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Thinking About How You Feel: The Relationship between Cognitive Variables in the Context of Depressive Symptoms

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THINKING ABOUT HOW YOU FEEL

Abstract

Major depressive disorder is a mental disorder characterized by multiple symptoms such as psychomotor retardation, sleep disturbances, and cognitive deficits in decision making. The current study explores the relationships between cognitive variables and depressive symptomology and seeks to determine what predictive relationships exist between these constructs and if items from these constructs can accurately classify depressed persons. A normal sample of $N = 116$ participants were administered the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) as well as the Adult Hope Scale (ADH; Snyder et al., 1991), the Index of Autonomous Functioning (IAF; Weinstein, Przybylski, & Ryan, 2012), the Life Orientation Test- Revised (LOT-R; Scheier, Carver, & Bridges, 1994), the Zimbardo Time Perspective Inventory (ZTPI; Zimbardo & Boyd, 1999), the Rumination Reflection Questionnaire (RRQ; Trapnell & Campbell, 1999), and the Automated Working Memory Assessment-II (AWMA; Alloway, 2012b). A stepwise linear regression analysis determined that the Pessimism and Optimism subscales of the LOT-R, the Present Fatalism subscale of the ZTPI, and the Hope Agency subscale of the AHS significantly predicted depression in participants. One item each from the Optimism and Pessimism subscales, two items from the Present Fatalism subscale, and one item from the Hope Agency subscale accurately classified between 67-82% of the depressed ($n = 42$) and non-depressed ($n = 64$) persons in the sample. The implications of these findings for therapy and cognitive approaches to understanding depression as well as the relationships between the predictor variables themselves are discussed.
Thinking About How You Feel: The Relationships between Cognitive Variables in the Context of Depressive Symptoms

Major depressive disorder (MDD) is characterized by reoccurring thought processes with negative and self-defeating content as well as pessimistic orientations towards internal and external domains such as the self and the environment (Levens, Muhtadie & Gotlib, 2009). An estimated 15.7 million (about 6.7% of the United States population) adults aged 18 and older reported a least one major depressive episode in the past year, with the highest percentage of prevalence in females (8.1%), persons between ages 18 and 25 (8.7%), and Asians (8.9%; NSDUH, 2008). Persons diagnosed with MDD display marked impairments in cognitive abilities such as working memory, problem solving, shifting attention sets, and planning (Bearden et al., 2006; Paelecke-Habermann, Pohl, & Leplow, 2005). Severe depression is especially prevalent on college campuses, wherein 30% of college students have reported a major depressive episode (ACHA, 2012).

Depression is a complex pathology with multiple contributing factors, yet some of these factors, such as working memory, autonomy, hope, and time perspective, have been primarily studied in isolation. The relationships between these factors are such that negative or maladaptive aspects of them are more likely to lead to depressive symptoms. For example, a person with little hope is more likely to experience depressive symptoms. Conversely, positive expressions of these constructs have been demonstrated to lessen the likelihood of depressive symptoms (Seligman, 1991; Buchanan & Seligman, 1995). In order to truly understand depression and the cognitive development of psychopathy, we must understand the multiple underlying relationships between associated cognitive constructs that moderate depression prevalence. This understanding enables us to develop targeted, non-invasive treatments to the
disorder. The aim of this cross-sectional study is to examine the relationships of some of the cognitive constructs that underlie depression. Constructs will be introduced briefly and results will be discussed.

**Beck’s Cognitive Theory of Depression**

A widely taken cognitive perspective on depression is by Aaron Beck. Beck’s cognitive theory of depression (Beck, 1979) has been used in the fields of cognitive psychology and counseling as the primary model for depression diagnosis (Allen, 2003). The model is triadic, positing that depression is caused by improper application of cognitive processes in three areas of life; the *self, experiences, and the future* (see Figure 1). In this theory, the person may experience a traumatic or stressful event and begin to think negatively dysfunctional thoughts about his or herself. These negative thoughts activate and perpetuate a negative self schema that produces biases toward attenuating to, processing, and recalling negative information in experiences. The selective attention towards negative information in the environment produces a belief in the person that the future will be negative, as is the present (Beck, 2008). The present study will take the Beckian perspective on depression to inform its research questions and data analyses.

In the present study, we will take the focus on the aspect of the *Self* in Beck’s theory by assessing cognitive constructs that are negatively associated with depressive symptoms. These constructs are Hope and Autonomy, which will be discussed below. We are also interested in expanding the *Future* component of Beck’s triadic model to include past, present, and future time perspectives (see Zimbardo & Boyd, 1999). For clarity, the literature review will be organized in congruence with the Self and Future components of Beck’s Triadic Model of Depression, notably excluding the Experiences component as there was no measure of this aspect in the present study.
Figure 1.

*Beck Cognitive Triad of Depression.*

**Self Component**

The current paper discusses the component of Self in the context of Hope and Autonomy.

**Hope.** Hope is the overall perception that goals can be met. Hope is considered to be the combination of agency and pathway thinking, which are measures of outcome and efficacy expectancies, respectively. Agency thinking is conceptualized as a sense of successful determination in meeting goals in the past, present, and future. Pathway thinking is conceptualized as a sense of being able to generate successful plans to meet goals. These components are regarded as additive, reciprocal, and positively correlated (Snyder et al., 1991). Taken together, agency and pathway thinking essentially give the hopeful person a *will* and a *way*, respectively, to accomplish a goal or experience a desired circumstance, but are not
individually sufficient to elicit hope (Snyder et al., 1991). Hope has been associated with a myriad of positive psychological processes, ranging from increased persistence in impossible tasks (optimism) to higher GPAs to greater life satisfaction (Averill, Catlin, & Chon, 1990). The lack of hope, conversely, has been demonstrated to elicit somatic disturbances, learned helplessness, and depression (Beck, 1967; Erickson et al., 1975; Gottschalk, 1974; Maier & Seligman, 1976).

Hope has also been associated with optimism, perception of control, and problem-solving confidence (Gibb, 1990). Thereby, measuring Hope in the context of Life Orientation, Autonomy, and Working Memory should provide the literature surrounding these topics a more complete view of their relationships with each other and depression.

**Autonomy.** Autonomy is behavior that is volitional and regulated by the self rather than by external contingencies. Essentially, it is one’s ability to self-govern (see review in Ryan & Deci, 2004). Self-determination theory posits that autonomy is regulation by the self, allowing a person to experience his behavior as endorsed by himself and congruent with his interests and values. Of note, autonomy is often influenced by factors specific to the context (La Guardia & Ryan, 2007). However, autonomy is also shaped by intra- and interpersonal experiences and exhibits developmental stability in that there are individual differences in personal inclinations to be more or less autonomous (Deci & Ryan, 1985b).

Autonomy is made up of three distinct characteristics; Authorship/self-congruence, Interest-Taking, and Susceptibility to control (Weinstein, Przybylski, & Ryan, 2012). Authorship/self-congruence is when the individual views him or herself as the author of behavior, along with fully assenting to his or her behavior (Pfander, 1911; Ricoeur, 1966). Thus, when a person is autonomous, his or her behavior can be said to be based on abiding values,
needs, and interests (Deci & Ryan, 1985b; Weinstein, Przybylski, & Ryan, 2012) and there is empirical support for this idea (Koestner et al., 1992; Ryan & Connell, 1989; Ryan & Deci, 2006). Susceptibility to control is defined as the absence of inner and outer pressures that motivate behavior. Finally, interest-taking, or spontaneous, open reflection on external and internal events, is involved in autonomous functioning by providing a motivating stimulus for action as determined by the person. This motivating stimulus (i.e. an incentive or goal, tangible or not) allows the person to be open to both the positive and negative experiences necessary to accomplish the goal towards which behavior is directed (Hodgins & Knee, 2002; Weinstein, Deci, & Ryan, 2011). Therefore, those persons high in autonomy perceive a higher degree of personal choice in their actions (Meissner, 1988; Perls, 1973; Ryan & Connell, 1989).

