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Specificity of Cognitive and Behavioral Variables to Positive and Negative Affect

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Abstract

The Tripartite Model proposes that a combination of greater Negative Affect (NA) and reduced Positive Affect (PA) contributes to depressive symptoms. The purpose of this study was to test a model of affective experience in which cognitive variables (i.e., negative cognitions and appraisals) are uniquely related to NA but not PA, and which behavioral variables (i.e., activity participation) are uniquely associated with PA but not NA. Participants included 88 spousal Alzheimer caregivers (mean age = 74 years). Multiple regression models, in which negative cognitions (i.e., helplessness, blames self, and negative appraisals) and activity participation (i.e., frequency of engaging in social and recreational activities) were used to predict depressive symptoms, PA and NA. Results indicated that while helplessness, blaming oneself, negative appraisals, and activity participation all significantly predicted depressive symptoms, only negative cognitive variables significantly predicted NA, and only activity participation significantly predicted PA. These data confirm that depressive experience consists of two relatively independent components - increased negative affect and reduced positive affect - which have unique correlates in negative cognitions and activity participation. If confirmed, the findings suggest the utility of focusing interventions on each of these components in the management of depressive symptoms.

Keywords

Tripartite Model; Behavioral Activation; Depression; Helplessness; Appraisals

Introduction

Although depression and anxiety have been traditionally conceptualized as two distinct entities, with depression relating to emotions such as sadness and anxiety relating to emotions such as fear (Izard, 1972; Watson & Kendall, 1989), empirical evidence has not typically supported a clear distinction of these constructs (Clark & Watson, 1991). Given the high comorbidity between the two syndromes (Mineka, Watson, & Clark, 1998) and high correlations between questionnaires assessing depressive and anxious symptoms (Clark & Watson, 1991; Watson,

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Weber, et al., 1995), several models have been proposed as a means of distinguishing the experience of depression from anxiety. Elucidating the components that constitute each specific syndrome not only improves assessment and diagnosis, but also helps improve treatment in that intervention targets can be made more precise. One such model is the Tripartite model (Clark & Watson, 1991).

The Tripartite Model of Anxiety and Depression

In a seminal review of psychometric evidence examining the properties of anxiety and depression measures, Clark and Watson (1991) concluded that individuals with anxiety and depression seemed to share an underlying non-specific affective state (i.e., general affective distress) known as Negative Affect (NA). This underlying distress is characterized by increased experience of emotions such as fear, sadness, guilt, and anger. However, depression appeared to have an additional underlying state characterized by diminished positive affect (PA), or feelings of joy, energy, enthusiasm, and interest, which were not typically diminished in anxiety. Therefore, in what came to be known as the *Tripartite Model* (Clark & Watson, 1991), depression seemed uniquely characterized by a diminished experience of PA combined with increased NA.

Since the introduction of the Tripartite Model of anxiety and depression, accumulating research on this 3-factor model (Brown, Chorpita, & Barlow, 1998; Chorpita, Albano, & Barlow, 1998; Joiner, Catanzaro, & Laurent, 1996; Teachman, Siedlecki, & Magee, 2007), and its individual components (Joiner, et al., 1999; Kiernan, Laurent, Joiner, Catanzaro, & MacLachlan, 2001) has supported its validity. In a two-part series investigating the validity and structure of a tripartite structure of these syndromes, Watson and colleagues tested their model in five samples: 3 student, 1 adult, and 1 patient (Watson, Clark, et al., 1995; Watson, Weber, et al., 1995). Participants completed the Mood and Anxiety Symptom Questionnaire (MASQ), which was constructed specifically to test the Tripartite model. The authors found that the MASQ anxious arousal and anhedonic depression subscales did indeed discriminate between anxiety and depression and demonstrated excellent convergent validity (Watson, Weber, et al., 1995). Furthermore, a 3-factor structure of the MASQ (General Distress, Anhedonia vs. Positive Affect, and Somatic Anxiety) emerged in each of the 5 samples, consistent with the Tripartite Model (Watson, Clark, et al., 1995).

Additionally, (Teachman, et al., 2007) and colleagues examined the structural invariance of the Tripartite Model in young, middle-aged, and older adults and found that the 3-factor (Tripartite) model best fit each age group, compared to 1- and 2-factors models tested. Evidence also generally supports the tripartite model in culturally diverse populations in children (Kiernan, et al., 2001; Yang, Hong, Joung, & Kim, 2006) and adults (Philipp, Washington, Raouf, & Norton, 2008). Although minor discrepancies to the model may include differences in emotional expression across cultures, lack of cross-culturally validated measurement tools, and varying measurement and data analytic techniques (Burns & Eidelson, 1998), the overall pattern of data to date suggests that the central principles of the model are consistent across several populations.

