g., control over their work/funding, and health insurance for self and family; Aschwanden 2006, Smaglik 2006). They also often report having feelings of fear, uncertainty, pressure, and lack of security due to the impermanence of their employment, high work expectations, as well as the extreme competitiveness of the job market (i.e., low supply, high demand for ideal jobs such as tenure-track professors/researchers; Woolston 2002, Davis 2009, Kaplan 2012). Considering these points, is it not surprising that postdocs describe their work and life as extremely stressful, and often filled with feelings of anxiety and depression.

Despite these grim reports, according to the broaden-and-build theory of positive emotions, positive emotions have the potential to help postdocs deal more effectively with their stressors. Therefore, the purpose of the present study was to examine if groups of flourishing, languishing, and depressed postdocs significantly differ from each other in scores of stress, trait anxiety, and depressive symptoms. It was hypothesized that (a) flourishing individuals would report the lowest levels of stress, trait anxiety, and depressive symptoms; (b) depressed individuals would report the highest levels of stress, trait anxiety, and depressive symptoms; and (c) languishing individuals would report scores in between the flourishing and depressed groups.

Methods

Participants and Procedures

Participants were recruited from a pool of postdocs who were employed at a large research institution in Texas. The email addresses of potential participants (n = 523) were obtained from the institution's human resources office, and recruitment letters were sent via email inviting postdocs to voluntarily participate in a Qualtrics online survey that required approximately 30 minutes to complete. The sample selection method did not have exclusion criteria, except that participants must be currently employed under a postdoctoral fellowship appointment during the time of data collection.

In order to enhance the survey response rate, a variety of incentive prizes were offered (Deutskens *et al.* 2004). Each participant was compensated with a $5 Starbucks gift card, a deck of inspirational quote cards ($2 value), and an *Individual Feedback Profile* document which provided a confidential report of the participant's results as well as an anonymous summary of the sample's aggregate results. In addition, participants were entered into a lottery drawing for a number of larger prizes (e.g., restaurant gift cards valued from $10 to $50, iPod Shuffles, and Amazon Touch Kindles); one prize was awarded for every 15 surveys completed. The present study was approved by the Institutional Review Board.

Measures

The online survey assessed participants' demographic characteristics, positivity, stress, trait anxiety, and depressive symptoms. Each of these variables is further discussed in the following sections, and a copy of the survey may be requested from the corresponding author.

Demographics. Participants were asked to report a variety of personal characteristics including age, sex, race/ethnicity, marital status, number of children, college/school (i.e., location of employment), employment length, and nationality (i.e., country of origin).

Positivity. The value of positivity represents the ratio of one's experienced positive emotions over negative emotions (Fredrickson and Losada 2005), and these emotions were measured by the 20-item Modified Differential Emotions Scale (mDES; Fredrickson *et al.* 2003, Fredrickson 2009). Ten of the scale's items assessed the participants' positive emotions (e.g., amused, hopeful, inspired, and proud) while the remaining 10 items examined negative emotions (e.g., angry, distrust, fearful, and overwhelmed).

On a five-point scale ranging from 0 to 4 (*never* to *most of the time*), respondents indicated to what extent they experienced various feelings and emotions over the past two weeks. For instance, a sample positive emotion item stated, "In the past two weeks, I have felt grateful, appreciative, or thankful." A sample negative emotion item stated, "In the past two weeks, I have felt sad, downhearted, or unhappy." Positive emotion items rated at least a score of 2 (*some of the time*) and negative emotion items rated at least a score of 1 (*hardly*) were tallied according to these asymmetric criteria in order to account for *positivity offset* and *negativity bias* (Fredrickson and Losada 2005). Positivity offset represents the notion that most people usually feel at least mild levels of positive emotions throughout their day-to-day activities (Cacioppo *et al.* 1999); on the other hand, negativity bias represents the idea that negative events have more weight and thus have stronger impacts than positive events (Cacioppo *et al.* 1999, Baumeister *et al.* 2001).

The positivity score, ranging from 0 to 10 points, was calculated by dividing the sum of the tallied positive emotion items with the sum of the tallied negative emotion items; if the sum of the negative emotion items was "0," it was recoded to "1" to prevent errors related to division by zero (Fredrickson 2009). Postdocs with positivity ratios greater than 2.9 were classified as *flourishing* individuals; those with ratios from 1.0 to 2.9 were considered *languishing*; and individuals with ratios below 1.0 were considered *depressed*. According to previous research, the internal reliability of the positive emotions subscale of the mDES was α = .78, while the negative emotions subscale had a coefficient of α = .69 (Fredrickson *et al.* 2003); the present study recorded greater reliability scores on both the positive (α = .87) and negative emotions subscales (α = .88).

Stress. This variable was assessed using the 10-item Perceived Stress Scale (PSS-10; Cohen and Williamson 1988), which measured the appraised stressfulness of the respondent's life situations. The scale items asked participants to rate how often stressful events occurred during the past month on a five-point scale from 0 (*never*) to 4 (*very often*). Sample items include "How often have you been upset because of something that happened unexpectedly?," "How often have you felt that you were unable to control the important things in your life?," and "How often have you felt difficulties were piling up so high that you could not overcome them?" The stress score was calculated as the sum of the 10 items, ranging from 0 to 40, with higher scores representing higher levels of stress. Previous research found the internal reliability of the PSS-10 to range from acceptable (α = .78) to excellent (α = .91;

Cohen and Janicki-Deverts 2012), and the reliability from the present study was estimated at α = .86.

Trait anxiety. The 20-item trait anxiety subscale of the State-Trait Anxiety Inventory for Adults (STAI; Spielberger *et al.* 1968, 1977) was used to measure the participants' tendency to appraise stressful events as threatening and thus respond with heightened levels of state anxiety reactions (Spielberger *et al.* 1983). Using a four-point scale ranging from 1 (*almost never*) to 4 (*almost always*), participants responded to items including, "I feel nervous and restless," "I feel like a failure," and "I get in a state of tension or turmoil as I think over my recent concerns and interests." Scores for this variable were calculated as the sum of the 20 items; scores ranged from 20 to 80, with higher scores representing higher levels of trait anxiety. The trait anxiety subscale demonstrated very good to excellent internal reliability, with Cronbach's alphas ranging from .89 to .91 (Spielberger *et al.* 1983); the present study also recorded an excellent reliability score at α = .91.

Depressive symptoms. The Center for Epidemiologic Studies Depression (CES-D) scale was used to assess the participants' level of experienced depressive symptoms (Radloff 1977). Consisting of 20 items, the instrument assessed how often respondents felt a variety of depressive symptoms during the previous week. Using a four-point scale ranging from 0 (*rarely or none of the time; less than 1 day*) to 3 (*most or all of the time; 5-7 days*), participants responded to statements such as "I was bothered by things that usually don't bother me," "I did not feel like eating; my appetite was poor," and "I had trouble keeping my mind on what I was doing." The CES-D score was calculated as the sum of the 20 items, ranging from 0 to 60, with higher scores representing higher levels of experienced depressive symptoms. A score of 16 or greater is considered a moderately severe level of symptoms and could be a marker for clinical depression (Radloff 1977). Previous research found the internal consistency of the scale ranged from good to excellent (α = .85-.90; Radloff 1977), and the present study also demonstrated very good reliability at α = .86.

Data Analyses
All analyses were completed using the Statistical Package for the Social Sciences (SPSS) software version 21, and mean substitution was used to replace missing data.

Descriptive statistics and correlations. Means, standard deviations, and bivariate correlations of all study variables were calculated using descriptive statistics, Pearson correlations for continuous variables, point-biserial

correlations for continuous and dichotomous variables, and chi-square tests for pairs of dichotomous variables.

Multivariate analysis of variance. A one-way between-groups multivariate analysis of variance (MANOVA) was performed to examine differences in reported stress, trait anxiety, and depressive symptoms among the varying levels of positivity. The independent variable, positivity, was classified into three groups (viz., flourishing, languishing, and depressed) according to the criteria scores determined by Fredrickson and Losada (2005). Using the procedures detailed by Pallant (2010), preliminary examinations of statistical assumptions were conducted to evaluate normality, univariate and multivariate outliers, linearity, homogeneity of regression, multicollinearity and singularity, and homogeneity of variance-covariance matrices. Post-hoc pairwise comparisons were performed using Tukey's Honestly Significant Difference (HSD) method; in the instance that equal variances were not assumed, the Games-Howell test was instead used. Cohen's d was calculated to estimate the effect size of group differences.

Results
Descriptive Analysis
Data collection was conducted over a period of two weeks and the study obtained a final sample size of $n = 200$ postdocs (38% response rate). This response rate exceeded expectations as previous studies with similar methods recorded lower return rates ranging from 17% to 25% (Sax *et al.* 2003, Deutskens *et al.* 2004, Evans and Mathur 2005); a meta-analysis of 56 web-based surveys from 39 studies reported an average response rate of 35% (Cook *et al.* 2000).

Participants were primarily male (59.5%) with a mean age of 32 years, ranging from 26 to 52 years. In terms of race/ethnicity, 63.5% were non-Hispanic White or Caucasian, 18% Asian or Pacific Islander, 8.5% Hispanic or Latino, 7% Indian or South Asian, 0.5% Black or African American, and 2.5% other. The majority were married (59.5%), 31% were single, 7% were living with a partner, and the remaining 2.5% were either divorced or separated. Their family sizes ranged from having zero to four children; 71% had no children, 18.5% had one, 6% had two, 4% had three, and one participant had four children. The participants were employed as postdocs for an average of 1.5 years, and ranged from 1 year to 6 years and 8 months. The majority worked in the college of natural sciences (48.5%), 20% in engineering, 7.5% in liberal arts, 5.5% in geosciences, 5% in pharmacy, and the

remaining were in communication, education, public affairs, social work, or other. Most of the postdocs were from the United States (US; 50.5%), 10.5% China, 6.5% India, 4% South Korea, 3.5% United Kingdom, 3% Canada, and the remaining were from 25 other countries around the globe.

Prior to correlation analyses, multiple-category demographic variables were collapsed into binary variables to produce appropriately sized groups: marital status (1 = *married,* 0 = *unmarried*), college/school (1 = *natural sciences,* 0 = *other*), race/ethnicity (1 = *non-Hispanic White/Caucasian,* 0 = *other*), and nationality (1 = *from US,* 0 = *other*). Age, number of children, and employment length were retained as continuous variables. Table 1 displays the means, standard deviations, and correlations for all study variables. The analysis indicated strong correlations between stress and trait anxiety ($r = .76$, $p < .001$), stress and depressive symptoms ($r = .72$, $p < .001$), as well as trait anxiety and depressive symptoms ($r = .75$, $p < .001$). Among the demographic control variables, no significant associations were found with any of the focal dependent variables except for marital status. Results showed that, on average, married postdocs experienced fewer depressive symptoms than those who were unmarried ($r = -.19$, $p < .01$).

Multivariate Analysis of Variance
Three data points related to positive emotions and one from depressive symptoms were missing; these were replaced via mean substitution. Preliminary tests of statistical assumptions found no serious violations, except for the equality of variances in depressive symptoms; according to Levene's Test of Equality of Error Variances, the variable depressive symptoms did not satisfy the assumption of equality of variances ($p < .01$), and thus the Games-Howell test was used for post-hoc comparisons in depressive symptoms instead of Tukey's HSD.

Results found a significant difference among the flourishing, languishing, and depressed groups on the combined dependent variables, $F_{6, 390} = 13.61$, $p < .001$; Wilks' Lambda = .68; $\eta_p^2 = .17$. When the results for the dependent variables were individually examined using the tests of between-subjects effects, significant differences were found for all dependent variables: stress ($p < .001$, $\eta_p^2 = .25$), trait anxiety ($p < .001$, $\eta_p^2 = .20$), and depressive symptoms ($p < .001$, $\eta_p^2 = .29$).

Table 1. Means, standard deviations (SD), and bivariate correlations for all variables (*n* = 200).

Variable	Mean	SD	S	TA	DS	A	NC	EL	F	M	NS	W	US
Stress (S)	16.21	5.76	--										
Trait Anxiety (TA)	39.66	9.09	.76***	--									
Depressive Symptoms (DS)	10.53	7.54	.72***	.75***	--								
Control													
Age (A)[a]	32.06	3.71	-.03	-.04	.00	--							
Number of Children (NC)	.45	.82	-.02	-.11	-.13	.45***	--						
Employment Length (EL)	1.50	1.23	.05	.09	.04	.26***	.15*	--					
Female (F)[†]	--	--	.02	-.03	-.07	-.03	-.00	-.16*	--				
Married (M)[†]	--	--	-.05	-.13	-.19**	.13	.43***	.15*	.04	--			
Natural Sciences (NS)[b†]	--	--	-.11	-.06	-.10	.01	.06	.21**	-.01	.11	--		
White (W)[†]	--	--	-.08	-.09	.01	.03	.10	.02	.08	-.08	-.03	--	
US American (US)[†]	--	--	-.03	-.03	.05	-.01	.03	.02	.19**	-.03	.04	.49***	--

[a]*n* = 197; [b]*n* = 199

[†]Sex (Female = 1, Male = 0); Marital Status (Married = 1, Unmarried = 0); College/School (Natural Sciences = 1, Other = 0);
Race/Ethnicity (White = 1, Other = 0); Nationality (US = 1, Other = 0).

*p < .05, **p < .01, ***p < .001

As shown in Figure 1, the flourishing group reported the lowest levels of stress, trait anxiety, and depressive symptoms. In contrast, the depressed group reported the highest levels of stress, trait anxiety, and depressive symptoms. And as expected, the languishing group had scores that were between the flourishing and depressed groups across all three of the dependent variables. All pairwise comparisons between the categories of positivity (viz., flourishing vs. languishing, flourishing vs. depressed, and languishing vs. depressed) yielded statistically significant differences in the mean scores of stress, trait anxiety, and depressive symptoms (see Table 2).

Discussion

Using a sample of *n* = 200 postdocs, the present study examined if groups of flourishing, languishing, and depressed postdocs would significantly differ from each other in scores of stress, trait anxiety, and depressive symptoms. As hypothesized, flourishing postdocs (positivity ratio > 2.9) reported the lowest levels of stress, trait anxiety, and depressive symptoms; the languishing group (positivity ratio = 1.0 to 2.9) reported higher levels than the flourishing group; but the depressed postdocs (positivity ratio < 1.0) exhibited the highest levels of stress, trait anxiety, and depressive symptoms.

These results lend further support for the utility of the positivity criteria as proposed by Fredrickson and Losada (2005). Post hoc comparisons yielded significant group differences between all possible pairs within each dependent variable, indicating that the positivity tipping points effectively distinguished differences among flourishing, languishing, and depressed postdocs. The

data showed that 13% of the postdocs were flourishing, 58% were languishing, and 29% were depressed. Previous researchers estimated that approximately 17 to 20% of the general population fit the criteria for flourishing (Keyes 2002, 2007, Fredrickson and Losada 2005), while about 80% scored below the flourishing point (Fredrickson 2009).
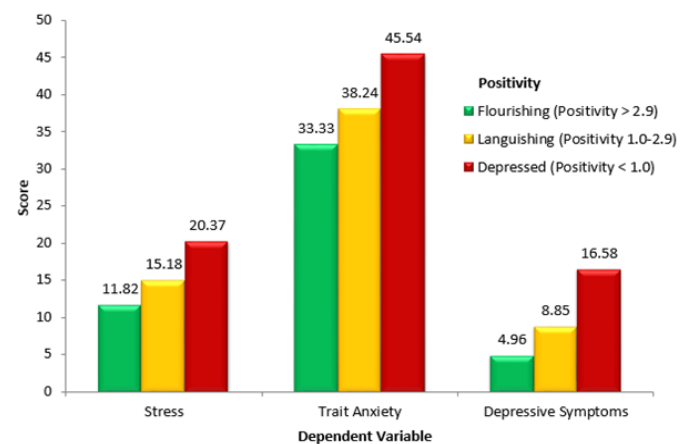
Dependent Variable	Flourishing (*n* = 27)	Languishing (*n* = 116)	Depressed (*n* = 57)	*F* (2, 197)
Stress (range 0 - 40)	11.82 ± 5.02	15.18 ± 5.03	20.37 ± 5.03	32.28***
Trait Anxiety (range 20 - 80)	33.33 ± 7.23	38.24 ± 8.20	45.54 ± 8.49	24.64***
Depressive Symptoms (range 0 - 60)	4.96 ± 4.32	8.85 ± 5.76	16.58 ± 8.18	39.80***

Note: Higher scores indicate higher levels of stress, trait anxiety, or depressive symptoms.
***p < .001

Figure 1. Means, standard deviations, and ranges of stress, trait anxiety, and depressive symptoms as reported by flourishing, languishing, and depressed postdocs (*n* = 200).

As expected, depressed postdocs not only experienced the highest levels of stress, trait anxiety, and depressive symptoms, but they also reported average levels that were above the cutoff score for clinically significant levels of depressive symptoms (Myers and Weissman 1980, Schulberg *et al.* 1985, Radloff 1977, Antoni *et al.* 2001). In terms of depressive symptoms, 21% had scores that were at or above the cutoff point of 16, indicating a moderately severe level of symptoms and a possible marker for clinical depression; this proportion aligns with the 21% in the general population who also report depressive symptoms scores above the cutoff value (Radloff 1977).

Approximately 40 million American adults are affected by anxiety disorders each year (Kessler *et al.* 2005), with work stress being a major contributor to the development of anxiety (Melchior *et al.* 2007). Thus, it is not surprising that postdocs struggle with heightened levels of anxiety considering their exposure to high levels of work stress (Smaglik 2006, Small 2012). Anxiety significantly contributes to the development of health problems such as hypertension, gastrointestinal problems, and cardiac disorders (Härter *et al.* 2003, Balon 2006). Individuals with high levels of anxiety and stress also suffer from migraines more frequently and for longer periods of time (Wacogne *et al.* 2003), and are more likely to be depressed (Kleppa *et al.* 2008, Hale III *et al.* 2009). Finally, individuals experiencing higher stress and anxiety report substantially lower satisfaction at work (Newbury-Birch and Kamali 2001).

Depending on the coping skills of postdocs, the harmful effects of stress can either be attenuated or exacerbated, leading to improved or worsened outcomes (Meyer 2001, Brown *et al.* 2005). Positive emotions have the ability to broaden one's adaptive coping skills and fuel resilience during times of stress (Fredrickson 2001, Fredrickson and Branigan 2005). Particularly in the work environment, studies have shown that positive emotions promote individual and organizational satisfaction, productivity, and well-being (Fredrickson 2003, Wright *et al.* 2007, Avey *et al.* 2008). Further research should examine whether interventions to enhance positive emotions can protect postdocs from experiencing harmful levels of anxiety. Employers could provide programs, opportunities, and resources to increase postdoc positivity, as well as decrease stress levels, trait anxiety, and depressive symptoms. Improving the positivity and well-being of postdocs is not only in the best interest of the postdoc, but also in the best interest of the organization, considering that happier and healthier employees are more engaged and more productive workers.

Table 2. Pairwise comparisons for each dependent variable by positivity category.

Dependent Variable	Comparison of Positivity Categories	Mean Difference (Standard Error)		Cohen's d
Stress	Flourishing vs. Languishing	-3.37**	(1.07)	-.67
	Flourishing vs. Depressed	-8.55***	(1.17)	-1.70
	Languishing vs. Depressed	-5.19***	(.81)	-1.03
Trait Anxiety	Flourishing vs. Languishing	-4.91*	(1.75)	-.60
	Flourishing vs. Depressed	-12.21***	(1.91)	-1.49
	Languishing vs. Depressed	-7.30***	(1.32)	-.89
Depressive Symptoms	Flourishing vs. Languishing	-3.88**	(.99)	-.61
	Flourishing vs. Depressed	-11.62***	(1.37)	-1.81
	Languishing vs. Depressed	-7.73***	(1.21)	-1.20

Note: Tukey's HSD was used for stress and trait anxiety. Games-Howell's test was used for depressive symptoms because equal variances were not assumed.
*p < .05, **p < .01, ***p < .001.

Results from the present study should be considered in light of the following limitations. Cross-sectional data were used, and thus causality and directionality cannot be determined from the found associations among the variables. It is also possible that the data may be biased due the self-report nature of the survey instrument. The participants were recruited from a pool of postdocs who were employed at a large research institution in the state of Texas in 2012. There were no exclusion criteria, and all postdocs from any college or department across the university were allowed to participate. Due to this localized sampling, results and implications may not be applicable to postdocs from other institutions, locations, or time periods.

In conclusion, findings from the present study provide further support for the mathematically derived positivity ratio cutoff scores developed by Fredrickson and Losada (2005). As expected, flourishing postdocs recorded the lowest scores, while depressed postdocs reported the highest levels of stress, trait anxiety, and depressive symptoms. Although most of the participants' health indicators scored relatively close to the scores of the general population, particular attention should be paid toward addressing anxiety issues among postdocs. Future research should investigate possible explanations behind why postdocs experience such high rates of anxiety. From an individual or interpersonal perspective, it may be that individuals in postdoc positions had higher anxiety levels prior to the postdoc experience; or that because postdocs are characterized neither as a faculty member or a student, they do not have sufficient support and mentorship. From an organizational perspective, it could be that those who are unable to obtain medical care—because postdoc employment appointments often do not offer healthcare benefits (Smaglik 2006)—are the ones who are suffering from anxiety. Once the contributing factors of anxiety are determined, interventions based on the broaden-and build theory of positive emotions should be developed with a multi-pronged approach at multiple ecological levels to increase positive emotions and decrease negative emotions in the day-to-day work and lives of postdocs.

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