The literature seems to support an indirect yet positive association between parents who grant their children very little autonomy, the degree of pessimism reported by the mother, and the child’s depressive symptoms (Hasan & Power, 2002). Autonomy is thought by the author to be theoretically related to explanatory style in that those persons who perceive themselves as agents of their own behavior will likely exhibit behaviors indicative of them acting in their own best self-interest. Therefore, if they are in control of their behaviors, it is also likely that they would expect to experience the positive outcomes, especially in the face of failure. Additionally, autonomy is considered to be positively related to the agency substrate of hope (Curry, Snyder, Cook, Ruby, & Rehm, 1997; Irving, Snyder, & Crowson, 1998) and negatively related to the Past-negative and Present-fatalistic substrates of Time perspective (Boniwell & Zimbardo, 2004).

In the present study, depression ratings may be related to ratings of autonomy reported by participants, whereby higher autonomy ratings would predict lower depression scores. This
hypothesis is derived from Martin Seligman’s reasoning behind the onset of depression (Seligman, 1975; Abramson, Seligman, and Teasdale, 1978). Seligman speculated that depression may develop when a person has consistent experiences that are uncontrollable and unstable. Uncontrollable negative experiences condition the person to expect uncontrollable, negative future events and past research in this area and theory have yielded supportive evidence of this argument (Abramson, Seligman, & Teasdale, 1978; Sanjuan & Magallares, 2009). Specifically, the current study seeks to understand what role perceptions of control have on depression scores.

**Future Component**

**Life-Orientation.** Scheier and Carver (1992) suggest that human behavior is goal-driven and optimism/pessimism is the outlook an individual adopts when they encounter impediments to their goal. Research on Life Orientation has yielded that, compared to pessimists, optimists generally have better physical and mental health and are less likely to experience depressive symptoms whereas, conversely, a pessimistic life orientation has been strongly positively associated with increased depression (Cohen & Pressman, 2006; Pressman & Cohen, 2005).

There is evidence that Explanatory Style (ES) underpins Life Orientation (Gillham, Shatté, Reivich, & Seligman, 2001; Seligman, 1991). While Life Orientation is the general outcome expectancy that a person has for events, ES is reflective of the individual differences in how a person habitually explains the causes of good and bad events and has been found to predict subjective well-being, depression, and academic achievement (Buchanan & Seligman, 1995). People that explain negative events using internal (“I am the cause of this event”), stable (“I will continually cause these events”), and global (“Events like these will effect my life greatly”) explanations are considered as having a pessimistic ES. Conversely, those who explain
negative events using these explanations are described as having an optimistic ES (Seligman, 1991).

Understanding the relationship between Life Orientation and ES is important when examining depression from a cognitive perspective. As mentioned before, Beck’s theory of depression supports that negative interpretations for the cause of an event leads to negative thoughts which then leads to increased depressive symptomology (Beck, 1979). Ultimately, negative thoughts precede the symptoms of depression and serve to perpetuate these symptoms, thereby highlighting the importance of an optimistic ES (how a person explains an event) and, in turn, an optimistic Life Orientation (his or her general expectancy for event outcomes).

**Time Perspective.** Time perspective is how individuals organize and divide their experiences between time zones and categories to facilitate decision-making. A person’s time perspective affects decision-making by locating the primary set of psychological influences within the temporal frames of present, past, and future (Zimbardo & Boyd, 1999). It is divided into three perspectives and these perspectives have two substrates to each of them. *Past Positive* orientations denote a focus on previous positive events and *Past Negative* orientations denote a focus on previous negative events. *Present Hedonism* orientations have characteristic behaviors that are less under control of past and future consequences. People of these types of orientation typically make decisions based off information perceived in the present moment, what feels good or what doesn’t. *Present Fatalism* can be conceptualized as the orientation a person takes when he believes that no action can be taken to influence the current situation or that events are fixed and determined. This orientation is theoretically similar to learned helplessness research, in that the experience of learned helplessness is that of the user believing that there is no self-governed influence on the aspects of the situation causing harm (Buchanan & Seligman, 1995). Finally,
future orientation describes the profile of time perspective associated with the consistent future thinking and planning of goals. Boniwell and Zimbardo (2004) posit that a balanced shifting between time perspectives is important for strong psychological health and ideal performance in life.

While there has been no known research concerning the direct link between Time Perspective and the constructs examined in this study, such as working memory, hope, and life orientation, there does seem to be a connection between all five factors of Time Perspective and depressive symptoms (Zimbardo & Boyd, 1999). Pluck et al. (2008) demonstrated that low scores on Past-Positive and high scores on Past-Negative and Present Fatalism subscales were associated highly with the depression in a homeless person sample, even in the presence of normal Present-Hedonism and Future orientation scores. The current study seeks to determine links between these five factors of time perspective and the other constructs reviewed in the context of depression.

OTHER FACTORS

Rumination. Depression has been demonstrated to be closely associated with engagement in rumination (Nolen-Hoeksema & Morrow, 1993; Joormann, Dkane, & Gotlib, 2006; Beevers, Rohde, Stice, & Nolen-Hoeksema, 2007; McMurrich & Johnson, 2008; Levens, Muhtadie & Gotlib, 2009). Rumination is a coping method for negative mood that involves self-focused attention characterized by self-reflective, as well as repetitive and passive focus on the negative mood (Lyubomirsky & Nolen-Hoeksema, 1993; Nolen-Hoeksema, 1991, 2000; Nolen-Hoeksema, Larson, & Grayson, 1999; Nolen-Hoeksema, Parker, & Larson, 1994). Rumination is comprised of reflection, which is a repetitive focus on positive emotions, and brooding, a repetitive focus on negative emotions. Depressed persons have been observed to brood more
frequently than non-depressed persons, whereas non-depressed persons have been observed to reflect more than depressed persons (Treynor, Gonzalez, & Nolen-Hoeksema, 2003). These data indicate that depressive symptoms may be largely moderated by cognitive processes and perhaps general cognitive constructs.

One explanation for why this pattern exists is that people who ruminate may engage in improper cognitive resource allocation towards ruminative thoughts rather than towards goal-relevant tasks (Levens, Muhtadie, & Gotlib, 2009). Indeed, studies have observed that depressed persons are less effective at tasks that do not have a specific goal or strategy to retain their attention (Hertel & Rude, 1991) and have difficulty maintaining positive information and disengaging from negative information in working memory (Levens, Muhtadie, & Gotlib, 2009; Levens & Gotlib, 2015). Moreover, Joorman, Levens, and Gotlib (2011) have demonstrated that depressed participants found it more difficult than non-depressed participants to process negative information and keep that information out of working memory (also see Daches & Mor, 2015). With the accumulation of this evidence, rumination is an important factor to examine to gain a holistic view of the cognitive processes involved in depression.