Unique Correlates of Positive and Negative Affect

In 1988, Watson proposed that a unique set of patterns could be observed between certain constructs and the two primary domains of depressive symptoms, that is, Positive (PA) and Negative Affect (NA). Specifically, Watson proposed that health complaints and perceived stress would be related to intraindividual changes in state NA and unrelated to state PA, and that daily social activity and physical exercise would be related to intraindividual fluctuations in state PA, but not to state NA. Moreover, previous work has supported similar hypotheses in between-subjects analyses (Watson & Pennebaker, 1989), and therefore, this study aimed

to replicate those findings in their sample. While the individual findings were not overwhelming, the resulting pattern that emerged was that PA was more strongly related to social activity and exercise, while NA was more strongly related to perceived stress. These results suggested that certain endogenous and exogenous factors may be uniquely associated with PA and NA. Indeed, Mausbach and colleagues found that intraindividual fluctuations in social and recreational activity were significantly correlated with fluctuations in PA but not NA (Mausbach, Coon, Patterson, & Grant, 2008). Given the unique importance of PA and NA to the experience of depression, demonstrating unique correlations with PA and NA has theoretical and clinical implications because it may suggest that certain targets of psychotherapy might differentially influence depressive symptoms via their relations to its two components (i.e., PA and NA). Further, it raises the question of whether greatest influence on depressive symptoms is achieved via targeting both the PA and NA domains, as opposed to simply targeting one domain.

Cognitive-Behavior Therapy and Positive and Negative Affectivity

Cognitive-Behavior Therapy (CBT) for depression, which combines both cognitive and behavioral intervention techniques, has received a great deal of attention as an empirically-supported treatment for depression. Several meta-analytic reviews have supported the efficacy of CBT interventions in the reduction of depressive symptoms in several populations such as children and adolescents (Lewinsohn & Clarke, 1999), older adults (Pinquart, Duberstein, & Lyness, 2007), and depressed inpatients (Stuart & Bowers, 1995). Many of these studies have found large effect sizes. Notably, it has been shown that patients receiving telephone-administered CBT demonstrated a greater reduction in depression and a greater increase in PA compared to those receiving a telephone-administered supportive emotion focused therapy (Mohr, et al., 2005).

CBT's unique integration of both cognitive and behavioral techniques may constitute a comprehensive treatment that may differentially operate to reduce NA and increase PA. A compelling 2007 study by Kring and colleagues (Kring, Persons, & Thomas, 2007) examined change in PA and NA via administration of a CBT intervention to patients diagnosed with a mood and/or anxiety disorder. Results indicated that while depressive symptoms decreased during treatment, change was most notable in NA but not PA. Indeed, PA only increased during treatment for those who demonstrated significant and enduring (without depression for over 20 weeks) decreases in depression. A revealing conclusion by the authors was that PA was not a central focus of treatment. That is, the therapy was heavily influenced by the cognitive theory of Aaron Beck (Beck, Rush, Shaw, & Emery, 1979) and less focused on behavioral theories of increasing pleasure or engagement in social and recreational activities (Lewinsohn & Graf, 1973; Lewinsohn & Libet, 1972).

These findings appear to suggest a unique pattern of correlations between behavioral constructs and PA on the one hand, and between cognitive constructs and NA on the other. Specifically, examining the findings of Watson (1988), we see that that behavioral constructs (e.g., social activity, exercise) may be more strongly related to PA (Watson, 1988). The findings of Kring and colleagues (2007) suggest that cognitive factors may more strongly relate to NA.

Despite these interesting findings, little research has examined the unique relations of the cognitive and behavioral components of CBT with PA and NA. However, Jacobson and colleagues (1996) have conducted one of the most detailed analyses of the individual components of CBT for depression. In their study, they enrolled depressed patients to receive a purely behavioral therapy (i.e., behavioral activation), a therapy focusing on both behavioral activation and negative cognitions (i.e., automatic thoughts), or pure Cognitive Therapy for depression, which included components of the previous 2 treatments but also examined core schemas. Interestingly, all three therapies significantly reduced symptoms of depression, but

none was more effective than the others. The authors conclude that if these findings are true, they raise questions about the conditions for change in cognitive therapy and the potential need to revise cognitive theory and cognitive therapy.

Current Study

This study had several aims based on findings in the extant literature. Our first aim was to establish the validity of the Tripartite Model of depression within a sample of Alzheimer's caregivers. Family caregivers to patients diagnosed with Alzheimer's disease are known to experience substantial psychological morbidity, including depressive symptoms (Cohen, et al., 1990; Ory, Hoffman, Yee, Tennstedt, & Schulz, 1999; Schulz, O'Brien, Bookwala, & Fleissner, 1995). Indeed, caregivers are estimated to be at twice the risk for depression compared to non-caregiving older adults (Baumgarten, et al., 1992). Therefore, Alzheimer's caregivers provide an excellent sample for examining variation in not only depressive symptoms, but also in affective experience (e.g., PA and NA). Indeed, during the course of providing care, caregivers adjust their own engagement in activities in response to providing greater care for their loved ones (Mausbach, Patterson, & Grant, 2008). Various caregiving demands, such as problem behaviors of the Alzheimer's patient that are often unpredictable, can lead to variability in NA (Mausbach, Coon, et al., 2008). Therefore, caregivers might be considered an ideal population for testing our first aim, for which we hypothesized that both Positive and Negative Affect will be significantly associated with depressive symptoms.

