Generalized expectancies for negative mood regulation predict change in anxiety and depression among college students

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Abstract

Negative mood regulation (NMR) expectancies, or the beliefs held by individuals that, when faced with various manifestations of stress and negative affect, they can successfully cope with such mood states, have proven to be a most useful construct in the context of better understanding self-regulatory processes. In the present prospective study, we examined the predictive utility of NMR expectancies with respect to its ability to predict residual change in both depressive and anxiety symptoms over an 8-week timeframe in a sample of 322 college students. Initial correlational analyses revealed that, as anticipated, NMR expectancies were negatively correlated with depressive and anxiety symptomatology, as well as with maladaptive coping style. Conversely, NMR expectancies were positively associated with self-reported adaptive coping. A series of hierarchical regression analyses revealed that, even when controlling for age, sex, baseline levels of affective distress (depression or anxiety), and coping styles, NMR expectancies predicted change in both depressive and anxiety symptomatology. Implications of the findings pertinent to theory building and testing are discussed.

Keywords: Mood regulation expectancies; Coping; Depressive symptoms; Anxiety symptoms

Most human beings are motivated to engage in self-regulatory behavior of some type or another (e.g., Carver & Scheier, 1981; Catanzaro & Mearns, 1999; Kanfer & Karoly, 1972). Attempts to enhance our understanding of how we regulate ourselves have spawned a great deal of theoretical conjecture and empirical scrutiny over the past 100 years, and have been addressed by those of diverse theoretical orientations (e.g., Carver & Scheier, 1981; James (1890/1950); Mischel, 1996). It has become apparent that human behavior is not governed solely by environmental contingencies and stimuli. Rather, converging evidence strongly suggests that individuals have the capacity to influence, modify, and control their own behavior. When failures in individuals’ ability to self-regulate behavior occur, this often results in various manifestations of psychopathology (e.g., Baumeister & Vohs, 2004). Hence, current theories of psychopathology have begun to more closely examine the role of mood regulation as a potentially unifying mechanism explaining a range of symptom presentations and maladaptive behaviors (Gross & Munoz, 1995).
Indeed, numerous studies have focused on the role played by mood regulation deficits in a range of clinical disorders, including substance abuse (Hayes et al., 2004), generalized anxiety disorder (Mennin, Heimberg, Turk, & Fresco, 2002), complex post-traumatic stress disorder (Cloitre, 1998), and borderline personality disorder (Linehan, 1993). The success of these studies across multiple clinical presentations encourages further research aimed at promoting an understanding of the mechanisms underlying both successful and maladaptive mood regulation strategies.

Quite often, successful mood regulation is equated with utilization of adaptive coping strategies (Folkman & Moskowitz, 2004; Rotter, Chance, & Phares, 1972). Indeed, a large body of literature focusing on the stress-coping process demonstrates that active techniques (e.g., problem-solving, seeking social support) are associated with positive outcomes such as lower levels of psychopathology, reduced stress, and enhanced psychological and physical well-being (Holahan & Moos, 1986; Surmann, 1999). In contrast, reliance on avoidant techniques (e.g., distraction or denial) predicts a variety of negative affective and behavioral outcomes such as higher levels of depression, anxiety, and drug- and alcohol-related problems (Cooper, Russell, Skinner, Frone, & Mudar, 1992; Evans & Dunn, 1995; Hayes et al., 2004). Despite accumulating evidence implicating the role of coping strategies in various mental health outcomes, several unanswered questions remain. It is not clear, for example, why some individuals engage in maladaptive rather than adaptive coping strategies. Factors such as family support, demographic variables, and personality have all been shown to only modestly correlate with choice of coping behaviors, be they adaptive or maladaptive (Holahan & Moos, 1987). Further, several studies indicate that one's coping style explains only a limited amount of variance in mental health outcomes (e.g., Catanzaro & Mearns, 1999), suggesting that other variables inherent to the process of self-regulation (Carver & Scheier, 1998) also become engaged.

One individual-difference variable that may be relevant to understanding successful mood regulation concerns an individual's expectancies of coping with negative affect (i.e., negative mood regulation (NMR) expectancies; Catanzaro & Mearns, 1990). At the core of NMR expectancies are contributions from social learning theory (Rotter, 1954, 1982; see Catanzaro & Mearns, 1999) positing that engagement in a given behavior is a function of both the expectancy that the behavior will lead to a particular set of outcomes and the desirability of those outcomes (see also Carver & Scheier, 1998). For instance, within a framework of NMR expectancies, stress often leads to a state of negative affect that most people find aversive, and seek to alleviate through some type of cognitive or behavioral action. It follows that if individuals hold high expectations that they can successfully cope with negative moods, they will be more likely to engage in adaptive coping mechanisms. On the other hand, those who hold low expectancies of their ability to regulate negative affect may be more likely to engage in less efficacious modes of coping. In turn, one’s choice of coping behavior leads to affective and behavioral outcomes. In support of such a conceptualization, Catanzaro and Greenwood (1994) found that individuals who possess low NMR expectancies tend to use avoidant coping strategies, thereby perpetuating their subclinical or even clinical levels of depression.