**Working Memory.** An emerging addition to the literature on depression is working memory. There is a growing body of research indicating that working memory plays a crucial role in emotional regulation. Working memory can be conceptualized as a dual-process system, comprising of recalling relevant information and processing information (Baddeley, 1996; Cowan, 2006; Engle, Tuholski, Laughlin, & Conway, 1999). Recall refers to the capacity or amount of information remembered in a specified sequence, while processing is controlled by a centralized cognitive component (i.e., the central executive or controlled attention). This latter function has been linked with processing emotions.
One theoretical model of working memory suggests that processing of verbal and visuo-spatial information is underpinned by distinct cognitive mechanisms (see Alloway & Alloway, 2013, for further discussion). On this basis, it is possible that verbal working memory is linked to verbal-based emotional regulation, such as replaying conversations (Joorman & Gotlib, 2008), while visuo-spatial working memory is associated with visual emotional regulation, such as replaying a scene (Levens & Gotlib, 2010). Storbeck and Watson (2014) also suggest that the reciprocity between working memory and emotional states is stimulus-dependent: completing a verbal working memory task leads a person to feel more positive and attend longer to positive stimuli, while completing a spatial working memory tasks is associated with higher levels of negative attention and affect. Neuroimaging research supports the reciprocity between affect and working memory. When participants were presented with stimuli that elicited negative affect and a spatial working memory task, fMRI images showed less activation in the dorsolateral prefrontal cortex (which is associated with working memory functioning), compared to misaligned experimental conditions such as presenting participants with similar negatively affective stimuli and a verbal working memory task (Gray, 2001).

Working memory has also recently been linked to dispositional optimism, the view that actions are based on positive and negative expectancies for the future. According to the biased competition theory, sensory inputs, such as experiences, are the bottom-up factors that compete for attention and working memory is a top-down factor that allocates attention accordingly (Desimone & Duncan, 1995). Thus, when an impediment presents itself, working memory is recruited to focus attention on a weaker stimulus in order to meet a goal (Woodman & Luck, 2007). To date, there has been one study specifically examining working memory and dispositional optimism jointly: Levens and Gotlib (2012) found that pessimistic individuals took
longer to match emotionally positive stimuli (‘happy’ human faces) in a working memory task compared to optimistic individuals. The authors considered that pessimists exhibit a bias towards noticing negative information and therefore experienced greater difficulty in processing positive information.

We extended this research further by investigating the relationship between working memory, and dispositional optimism, as well as depression (Alloway, Horton, & Moulder, 2016). Previous findings revealed that visuospatial working memory was a significant mediator to the predictive relationship between pessimism (but not optimism) and depression. Lower visuospatial working memory scores were associated with higher levels of pessimism, which is consistent with the biased competition theory. Pessimists attend more to negative stimuli in the environment, exhibiting a negativity bias. This bias refers to the idea that individuals allocate preferential attention to negative visual stimuli, such as faces (Fiske, 1980) and words (Ohira, Winton, & Oyama; 1998). Perhaps pessimists use their visual skills to process negative information because of their negativity bias presents negative information as a stronger stimulus than other neutral or more positive stimuli. Over use of this bias without correction could be a contributing factor to depressive symptomology or a vulnerability to depression. This evidence seems to be heuristically similar to the mechanics of rumination and its role in depression. At present, it is not clear whether verbal working memory may be linked to optimism.

The current study contributes two novel aspects to depression research. The first is that the current study’s sample is from a non-college and non-clinically depressed population which will extend the literature the cognitive literature on depression to alternative populations. Additionally, the current study seeks to examine a synthesis of multiple variables related to depression to determine which constructs are most predictive of depression and could the items
used to measure these constructs accurately classify depressed groups of people. Accurate
classification via these constructs would provide further information on cognitive risk factors for
depression. It is also possible that some of these variables may be indirect predictors of
depression in the context of other variables related to depression and as such may be the case,
these patterns will be explored as well.

**Method**

**Participants**

Participants were 116 volunteers, aged between 16 and 79 years (38% males), who were
members Amazon’s mTurk survey system. Ethnic percentages were 65.5% White, 24.1%
Asian/Pacific Islander, 6% Black or African American, 1.7% Other, and .9% Hispanic. Income
bands were measured and percentages of groups were 20.7% $30,000 to $39,999, 14.7% $10,000
to $19,999, 12.1% $40,000 to $49,999, 11.2% $20,000 to $29,999, 9.5% $100,000 or more,
8.6% $50,000 to $59,999 and $70,000 to $79,999, 6.9% Less than $9,999, 5.2% $60,000 to
$69,999, and .9% $80,000 to $89,999 and $90,000 to $99,999.

**Materials**

**Depression.** We administered the Center for Epidemiologic Studies Depression Scale
(CES-D; Radloff, 1977), consisting of 20 items that measure the frequency of self-reported
depressive symptoms. Each statement inquires the frequency that the participant experienced
depressive symptoms during the past week. Each statement was rated on a 4-point scale with a
selection of 0 = *Rarely of none of the time (less than 1 day)*, indicating less depressive symptoms
to 3 = *All of the time (5-7 days)*, indicating more depressive symptoms. Scores were summed to
achieve an overall score, with the minimum score of 0 and a maximum score of 60. Total scores
of 16 or higher were considered indicative of depression. Test-retest reliability was .67 and the Cronbach’s alphas ranged from .85 to .90.

**Hope.** We administered the Adult Hope Scale (AHS; Snyder et al., 1991), consisting of 12 items including agency (e.g., *I meet the goals that I set for myself*) and pathway (e.g., *Even when others get discouraged, I know I can find a way to solve the problem*) subscales (four items each, plus four filler items) wherein each statement was rated on an 8-point scale with 1 = *definitely false* and 8 = *definitely true* The agency and pathway scores were summed together to achieve an overall score, with a minimum score of 8 and a maximum score of 32. High scores indicated higher hope in both agency and pathway substrates. Test-retest reliability was .82 and the Cronbach’s alphas ranged from .74 to .84.

**Autonomy.** Participants responded to 15 items from the Index of Autonomous Functioning (IAF; Weinstein, Przybylski, & Ryan, 2012). The items measured autonomous functioning which consist of the authorship, interest-taking, and susceptibility to control (five items each). Each item was rated on a 5-point scale with a 1 = *not at all true* and 5 = *completely true* (e.g., *My decisions represent my most important values and feelings*). The susceptibility to control subscale was reverse scored and summed together with authorship and interest-taking items to produce a total autonomous functioning score. Total IAF scores ranged from 15 to 75 (the midpoint is 45), with high scores indicating more autonomous functioning. Test-retest reliability was .86 and Cronbach’s alpha ranged from .74 to .83.

**Life Orientation.** We administered the Life Orientation Test- Revised (LOT-R; Scheier, Carver, & Bridges, 1994), which consists of optimism and pessimism subscales (three items each, plus four filler items). Each statement was rated on a 5-point scale with 1 = *I agree a lot* and 5 = *I disagree a lot*. The pessimism items were reverse scored and summed together with the
optimism items to yield an overall optimism score. Total LOT-R scores ranged from 6 to 30 (the scale midpoint is 18), with low scores indicating an optimistic outlook. Average test-retest reliability was .66 and the Cronbach’s alphas was .78.

**Time Perspective.** We administered the 56-item Zimbardo Time Perspective Inventory (ZTPI; Zimbardo & Boyd, 1999) to participants. The ZTPI measures five factors (past positive, past negative, present hedonistic, present fatalistic, future orientation) each on a 5-point Likert scale that ranged from 1=very uncharacteristic to 5=very characteristic (e.g., *I do things impulsively*). Five items were reverse scored and each of the five factors were summed individually and divided by the number of questions for each factor, yielding an average score for each factor. Higher scores indicated a stronger orientation to that factor (High score in future orientation indicates a strong future time orientation). Test retest reliability ranged from .70 to .80 and Cronbach’s alpha was .74.