Our second aim was to demonstrate that both cognitive and behavioral variables are significantly associated with depressive symptoms, but uniquely associated with the core features of depressive symptoms, namely PA and NA. For the first part of this aim, we hypothesized that both activity participation (i.e., frequency of engagement in social and recreational activities) and negative cognitions (i.e., blaming oneself, helplessness/hopelessness, and distress experienced from stressors) would be significantly associated with experience of depressive symptoms.

However, our third aim was to demonstrate that, despite these constructs being significantly associated with depressive symptoms, there would be a unique pattern of significant associations between behavioral constructs and PA on the one hand, and between cognitive constructs and NA. Therefore, for our third hypothesis, we proposed that activity participation would be significantly associated with PA but not NA, and our fourth hypothesis was that negative cognitions would be significantly associated with NA but not PA.

Methods

Participants

The participants were 88 spousal caregivers of patients with Alzheimer's Disease (AD) participating in a study of chronic stress and well being. Inclusion/exclusion criteria required participants to be at least 55 years of age, providing in-home care to a spouse with probable AD, and not being currently treated for serious health conditions that would render participation burdensome for the individual (e.g., heart failure, COPD, cancer, schizophrenia, etc). Participants were recruited through a variety of means, most commonly through local caregiver support groups, referrals from agencies serving dementia patients and their loved ones (e.g., University of California San Diego Alzheimer's Disease Research Center), and community health fairs. The study was approved by the Institutional Review Board of the University of California San Diego and all participants provided written consent prior to participating.

Measures

Descriptive Measures—All participants were assessed for demographic and descriptive variables such as age, sex, race/ethnicity, monthly income, and years of caregiving. Caregivers were administered the Clinical Dementia Rating (CDR) scale (Morris, 1993), for which caregivers rated their spouse's abilities in several cognitive and functional domains (e.g., Memory, Orientation, Judgment and Problem-Solving). Based on overall responses, a rating ranging from 0 (none) to 3 (severe) was given for each care receiver with regard to his/her overall dementia severity.

Depressive Symptoms—Symptoms of depression were assessed using the short form of the Center for Epidemiologic Studies Depression scale (CESD-10)(Andresen, Malmgren, Carter, & Patrick, 1994). The CESD-10 consists of 10 items from the original CESD (Radloff, 1976). Participants were read 10 statements about how people might feel (e.g., "I felt depressed"; "I felt lonely"; "I could not get going") and were asked to indicate how often they felt that way over the past week. Ratings were given on a scale from 0 = "Rarely or none of the time" to 3 = "Most or almost all the time". Studies show the CESD-10 to be reliable and valid (Andresen, et al., 1994), and coefficient alpha for the present sample was .76.

Positive and Negative Affect—The constructs of Positive (PA) and Negative Affect (NA) were assessed using the Positive and Negative Affect Scale (PANAS)(Watson, Clark, & Tellegen, 1988). The PANAS consists of 20 mood adjectives (10 positive, 10 negative), to which each was rated by the participant on a 5-point Likert scale from 1 = "very slightly or not at all" to 5 = "extremely". For the PA scale, sample items were "Enthusiastic", "Active", and "Alert". Sample items on the NA scale were "Nervous", "Irritable", and "Hostile". For the present study, participants were asked to rate the extent to which they experienced each mood over the "past few weeks". Watson, Clark, and Tellegen (1988) reported excellent reliability and validity for both the PA and NA domains, and for the present study, coefficient alpha for the PA and NA scales was .87 and .79, respectively.

Negative Cognitions/Appraisals—In the present study, three scales assessed negative cognitions/appraisals. The first was the Personal Mastery scale (Pearlin & Schooler, 1978), which consists of 7 statements assessing the participant's belief that he/she can control or influence outcomes in life, each rated on a 4-point Likert scale ranging from 0 = "Strongly disagree" to 3 = "Strongly Agree". Five of the statements are negatively worded to reflect a sense of *helplessness/hopelessness* (i.e., "There is really no way I can solve some of the problems I have"; "Sometimes I feel that I am being pushed around in life"; "I have little control over the things that happen to me"; "I often feel helpless in dealing with the problems in life"; "There is little I can do to change many of the important things in my life"), and the remaining two items are positively worded (i.e., "I can do just about anything I really set my mind to do"; "What happens to me in the future mostly depends on me"). Because the focus of the current study was on negative cognitions, we scored the personal mastery scale in the opposite direction. That is, the two positive worded items were reverse scored to reflect disagreement that the individual could manage life stresses. Therefore, for the present study, the 5 negatively worded items were summed with the 2 reverse scored items to create a total "helplessness" score. Reliability of these 7 items for the present sample was good (Cronbach's $\alpha = .75$).

The second scale was the "*Blames Self*" subscale of the Revised Ways of Coping Checklist (RWCC)(Vitaliano, Russo, & Carr, 1985). The RWCC is a 42-item questionnaire assessing 5 different coping styles. The *Blames Self* subscale consists of 3 items evaluating the extent to which the participant accepted blame for stressful circumstances in his/her life (i.e., "Blamed yourself"; "Criticized or lectured yourself"; "Realized you brought the problem on yourself").

Items were rated from 0 = “Never Used” to 3 = “Used a great deal”, and items were averaged to create an overall score. Coefficient alpha for this scale was .60.

The third scale assessing negative cognitions/appraisals was the reaction subscale of the Revised Memory and Behavior Problems Checklist (RMBPC) (Roth, et al., 2003; Teri, et al., 1992). For this scale, caregivers were asked the extent to which their spouses exhibited 24 behaviors during the past week, ranging from 0 = “Never” to 3 = “Daily or more often”. A follow-up question assessed each caregiver’s reaction to these 24 behaviors, namely the extent to which these 24 behaviors “bothered or upset” them. Responses were given on a 5-point scale ranging from 0 = “Not at all” to 4 = “Extremely”. As reported by Roth et al. (2003), this “reaction” subscale represents the caregiver’s stress appraisal process by indicating how reactive, on average, the caregiver was to any behavior problem. Therefore, for the present study, the average reaction score was used as a reflection of each caregiver’s *negative appraisals*. Cronbach’s alpha for this sample was .87.

Activity Participation—This construct was measured using a modified version of the Pleasant Events Schedule – AD (Logsdon & Teri, 1997). This scale required participants to indicate the extent to which they engaged in 20 specific activities over the past month (e.g., “shopping or buying things”; listening to music”; “going on outings”). Participants responded on a 3-point scale with 0 = “Not at all”, 1 = “A few times (1–6 times), and 2 = “Often “7 or more times”). An overall activation score was created by summing the 20 items, and overall Cronbach’s alpha was .72 for this sample.

Covariates—A number of constructs theoretically and empirically related to depressive symptoms, positive affect, and negative affect were also included in some of the statistical models, including gender, general physical health, antidepressant prescription, and social support.

Health symptoms were assessed by asking caregivers to report whether or not they had experienced 21 health symptoms over the past month (e.g., sore throat, temperature of 100 degrees Fahrenheit or more, etc). A total *health symptoms* score was created by summing the ‘yes’ responses.

Participants were asked to report all prescription and over-the-counter medications they were currently taking. Based on these data, participants were coded on whether or not they were currently taking antidepressant medication.

Social support was assessed using the scale developed by Pearlin et al. (1990). Caregivers were asked the extent to which they agreed or disagreed with 8 statements about the help and support they received from friends and relatives (e.g., “The people close to you let you know they care about you”; “You have someone that you feel you can trust”). Responses were on a 4-point Likert scale from 1 = “Strongly Disagree” to 4 = “Strongly agree”, with the 8 items summed to create an overall score.

Data Screening

Prior to conducting analyses, all variables were screened for normality and outliers. Results of this screening indicated that the Negative Appraisals variable was significantly positively skewed and required a square root transformation. No other variables were significantly skewed. In addition, outliers were not existent for any variables.

Results

Descriptive Statistics

Along with scores on our assessed constructs, demographic and health characteristics were assessed and are presented in Table 1. Reliability estimates (coefficient alpha) and bivariate correlations between variables used in this study are presented in Table 2.

Hypothesis 1 – Both Positive and Negative Affect uniquely predict depressive symptoms: Confirmation of the Tripartite Model

Before proceeding to examine correlates of PA and NA, we first examined the validity of the Tripartite Model for our sample. Our hypothesis was that both PA and NA would significantly predict total CESD scores. We conducted a multiple regression analysis with total CESD-10 score as our dependent variable and both PA and NA entered as our primary independent variables. Covariates in the model included age, sex, use of antidepressant medications, health symptoms, and social support. Results of this analysis confirmed our hypothesis (see Table 2). Specifically, both PA ($p < .001$) and NA ($p < .001$) were significantly correlated with depressive symptoms. The Tripartite Model also suggests that PA and NA are modestly correlated. Our results were consistent with this assumption, with a Pearson correlation coefficient between PA and NA of $-.20$ ($p = .058$).

Hypothesis 2 – Activity participation and negative cognitions are significantly associated with depressive symptoms

Our next hypothesis was that both activity participation and negative cognitions would significantly predict depressive symptoms above and beyond the effects of other known predictors of depressive symptoms. To test this hypothesis, we conducted a multiple regression analysis in which our primary independent variables were activity participation and all three negative cognition variables (i.e., helplessness, blames self, and negative appraisals). Within this model, we also covaried for participant age, sex, antidepressant use, health symptoms, and social support. Results of this analysis are presented in Table 4, and demonstrated that activity participation ($p = .041$), helplessness ($p < .001$), blames self ($p = .004$), and negative appraisals ($p = .009$) were significantly related to CESD-10 scores. Our overall model accounted for 53.0% (adjusted $R^2 = 47.5\%$) of variance in CESD-10 scores.

Hypothesis 3 – Activity participation, but not Negative Cognitions, is significantly associated with Positive Affect

To examine if activity participation was uniquely correlated with PA, we conducted a multiple regression analysis with PA as our dependent variable and both activity participation and our 3 negative cognition variables as our primary independent variables. Again, all covariates used in previous models were entered in this model. Results indicated that activity participation was significantly related to PA ($t(79) = 3.32$, $p = .001$), whereas helplessness ($t(79) = -1.41$, $p = .163$), blames self ($t(79) = -0.61$, $p = .546$), and negative appraisals ($t(79) = 0.41$, $p = .685$) were not significantly correlated with PA. Our overall model accounted for 30.5% (adjusted $R^2 = 22.5\%$) of the variance in PA. Standardized and unstandardized coefficients for each variable in our model are presented in Table 5.

Hypothesis 4 – Negative Cognitions, but not Activity Participation, is significantly associated with Negative Affect

This hypothesis was also tested with a multiple regression analysis, with both activity participation and our 3 negative cognition variables entered as our primary independent variables predicting NA. All covariates from our previous model were entered in this model. Results indicated that helplessness ($t(79) = 3.28$; $p = .002$), blames self ($t(79) = 2.48$; $p = .015$),

and negative appraisals ($t(79) = 3.42$; $p = .001$) each were significantly related to NA, whereas activity participation was not ($t(79) = 0.83$; $p = .410$). Overall, our model accounted for 42.4% of variance in NA. Again, standardized and unstandardized coefficients for all variables are presented in Table 5.

Correlations between Cognitive and Behavioral Variables

Cognitive and behavioral variables can be thought to co-vary with one another. That is, individuals with more negative cognitions may also demonstrate reduced activity participation and vice versa. To explore this possibility, we conducted Pearson correlations between our activity participation variable and our 3 cognition variables. Results of these analyses indicated the correlation between activity participation and helplessness, blames self, and negative appraisals was $-.28$ ($p = .009$), $-.25$ ($p = .021$), and $-.10$ ($p = .353$), respectively, suggesting a modest association between cognitive and behavioral domains, but not enough to suggest that large shifts in one would result in large shifts in the other. To be thorough, the correlation was $.01$ between helplessness and blames self ($p = .899$), $.39$ between helplessness and negative appraisals ($p < .001$), and $.20$ between blames self and negative appraisals ($p = .062$), suggesting that although negative cognitions are related to a certain degree, these variables were best examined as unique from one another.

Discussion

Depressive symptoms, as defined by the Tripartite Model, can be thought of as consisting of the two primary domains Positive and Negative Affect. This study offers support for the Tripartite model in a sample of older caregivers of Alzheimer's patients. This confirmation of the Tripartite model in older adults is contrary to the findings of Meeks, Woodruff-Borden, and Depp (Meeks, Woodruff-Borden, & Depp, 2003), who did not find confirmation of the Tripartite model in two samples of older adults. However, our results are consistent with those reported by Teachman et al. (2007), who found support for the Tripartite Model in young, middle-aged, and older participants. While Meeks and colleagues utilized a similar measure of depressive symptoms (i.e., the full version of the CES-D), perhaps one explanation for this discrepancy is their use of the Bradburn Affect Balance Scale (Bradburn & Caplovitz, 1965) to measure Positive and Negative Affect. This measure had lower reliability and may reflect moderately different definitions of PA and NA than the PANAS. Further, these discrepant findings may suggest that how one assesses PA and NA is important to our understanding of the Tripartite Model in older adults.

This study also offered a preliminary investigation into a model of depressive symptoms in which specific variables were hypothesized to uniquely associate with PA and NA. Results confirmed our hypotheses that behavioral constructs (i.e., activity participation) are uniquely associated with PA (but not NA), whereas cognitive constructs are uniquely associated with NA (but not PA). That is, we found that greater activity participation (i.e., engagement in social and recreational activities) was significantly associated with increased PA but was not significantly associated with NA. In contrast, 3 cognitive variables (i.e., helplessness, blames self, and negative appraisals) were significantly and positively associated with NA but were not significantly associated with PA. Interestingly, all 4 variables were significantly associated with a summary measure of depressive symptoms, suggesting that while all of these constructs may play a role in one's experience of depressive symptoms, they may be uniquely associated with the two specific domains of depression (i.e., PA and NA).