Importantly, beyond predicting individuals’ choice of coping strategies, several studies have shown that NMR expectancies may play an independent role in determining certain affective outcomes. For example, Mearns and Cain (2003), in a cross-sectional study of teacher burnout, found that enhanced NMR expectancies predict less burnout and distress, independent of stress level and coping style. Similarly, several studies have tested the notion that if NMR expectancies are independently predictive of affective distress, then these expectations about one’s ability to regulate negative moods should prospectively predict affective response to a stressor. Consistent with this prediction, Mearns (1991) demonstrated that NMR expectancies measured before the breakup of a romantic relationship predicted the level of depression measured a week after the breakup above and beyond assessed coping strategies. Similarly, results from prospective studies by Catanzaro and colleagues (Catanzaro & Greenwood, 1994; Catanzaro, Wasch, Kirsch, & Mearns, 2000) indicate that NMR expectancies add to predictions of changes in affective distress, even when controlling for coping strategies and baseline levels of distress. Overall, then, NMR expectancies represent a potentially useful individual-difference variable with respect to independently predicting levels of depressive symptomatology.

To the relative exclusion of other forms of affective distress, the majority of studies to date have tended to focus on the role of NMR expectancies in depression. Extension of such findings to the realm of anxiety could
make significant contributions to both clinical and theoretical databases. Indeed, it is worth noting that the rates of co-occurrence of depression and anxiety are very high (approximately 40–75% of the time; Clark, 1989; Kessler et al., 1996), and in fact, the two types of negative affect are highly correlated (Clark & Watson, 1991; Shankman & Klein, 2003). Although the factors underlying this co-occurrence are unknown, it is hypothesized that both syndromes share a core of negative affect (Clark & Watson, 1991; Feldman, 1993). Because NMR expectancies refer to the regulation of non-specific negative affective states, they may be similarly useful in predicting anxiety symptoms. Consistent with this analysis, Catanzaro (1996) found that individuals with low NMR expectancies were negatively influenced by anxiety during an exam. Conversely, students reporting average to strong NMR expectancies suffered few, if any, ill effects; some, in fact, appeared to actually benefit psychologically from a moderate level of anxiety. These findings suggest that holding strong beliefs in the ability to regulate one's negative moods could reduce the risk of developing anxiety symptoms. Further, expectations of one's ability to lessen these anxiety symptoms could predict the success of one's coping strategies. At the same time, it is important to note that Catanzaro et al. (2000) found that NMR expectancies added to the prediction of state anxiety cross-sectionally, but not longitudinally.

When considered within the context of both social-learning and self-regulation theory (Carver & Scheier, 1998), it follows that the extent to which individuals believe that they can effectively cope with negative moods might play a role in the initiation and maintenance of both depressive and anxiety related symptomatology. Importantly, response expectancies, of which NMR is but one example, can be—and indeed often are—self-confirming (Kirsch, 1985), the paradigmatic example being placebo effects (see Kirsch, 1999 for a detailed discussion of these issues). As such, one might anticipate an unmediated relationship between NMR expectancies and manifestations of affective distress. The primary purpose of the present study is, therefore, to employ a prospective design wherein we examine the association between NMR expectancies and both depressive and anxiety symptoms. Moreover, we examine whether NMR expectancies can explain significant variance in these manifestations of affective distress above and beyond that accounted for by the more traditionally studied variable of coping style.

Method

Participants were comprised of a sample of 322 undergraduate psychology students recruited from the “Introduction to Psychology” participant pool at a large southeastern university. Participation in this study fulfilled course requirements. Ages of participants ranged from 18 to 24 years; the mean (± SD) age was 18.41 (±0.87). A majority were female (81%) and Caucasian (89%). Subjects were administered a battery of questionnaires in groups of 10-15 individuals, on two occasions (Visits 1 and 2), separated by an 8-week interval. Measures were randomly sequenced across participants to limit order effects.