**Rumination.** Participants responded to 24 items from the Rumination Reflection Questionnaire (RRQ; Trapnell & Campbell, 1999). This scale measures two factors, rumination and reflection, on a 5-point Likert scale that ranged from 1=strongly disagree to 5=strongly agree. Nine items were reversed scored and both subscales were summed together, with higher scores indicating greater amounts of rumination and reflection (e.g., *My attention is often focused on aspects of myself I wish I’d stop thinking about*). Test retest reliability was .87 and Cronbach’s alpha was .90 and .89, respectively, for rumination and reflection subscales (DaSilveira, DeSouza, & Gomes, 2015; Trapnell & Campbell, 1999).

**Working memory.** Working memory was measured using a beta version of a standardized memory assessment, the Automated Working Memory Assessment-II (AWMA; Alloway, 2012b). For verbal working memory tests, we administered the processing letter recall
test. The participant views a letter in red that stays on the computer screen for one second. Another letter in black immediately follows this on the screen. Participants verified whether the black letter was the same as the red letter by clicking on a box marked either ‘Yes’ or ‘No’ on the screen. They then clicked on the red letters they saw in the correct sequence.

For the visual spatial working memory test, we administered the Mr. X task. The participant viewed an animated picture of a boy holding a ball in either hand. The section next to picture displayed a grid of six dots that represent the positioning of the ball in the boy’s hand and the participant clicked the correct corresponding dot on the grid section specific to where the boy was holding the ball in the pictures.

**Results**

The current study seeks to determine what predictive relationships exist between the constructs and depression. Therefore, stepwise linear regressions were ran to test these relationships. Additionally, the current study seeks to determine what scale items could significantly classify depressed and non-depressed groups. Discriminant function analyses were ran to explore this idea.

Table 1.

*Descriptive Statistics for Variables*

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<thead>
<tr>
<th></th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>SD</th>
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</thead>
<tbody>
<tr>
<td>Autonomy</td>
<td>37.00</td>
<td>71.00</td>
<td>53.03</td>
<td>6.58</td>
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<td>Depression</td>
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<td>44.00</td>
<td>13.46</td>
<td>11.45</td>
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<tr>
<td>Hope</td>
<td>17.00</td>
<td>64.00</td>
<td>48.36</td>
<td>8.94</td>
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<tr>
<td>Life-Orientation</td>
<td>1.00</td>
<td>24.00</td>
<td>14.51</td>
<td>4.48</td>
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<tr>
<td>Rumination</td>
<td>53.00</td>
<td>104.00</td>
<td>77.64</td>
<td>11.71</td>
</tr>
</tbody>
</table>
THINKING ABOUT HOW YOU FEEL

Verbal WM | 12 | 127 | 96.95 | 25.23
Visual Spatial WM | 16 | 136 | 85.16 | 20.70
Future Orientation | 2.54 | 4.54 | 3.59 | .46
Past Negative Orientation | 1.00 | 4.70 | 3.19 | .80
Past Positive Orientation | 1.89 | 4.89 | 3.45 | .58
Present Fatalism Orientation | 1.00 | 4.78 | 2.84 | .81
Present Hedonism Orientation | 1.87 | 4.53 | 3.21 | .61

Note: WM = Working Memory

Descriptive statistics for scores in depression, life orientation, rumination, hope, time perspective, autonomy, and working memory are shown in Table 1. We were also interested in the relationship between these factors and the correlation coefficients are shown in Table 2.

Table 2.

Correlations among Variables.

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<th>14</th>
<th>15</th>
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<td>.09</td>
<td>.067</td>
<td>.142</td>
<td>.275</td>
<td>-.083</td>
<td>.278*</td>
<td>.089</td>
<td>.267*</td>
<td>-.012</td>
<td>- .104</td>
<td>.211*</td>
<td>.141</td>
<td>.288*</td>
<td>.375*</td>
<td>.076</td>
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<td>.11</td>
<td>.098</td>
<td>.112</td>
<td>.138</td>
<td>.039</td>
<td>.283*</td>
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<td>.108</td>
<td>-.229*</td>
<td>.006</td>
<td>.269*</td>
<td>.361*</td>
<td>.029</td>
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<td>3. Agency</td>
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<td>.457</td>
<td>-.015</td>
<td>.213*</td>
<td>.402*</td>
<td>.582*</td>
<td>.056</td>
<td>-.236*</td>
<td>.063</td>
<td>-.101</td>
<td>.325*</td>
<td>.286*</td>
<td>-.013</td>
<td>.125</td>
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<td>4. Pathway</td>
<td>.369</td>
<td>-.039</td>
<td>.201*</td>
<td>.196*</td>
<td>.373*</td>
<td>-.053</td>
<td>-.174</td>
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<td>-.034</td>
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<td>.363*</td>
<td>.405*</td>
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<td>.211*</td>
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<td>-.132</td>
<td>.461</td>
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<td>.407*</td>
<td>.009</td>
<td>.495*</td>
<td>.431*</td>
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<tr>
<td>7. Interest Taking</td>
<td>-.043</td>
<td>.388*</td>
<td>-.151</td>
<td>.172</td>
<td>.491*</td>
<td>.379*</td>
<td>.371*</td>
<td>.427*</td>
<td>.308*</td>
<td>.163</td>
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<td></td>
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<tr>
<td>8. Depression</td>
<td>-.460*</td>
<td>.604*</td>
<td>-.497*</td>
<td>-.486*</td>
<td>.344*</td>
<td>.221*</td>
<td>.491*</td>
<td>-.079</td>
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<td></td>
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<tr>
<td>9. Optimism</td>
<td>-.200*</td>
<td>.253*</td>
<td>-.228</td>
<td>-.043</td>
<td>.422*</td>
<td>.321*</td>
<td>.042</td>
<td>.178</td>
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<tr>
<td>10. Pessimism</td>
<td>-.424*</td>
<td>.140</td>
<td>.437*</td>
<td>.303*</td>
<td>.369*</td>
<td>.517*</td>
<td>.004</td>
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</table>
In the following section, it is reported in a series of regression analyses where, based on the correlation output, all variables that were significantly correlated with the target variable were used as predictor variables.

**Predictors of Depression**

We conducted a stepwise regression analysis on the total score for Depression (CESD) as the outcome variable. Based on the correlation analyses, all variables that were significantly correlated with depression were used as predictor variables. Predictor variables entered were Verbal and Visual Spatial Working Memory, Hope Agency and Pathways, Autonomy Authorship, Interest-Taking, and Susceptibility to Control, Optimism and Pessimism, Rumination (subscale), and Past Negative, Past Positive, Present Fatalistic, and Present Hedonistic time perspectives. Model statistics, as well as standardized beta values and t-statistics, are provided in Table 3. Scores for Optimism, Pessimism, Present Fatalism, and Hope Agency were significant predictors of depression.

In order to inform the literature on the nature of predictive relationships, multiple subsequent regression analyses were run with different outcome variables.