These findings are similar to those reported by Mausbach and colleagues (Mausbach, Coon, et al., 2008), who found that increased activity participation was associated with elevations in PA, but had no relation to NA over a two week diary collection period. Adding to these previous data, we demonstrated the unique correlations between cognitive variables and NA. Overall,

these results are important because they potentially set the stage for specific mechanistic investigations into how cognitive and behavioral constructs may lead to the experience of depression. That is, while cognitive shifts toward negative thinking/appraisals alone may heighten one's experience of depressive symptoms via increases in NA, a combination of increased negative cognitions and reduced activity participation may work to increase NA and decrease PA, respectively. The end result is for changes to these variables to exacerbate affective experience and contribute to a "depressive entrapment."

In addition, these results have implications for exploring the active ingredients of Cognitive and Behavior Therapies for caregivers. Specifically, this proposed model may be used to investigate specific ingredients of Cognitive and Behavior Therapies that bring about changes to Positive and Negative Affect. If the current theoretical framework is true, do Cognitive Therapies have less impact on the Positive Affect domain? Is it possible that Cognitive Therapies are efficacious for depression because they actively alter NA by reducing negative cognitions and appraisals? Similarly, Behavior Therapies for depression frequently emphasize behavior change (e.g., activity participation). Is it also possible that Behavior Therapies lift depressive symptoms by increasing PA, but have little impact on NA? Investigation into these questions is highly encouraged. Of particular interest would be investigations of CBT for caregivers, especially given that activity restriction seems to play an important role in the experience of depressive symptoms in this population (Mausbach, Patterson, et al., 2008), and that behavior therapies appear efficacious for caregiver depression (Coon, Thompson, Steffen, Sorocco, & Gallagher-Thompson, 2003).

This study has limitations that are important to address. First, given the cross-sectional/correlational design, we urge caution in interpreting the causal nature of these results. What we know from the present study is that NA co-varies with cognitive variables and PA covaries with behavioral variables. However, we cannot know if NA and PA are influenced by these variables or if these variables are influenced by NA and PA. What is known is that cognitive therapies for depression, which actively work to alter negative cognitions, are efficacious for improving depressive symptoms, and that exclusively behavioral therapies, which focus on increasing social and recreational activities, are equally efficacious for reducing depressive symptoms (Jacobson, et al., 1996; Jacobson & Gortner, 2000). As such, although the present study cannot demonstrate causation, the overall model, in which cognitive and behavioral variables uniquely impact NA and PA, respectively, can be tested empirically. Further research along these lines is desirable.

While the sample here is known to have elevations in depressive symptoms (i.e., Alzheimer's caregivers), they were not assessed for clinical depression (e.g., via a structured clinical interview). Therefore, it is unclear if these results replicate in a clinically depressed population. Nonetheless, our sample indeed experienced considerable levels of depressive symptoms, with 53.4% of this sample exceeding the recommended cutoff of 8 for significant depressive symptoms (Andresen, et al., 1994). Yet, perhaps more importantly, our sample demonstrated excellent variation in CESD-10 scores, with 25% scoring 4 or less, approximately half scoring 8 or less, and 75% scoring 12 or less. This variation can be considered important as it helps avoid a ceiling effect in depressive symptoms while simultaneously increasing generalization to the general population, at least to the caregiving population. Nonetheless, examination of this model in a clinically depressed population would be interesting.

The current study examined specific behavioral and cognitive variables, and it remains to be seen if these results replicate using other methods of assessing negative cognitions and activity participation. For example, Watson (1988) found that two methods of assessing activity participation (i.e., physical exercise, social activity) were only modestly correlated with PA ($r = .12$ and $.14$, respectively). Our behavioral conceptualization was frequency of engagement in

social and recreational activities, which encompassed these two forms of activity (e.g., being with family/friends, exercising), along with other, more recreational activities (e.g., shopping/buying things, listening to music, etc). Perhaps our correlations exceeded those of Watson's because of a greater variety of activities to which participants responded.

Similarly, the assessment of negative cognitions is complex and difficult, and our study was able to examine only three types of negative cognitions (i.e., negative appraisals, blames self, and helplessness). Other studies might wish to examine a greater variety of cognitive variables. One study by Gunthert et al. (2007) found that those high in depression were more likely to experience prolonged negative cognitions and NA following an interpersonal stressor compared to those lower in depression (Gunthert, Cohen, Butler, & Beck, 2007). The authors found that appraisals of the stressor did not mediate this relationship. However, they do propose other explanations that may reflect cognitive processes such as unstable self concept leading to increased perception of self rejection, cognitive rumination, and maladaptive coping.