Measures

**NMR Expectancies Scale**: The NMR Scale (Catanzaro & Mearns, 1990) is a 30-item questionnaire that measures generalized expectancies for alleviating negative moods. Participants are asked to indicate the degree to which they believe their use of various coping strategies alters their negative moods. For each item, participants responded on a 5-point scale (strongly disagree = 1 to strongly agree = 5) to a statement completing the stem, “When I'm upset, I believe that...” Sample items included, “I can do something to feel better;” and “I'll feel okay if I think about more pleasant times.” Thus, a high score on the NMR Scale indicates a strong belief that one can alleviate negative moods. The NMR Scale has a high level of internal consistency and is a unifactorial scale. It correlates in theoretically predicted ways with measures of depression, anxiety, coping responses, and emotional states, and has demonstrated discriminant validity from social desirability, locus of control, and depression (Catanzaro & Greenwood, 1994; Catanzaro, 1996; Kirsch, Mearns, & Catanzaro, 1990). The NMR Scale was administered at Visit 1 and the obtained coefficient alpha for this measure was 0.91.

**Coping**. The Revised Ways of Coping Checklist (RWCCL; Vitaliano, Russo, Carr, Maiuro, & Becker, 1985), was used to evaluate coping at Visit 1. The RWCCL is a 60-item checklist designed to assess strategies
used by an individual in response to stressful situations. The RWCCCL measures five coping styles: avoidant (AV), blaming (B), wishful thinking (W), problem focused (PF), and seeks social support (SS). Construct and concurrent validity of the RWCCCL have been well established (Vitaliano et al., 1985). An adaptive coping (AC) index was calculated by adding participant scores across the PF and SS subscales ($\alpha = 0.77$). A maladaptive coping (MC) index was calculated by summing across the AV, B, and W subscales ($\alpha = 0.81$).

Depressive symptomatology: The Inventory to Diagnose Depression (IDD; Zimmerman, Coryell, Corenthal, & Wilson, 1986), administered at Visits 1 and 2, was used to measure depressive symptomatology over the past week. Sample items include, “I get no pleasure from any of the activities which I usually enjoy,” and “I feel very discouraged about the future most of the time.” The IDD correlates highly with the Beck Depression Inventory ($r = 0.87$; Beck, 1978) and the Hamilton Rating Scale ($r = 0.80$; Zimmerman et al., 1986). We obtained an alpha coefficient of 0.90.

Anxiety: The State Anxiety subscale of the State-Trait Anxiety Inventory Form Y (STAI-S; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) was administered at Visits 1 and 2, and used to assess anxiety over the past week. The STAI-S is a 20-item scale that evaluates feelings of nervousness, tension, apprehension, and worry. Participants respond to self-descriptive statements (e.g., “I feel calm” and “I feel nervous”) on a 4-point scale. The psychometric properties of the STAI are excellent and well established (Spielberger et al., 1983). The obtained alpha coefficient in the present study was 0.95.

Summary: The study utilized a prospective design wherein symptoms of depression and anxiety were assessed twice, at Visits 1 and 2, separated by eight weeks. Coping and NMR expectancies were each assessed at Visit 1 and, thus, treated as predictors of change over time in both depression and anxiety.

Data analysis

Initial correlational analyses were conducted to examine the relationships among the primary variables. We next conducted separate hierarchical analyses on depressive and anxiety symptoms in which we entered age, sex, both adaptive and maladaptive coping styles simultaneously, and NMR expectancies. Last, separate hierarchical regression analyses were undertaken in which the two categories of coping (adaptive and maladaptive) were each separately entered in order to examine their unique influence on depression and anxiety symptomatology, respectively. Overall, then, we were interested in ascertaining whether NMR expectancies account for variance in both depression and anxiety above and beyond that attributable to coping style. It is important to note that this analytic strategy affords the opportunity to assess residual change in both depressive and anxiety symptoms. It has been argued that this method (hierarchical regression) of assessing change over time is preferable to the option of simply calculating raw change scores (Visits 2–1) for each individual participant, as the latter approach fails to take into account baseline (Visit 1) differences, and generally yields less reliable estimates (see Cohen & Cohen, 1983, pp. 413–423, for an extensive discussion of these issues).

In all analyses, age and sex were entered in the first step, given that there is reason to believe that both demographic variables are associated with depression (Hankin & Abramson, 2001), anxiety (Lewinsohn, Gotlib, Lewinsohn, Seeley, & Allen, 1998), and coping behavior (Ptacek, Smith, & Dodge, 1994). This step was followed by entering depressive (or anxiety) symptomatology at Visit 1 in the second step, coping style (adaptive and/or maladaptive) in the third step, and NMR expectancies in the fourth step. Finally, in each instance, the complete (simultaneous entry) model was examined to assess the extent to which NMR expectancies, while controlling for the other predictor variables, explained significant variance in depressive or anxiety symptoms.