**Predictors of Present Fatalism**
We conducted a stepwise regression analysis on the Present Fatalism subscale scores as the outcome variable. Based on the correlation analyses, all variables that were significantly correlated with Present Fatalism were used as predictor variables. Model statistics, as well as standardized beta values and t-statistics, are provided in Table 3. Scores for the Pessimism, Present Hedonism, Past Negative, and Rumination subscales were significant predictors of Present Fatalism.

**Predictors of Hope Agency**

We conducted a stepwise regression analysis on the Adult Hope Scale-Agency subscale scores as the outcome variable. Based on the correlation analyses, all variables that were significantly correlated with Hope Agency were used as predictor variables. Model statistics, as well as standardized beta values and t-statistics, are provided in Table 3. Scores for Optimism, Present Hedonism, Hope Pathway were significant predictors of Hope Agency.

**Predictors of Pessimism**

In order to investigate predictors of life orientation, we conducted a stepwise regression analysis on the self-reported scores on the Pessimism subscale as the outcome variable. Based on the correlation analyses, all variables that were significantly correlated with Pessimism were used as predictor variables. Model statistics, as well as standardized beta values and t-statistics, are provided in Table 3. Scores for the Present Fatalism, Past Positive, Susceptibility to Control, and Rumination subscales were significant predictors of Pessimism.

**Predictors of Optimism**

In order to investigate predictors of life orientation, we conducted a stepwise regression analysis on the self-reported scores on the Optimism subscale as the outcome variable. Based on the correlation analyses, all variables that were significantly correlated with Optimism were used
as predictor variables. Model statistics, as well as standardized beta values and $t$-statistics, are provided in Table 3. Scores for the Interest-Taking, Hope Agency, and Rumination subscales were significant predictors of Optimism.

**Predictors of Autonomy Interest Taking**

In order to investigate predictors of Interest Taking, we conducted a stepwise regression analysis on the self-reported scores on the Interest Taking subscale as the outcome variable. Based on the correlation analyses, all variables that were significantly correlated with Autonomy Interest Taking were used as predictor variables. Model statistics, as well as standardized beta values and $t$-statistics, are provided in Table 3. Scores for the Susceptibility to Control, Authorship, and Reflection subscales were significant predictors of Autonomy Interest Taking.

**Predictors of Autonomy Susceptibility to Control**

In order to investigate predictors of Susceptibility to Control, we conducted a stepwise regression analysis on the self-reported scores on the Susceptibility to Control subscale as the outcome variable. Based on the correlation analyses, all variables that were significantly correlated with Autonomy Susceptibility to Control were used as predictor variables. Model statistics, as well as standardized beta values and $t$-statistics, are provided in Table 3. Scores for the Pessimism, Present Fatalism, and Past Negative subscales were significant predictors of Susceptibility to Control.

**Predictors of Rumination**

In order to investigate predictors of Rumination, we conducted a stepwise regression analysis on the self-reported scores on the Rumination subscale as the outcome variable. Based on the correlation analyses, all variables that were significantly correlated with Rumination were used as predictor variables. Model statistics, as well as standardized beta values and $t$-statistics,
are provided in Table 3. Scores for the Present Fatalism, Pessimism, Optimism, and Past Negative.

**Remaining Predictors**

The remaining predictive relationships are provided in Table 3.

Table 3.

*Stepwise Regression Analyses Predicting Self-Reported Depression Scores.*

<table>
<thead>
<tr>
<th>Variable</th>
<th>R² Change</th>
<th>F</th>
<th>β</th>
<th>t</th>
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<tbody>
<tr>
<td><strong>Outcome: Depression</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life-Orientation – Pessimism</td>
<td>.355</td>
<td>48.53</td>
<td>-.60</td>
<td>-6.97</td>
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<tr>
<td>Life-Orientation – Optimism</td>
<td>.131</td>
<td>41.23</td>
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<td>-4.71</td>
</tr>
<tr>
<td>Present Fatalism</td>
<td>.075</td>
<td>36.77</td>
<td>.32</td>
<td>3.85</td>
</tr>
<tr>
<td>Hope Agency</td>
<td>.030</td>
<td>30.79</td>
<td>-.21</td>
<td>-2.49</td>
</tr>
</tbody>
</table>

**Outcome: Life-Orientation – Pessimism**

<table>
<thead>
<tr>
<th>Predictors</th>
<th>R² Change</th>
<th>F</th>
<th>β</th>
<th>t</th>
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</thead>
<tbody>
<tr>
<td>Autonomy Susceptibility to Control</td>
<td>.311</td>
<td>43.72</td>
<td>.56</td>
<td>6.61</td>
</tr>
<tr>
<td>Rumination</td>
<td>.045</td>
<td>26.55</td>
<td>-.24</td>
<td>-2.60</td>
</tr>
<tr>
<td>Past Positive</td>
<td>.033</td>
<td>20.16</td>
<td>.18</td>
<td>2.26</td>
</tr>
<tr>
<td>Present Fatalism</td>
<td>.025</td>
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<td>-1.99</td>
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### Outcome: Life-Orientation – Optimism

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<tbody>
<tr>
<td>Hope Agency</td>
<td>.43</td>
<td>68.61</td>
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<td>8.28</td>
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<tr>
<td>Autonomy Interest Taking</td>
<td>.06</td>
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### Outcome: Present Fatalism

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<tbody>
<tr>
<td>Present Hedonism</td>
<td>.53</td>
<td>101.46</td>
<td>.73</td>
<td>10.07</td>
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<tr>
<td>Past Negative</td>
<td>.11</td>
<td>79.81</td>
<td>.39</td>
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<td>Life-Orientation – Pessimism</td>
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<td>59.76</td>
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<td>Rumination</td>
<td>.02</td>
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### Outcome: Hope Agency

<table>
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<td>Hope Pathways</td>
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<td>43.36</td>
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<td>Life-Orientation – Optimism</td>
<td>.146</td>
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<td>.41</td>
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<td>.034</td>
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### Outcome: Present Hedonism
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<tbody>
<tr>
<td>Present Fatalism</td>
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<td>90.20</td>
<td>.72</td>
<td>9.50</td>
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<tr>
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<td>.090</td>
<td>64.41</td>
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<td>.14</td>
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<tr>
<td><strong>Predictors</strong></td>
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<tr>
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<td>8.90</td>
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<td>-.22</td>
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<tr>
<td>Present Fatalism</td>
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<td><strong>Outcome: Past Negative</strong></td>
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<tr>
<td><strong>Predictors</strong></td>
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<tr>
<td>Rumination</td>
<td>.471</td>
<td>76.50</td>
<td>.69</td>
<td>8.74</td>
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<tr>
<td>Present Fatalism</td>
<td>.216</td>
<td>93.38</td>
<td>.49</td>
<td>7.67</td>
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<tr>
<td>Trust</td>
<td>.031</td>
<td>71.38</td>
<td>.19</td>
<td>3.04</td>
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<td><strong>Outcome: Autonomy Interest Taking</strong></td>
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<tr>
<td><strong>Predictors</strong></td>
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<tr>
<td>Reflection</td>
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<td>Outcome: Autonomy Susceptibility to Control</td>
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<td>Autonomy Authorship</td>
<td>.060</td>
<td>35.27</td>
<td>.25</td>
<td>3.49</td>
</tr>
</tbody>
</table>

**Outcome: Autonomy Susceptibility to Control**

**Predictors**

- Present Fatalism: .362 51.73 -.60 -7.19
- Life-Orientaction – Pessimism: .109 40.16 .39 4.31
- Past Negative: .046 31.78 -.29 -2.90