Further, more refined assessments of these constructs might be helpful. For example, our "blames self" measure contained only 3 items which is a relatively small number of items for measuring a complex variable. One example of the complexity of self-blame is demonstrated by differentiating "behavioral self-blame" (i.e., attributing negative events to one's own behaviors) from "characterological self-blame" (i.e., blaming oneself as a person and/or faulting one's character) (Janoff-Bulman, 1979). While both characterize "self-blame", they relate to depression in different ways (Tilghman-Osborne, Cole, Felton, & Ciesla, 2008), suggesting that utilizing more detailed measures that assess both these phenomena might be helpful for understanding emotional experience.

The correlations between our 3 negative cognition variables were modest, which may be attributable to differential reliabilities. That is, variables not measured reliably may not have systematic variance available to be related to other variables. However, we believe this lack of correlation is consistent with the tenets of cognitive therapy. In his influential monograph on cognitive therapy of depression, Beck lists several systematic errors in thinking that are believed to exacerbate depressed mood (Beck, et al., 1979). Within cognitive therapy, the therapist aims to identify cognitive distortions (i.e., negative appraisals) that the patient frequently makes. While each cognitive pattern likely contributes to an exacerbation of depressive symptoms, each depressed patient likely identifies with some distortions more strongly than others. That is, within cognitive therapy the therapist typically does not assume the patient exhibits "all of the above" negative cognitions, but rather helps identify the unique pattern of negative thoughts the individual patient "falls into". This helps explain how each of the negative cognitions would contribute to NA but would only be modestly correlated with each other. Indeed, research appears to support a "differential profiles" view of cognitive processes. For example, a recent study found that men and women differed in their use of coping strategies (i.e. positive reframing and self-blame) and that these differences had an impact on the clinical presentation (Kelly, Tyrka, Price, & Carpenter, 2008). Similar results have been found when examining ethnic differences in negative cognitions (Greening, Stoppelbein, Dhossche, & Martin, 2005).

This study examined negative cognitions and their association with NA and PA, and other studies should examine the relations between positive cognitive appraisals and both these affective dimensions. For example, participants were asked the extent to which they agreed or disagreed with negative statements such as, "There is really nothing I can do to change many of the important things in my life." Disagreement with this statement may reflect a diminished negativity but may not represent an overt positive appraisal such as, "I can do many things to change important things in my life." How these sorts of appraisals, as well as positive appraisals of traditionally negative events (e.g., death or health decline of a loved-one) relate to one's

experience of NA and PA would be an important area of research. Indeed, previous research suggests that positive appraisals may indeed be associated with positive emotional states. Smith and Ellsworth (1985) demonstrated that feelings of sadness, anger/contempt, and shame/guilt were associated with negative appraisals. They further demonstrated that positive appraisals of feeling “in control” were associated with specific positive emotions such as happiness and pride. Explorations of these relations would help to expand the cognitive aspects of the proposed model.

Similarly, other empirical models emphasize different cognitive constructs relevant to the experience of emotion, particularly constructs related to “positivity”. For example, in Socioemotional Selectivity Theory (SST) (Carstenson, Isaacowitz, & Charles, 1999) cognitive appraisals of time (i.e., years of life remaining) play a central role in an individual’s motivations and emotions. Briefly, SST posits that as individuals age, cognitive appraisals shift from a “time is expansive” to a “time is limited” perspective. In turn, the individual focuses more on the here-and-now and chooses goals and behaviors that derive emotional meaning and that result in emotional satisfaction. Similarly, Mather and Carstensen (2005) have identified a “positivity effect” in which older adults remember more positive images and events and may pay greater attention to positive than negative stimuli. Each of these theories has implications for the experience of positive and negative affect and can be tested empirically.

In sum, our study of elderly Alzheimer caregivers who experienced generally mild to moderate depressive symptoms finds unique associations between measures of activity participation, negative cognitions, and components of depressive experience, supportive of the tripartite model. Specifically, activity participation relates to positive affect and negative cognitions to negative affect. If confirmed, the results suggest that interventions might usefully be designed to target each of these somewhat independent dimensions of depression.

