Unique effects of daily perceived control on anxiety symptomatology during conjugal bereavement

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Abstract

The role of daily perceived control was examined in a recently bereaved sample of 34 older adult widows. Trait measures of environmental mastery and stress were measured in questionnaires, and state measures of anxiety, depression, stress, and control were assessed daily over ninety-eight days. Results highlight the critical role of daily control in the months immediately following conjugal loss. After controlling for concurrent depressive symptomatology, intra-individual analyses revealed significant reductions in the magnitude of the stress–anxiety correlation on days in which greater perceived control was present. Results also suggest different vulnerability and protective factors are implicated in the experience of daily anxiety. For widows with greater environmental mastery, there was significant attenuation in the magnitude of the within-person correlation between control and anxiety. In contrast, among widows with chronically high levels of stress, there was greater overlap in ratings of daily stress and anxiety.

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1. Unique effects of daily control on anxiety symptomatology

The loss of a spouse is generally regarded as one of the most stressful life events, particularly for older adults (Gallagher, Breckenridge, Thompson, & Peterson, 1983; Holmes & Rahe, 1967). Perhaps the most pressing challenge facing bereaved individuals is preserving the quality of their daily lives despite repeated exposure to anxiety-related symptoms that are often impossible to predict (Byrne & Raphael, 1997; Jacobs, Hansen, & Kasl, 1990). One well-established consequence of experiencing anxiety is an increase in negative affect during the anxiety episode, including states of tension, nervousness, and uncertainty (Clark & Watson, 1991; Mineka, Watson, & Clark, 1998). Indeed, the uncertainty surrounding both the onset and course of bereavement-related anxiety are sources of stress that may confer risk to widows who may already have maladaptive coping skills (Bonanno & Kaltman, 2001). Over time the strains of attempting to modulate these aversive states may lead to tonic elevations in negative affect (Watson, Clark, & Carey, 1988; Watson & Kendall, 1989).

Although considerable efforts have now focused on documenting the psychologicalsequelae of bereavement-related depressive symptomatology (e.g., Byrne & Raphael, 1997; Turvey, Carney, Arndt, Wallace, & Herzog, 1999), relatively less attention has been given to examining the interand intra-individual correlates of anxiety responses in the months immediately following conjugal loss. The larger literature on anxiety and depression (e.g., Abramson, Metalsky, & Alloy, 1989; Alloy, Kelly, Mineka, & Clements, 1990) suggest that although anxiety and depression share a general, nonspecific factor with negative affect (Clark & Watson, 1991; Mineka et al., 1998), it is the perceived inability to exert control over one's surroundings that has been posited to be a hallmark feature of anxiety (Alloy et al., 1990; Barlow, 1988; Beck & Emery, 1985).

In the context of bereavement, increased perceived control during times of elevated stress should mitigate the manifestation of anxiety-related symptoms (Monroe, Imhoff, Wise, & Harris, 1983; Walkar & Craske, 1997). This prediction, although plausible, is not as straight-forward as it may seem. It is possible that the benefits of perceived control during times of stress are attached to underlying personal dispositions such as environmental mastery. This congruence interpretation of person-situation interaction effects (e.g., Kahana, Kahana, & Riley, 1989; Lawton, 1982; Reich, Zautra, & Manne, 1993; Wallace & Bergeman, 1997) suggests that the intraindividual relationships between daily control, stress, and anxiety are strongest for those who are dispositionally able to exert control over their lives. It is also possible, however, that these within-person relationships would exist regardless of what traits people have. This isomorphic interpretation of person-situation effects (e.g., Fleson, Malanos, & Achille, 2002; Nesselroade, 1988) predicts that fast-varying emotional states (i.e., daily anxiety) are best predicted by other fast-varying states (i.e., daily control, stress).

We tested these separate predictions in a daily diary study of widows coping with the recent death of a spouse. Specifically, we examined the question of how trait and state processes of stress and perceived control each influence the experience of daily anxiety following the loss of a spouse. Using a multilevel daily process design, we tested predictions that perceived control may be most influential when present at the time of stress (Monroe et al., 1983; Walkar & Craske, 1997). In addition, we examined the degree to which within-person relationships between control, stress, and anxiety are influenced by individual differences in environmental mastery, even after holding constant current levels of depression.
2. Methods

2.1. Participants

The study examined data from the Notre Dame Study of Adjustment to Widowhood, a longitudinal study of the effects of bereavement on the mental and physical health of older widows. A detailed description of how participants were selected has been provided elsewhere (Bisconti, Bergeman, & Boker, 2004; Ong, Bergeman, & Bisconti, 2004). Participants ranged from 61 to 83 years of age ($M = 71.94$, $SD = 6.11$). The majority of participants had at least a high school education (97.06%). Additionally, 55.87% of the women had received some post-high school education or training. Income levels were difficult to assess immediately following loss. However, during the follow-up interview, which was approximately four months post-loss, 16.67% of the participants reported an annual income between $7500 and $15,000. Also, 46.67% of the participants reported a yearly income between $15,000 and $25,000, 13.33% reported an annual income between $25,000 and $40,000, and 23.33% reported making over $40,000 per year. The length of marriage ranged between 14 and 63 years ($M = 46.97$, $SD = 12.26$), and for 79.41% of the widows it was their first marriage. In addition, 61.76% of the widows expected the death of their husband to occur, and 91.18% of them were living alone following conjugal loss.

2.2. Procedure

Thirty-four participants received a battery of self-report questionnaires approximately 1 month postloss ($M = 28$ days, $SD = 6$). Participants then took part in a daily diary study of affect and stress. Each daily packet was dated and mailed to the widows in two-week intervals. If a participant missed a day, she was instructed to leave that day’s response sheet blank. The first set was given to the participants at the initial interview and included a self-addressed, postage-paid envelope to return surveys. Participants were instructed to complete response sheets in the evening and return diaries by mail every 2 weeks. In order to remind participants to mail the packet of daily assessments, phone calls were made every three weeks. These conversations were also a way to keep in touch with the widows over the three-month project. Widows received $30.00 in return for their participation.

2.3. Personal-level measures

**Environmental mastery.** Dispositional control was measured with the Environmental Mastery Scale (Ryff & Keyes, 1995), a 14-item scale designed to assess one’s competency in managing the environment, control over external activities, making use of surrounding opportunities, and the ability to choose or create contexts to meet personal needs and values. Sample questions, which were answered using a four-point scale (from 1, *strongly disagree* to 4, *strongly agree*), include, “In general, I feel that I am in charge of the situation in which I live” and “I often feel overwhelmed by my responsibilities” (reversed coded). Internal consistency reliability was 0.89.

**Trait stress.** Trait stress was assessed using the 14-item Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983). This measure was designed to assess the degree to which individuals appraise the situations in their lives as stressful. Participants respond to items such as “In the last
month, how often have you felt difficulties were piling up so high that you could not overcome them?” and “In the last month, how often have you dealt successfully with irritating life hassles? (reverse coded). Participants respond on a four-point scale (from 1, never to 4, always). Cronbach’s $\alpha = 0.86$.

2.4. Day-level measures

Perceived control, anxiety, and depression. Participants were assessed each day over 98 days on perceived levels of control as well as negative emotional states traditionally assessed in symptom-specific measures of anxiety and depression (e.g., Clark & Watson, 1991; Watson, Clark, & Weber, 1995). Participants were asked to indicate on a four-point (from 1, not at all true to 4, completely true) scale the extent to which they had experienced behavioral/emotional control, depression, and anxiety on a daily basis. Daily control, anxiety, and depression were assessed using the nine-item behavioral/emotional control, nine-item anxiety, and four-item depression subscales of the Mental Health Inventory (MHI; Veit & Ware, 1983). In addition to being one of the most widely used mental health assessment inventories, the MHI is sensitive to intra-individual change (for reviews, see McHorney, Ware, Rogers, Anastasia, & Lu, 1992; Ware & Gandek, 1994). Example items assessing daily perceived control are “Today, I felt control of my behavior, thoughts, and feelings”, “Today, I felt emotionally stable”, and “Today, nothing turned out as I wanted it” (reversed coded). Example items assessing daily anxiety are “Today, I was a very nervous person”, “Today, I was anxious and worried,” and “I had difficulty trying to calm down”. Example items measuring depression are “Today, I felt downhearted and blue”, “Today, I felt depressed”, and “Today, I had low or very low spirits”.

Daily stress. In addition to reporting on their daily mood, widows completed a single item on the most stressful event of the day and then rated their perceptions of how stressful the event was on a scale of 1 (very stressful) to 5 (not very stressful).

3. Results

Descriptive findings. Preliminary analyses were conducted to obtain descriptive statistics and correlations among the person- and day-level variables. The daily variables were aggregated for each participant. Correlations and descriptive statistics among these variables, and with the person-level variables, are reported in Table 1. Age showed no significant correlations with either person- or day-level variables. The two positive indicators of well-being (environmental mastery and daily perceived control) correlated significantly with each other, as did the four negative indicators (trait stress, daily anxiety, daily depression, and daily stress). Notably, greater environmental mastery and daily control were associated with less daily anxiety, stress, and slightly less daily depression.

3.1. Overview of HLM analyses

We tested our hypotheses using hierarchical linear modeling (HLM; Bryk & Raudenbush, 1992). The flexibility of multilevel modeling provides a number of advantages. First, it is appro-
appropriate for daily diary data. In the current study, the data have a hierarchical structure with ninety-eight daily observations nested within each of thirty-four participants. Second, it does not require that all individuals be measured at all occasions. We can use the data from participants who have missing data for some occasions of the study. Finally, a multilevel modeling approach allows us to estimate person- and day-level effects simultaneously. For example, we can examine the separate and independent day-level effects of daily stress, control, and depression on anxiety and then test whether person-level variables (e.g., environmental mastery) moderate these effects.

We developed HLM equations predicting daily anxiety to test our hypotheses. There were several common elements in each of our HLM analyses. First, following recommendations by Bryk and Raudenbush (1992), all day-level variables were centered on the individuals’ mean, and all person-level variables were centered on sample means. Second, variables that did not include a meaningful zero in the original scaling (e.g., day of study) were rescaled to include zero. Third, we controlled for trait stress in the prediction of daily anxiety to remove trait stability and examine only the state fluctuations.

### 3.2. Predicting daily anxiety

Day-level anxiety was estimated by the following equation:

$$\text{Anxiety}_t = \beta_0 + \beta_1 \text{Stress}_t + \beta_2 \text{Control}_t + (\beta_3 \text{Stress} \times \text{Control}_t) + \beta_4 \text{Dep}_t + \beta_5 \text{Day}_t + e_t$$

where $\beta_0$ refers to the intercept (i.e., a widow’s anxiety level on an average day); $\beta_1$–$\beta_5$ represent maximum likelihood estimates of the population slopes estimating daily anxiety from daily stress, control, the control by stress interaction, depression, and time (in days) from loss, respectively; and $e_i$ is a random component of anxiety at time $t$. Including depression in this equation controls for current level of depression in predicting daily anxiety.

In the second portion of the model, person level effects were estimated as follows:

$$\beta_0 = \gamma_00 + \gamma_{01} \text{EnvironMastery}_i + \gamma_{02} \text{TraitStress}_i + u_{0}$$

$$\beta_1 = \gamma_{10} + \gamma_{11} \text{EnvironMastery}_i + \gamma_{12} \text{TraitStress}_i + u_{0}$$

### Table 1

Descriptive statistics and correlations

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Age</td>
<td>71.97</td>
<td>6.11</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>(2) Environmental mastery</td>
<td>66.49</td>
<td>5.92</td>
<td>0.11</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>(3) Trait stress</td>
<td>31.72</td>
<td>5.29</td>
<td>–0.02</td>
<td>–0.33*</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>(4) Daily perceived control</td>
<td>2.46</td>
<td>0.68</td>
<td>0.19</td>
<td>0.46**</td>
<td>–0.11</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>(5) Daily anxiety</td>
<td>3.27</td>
<td>0.41</td>
<td>–0.08</td>
<td>–0.34*</td>
<td>0.33*</td>
<td>–0.48**</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>(6) Daily depression</td>
<td>2.81</td>
<td>0.57</td>
<td>–0.15</td>
<td>–0.23</td>
<td>0.37*</td>
<td>–0.19*</td>
<td>0.54**</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>(7) Daily stress</td>
<td>2.62</td>
<td>0.89</td>
<td>–0.13</td>
<td>–0.24</td>
<td>0.41*</td>
<td>–0.25*</td>
<td>0.39**</td>
<td>0.47**</td>
<td>–</td>
</tr>
</tbody>
</table>

Note. *$p < 0.05$, **$p < 0.01$. 
\[ \beta_2 = \gamma_{20} + \gamma_{21}\text{EnvironMastery}_i + \gamma_{22}\text{TraitStress}_i + u_0 \]

\[ \beta_3 = \gamma_{30} + \gamma_{31}\text{EnvironMastery}_i + \gamma_{32}\text{TraitStress}_i + u_0 \]

\[ \beta_4 = \gamma_{40} + \gamma_{41}\text{EnvironMastery}_i + \gamma_{42}\text{TraitStress}_i + u_0 \]

\[ \beta_5 = \gamma_{50} + \gamma_{51}\text{EnvironMastery}_i + \gamma_{52}\text{TraitStress}_i + u_0 \]

where each person’s level 1 intercept (\(b_0\)) and level 1 slopes (\(\beta_1 – \beta_5\)) are predicted by an intercept, environmental mastery, trait stress, and a random error component. Including trait stress controls for trait variability in predicting daily anxiety.

The results of the HLM analyses predicting daily anxiety are summarized in Table 2. The data indicate that after controlling for current level of depression, persons high in trait stress had a higher intercept for anxiety than those reporting lower levels of stress (\(b = 15.362, SE = 1.085, t = 13.657, p < 0.001\)). Also evident was a significant effect of time, such that anxiety showed a significant increase over the course of the study (\(b = 0.584, SE = 0.053, t = 14.362, p < 0.001\)). In comparison to those low in trait stress, however, widows who reported high levels of chronic stress had steeper increases in anxiety over the course of study (\(b = 0.335, SE = 0.064, t = 5.974, p < 0.05\)). Table 2 also shows that higher levels of daily stress were associated with greater anxiety.

Table 2
Predicting daily changes in anxiety from stress, perceived control, S × PC, and depression as a function of individual differences in environmental mastery, trait stress, and time since loss

<table>
<thead>
<tr>
<th>Predictor</th>
<th>(b)</th>
<th>SE</th>
<th>(t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>31.214</td>
<td>0.843</td>
<td>26.21**</td>
</tr>
<tr>
<td>Environmental mastery</td>
<td>-3.212</td>
<td>0.721</td>
<td>-3.417</td>
</tr>
<tr>
<td>Trait stress</td>
<td>15.362</td>
<td>1.085</td>
<td>13.657**</td>
</tr>
<tr>
<td>Daily stress</td>
<td>0.412</td>
<td>0.035</td>
<td>13.854**</td>
</tr>
<tr>
<td>Environmental mastery</td>
<td>-0.117</td>
<td>-0.254</td>
<td>-0.914</td>
</tr>
<tr>
<td>Trait stress</td>
<td>0.271</td>
<td>0.072</td>
<td>4.325*</td>
</tr>
<tr>
<td>Daily perceived control</td>
<td>-0.402</td>
<td>0.041</td>
<td>-13.214*</td>
</tr>
<tr>
<td>Environmental mastery</td>
<td>-0.321</td>
<td>0.091</td>
<td>-9.352*</td>
</tr>
<tr>
<td>Trait stress</td>
<td>0.082</td>
<td>0.056</td>
<td>0.889</td>
</tr>
<tr>
<td>Daily stress × perceived control</td>
<td>-0.305</td>
<td>0.055</td>
<td>-10.245**</td>
</tr>
<tr>
<td>Environmental mastery</td>
<td>-0.038</td>
<td>0.191</td>
<td>-0.395</td>
</tr>
<tr>
<td>Trait stress</td>
<td>0.035</td>
<td>0.224</td>
<td>0.456</td>
</tr>
<tr>
<td>Daily depression</td>
<td>0.351</td>
<td>0.052</td>
<td>12.365**</td>
</tr>
<tr>
<td>Environmental mastery</td>
<td>-0.094</td>
<td>0.084</td>
<td>-0.913</td>
</tr>
<tr>
<td>Trait stress</td>
<td>0.113</td>
<td>0.097</td>
<td>1.364</td>
</tr>
<tr>
<td>Day</td>
<td>0.584</td>
<td>0.053</td>
<td>14.362**</td>
</tr>
<tr>
<td>Environmental mastery</td>
<td>-0.426</td>
<td>0.081</td>
<td>-6.351*</td>
</tr>
<tr>
<td>Trait stress</td>
<td>0.335</td>
<td>0.064</td>
<td>5.974*</td>
</tr>
</tbody>
</table>

Note. *\(p < 0.05\), **\(p < 0.001\).
(b = 0.412, SE = 0.035, t = 13.854, p < 0.001), and that the individual slopes of this stress-to-anxiety relationship were predictable from individual differences in trait stress. Among widows with chronically higher levels of stress, the link between daily stress and anxiety was considerably stronger than was the link between daily stress and anxiety for less stressed widows (b = 0.271, SE = 0.072, t = 4.325, p < 0.05). Importantly, higher levels of daily perceived control were associated with lower levels of anxiety, even after covarying current levels of depression (b = −0.402, SE = 0.041, t = −13.214, p < 0.001). Further, this relationship was strongest among those high in environmental mastery (b = −0.321, SE = 0.091, t = −9.352, p < 0.05). This interaction is depicted in Fig. 1. For persons high in environmental mastery, daily changes in perceived control were associated with significant reductions in daily anxiety. Finally, the slope defining the stress-anxiety association was more shallow on days in which greater control was also present (b = −0.305, SE = 0.055, t = −10.245, p < 0.001). This interaction is depicted in Fig. 2. There was a less manifest increase in anxiety on days marked by greater stress when perceived control was also high.

4. Discussion

The loss of a spouse or partner is among the most exigent of human experiences, sapping our ability to stay focused and to make accurate distinctions between where we have control and where we do not. The resulting conjugal bereavement is associated with an increased risk of depressive symptoms, major depressive episodes (Byrne & Raphael, 1997; Reynolds, Miller,
Pasternak, 1999), and anxiety-related symptoms and disorders (Jacobs et al., 1990; Turvey et al., 1999). Symptoms related to anxiety and depression, in turn, are highly comorbid (Clark & Watson, 1991; Mineka et al., 1998), showing marked intra-individual variation in the months immediately following conjugal loss (Byrne & Raphael, 1997; Prigerson, Frank, & Kasl, 1995).

Although anxiety and depression are strongly associated and are presumed to share a common genetic diathesis with negative affect, it is low behavioral and emotional control that is often regarded as the crucial component for vulnerability to anxious symptomatology (Alloy et al., 1990; Barlow, 1988; Beck & Emery, 1985). Consistent with this prediction, our results revealed an inverse association between daily control and reported symptoms of anxiety. This within-person relationship remained even after holding constant concurrent depressive symptomatology. The current findings also support the hypothesis that the associations between daily stress and anxiety are substantially attenuated when perceived control is also present. Intra-individual analyses revealed significant reductions in the magnitude of the stress-anxiety correlation on days in which greater control was present, supporting the conclusion that daily control provides stress-buffering effects on anxiety (Monroe et al., 1983; Walker & Craske, 1997).

Equally important to explicating the pathways that lead to daily emotional control is identifying the psychological factors that both nurture and undermine control throughout the bereavement process. How does the ability to exert control over stressful situations help widows to stave off feelings of anxiety during bereavement? Our results indicate that the anxiety levels of those widows with greater environmental mastery were significantly reduced on days in which perceived control was high. In contrast, high-stressed widows displayed amplified stress responsivity to daily life events, a finding that is consistent with the hypothesis that chronic stress exacerbates

Fig. 2. Relationship between daily anxiety and daily stress as a function of daily perceived control. High and low were defined as one standard deviation from the mean.
the concurrent effects of daily events on emotional states (Caspi, Bolger, & Eckenrode, 1987; van Eck, Nicolson, & Berkhof, 1998). When viewed together, these results are consistent with congruence models of person-environment interaction effects, suggesting that an individual’s standing on salient traits may predispose greater reactivity to certain life events and lesser reactivity to others (Kahana et al., 1989; Wallace & Bergeman, 1997).

Our results regarding the unique influence of daily control on anxiety have implications for intervention. Clark and Watson (1991) postulated a theoretical model in which hyperarousal was uniquely linked to anxiety symptoms and that such symptoms were much more likely to precede depressive symptoms than the reverse (Alloy et al., 1990; Mineka et al., 1998). Cognitive and behavioral interventions for anxiety (e.g., Barlow, 1988; Beck & Emery, 1985) often encourage individuals to become involved in activities that will strengthen and enhance their feelings of mastery (e.g., exercise). The results of the present study suggest that such interventions may derive their efficacy from the affective changes that take place as a result of significant decreases in anxiety symptoms coinciding with increases in perceived control during times of stress. In the context of bereavement-related interventions, helping widows shift their attention to aspects of their lives that they can control may alleviate the manifestation of anxiety-related symptoms, and may even help to inhibit future biphasic anxiety-depression responses (Alloy et al., 1990).

There are at least three limitations to the current study: causality, a widowed sample, and the reliance on self-reports. First, although the daily process design of the study allows us some confidence in the conclusions that we have drawn from the correlations among the variables over time, causal conclusions cannot be made. In addition, the measures were completed at the end of the day, and hours could have passed since the occurrence of the daily stressor. It is possible that negative mood resulted in a distorted recollection and appraisal of events (Marco & Suls, 1993). Second, the sample for this study consisted of only widows. Whether our conclusions can be generalizable to explain gender differences in bereavement-related anxiety (e.g., Nolen-Hoeksema, 2000) is an empirical question. Finally, the analyses of daily affect and stress relied heavily on self-reports from respondents. It would have been useful to have clinical diagnoses of anxiety and depression for these analyses. Thus, firm conclusions about the relationship between perceived control and anxiety during conjugal bereavement await further study.

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