**Outcome: Hope Pathways**

**Predictors**

- Hope Agency: .411 70.44 .64 8.39
- Future: .025 38.69 .16 2.12

**Outcome: Reflection**

**Predictors**

- Autonomy Interest Taking: .264 35.17 .51 5.93
- Rumination: .095 27.22 -.31 -3.80

**Outcome: Trust**
<table>
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<tr>
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<tr>
<td>Hope Agency</td>
<td>.040</td>
<td>6.72</td>
<td>-.20</td>
<td>-2.59</td>
</tr>
<tr>
<td>Past Negative</td>
<td>.039</td>
<td>6.88</td>
<td>-.20</td>
<td>-2.61</td>
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**Outcome: Autonomy Authorship**

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<tbody>
<tr>
<td>Hope Agency</td>
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<td>22.04</td>
<td>.44</td>
<td>4.70</td>
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<tr>
<td>Future</td>
<td>.142</td>
<td>22.98</td>
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<td>4.42</td>
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<td>Life-Orientatation – Pessimism</td>
<td>.048</td>
<td>18.71</td>
<td>.22</td>
<td>2.67</td>
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**Outcome: Past Positive**

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<tr>
<td>Autonomy Authorship</td>
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<td>20.86</td>
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<td>4.57</td>
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<td>Autonomy Interest Taking</td>
<td>.076</td>
<td>16.38</td>
<td>.29</td>
<td>3.17</td>
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<td>Life-Orientatation – Pessimism</td>
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<td>Future</td>
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<tr>
<td>Hope Agency</td>
<td>.034</td>
<td>13.30</td>
<td>.19</td>
<td>2.27</td>
</tr>
</tbody>
</table>

**Outcome: Future**
THINKING ABOUT HOW YOU FEEL

**Predictors**

| Autonomy Authorship | .192 | 23.99 | .44 | 4.90 |

**Discriminant Function Analysis**

Based on the normative threshold of the CESD (Radloff, 1977), the sample was split into depressed (>15; n = 42) and non-depressed groups (<15; n = 64). We conducted three discriminant function analyses (DFA) to determine which items from these three scales would correctly classify these two groups.

In the first stepwise DFA, two of the six items from the Life Orientation Test were sufficient to correctly assign group membership for 82.9% of the sample (86% of the Depressed group), $\lambda(1) = 64.59, p < .001$. These items were: “I rarely count on good things happening to me” (pessimism) and “I’m always optimistic about my future” (optimism).

In the second stepwise DFA, two of the nine items from the Present Fatalism subscale were sufficient to correctly assign group membership for 67.9% of the sample (68% of the Depressed group), $\lambda(2) = 22.02, p < .001$. These items were: “It takes the joy out of the process and flow of my activities, if I have to think about goals, outcomes, and products” and “My life path is controlled by forces I cannot influence.”

In the third stepwise DFA, one of the four items from the Hope Agency subscale were sufficient to correctly assign group membership for 67% of the sample (61% of the Depressed group), $\lambda(1) = 26.66, p < .001$. The item was: “I energetically pursue my goals.”

**Discussion**

There were three main factors that predicted Depression: 1) dispositional Optimism (Optimism and Pessimism subscales) 2) a sense no control in the current circumstance (Present
Fatalism subscale) and 3) perceived goal-directed energy (Hope Agency subscale). Items from these subscales were able to accurately classify 67% to 82% of the depressed group. Each of these findings will be discussed in turn below.

**Present Fatalism**

Previous research has demonstrated that a Past Negative orientation was more correlated with Depression than a Present Fatalistic orientation (Zimbardo & Boyd, 1999). The present data reflected these previous results in the correlation analysis but the stepwise regression analysis revealed that Present Fatalism, not Past Negative, predicted Depression.

Why did Present Fatalism predict Depression over Past Negative? Perhaps sampling differences could explain this relationship. In many of Zimbardo’s studies, college samples were used to construct the ZTIPI, with a mean age of participants at 19.3 (Zimbardo & Boyd, 1999). In the current study, the Amazon MTurk participant pool yielded an older mean age range, as age was measured in age bands (94% above age 19, 60% above age 25). Additionally, college campuses have consistently demonstrated to be environments of high stress and high depression rates, significantly higher than non-college samples (ACHA, 2012). Stressful environments generally facilitate in higher rates of depression for people who are chronically exposed to the stressful elements of the environment without proper coping strategies (Duncan, Brooks-Gunn, & Klebanov, 1994; Gilman Kawachi, Fitzmaurice, & Buka, 2002; Pearlin, Menaghan, Lieberman, & Mullan, 1981). Moreover, executive functioning is still developing at the age most students attend college (see Gray, Chabris, & Braver, 2003) and, thus, students are less equipped to employ proper coping strategies than older individuals. Perhaps for these reasons, older, non-college participants have distinct time perspective profiles that they use to make decisions and that may contribute to the development of depressive symptomology. Further research can
explore possible impact that can arise from recruiting college samples versus a wider demographic in studying depression and time perspective.

The link between rumination and Present Fatalism has not been previously explored. One possibility for why Rumination is linked to Present Fatalism is because it is conceptually similar to Past Negative time perspective as both constructs involve a person primarily remembering and trying to process the cause and effect of negative past experiences. Thereby, there is convergent validity for the claim that constantly processing Past Negative experiences results in a perceived lack of control in the present. These relationships provide evidence that engaging in Present Fatalism is cognitively less healthy than ruminating when considering Depression susceptibility in older individuals.

With these results in mind, it is important to note the characteristics of a fatalist perspective is that it does not include goals for the future, excitement in the present, or an active use of positive and negative memories (Zimbardo & Boyd, 1999). Essentially, a person who is presently fatalistic resembles a person who could be considered to be hopeless or helpless. The link between Depression and Present Fatalism may be clearer with consideration of the learned helplessness theory of Depression (Seligman, 1974).

Learned helplessness is a state that an organism experiences when it is in adverse circumstances with no agency to change the circumstances and in this state, behaviors exhibited model symptoms of Depression, such as psychomotor retardation, lack of appetite, and cognitive deficits (see Weissman, Sholomskas, Pottenger, Prusoff, & Locke, 1977). For example, if a rat is place in a cage and experiences a mild electric shock, the rat will run to a part of the cage where it does not experience the shock. However, if a rat experiences the shock regardless of its position in the cage (a lack of control in adverse circumstances), the rat will give up trying to
escape the shock and subsequent shocks unless prompted to move by another stimulus (see Seligman, 1974). Learned helplessness has been used to help explain depressive episodes in a variety of environments in which humans and animals experience stress and a perceived lack of control to alleviate that stress. Zimbardo regards time perspective as a cognitive construct that is foundational for other more complex constructs (Zimbardo & Boyd, 1999) so it is possible that a present fatalistic time perspective underpins learned helplessness. Indeed, present fatalism was bidirectionally predicted by Pessimism, reflecting that negative views of the future influence and are influenced by a lack of control in the moment. Additionally, present fatalism predicted susceptibility to control scores, providing further evidence that perceptions of control of one’s actions plays a role in dispositional cognitive processes. Further research can explore these links.

Hope Agency

Hope is described by Snyder et al. (1991) as a positive motivational trait intended to facilitate goal-driven behaviors. The present results indicated that individual’s perceived goal-directed energy (Hope Agency) negatively predicted their Depression score, suggesting that a person will be more likely to be depressed if he or she perceives that there is less will to complete goals. Gibb (1990) has previously demonstrated that Depression and Hope are negatively correlated, but what is interesting about the findings of the current study is that Hope Agency specifically, and not Hope Pathways, predicted Depression: the will to complete a goal was more of a predictor for Depression than believing there are ways to complete a goal.