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To test for a meaningful reduction of the five RWCCCL subscales into higher-order coping components, a principal components analysis was conducted. Using both varimax and oblimin rotations, a two component solution emerged. The orthogonal solution was retained, accounting for 71% of the total variance. The first component explained 42% of the variance, and as anticipated, consisted of the three less effective coping styles (AV, B, and W). The second component added an additional 29% of the variance and included the two adaptive coping styles (PF and SS). Component scores were calculated for both of the derived coping components, titled Maladaptive and Adaptive Coping, respectively, and used in all subsequent analyses.
Results

Correlational Analyses: The first test of the notion that NMR expectancies are related to both coping styles and affective distress was to simply examine the correlations among these constructs. Inspection of the correlation matrix (Table 1) reveals that, consistent with previous research, NMR expectancies are negatively related to maladaptive types of coping (blaming, wishful thinking, and avoidance) and positively related to more adaptive coping styles (problem-focused and social support; Catanzaro & Greenwood, 1994; Kassel, Jackson, & Unrod, 2000; Kirsch et al., 1990). Further, inspection of Table 1 reveals significant, negative associations between NMR expectancies (assessed at Visit 1) and both depression and anxiety symptomatology (assessed at Visits 1 and 2). Thus, as expected, those individuals who hold low expectations of their ability to successfully cope with negative affect are more likely to experience symptoms of both depression and anxiety. The associations between NMR expectancies and coping styles were also in the anticipated direction: a significant negative correlation emerged between NMR expectancies and Maladaptive Coping, whereas the relationship between NMR expectancies and Adaptive Coping was positive. Further, the correlations between coping style and affective distress were also significant and in the expected direction, such that maladaptive coping styles were associated with heightened affective distress, and adaptive coping was associated with fewer symptoms of depression and anxiety. Lastly, it was observed that at each respective visit, anxiety and depression correlated more highly with each other than did with the second administration of the same measure.

Analysis 1: NMR expectancies, maladaptive and adaptive coping style, and depressive symptomatology

A hierarchical regression analysis was conducted in which depression symptomatology at Visit 2 (IDD total score) served as the criterion variable. In this first analysis, we wanted to determine the relative contribution of demographic variables (age, sex), baseline (Visit 1) depressive symptomatology, both adaptive and maladaptive coping strategies, and NMR expectancies to the prediction of Visit 2 depressive symptoms. The results are presented in Table 2. Although sex was unrelated to depressive symptomatology, age was positively associated with Visit 2 depression ($p < 0.05$), suggesting that older students were more likely to endorse depressive symptoms. Depressive symptomatology at Visit 1 was entered in Step 2 and accounted for an additional 42% of the variance. In Step 3, both maladaptive and adaptive coping styles were entered into the model and, together, approached significance, accounting for an additional 1% of the variance in depressive symptoms at Visit 2. Univariate analyses showed that whereas maladaptive coping made a significant contribution to Time 2 depressive symptoms, adaptive coping did not. Finally, scores from the NMR Scale were entered in Step 4 and made a near-significant contribution ($p < 0.10$), accounting for an additional 1% of the variance in outcome. When the full model was inspected (with all variables entered simultaneously), age ($\beta = 0.12, p < 0.004$), depressive symptoms at Visit 1 ($\beta = 0.55, p < 0.001$), and NMR

<table>
<thead>
<tr>
<th>Measures</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. NMRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>104.52</td>
<td>16.56</td>
</tr>
<tr>
<td>2. Visit 1—STAI</td>
<td>-0.56</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>45.56</td>
<td>13.89</td>
</tr>
<tr>
<td>3. Visit 1—IDD</td>
<td>-0.56</td>
<td>0.68</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12.82</td>
<td>9.50</td>
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<tr>
<td>4. Visit 2—STAI</td>
<td>-0.41</td>
<td>0.55</td>
<td>0.41</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>45.78</td>
<td>14.11</td>
</tr>
<tr>
<td>5. Visit 2—IDD</td>
<td>-0.45</td>
<td>0.53</td>
<td>0.65</td>
<td>0.64</td>
<td></td>
<td></td>
<td></td>
<td>10.54</td>
<td>8.98</td>
</tr>
<tr>
<td>6. Adaptive coping</td>
<td>0.38</td>
<td>-0.23</td>
<td>-0.21</td>
<td>-0.21</td>
<td>-0.21</td>
<td></td>
<td></td>
<td>61.48</td>
<td>7.60</td>
</tr>
<tr>
<td>7. Maladaptive coping</td>
<td>-0.42</td>
<td>0.46</td>
<td>0.48</td>
<td>0.35</td>
<td>0.38</td>
<td>0.02*</td>
<td></td>
<td>55.35</td>
<td>10.23</td>
</tr>
</tbody>
</table>

Note: NMRE = negative mood regulation expectancies; STAI-S = state subscale of the State-Trait Anxiety Inventory; IDD = inventory to diagnose depression. Means are based on raw scores.
*Not significant; all other correlations are significant at $p < 0.001$. 
expectancies \((\beta = -0.09, p<0.10)\) remained the only significant (or in the case of NMR expectance, near-significant) predictors of depressive symptoms at Visit 2.

