Research Report

POSITIVE EMOTIONS TRIGGER UPWARD SPIRALS TOWARD EMOTIONAL WELL-BEING

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Abstract—*The broaden-and-build theory of positive emotions predicts that positive emotions broaden the scopes of attention and cognition, and, by consequence, initiate upward spirals toward increasing emotional well-being. The present study assessed this prediction by testing whether positive affect and broad-minded coping reciprocally and prospectively predict one another. One hundred thirty-eight college students completed self-report measures of affect and coping at two assessment periods 5 weeks apart. As hypothesized, regression analyses showed that initial positive affect, but not negative affect, predicted improved broad-minded coping, and initial broad-minded coping predicted increased positive affect, but not reductions in negative affect. Further mediational analyses showed that positive affect and broad-minded coping serially enhanced one another. These findings provide prospective evidence to support the prediction that positive emotions initiate upward spirals toward enhanced emotional well-being. Implications for clinical practice and health promotion are discussed.*

Positive emotions feel good. Plus, the balance of people's positive and negative emotions contributes to judgments of life satisfaction (Diener & Larsen, 1993). Are these the only reasons people should care about positive emotions? We think not. We propose that positive emotions not only feel good in the present, but also increase the likelihood that one will feel good in the future. That is, we suggest that positive emotions trigger upward spirals toward enhanced emotional well-being.

This prediction stems from a new perspective on positive emotions offered within Fredrickson's (1998, 2001) *broaden-and-build theory.* This model posits that, unlike negative emotions, which narrow people's thought-action repertoires (e.g., fight or flight), positive emotions *broaden* people's thought-action repertoires, encouraging them to discover novel lines of thought or action. Joy, for instance, creates the urge to play, interest creates the urge to explore, and so on. A key, incidental outcome of these broadened mind-sets is an increase in personal resources: As individuals discover new ideas and actions, they *build* their physical, intellectual, social, and psychological resources. Play, for instance, builds physical, socioemotional, and intellectual skills, and fuels brain development. Similarly, exploration increases knowledge and psychological complexity (Fredrickson, 1998, 2000).

Key to our proposal that positive emotions trigger upward spirals is the proposition that positive emotions broaden attention and cognition. Evidence supporting this claim comes from studies that use global-local visual processing paradigms to assess biases in attentional focus. Negative states—like anxiety, depression, and failure—predict local biases consistent with narrowed attention, whereas positive states—like subjective well-being, optimism, and success—predict global biases consistent with broadened attention (Basso, Schefft, Ris, & Dember, 1996; Derryberry & Tucker, 1994). Other experiments have shown that positive emotions produce patterns of thought that are notably unusual, flexible, creative, and receptive (Isen, 1987). In general terms, positive emotions "enlarge" the cognitive context (Isen, 1987), an effect linked to increases in brain dopamine (Ashby, Isen, & Turken, 1999).

If positive emotions broaden attention and cognition, enabling flexible and creative thinking, they should also facilitate coping with stress and adversity (Aspinwall, 1998). Indeed, people who experience positive emotions during bereavement tend to develop long-term plans and goals. Together with positive emotions, plans and goals predict greater well-being 12 months postbereavement (Stein, Folkman, Trabasso, & Richards, 1997). One way people experience positive emotions in the face of adversity is by finding positive meaning in ordinary events and within the adversity itself (Folkman & Moskowitz, 2000; Fredrickson, 2000). Finding positive meaning also predicts increases in well-being and health (Davis, Nolen-Hoeksema, & Larson, 1998). The relation between positive meaning and positive emotions is considered reciprocal: Not only does finding positive meaning trigger positive emotion, but also positive emotions—because they broaden thinking—increase the likelihood of finding positive meaning in subsequent events (Fredrickson, 2000).

These suspected reciprocal relations among positive emotions, broadened thinking, and positive meaning underlie our prediction that positive emotions trigger upward spirals. That is, the effects of positive emotions should accumulate and compound: The broadened attention and cognition triggered by earlier experiences of positive emotion should facilitate coping with adversity, and this improved coping should in turn predict future experiences of positive emotion. As this cycle continues, people build their psychological resilience and enhance their emotional well-being.

We tested these predictions by assessing affect and coping at two times. We spotlighted positive affect (PA) and broad-minded coping, characterized by taking a broad perspective on problems and generating multiple possible solutions to them. Our first hypothesis was that initial experiences of PA predict improvements in broad-minded coping over time. Our second hypothesis was that initial levels of broad-minded coping predict increases in PA over time. We also tested whether similar relations are linked to negative affect (NA), and predicted the relations are specific to PA. As another test of specificity, we tested whether similar relations with PA (and not NA) emerge for other coping styles. Our third and fourth hypotheses concerned upward spiral relations directly. Our third hypothesis was that initial PA predicts subsequent PA, in part through changes in broad-minded coping. Similarly, our fourth hypothesis was that initial broad-minded coping predicts subsequent broad-minded coping, in part through changes in PA. Support for these hypotheses would suggest that PA

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and broad-minded coping serially influence one another, creating an upward spiral toward improved emotional well-being.

METHOD

Participants and Procedure

One hundred thirty-eight undergraduates (54% female; mean age = 20, *SD* = 1.3; 71% Caucasian, 14% Asian American, 10% Hispanic, 5% African American) received credit in an introductory psychology course for participating in two sessions, conducted in small groups. At Time 1 (T1), participants provided consent and completed measures of affect and coping. Five weeks later, at Time 2 (T2), they completed identical measures.

Measures

Positive and Negative Affect Schedule (PANAS)

The PANAS (Watson, Clark, & Tellegen, 1988) includes two 10-item scales, one for PA and one for NA. Respondents indicated the extent to which they felt each feeling or emotion during the past 2 weeks. Scores for PA and NA range from 10 to 50, with higher scores indicating more PA and NA, respectively. Coefficient alpha for NA was .85 at both T1 and T2; coefficient alpha for PA was .88 at T1 and .90 at T2.

Coping Responses Inventory (CRI)

On the CRI (Moos, 1988), respondents pick "the most important problem" they faced during the past year, and indicate how often they used various coping strategies to deal with it. The CRI yields eight subscales: Cognitive Analysis, Positive Reframing, Seeking Alternative Rewards, Problem-Solving, Emotional Discharge, Avoidance, Acceptance/Resignation, and Seeking Counsel. We focused on Cognitive Analysis because its face validity suggests it assesses broadened cognition (e.g., "think of different ways to deal with the problem," "try to step back from the situation and be more objective"). This subscale includes six items and yields scores ranging from 0 to 24, with higher scores indicating more broad-minded coping. Coefficient alpha for the Cognitive Analysis subscale was .76 at T1 and .79 at T2.

To demonstrate construct validity for our use of this particular subscale to index broad-minded coping, we turned to other data sets in which we could relate the eight CRI subscales to criterion measures of broadened thinking or other constructs theoretically linked to the broadening associated with positive emotions. In one data set (N = 124), we administered the CRI and also measured broadened thinking with the Alternative Uses Test (AUT; based on Torrance, 1976) of creativity (e.g., "think of as many different uses as you can for [a pencil]"). Among the eight CRI subscales, only Cognitive Analysis correlated significantly with the AUT ($r = .29$, $p < .001$). In another data set (N = 141), we administered the CRI and also measured interpersonal trust (Garner, Olmsted, & Polivy, 1983) and attributional optimism (Metalsky, Joiner, Hardin, & Abramson, 1993). The broaden-and-build theory suggests that these are two personal resources that positive emotions and broadened thinking build (Fredrickson, 2000). Among the eight CRI subscales, Cognitive Analysis correlated most strongly with each of these measures ($r = .63$ and $r = .33$, respectively, $p < .001$).

RESULTS[1]

Does PA (but Not NA) Predict Improved Broad-Minded Coping?

Our first hypothesis was that T1 PA would predict changes in broad-minded coping from T1 to T2, such that the more PA individuals initially reported, the more they would experience improvements in broad-minded coping over time. By contrast, we expected that the same would not hold for NA; that is, T1 NA would not predict changes in broad-minded coping.

To test this hypothesis, we constructed a regression equation with T2 broad-minded coping as the dependent variable. First, T1 broad-minded coping was entered, creating residual change scores. This, of course, also controlled for T1 broad-minded coping. Next, T1 PA and T1 NA were entered simultaneously.

As hypothesized, PA, but not NA, led to enhanced broad-minded coping. As shown in the top panel of Table 1, T1 PA was significantly related to changes in broad-minded coping from T1 to T2 ($pr = .19$), $t(134) = 2.25$, $p < .05$, but T1 NA was not ($pr = -.08$), $t(134) = -0.93$, n.s.

Does Broad-Minded Coping Predict Increased PA (but Not Reduced NA)?

Our second hypothesis was that T1 broad-minded coping would predict changes in PA from T1 to T2, such that the better individuals coped initially, the more their PA would increase over time. By contrast, we expected that the same would not hold for NA; that is, broad-minded coping at T1 would not be associated with reductions in NA.

To test this hypothesis, we constructed two regression equations. For the first, T2 PA was the dependent variable, and T1 PA was entered first, creating residual change scores. For the second equation, T2 NA was the dependent variable, and T1 NA was entered first, creating residual change scores. For both equations, T1 broad-minded coping was entered as a predictor on the last step.

As shown in the middle and bottom panels of Table 1, our predictions were supported. Specifically, T1 broad-minded coping significantly predicted increased PA ($pr = .32$), $t(135) = 3.83$, $p < .05$, but was not significantly related to changes in NA ($pr = .07$), $t(135) = 0.82$, n.s.

Do Other Coping Styles Relate Similarly to PA (but Not NA)?

We repeated all the previous analyses with each of the other seven subscales of the CRI. None displayed the same pattern of results as did broad-minded coping. Most neither predicted nor were predicted by PA. The two exceptions were Emotional Discharge and Seeking Counsel, but neither was related to PA but not NA. Cognitive Analysis, our measure of broad-minded coping, was the only subscale that conformed to the predicted pattern for each link in the spiral.

Do PA and Broad-Minded Coping Serially Influence Each Other?

Our third hypothesis was that T1 PA would predict T2 PA, partly as a function of predicting changes in broad-minded coping. Similarly,

1. Because gender and age did not correlate with any variables, and did not moderate any analyses, these variables are not discussed further.

Table 1. *Time 1 variables predicting changes from Time 1 to Time 2*

Order of entry of set	Predictors in set	*F* for set	*t* for within-set predictors	*df*	Partial correlation	Model R^2
			Dependent variable = Time 2 broad-minded coping			
1	Time 1 coping	71.48*	8.46*	1, 136	.59	.34
2	Main effects	2.99		2, 134	.24	.37
	Time 1 PA		2.25*	134	.19	
	Time 1 NA		−0.93	134	−.08	
			Dependent variable = Time 2 PA			
1	Time 1 PA	39.69*	6.30*	1, 136	.48	.23
2	Time 1 coping	14.65*	3.83*	1, 135	.32	.31
			Dependent variable = Time 2 NA			
1	Time 1 NA	26.44*	5.14*	1, 136	.40	.16
2	Time 1 coping	0.66	0.82	1, 135	.07	.17

Note. Coping = Cognitive Analysis subscale of the Coping Responses Inventory (Moos, 1988), our index of broad-minded coping; PA = Positive Affect subscale of the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988); NA = Negative Affect subscale of the Positive and Negative Affect Schedule. *$p < .05$.

our fourth hypothesis was that T1 broad-minded coping would predict T2 broad-minded coping, partly as a function of predicting increased PA. In each case, supportive findings would suggest an upward spiral, in which PA and broad-minded coping serially enhance one another.

To test these hypotheses, we used mediational analyses. Kenny, Kashy, and Bolger (1998) described four steps to determine whether mediation occurs. Step 1 is to show a significant correlation between predictor and outcome (here, between T1 and T2 PA, and between T1 and T2 broad-minded coping). Table 1 shows that this step is satisfied. Step 2 is to show a significant correlation between the predictor and the mediator (here, between T1 PA and changes in broad-minded coping, and between T1 broad-minded coping and changes in PA). As we have already discussed, this step is also satisfied (see Table 1).

Steps 3 and 4 are accomplished with one regression analysis, with the outcome as dependent variable and with the mediator and predictor entered simultaneously as independent variables. Step 3 is to show that the mediator affects the outcome, controlling for the predictor (i.e., changes in broad-minded coping relate to T2 PA, controlling for T1 PA, and changes in PA relate to T2 broad-minded coping, controlling for T1 broad-minded coping). For this step, we created variables corresponding to changes in broad-minded coping (the residual of T2 broad-minded coping regressed on T1 broad-minded coping) and changes in PA (the residual of T2 PA regressed on T1 PA). Next, we computed two regression equations. In the first, with T2 PA as the dependent variable, T1 PA and the variable reflecting changes in broad-minded coping were entered simultaneously as predictors. Step 3 was satisfied: Changes in broad-minded coping were associated with T2 PA, controlling for T1 PA ($pr = .20$), $t(135) = 2.35$, $p < .05$. In the second equation, with T2 broad-minded coping as the dependent variable, T1 broad-minded coping and the variable reflecting changes in PA were entered simultaneously as predictors. Again Step 3 was satisfied: Changes in PA were associated with T2 broad-minded coping, controlling for T1 broad-minded coping ($pr = .21$), $t(135) = 2.44$, $p < .05$.

Step 4 determines whether complete or partial mediation has occurred; complete mediation is indicated by the effect of the predictor on the outcome being completely removed when the mediator is controlled. If Steps 1 through 3 are satisfied, but Step 4 is not, partial mediation is indicated. In both cases, partial mediation was indicated. That is, T1 PA remained a significant predictor of T2 PA when changes in broad-minded coping were controlled ($pr = .45$), $t(135) = 5.82$, $p < .05$. Similarly, T1 broad-minded coping remained a significant predictor of T2 broad-minded coping when changes in PA were controlled ($pr = .54$), $t(135) = 7.37$, $p < .05$.

Last, we calculated the indirect effect sizes of the predictors through the mediators. The strength of the indirect effect of T1 PA on T2 PA through changes in broad-minded coping was .16, $t(135) = 3.28$, $p < .05$. The strength of the indirect effect of T1 broad-minded coping on T2 broad-minded coping through changes in PA was .13, $t(134) = 2.77$, $p < .05$.

Taken together, this sequence of findings indicates that PA predicts itself partly via broad-minded coping, and that broad-minded coping predicts itself partly via PA. PA and broad-minded coping, then, mutually build on one another.

DISCUSSION

Drawing from the broaden-and-build theory (Fredrickson, 1998, 2001), we predicted that positive emotions trigger upward spirals toward enhanced emotional well-being. Data from two assessment waves supported our four hypotheses and demonstrated specificity to PA and broad-minded coping. Taken as a whole, our results support the upward-spiral prediction: Positive emotions—through their effects on broadened thinking—predict future increases in positive emotions.

Contrast these findings to the downward spirals often associated with depressed affect. Depressed affect and the narrowed, pessimistic thinking it engenders influence one another reciprocally, leading to ever-worsening negative emotions, and even clinical levels of depres-

sion (Peterson & Seligman, 1984). In contrast, we have shown that positive emotions, through incremental processes associated with broadened thinking, initiate upward spirals toward emotional well-being. Individuals who achieve such upward spirals not only enjoy improved emotional well-being, but also build their coping arsenal for handling future adversities (see also Aspinwall, 1998, 2001).

These findings have clinical implications as well. Clinicians who induce positive emotions (e.g., by asking depressed patients about their past "best of times"), or who time skill-based interventions to correspond to patients' positive moods, may increase both the chances that patients fully learn therapy-based skills and the speed with which they do so (Rudd, Joiner, & Rajab, 2001).

In sum, the data reported here provide prospective evidence that positive emotions do more than simply feel good in the present. Experiences of positive emotions also increase the odds that people will feel good in the future. Moreover, as predicted by the broaden-and-build theory (Fredrickson, 2000), this upward-spiral effect is linked to the broadened thinking that accompanies positive emotions. It may also explain how positive emotions promote longevity (Danner, Snowdon, & Friesen, 2001). Although an isolated experience of positive emotion is unlikely to increase emotional well-being or longevity, the broaden-and-build theory predicts that positive emotions accumulate and compound. The psychological broadening sparked by one positive emotion increases the odds that an individual will find positive meaning in subsequent events and experience additional positive emotions. This upward spiral can, over time, build psychological resources and optimize people's lives.

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