The relationship between Hope Agency and Depression (as well as between Life Orientation and Depression) lends some support to the argument by Scheier and Carver (1987) that outcome expectancies are stronger predictors of behavior than efficacy expectancies, contrary to arguments by Bandura (1977, 1982, 1986, 1989). An attractive feature of the
construct of Hope as defined and measured by Scheier and Carver’s Adult Hope Scale is that the Agency Subscale measures outcome expectancies and the Pathways subscale measures efficacy expectancies whereas Life-Orientation measures positive and negative outcome expectancy but not efficacy outcome. This measurement overlap is likely why Hope Agency and Optimism shared positive predictive relationships in the current study. To be clear, the current study only provides support for Scheier and Carver’s claim over Bandura in the context of depressive symptomology. Further research is needed to determine whether outcome expectancies predict behavior in typical, non-depressed populations.

How might Hope possibly relate to Depressive symptomology? Hope Agency may be underpinned by what Baumeister and colleagues refer to as self-regulatory energy (Baumeister, 2002; Gailliot et al., 2007; Vohs & Heatherton, 2000). Self-regulation involves voluntary and involuntary responses to the environment that help the self maintain biophysical and psychological homeostasis (Gailliot et al., 2007) and works similar to building muscle in the body. More specifically, as more cognitive resources are devoted to completing a task, such as multitasking scenarios or sustained attention tasks, self-regulatory energy will deplete analogous to muscle fatigue but, over time, will be stronger and the self will be able to handle more complex tasks for longer periods of time (Baumeister, 2002). Hope Agency may cognitively reflect the amount of energy individuals believe they have to allocate to solving a particular problem. Subsequently, if one is low in goal-directed energy, it is reasonably less likely to that they will accomplish their goals, which may likely be one cause for Depression. Indeed, psychomotor retardation, a hallmark symptom of Depression, involves not believing that one is capable of completing the necessary movements for goal accomplishment and previous research has demonstrated that low self-regulatory energy is positively linked to Depression (Strauman,
2002). Additionally, previous research has demonstrated that depressed persons perform comparably with non-depressed persons on goal-directed tasks but significantly worse on tasks that are not goal-directed, (i.e. free play) (Hertel & Rude, 1991). These data and others (see Hertel, 2000 and Levens, Muhtadie, & Gotlib, 2009) taken together provide evidence for the idea that depressed persons are impaired in their ability to properly allocate cognitive resources towards accomplishing goals. Perhaps dispositional hope serves as a legitimate precursor for depression although further research is needed to replicate this finding and determine the breadth of applicability.

**Life-Orientation and Depression**

Life-Orientation, specifically both Optimism and Pessimism, accounted for the largest amount of variance in predicting Depression. This is in line with a considerable amount of literature demonstrating the link between a pessimistic outlook and Depression (Alloy & Ahrens, 1987; Beck, Weissman, Lester, & Trexler, 1974; Oettingen & Seligman, 1990). The inverse of this relationship has also been verified; an optimistic outlook is associated with a low prevalence of Depression. The current study contributes to this knowledge by demonstrating how life orientation relates to other cognitive constructs which will be explored further separately for reader clarity.

**Pessimism.** Pessimism shared additional reciprocally predictive relationships with the autonomy subscale Susceptibility to Control and predicted Autonomy Authorship, Past Positive and Present Fatalistic time perspectives, and Rumination. Some general results are that individuals are more likely to believe that future outcomes will not be favorable (Pessimism) if they perceive that their actions are highly susceptible to control and they are more likely to think fatalistically if they believe future outcomes will be unfavorable. Moreover, a person is more
likely to think about Past Negative experiences (Rumination, in this case) if he or she believes that future outcomes will be unfavorable.

The findings suggest that Pessimism affects perceptions of control and the types of information, positive or negative, remembered by the agent. This relationship could possibly be due to early experiences with adverse environments. Research by Smith et al. (2013) demonstrated that pessimists self-report more adverse social experiences than positive ones, possibly indicating that they experience more goal failures than goal accomplishment (with the assumption that a negative experience is one in which the agent’s goals are threatened or not being accomplished). Conversely, optimists self-report more positive experiences than negative experiences compared to pessimists. In application to the current study, perhaps when an individual that feels out of control (engages in Present Fatalism), influenced by forces outside of the self (susceptibility to control), and consistently remembers experiences when goals were not accomplished or pain was experienced (Rumination). In turn, does not think about the positive experiences (Past Positive), he or she, when asked about the future, will project based on past experiences that are most salient (facilitated by Rumination), will consider future circumstances to be bleak (Pessimism).

**Optimism.** Optimism shared an additional reciprocally predictive relationship with Hope Agency, predicts a Past Positive time perspective, and is predicted by Autonomy Interest-Taking.

Firstly, Optimism predicts a Past Positive time orientation, which is to say that a positive outcome expectancy predicts the likelihood that a person will reflect on positive experiences from the past. Past positive items imply that people have experienced and remember more positive events in their past, which may serve to develop an optimistic life orientation and/or a biased Past Positive perspective.
Participants who believe that future outcomes would be favorable were less likely to be depressed and to ruminate but were more likely feel they had enough goal-directed energy (Hope Agency).

Novel findings exist concerning the bidirectional relationship between Optimism and Hope Agency, as no known research has examined Optimism and agency. As agency is described by Synder et al. (1991) as the will to complete a task, a potential moderator for the relationship between Agency and the degree to which one is optimistic is self-regulatory energy. Poor self-regulation has been linked to failure to complete goals in numerous studies (see Vohs & Baumeister, 2011) so perhaps the degree to which one can self-regulate moderates the relationship between Hope Agency and Optimism. This would imply that sustained Optimism in the presence of goal threatening stimuli is in part determined by how well a person is able to maintain the necessary behaviors appraised for accomplishing the intended goal. A person unable to self-regulate would then likely be less capable of maintaining the proper cognitive-behavioral interaction and would shift to processing information that is either more immediately essential for survival or easier to process.

**Autonomy.** Autonomy, while not directly predictive of Depression, did predict Optimism and Pessimism, specifically the Interest Taking and Susceptibility to Control subscales, respectively. There has not been much examination of this relationship in the literature on Optimism and autonomy having a positive affect towards a goal may increase the likelihood of attaining that goal or possibly give a person more self-regulatory energy to devote to cognitive resources needed to execute behaviors necessary for the accomplishment of that goal.

It seems the degree to which a person agrees with statements that are promotive of reflective practices (i.e. “I often reflect on why I react the way I do”; Weinstein, Przybylski, &
Ryan, 2012) specifically targeted at what actions that person could control (Autonomy Interest Taking) predicted the degree to which that person was optimistic about his or her future, although the Weinstein et al. report reflection is more heuristically similar to interest that a person takes in themselves. Conversely, the degree to which a person agrees with statements that indicate a lack of control of his or her actions (Susceptibility to Control) predicted the degree to which that person was pessimistic about his or her actions. Past literature has identified a positive link between autonomy granting in child-rearing practices and Optimism later in life (Hasan & Power, 2002) so it is possible that this link can persist cognitively to increasing and decreasing degrees as development occurs. Future research on this relationship between perceived control of actions and a person’s future outlook may serve to inform the growing literature of positive psychology regarding cognitive-behavioral interventions for Depression and other disorders where achievement of one’s full potential is hindered.