**Analysis 2: NMR expectancies, maladaptive and adaptive coping style, and anxiety symptomatology**

The next hierarchical regression analysis examined anxiety symptomatology at Visit 2 as the criterion variable. Results are presented in Table 2. Neither sex nor age was associated with Visit 2 anxiety. Anxiety symptomatology at Visit 1 was entered in Step 2 and accounted for an additional 29% of the variance. In Step 3, both maladaptive and adaptive coping styles were entered into the model and, together, added a significant and additional 2% of the variance in anxiety symptoms at Visit 2. Univariate analyses showed that both maladaptive and adaptive coping made significant contributions to Time 2 anxiety symptoms. Finally, scores from the NMR Scale were entered in Step 4 and failed to significantly predict additional variance in affective outcome. When the full model was inspected, only anxiety symptoms at Visit 1 \((\beta = 0.42, p<0.001)\), and maladaptive coping \((\beta = 0.12, p<0.04)\) remained significant predictors of depressive symptoms at Visit 2.

**Analysis 3: NMR expectancies, maladaptive coping style, and depressive symptomatology**

Next, we examined the independent effect of NMR expectancies and maladaptive coping on depressive symptomatology (see top half of Table 3). Beginning with Step 3 (as the results from Steps 1 and 2 are the same as those presented in Analysis 1), maladaptive coping was entered into the model and approached significance, accounting for an additional .9% of the variance in depressive symptoms at Visit 2. Scores from the NMR Scale were entered in Step 4 and added significantly to the variance, accounting for an additional 1%. When the full model was inspected (with all variables entered simultaneously), age \((\beta = 0.13, p<0.003)\), depressive symptoms at Visit 1 \((\beta = 0.56, p<0.0001)\), and NMR expectancies \((\beta = -0.11, p<0.04)\) remained the only significant predictors of depressive symptoms at Visit 2.
Analysis 4: NMR expectancies, adaptive coping style, and depressive symptomatology

This hierarchical regression analysis used the same form as the last, except that adaptive coping style was entered in Step 3 in lieu of maladaptive coping (see bottom half of Table 3). Accounting for demographic variables and Visit 1 depression scores, adaptive coping made a marginally significant contribution to the variance in Visit 2 depression, accounting for an additional .5%. When entered in Step 4, NMR expectancies added an additional (and statistically significant) 1% to the variance in depressive symptoms. Importantly, inspection of the full model reveals that with all variables entered simultaneously, age ($b = 0.13, p < 0.003$), depressive symptoms at Visit 1 ($b = 0.58, p < 0.0001$), and NMR expectancies ($b = -0.11, p < 0.04$) remained as the only significant predictors of depressive symptomatology at Visit 2.

Analysis 5: NMR expectancies, maladaptive coping, and symptoms of anxiety

A hierarchical regression analysis was then conducted in which anxiety symptomatology at Visit 2 (STAI-S total score) served as the criterion variable. We conducted two separate analyses, first with maladaptive coping, and then utilizing adaptive coping indices as unique predictors. Results are presented in Table 4. Age and sex, which were entered simultaneously in Step 1, did not significantly predict anxiety symptoms. Anxiety symptomatology at Visit 1 was entered in Step 2 and accounted for an additional 29% of the variance. In Step 3, maladaptive coping was entered into the model and was significant, accounting for an additional 1.5% of the variance in symptoms of anxiety. Finally, scores from the NMR Scale were entered in Step 4 and added significantly to the variance, accounting for an additional 1.1%. When the full model was inspected (with all variables entered simultaneously), only anxiety symptoms at Visit 1 ($b = 0.43, p < 0.0001$) and NMR expectancies ($b = -0.12, p < 0.04$) remained as significant predictors of anxiety symptoms at Visit 2.

Analysis 6: NMR expectancies, adaptive coping, and symptoms of anxiety

This last analysis was conducted with adaptive coping as a predictor. Results are presented in Table 4. Findings were identical to those described above with respect to demographics and anxiety symptomatology at Visit 1 (Steps 1 and 2, respectively). In Step 3, adaptive coping was entered into the model and found to be marginally significant, accounting for an additional 0.8% of the variance in anxiety symptomatology. Scores from the NMR scale were entered in Step 4 and added significantly to the variance, accounting for an additional 1.0%. When all variables were entered simultaneously, only anxiety symptoms at Visit 1 ($b = 0.46$, $p < 0.0001$) remained as significant predictors of anxiety symptoms at Visit 2.
Discussion

Drawing on a large sample of college students, we examined the relationship between NMR expectancies and depressive symptomatology over an 8-week period. Consistent with previous findings (e.g., Catanzaro & Greenwood, 1994; Davis, Andresen, Trosko, Massman, & Lovejoy, 2005; Mearns, 1991), our results indicate that NMR expectancies contribute to the prediction of depressive symptomatology, even when controlling for age, sex, coping strategies, and depression at the baseline visit. Thus, data from this sample further adds to the burgeoning literature suggesting that NMR expectancies serve as a reliable predictor of change in depressive symptoms. In turn, these findings provide additional support for the independent role of NMR expectancies in influencing depressive symptomatology.

As an extension of past work, we also assessed whether changes in NMR expectancies predicted change in another form of affective distress: anxiety symptomatology. Consistent with our findings on depressive symptoms, NMR expectancies significantly contributed to the prediction of anxiety, even when controlling for demographic variables, baseline anxiety, and coping styles. Thus, the predictive utility of NMR expectancies is not unique to depression, but extends to anxiety as well. As such, the current findings encourage further investigation of the generalizability of this model not only to other negative affective states, but also to relevant behaviors (e.g., anxiety-related avoidance behavior, substance abuse, self-destructive behaviors). In this regard, encouraging research has been reported by Kassel et al. (2000), as well as Catanzaro and Laurent (2004), indicating that NMR expectancies are related to problem drinking among college students and adolescents. Taken together, these findings suggest that NMR expectancies not only influence affective state, but may also influence consequent behavioral outcomes.

It is interesting to note that at each respective visit, anxiety and depression correlated more highly with each other than they did with the second administration of the same measure. Such an observation might call into question the true independence of these constructs. As originally noted in the tripartite model of depression and anxiety (Clark & Watson, 1991), depression and anxiety do share tremendous conceptual and behavioral overlap, particularly with respect to the presence of negative affect. At the same time, several models describing the etiology of depression and anxiety highlight a number of dimensions on which anxiety and depression do significantly differ (see Shankman & Klein, 2003 for a thorough discussion of these issues). For instance, depression and anxiety are clearly different with respect to the absence of positive affect in depression, and the presence of physiological hyperarousal in anxiety (Watson et al., 1995). As such, future

Table 4
Regression analyses predicting symptoms of anxiety: NMR expectancies and coping strategies

<table>
<thead>
<tr>
<th>Order of entry of set predictors</th>
<th>B</th>
<th>Increase in $R^2$</th>
<th>Test of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maladaptive coping</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1: Age, sex</td>
<td>0.00</td>
<td>0.01</td>
<td>$F = 1.02, 2/315 df$</td>
</tr>
<tr>
<td>Age</td>
<td>0.08</td>
<td>0.01</td>
<td>$t = 1.42, 317 df$</td>
</tr>
<tr>
<td>Sex</td>
<td>0.54</td>
<td>0.29</td>
<td>$F = 129.19, 1/314 df^{**}$</td>
</tr>
<tr>
<td>Step 2: Anxiety symptoms, Visit 1</td>
<td>0.01</td>
<td>0.29</td>
<td>$F = 129.19, 1/314 df^{**}$</td>
</tr>
<tr>
<td>Step 3: Maladaptive coping</td>
<td>0.12</td>
<td>0.13</td>
<td>$F = 5.18, 1/313 df^{**}$</td>
</tr>
<tr>
<td>Step 4: NMRE</td>
<td>-0.12</td>
<td>0.01</td>
<td>$F = 4.54, 1/312 df^{**}$</td>
</tr>
<tr>
<td>Model</td>
<td>0.32</td>
<td></td>
<td>$F = 29.02, 5/312 df^{***}$</td>
</tr>
<tr>
<td><strong>Adaptive coping</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 3: Adaptive coping</td>
<td>-0.09</td>
<td>0.01</td>
<td>$F = 3.36, 1/313 df^{*}$</td>
</tr>
<tr>
<td>Step 4: NMRE</td>
<td>-0.13</td>
<td>0.01</td>
<td>$F = 4.38, 1/312 df^{**}$</td>
</tr>
<tr>
<td>Model</td>
<td>0.31</td>
<td></td>
<td>$F = 28.46, 5/312 df^{***}$</td>
</tr>
</tbody>
</table>

Note: NMRE = negative mood regulation expectancies. Results from Steps 1 and 2 are not presented in the adaptive coping analyses as they are identical to the findings presented in the maladaptive coping analyses.

*p<0.10; **p<0.05; ***p<0.001.

$p<0.0001$) and NMR expectancies ($\beta = -0.13, p<0.04$) remained as significant predictors of anxiety symptoms at the Visit 2.

Discussion

Drawing on a large sample of college students, we examined the relationship between NMR expectancies and depressive symptomatology over an 8-week period. Consistent with previous findings (e.g., Catanzaro & Greenwood, 1994; Davis, Andresen, Trosko, Massman, & Lovejoy, 2005; Mearns, 1991), our results indicate that NMR expectancies contribute to the prediction of depressive symptomatology, even when controlling for age, sex, coping strategies, and depression at the baseline visit. Thus, data from this sample further adds to the burgeoning literature suggesting that NMR expectancies serve as a reliable predictor of change in depressive symptoms. In turn, these findings provide additional support for the independent role of NMR expectancies in influencing depressive symptomatology.

As an extension of past work, we also assessed whether changes in NMR expectancies predicted change in another form of affective distress: anxiety symptomatology. Consistent with our findings on depressive symptoms, NMR expectancies significantly contributed to the prediction of anxiety, even when controlling for demographic variables, baseline anxiety, and coping styles. Thus, the predictive utility of NMR expectancies is not unique to depression, but extends to anxiety as well. As such, the current findings encourage further investigation of the generalizability of this model not only to other negative affective states, but also to relevant behaviors (e.g., anxiety-related avoidance behavior, substance abuse, self-destructive behaviors). In this regard, encouraging research has been reported by Kassel et al. (2000), as well as Catanzaro and Laurent (2004), indicating that NMR expectancies are related to problem drinking among college students and adolescents. Taken together, these findings suggest that NMR expectancies not only influence affective state, but may also influence consequent behavioral outcomes.

It is interesting to note that at each respective visit, anxiety and depression correlated more highly with each other than they did with the second administration of the same measure. Such an observation might call into question the true independence of these constructs. As originally noted in the tripartite model of depression and anxiety (Clark & Watson, 1991), depression and anxiety do share tremendous conceptual and behavioral overlap, particularly with respect to the presence of negative affect. At the same time, several models describing the etiology of depression and anxiety highlight a number of dimensions on which anxiety and depression do significantly differ (see Shankman & Klein, 2003 for a thorough discussion of these issues). For instance, depression and anxiety are clearly different with respect to the absence of positive affect in depression, and the presence of physiological hyperarousal in anxiety (Watson et al., 1995). As such, future
research should attempt to utilize measures that tap these critical aspects of depression and anxiety, rather than focusing solely on the shared determinants of negative affect. In this respect, it is conceivable that NMR expectancies may differentially influence positive affect and physiological reactivity in ways that have, to date, gone unexplored.

Methodological challenges and limitations

When both coping variables were simultaneously entered in the regression models, maladaptive coping remained a significant (negative) predictor of change in both depressive and anxiety symptoms, while adaptive coping predicted change only for anxiety symptomatology. The extent to which the role of coping reliably differs across depressive and anxiety symptoms will need to be assessed by further empirical study. We also observed that in the models in which we simultaneously entered both coping styles, NMR expectancies failed to significantly add to the prediction of change in anxiety and depressive symptoms. It is important to note, however, that such analyses provide a most conservative approach toward ascertaining whether NMR expectancies can contribute incremental variance to affective outcome, above and beyond that already accounted for by baseline affective symptoms and both adaptive and maladaptive coping styles. Importantly, when the respective coping styles (adaptive and maladaptive) were examined in separate regression models, NMR expectancies did emerge as an independent predictor of change in affective outcome (both anxiety and depression), although the incremental variance accounted for was modest at best (~1%). At the same time, it must be recognized again that the study design affords a stringent assessment of the notion that NRM expectancies contribute to residual change in affective distress over time. Hence, the ability of NMR expectancies to explain additional variance in outcome to that accounted for by baseline symptomatology and coping styles over a period as brief as eight weeks is still noteworthy.

Many items on the NMR expectancies questionnaire (Catanzaro & Mearns, 1990) refer to particular emotion regulation strategies that people may use to modulate emotional arousal. In turn, this implies that emotion regulation strategies are adaptive regardless of context and that certain strategies are always more adaptive than others—an implication inconsistent with conceptualizations of emotion regulation that emphasize the context-dependent nature of adaptive regulation strategies (see Cole, Michel, & Teti, 1994; Thompson & Calkins, 1996). Moreover, a similar concern could be expressed with the ways of Coping Checklist in that it asks participants to consider a recent stressor and respond with respect to how they coped with that specific event. Hence, the extent to which this measure captures a “typical” coping repertoire for any given individual—one that generalizes across different contexts—must also be questioned. At the same time, it is important to note that the correlations between coping and affective distress (depressive and anxiety symptoms) observed in this study equal or exceed those reported in other investigations (e.g., Lee et al., 2000; Wagner, 1993). Thus, even in the absence of a context-specific measure of coping (and, for that matter, NMR expectancies), the manifest correlations suggest that these self-report questionnaires are tapping the targeted constructs, albeit independent of context.

It is also important to note that the homogeneity of the current sample (mainly European-American female college students) may ultimately limit the generalizability of these findings. The target population is arguably an important one for whom both anxiety and depression may be especially salient concerns, given the stress of adjustment to the new responsibilities of adulthood and higher education (Oliver, Reed, & Smith, 1998). However, the extent to which the present pattern of results might be replicated with older or minority populations, or among those who meet criteria for mood and anxiety disorders needs yet to be fully ascertained. Furthermore, the majority of participants in this study were female. The predominance of women may have influenced the results, especially given the differential base rates of depression and anxiety for men and women, coupled with theoretical reasons suggesting that factors that predispose individuals to the emergence of depression and anxiety may differ across the sexes (e.g., Hankin & Abramson, 2001).

In sum, our study assessed emotion regulation using questionnaire measures of NMR expectancies, affective distress, and coping style. Although all of the measures demonstrate good reliability and construct validity, sole reliance on self-report measures raises the concern of mono-method assessment. A more sophisticated approach would perhaps involve utilization of a comprehensive measurement of emotion regulation that accommodates its multidimensional nature (Gratz & Roemer, 2004). The use of broader assessment
methodology would then allow for determination of whether the current pattern of findings replicates across other dimensions of emotion regulation (e.g., awareness, understanding, and acceptance of emotions), and even emotional response systems (e.g., psychophysiological indices of emotion).

In order to ultimately arrive at more definitive conclusions, it is clear that this area of research would also benefit from implementing experimental designs that seek to determine whether NMR expectancies are, indeed, causally related to affective outcome. A true test of causality requires a manipulation of NMR expectancies (e.g., through targeted cognitive interventions), while experimentally or statistically holding all other relevant variables constant. As such, future investigations of this kind could yield substantial benefits for at-risk populations.

Finally, as this was one of the first tests of the relationship between NMR expectancies and both depressive and anxiety symptoms, we chose not to examine possible interaction effects. Future research should clearly explore variables derived from social learning theory (Catanzaro & Mearns, 1999) that may serve to moderate and/or mediate the impact of NMR expectancies on various indices of affective distress.

Conclusions

Assessment of NMR expectancies could potentially serve as a useful and cost-effective tool for the identification of individuals who are at some risk for developing affective distress, or even clinical disorders of affect. As noted earlier, although one might argue that NMR expectancies exerts their effects entirely through coping behavior, multiple studies (including the present one, see also Kirsch et al., 1990, as well as Catanzaro & Greenwood, 1994) have now demonstrated that, although NMR expectancies are reliably associated with coping styles, they frequently add incremental variance to the prediction of affective distress. Kirsch et al. (1990), for example, found that even if active coping strategies are employed when faced with stressful circumstances, the final determinant of affective outcome is NMR expectancies. Hence, a burgeoning literature points to the potentially powerful impact NMR expectancies can have on mood regulation both in concert with, and at times, independent of, individuals’ actual coping strategies. In other words, there is growing reason to believe that NMR expectancies function like placebos, or self-fulfilling prophecies, ultimately yielding the expected changes in mood regardless of the type of coping one actually utilizes.

Taken together, the current study represents an important, albeit preliminary, step toward the identification of a factor—impaired NMR expectancies—that renders individuals vulnerable to the development of depression and anxiety symptoms. As argued above, future work would benefit from utilization of a more comprehensive assessment of mood regulation, and should investigate whether NMR expectancies do, indeed, play a causal role in the etiology and maintenance of depression, anxiety, and other forms of affective distress. Importantly, Cloitre, Koenen, Cohen, & Han (2002) demonstrated that improvement over the course of therapy in NMR expectancies proved a useful indicator of therapy outcome. As such, potential clinical implications of the present work suggest a renewed focus on the development of prevention and treatment efforts targeted at identifying and modifying mood regulation expectancies.

References