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Table 1

Characteristics of the Sample

Variable	Value	Range of Sample
Age, M (SD)	73.9 (7.7)	55–90
Sex, n (%)		
Male	23 (26.1)	
Female	65 (73.9)	
Ethnicity, n (%)		
White, not Hispanic	81 (92.0)	
Hispanic	5 (5.7)	
African American	2 (2.3)	
Years Caregiving, M (SD)	4.2 (3.4)	0.50–16.76
Monthly Income, M (SD)	\$5,270 (3,433)	\$900–\$25,000
CDR Score, M (SD)	1.7 (0.7)	0.5–3.0
Taking Antidepressant Medication, n (%)	8 (9.1)	
Health Symptoms, M (SD)	2.1 (2.1)	0–9
Social Support, M (SD)	26.0 (3.8)	16–32
Helplessness, M (SD)	9.7 (3.3)	0–21
Blames Self, M (SD)	0.67 (0.62)	0–2.67
Negative Appraisals, M (SD)	0.57 (0.48)	0–2.29
Activity Participation, M (SD)	30.7 (4.9)	17–39
CESD-10, M (SD)	8.6 (5.5)	0–22
Positive Affect, M (SD)	31.7 (7.5)	10–50
Negative Affect, M (SD)	17.8 (5.3)	10–36

Note. CDR = Clinical Dementia Severity. CR = Care Receiver. CESD-10 = Center for Epidemiologic Depression scale (brief version).

Table 2
Coefficient alpha and bivariate coefficients for study measures

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Age	--											
2. Years Caregiving	-.06	--										
3. Monthly Income	-.09	.33*	--									
4. CDR Score	-.06	.26*	-.12	--								
5. Health Symptoms	-.04	-.17	-.18	-.03	--							
6. Social Support	-.03	-.10	.13	.01	.07	--						
7. Helplessness	-.14	.07	-.18	.31*	.02	-.17	--					
8. Blames Self	.13	-.11	-.05	-.05	-.06	.02	.01	--				
9. Negative Appraisals	-.07	-.11	.06	-.02	.09	-.07	.39*	.20	--			
10. Activity Participation	-.12	-.01	.24*	-.39*	.02	.29*	-.28*	-.25*	-.10	--		
11. CESD-10	-.09	.01	-.04	.11	.19	-.23*	.53*	.32*	.49*	-.37*	--	
12. PA	-.04	.09	.18	-.14	-.19	.19	-.30*	-.11	-.09	.39*	-.55*	--
13. NA	-.03	-.07	-.15	.09	.07	-.15	.47*	.26*	.53*	-.11	.66*	-.20

Note. α = Coefficient alpha.

* = $p < .05$

Table 3

Regression model showing associations between PA/NA and total CESD-10 score

Variable	B (SE)	β	t-value (df)	p-value
Age	−0.06 (0.05)	−.09	−1.31 (80)	.192
Female	−0.38 (0.91)	−.03	−0.32	.678
Antidepressant Use	0.51 (1.34)	.03	0.38	.705
Health Symptoms	0.21 (0.18)	.08	1.15	.252
Social Support	−0.10 (0.10)	−.07	−0.96	.343
PA	−0.31 (0.05)	−.42	−5.77	<.001
NA	0.58 (0.07)	.56	7.85	<.001
R ²	63.9%			
Adj. R ²	60.8%			

Note. PA = Positive Affect; NA = Negative Affect; df = 7, 80.

Table 4

egression model showing associations between cognitive and behavioral variables and total CESD-10 score

Variable	B (SE)	β	t-value (df)	p-value
Age	−0.04 (0.06)	−.06	−0.71	.482
Female	1.50 (1.06)	.12	1.42	.160
Antidepressant Use	0.51 (1.55)	.03	0.33	.743
Health Symptoms	0.39 (0.21)	.15	1.84	.069
Social Support	−0.20 (0.12)	−.14	−1.67	.099
Helplessness	0.54 (0.15)	.32	3.56	.001
Blames Self	2.26 (0.74)	.26	3.06	.003
Negative Appraisals	3.76 (1.45)	.23	2.59	.011
Activity Participation	−0.22 (0.10)	−.19	−2.15	.035
R ²	53.0%			
Adj. R ²	47.5%			

Note. df = 9, 78.

Table 5
Regression models predicting Positive and Negative Affect

Variable	PA		NA	
	B (SE)	β	B (SE)	β
Age	−0.02 (0.09)	−.02	0.04 (0.06)	.05
Female	−4.75 (1.74)	−.28**	0.83 (1.13)	.07
Antidepressant Use	0.61 (2.55)	.02	1.13 (1.65)	.06
Health Symptoms	−0.51 (0.35)	−.14	0.03 (0.22)	.01
Social Support	0.21 (0.20)	.11	−0.15 (0.13)	−.11
Helplessness	−0.36 (0.25)	−.16	0.54 (0.16)	.33**
Blames Self	−0.69 (1.22)	−.06	1.87 (0.79)	.22*
Negative Appraisal	0.91 (2.40)	.04	5.33 (1.55)	.34**
Behavioral Activation	0.54 (0.17)	.35**	0.10 (0.11)	.09
R ²	30.5%		42.6%	
Adj. R ²	22.5%		36.0%	

**
p < .01.

*
p < .05. df = 9, 78.