We now examine two constructs that previously linked to Depression, however, this pattern was not replicated in the current study: Rumination and working memory.

**Rumination.** Although Rumination is related to depression, other studies show that that relationship is mediated by other factors, including optimism (Tucker et al., 2013). The present study showed a similar pattern wherein rumination did not predict depression but that rumination was related to other constructs. Rumination shared positive reciprocal relationships with Past Negative, Present Fatalistic, and Pessimism and was negatively predicted by Optimism. The reciprocal relationships represent perspectives concerning experiences of the past (Past Negative), present (Present Fatalism), and Future (Pessimism), specifically the negative aspects of those experiences.
The relationship between Rumination and Past Negative is not surprising, as it suggests that a negative life outlook is more important to consider regarding Depression than the constant negative thoughts that are characteristic of Rumination. This could potentially create a negative cognitive feedback loop where a person who constantly ruminates examines his or her future expectations and the most accessible, salient attitude towards future outcomes is negative.

The relationship between Pessimism and Rumination may also help explain the relationship between Rumination and Present Fatalism. A person may ruminate on Past Negative thoughts, feel Hopeless concerning present circumstances which could be enough to have the person feel depressed. A pessimistic outlook may perpetuate this cycle of past and present negative thinking as reflected by the reciprocally predictive relationship between Pessimism and Depression. Further research is needed to respond to the implications of this data such that life orientation (future) be used to determine a collective propensity to Depression and engaging in ruminative (past) and fatalistic (present) thinking are activities that people should avoid cognitively participating in.

**Working Memory.** Previous research has linked deficits in working memory to Depression (Bartova et al., 2015; Brooks et al., 2015; Dumas & Newhouse, 2015; Hubbard et al., 2016) but why were working memory and depression not directly linked in the current study? A few explanations may answer this question. First, the current study sampled a non-clinically depressed population whereas other studies have examined clinically depressed persons (Joorman & Gotlib, 2008; Levens & Gotlib, 2010; Levens, Muhtadie, & Gotlib, 2009). Furthermore, the measurement used in other studies varied from the current one. For example, in a study by Joorman, Levens, and Gotlib (2011), working memory scores were not lower in the depressed group compared to the non-depressed group rather, participants took longer to process
negative information. Lastly, previous researchers have found a link between working memory and Depression using emotional stimuli (i.e. faces, emotional words) whereas the current study examines these variables in the context of neutral emotional affect. Perhaps working memory is recruited during emotionally-charged information processing and Depression is a disorder that recruits working memory to perpetuate a false, negative narrative of the self and the environment. Future research should consider the implied or explicit effect of chosen cognitive variables.

**Depression.** Depression was predicted by Present Fatalism, Hope Agency, and Optimism and Pessimism. Depression exhibited a predictive relationship with Optimism and Pessimism, as previously demonstrated in Alloway and Horton (*under review*, 2016). General results indicated that persons were more likely to be depressed if they believed that they do not have control over the present circumstances (Present Fatalism) or that future outcomes will be favorable (Pessimism). Additionally, people were less likely to be depressed if they believed that future outcomes will be favorable (Optimism) and that they had the energy to achieve their goals. These relationships reflect positive and negative cognitive mechanisms regarding Depression. Implications are discussed below.

The current study provides evidence that control or, rather, a perception of control in present circumstances may influence the likelihood of Depression and this is applicable to the general population. Society and social networks are ever-more complex as civilization progresses and there are many times daily that individuals feel out of control in relation to accomplishing their goals. For example, a person may have the goal to run a list of errands but along the time taken to accomplish those goals, she will have to be subjected to an unknown amount of controllable circumstances that may impede her progress. Those who may not have the cognitive
capacity, energy, or social support, all of which are factors that increase the likelihood of goal completion (Vohs & Heatherton, 2000; Vohs & Baumeister, 2011), may continue to believe that current circumstances are fixed and uncontrollable and the future will likely not be much different.

**Changes to Beck’s Cognitive Triadic Model of Depression**

Beck’s Cognitive Triadic Model of Depression also places an emphasis on future outcomes being viewed as negative by depressed persons, however, this perspective is limited. The findings from the current study puts forward additional evidence for the inclusion of measures of past and present time orientations to accompany the current measures of future time orientations. Although the current study’s model should be tested in follow-up studies for reliability to establish validity, these results indicate that if a person believes that current events are fixed and uncontrollable, then he is more likely to think only about the pleasure of the moment (Present Hedonism) or about Past Negative experience (Past Negative and Rumination).

Although the Experience component of Beck’s model was not explicitly measured, it is possible that Present Fatalism is a latent measure of this component. In depressed persons, dysfunctional explanations and interpretations of adverse experiences result in dysfunctional attitudes about the self which integrate cognitively as negative schemas about the self. When later adverse experiences occur that activate these negative schemas, the depressed person shows a distinct negativity bias in the information attended to, processed, and recalled (Beck, 2008). Perhaps a Present Fatalistic time orientation is a latent measure of the state-induced or more persistent activation of this negative schema. Activation of a negative schema and subsequent attentiveness towards negative stimuli may precede feelings of helplessness in the present moment and if this schema is constantly activated, perhaps a person would tend to over use a
Present Fatalistic time perspective, resulting in a predictive relationship with depression. Future time perspective research should consider this potential explanation when studying depressed samples.

**Future Research and Limitations**

The current study demonstrates that present and past time perspectives are important in understanding the scope of Depression throughout various cognitive processes as they provide information on how a person is cognitively processing information with respect to other experiences. The authors also acknowledge that this was a non-clinical population and, thereby, results from this study may not be applicable to severely depressed persons, whom are clearly most at risk for suicidal tendencies. However, future research could apply the current study’s model to a clinically depressed sample to determine the reliability of these results as to further inform the literature on depression. Additionally, due to non-response attrition, sample sizes were small which may have limited the exploration of more nuanced patterns between the variables. Larger sample sizes would have also allowed for more accurate model testing such as structural equation modeling to test the goodness-of-fit of the regression model proposed in the current study.

Future research may also explore treatment applications derived from Time Perspective Therapy (TPT). There is some arguably converging evidence that this therapy may aid in developing cognitive buffers to or possibly treat depression (Sword, Sword, Brunskill, & Zimbardo, 2014; Zimbardo, Sword, & Sword, 2012). Time Perspective Therapy is currently being used in counseling settings to treat military veterans with post-traumatic stress disorder (PTSD) by prescribing patients cognitive-behavioral techniques that utilize the positive, promotive time perspective orientations. This approach is derived from the perspective that over-
utilization of any time perspective orientation is harmful and that a balanced overall time perspective profile is optimal for psychological health. This profile is described as high engagement in Past Positive, moderate, selective engagement in Present Hedonism, high to moderate engagement in Future, and low engagement in Past Negative and Present Fatalism. People who have a balanced time perspective profile (even those who develop the profile via therapy) are significantly less likely to experience symptoms associated with depression (Boniwell & Zimbardo, 2004) and PTSD (Sword, Sword, Brunskill, & Zimbardo, 2014). Perhaps TPT could facilitate the lessening of clinically depressive symptoms, similar to TBT’s effect on PTSD symptoms. The current study indirectly contributes to the literature on TPT by highlighting the relationships that different time perspectives share with other cognitive constructs in the context of Depression.
References


Weinstein, N., Przybylski, A. K., & Ryan, R. M. (2012). The index of autonomous functioning:
