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## Upward spirals of positive emotion and coping: Replication, extension, and initial exploration of neurochemical substrates

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### Abstract

The broaden-and-build theory (Fredrickson, 1998, 2001) predicts that positive emotions broaden the scopes of attention and cognition, thereby facilitating the building of personal resources and initiating upward spirals toward increasing emotional well-being. This study attempts to replicate and extend previous empirical support for this model. Using a sample of 185 undergraduates, we assessed whether positive affect and broad-minded coping, interpersonal trust, and social support reciprocally and prospectively predict one another over a two-month period, and whether this upward spiral might be partially based in changes in dopaminergic functioning. As hypothesized, PA and positive coping did mutually build on one another, as did PA and interpersonal trust. Contrary to expectation, PA did not demonstrate an upward spiral relation with social support. Results suggest further study of the relationship between PA and changes in dopamine metabolite levels over time is warranted.

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## 1. Introduction

Positive emotional experiences not only feel good, they also help people stay healthy (Cohen, Doyle, Turner, Alper, & Skoner, 2003) and live longer (Danner, Snowdon, & Friesen, 2001), even accounting for age, gender, prior health status, social class, and other possible confounds (Levy, Slade, Kunkel, & Kasl, 2002; Moskowitz, 2003; Ostir, Markides, Black, & Goodwin, 2000). But *how* do pleasant feelings promote health and well-being?

Fredrickson's (1998, 2001) *broaden-and-build theory* suggests possible pathways. The theory holds that positive emotions *broaden* people's thought-action repertoires, encouraging them to discover novel lines of thinking and behavior. A key, incidental outcome of these broadened mindsets is an increase in personal resources: As individuals discover new ideas and actions, they *build* physical, intellectual, social, and psychological resources. Aspects of the broaden-and-build perspective have received empirical support in past work, which has shown positive emotions to broaden the scope of people's visual attention, widen their thought-action repertoires, and enhance intuitive and creative thinking and coping skills (Bolte, Goschke, & Kuhl, 2003; Fredrickson & Branigan, 2005; Isen, Daubman, & Nowicki, 1987).

Only one study, however, has examined the *reciprocal* nature of the relation between positive emotions and personal resources. Fredrickson and Joiner (2002) empirically demonstrated that positive emotions broaden the scopes of attention and cognition, and by consequence initiate upward spirals toward increasing emotional well-being. These authors studied undergraduates' self-reported affect and coping at two assessment periods, five weeks apart. As hypothesized, results indicated that positive affect (PA) predicted improved broad-minded coping, and broad-minded coping predicted increased PA. Further analyses showed that PA and broad-minded coping serially enhanced one another: the broadened attention and cognition triggered by earlier experiences of positive emotion facilitated coping, which in turn predicted future experiences of positive emotion. All findings were specific to PA; similar patterns with negative affect (NA) were not evident. This study provided prospective evidence to support the prediction that positive emotions initiate upward spirals toward enhanced emotional well-being via enhanced coping.

Our purpose in the present study is to replicate the findings of Fredrickson and Joiner (2002), and to extend them in several ways. First, whereas Fredrickson and Joiner (2002) rationally selected a specific coping subscale as an index of broad-minded coping, we utilize a broader, factor-analytically derived coping composite. Second, we seek to demonstrate that upward spirals involve interpersonal as well as cognitive resources and benefits. The broaden-and-build theory posits that positive emotions facilitate approach behaviors that motivate people to explore and interact with their environment in a variety of ways, which in turn should foster the development of an array of physical, cognitive, and social resources (Fredrickson, 2001). Accordingly, in addition to assessing coping (a cognitive resource) we assess the social resources of interpersonal trust and social support. Finally, there is intriguing preliminary evidence that the effect of positive emotions on "enlarging" the cognitive context is linked to increases in brain dopamine. Ashby, Isen, and Turken (1999) reviewed the literature on PA and cognition and proposed a theory postulating that increased CNS dopaminergic activity mediates the association between PA and improvements in various cognitive skills including creative problem solving and selection of cognitive perspective. An exploratory aim of our study is to empirically assess whether the upward spiral of positive emotions and broad-minded coping is related to changes in dopaminergic functioning.

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