

**HOPE, OPTIMISM, AND HOPELESSNESS:
CONCEPTUAL DISTINCTIONS AND EMPIRICAL ASSOCIATIONS
WITH SUICIDAL IDEATION**

by

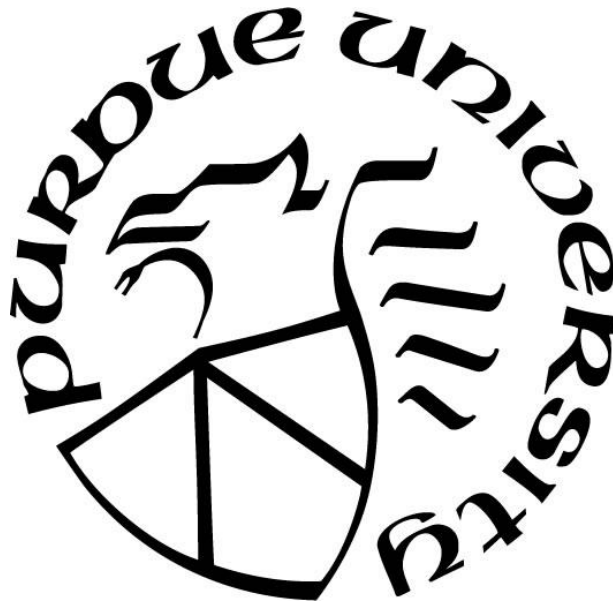
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A Thesis

Submitted to the Faculty of Purdue University

In Partial Fulfillment of the Requirements for the degree of

Master of Science



Department of Psychological Sciences

Indianapolis, Indiana

December 2018

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ABSTRACT

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Institution: Purdue University

Degree Received: December 2018

Title: Hope, Optimism, and Hopelessness: Conceptual Distinctions and Empirical Associations with Suicidal Ideation.

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Trait expectancies are related to several aspects of psychological well-being. Specifically, hope, optimism, and hopelessness have been associated with positive and negative indicators of mental health, including suicidality. In addition to empirical similarities, these constructs also have substantial conceptual and measurement overlap. Moreover, while current literature suggests hope and optimism are unique constructs, the distinctions between hopelessness, hope, and optimism remain unclear. The main goals of the present study were: 1) to identify the best structural conceptualization of hope, optimism, and hopelessness; and 2) to apply this conceptualization to examine how different trait expectancies uniquely predict suicidal ideation. Undergraduate students (N= 456) completed a battery of questionnaires at two time points, two months apart. To achieve the first goal, a series of a priori factor models of hope, optimism, and hopelessness was tested using confirmatory factor analysis (CFA). CFA was also performed to confirm the best factor structure of suicidal ideation. Finally, using results from these CFAs, the differential relationships between trait expectancies and suicidal ideation were examined using latent variable path analysis. Results showed that hope, optimism, and hopelessness are best conceptualized as distinct but related constructs. Results also found that both hope and hopelessness predicted increased suicidal ideation over time; whereas, optimism was not predictive of suicidal ideation. Surprisingly, these results suggest that higher hope may be a risk factor for increased suicidal ideation among undergraduates.

INTRODUCTION

Our beliefs about the future influence the course of our lives. From the power of positive thinking to self-fulfilling prophecies to the placebo effect, this idea has been culturally engrained within the general public and is supported within the scientific literature. Within psychology, these beliefs are referred to as *expectancies* (Rotter, 1954). Expectancies, or subjective beliefs about the likelihood of future events, are related to a variety of outcomes, including psychological well-being (Ballard, Patel, Ward, & Lamis, 2015), physical health (Carvajal, 2012), and goal-directed performance (Rand, 2009; Rotter, 1954). Expectancies can be specific or generalized (Rotter, 1966). In other words, people have expectancies about specific events (e.g., the likelihood that studying for an organic chemistry test will improve one's grade) and about broader domains (e.g., the likelihood that one can perform well in all classes in a school year). Snyder's (1991) hope and Scheier and Carver's (1985) optimism are two of the most widely-studied generalized expectancies in psychology.

Hope

Snyder's (1991) theory defines hope as one's perceived abilities to accomplish goals. Snyder theorized that hope is made up of two components: *agency* and *pathways*. Agency refers to one's perceived goal-directed energy or motivation (i.e., willpower), and pathways refers to one's perceived ability to develop goal-directed plans (i.e., waypower; Snyder et al., 1991). Agency and pathways are thought to be additive and complementary. That is, people who are determined to achieve goals can typically generate pathways through which they can pursue these goals. The perception of these pathways, in turn, enhances one's motivation to pursue one's goals. Snyder (1994) postulated that greater hope should promote more successful goal

pursuits, which should result in enhanced psychological well-being. Consistent with this theory, higher hope has been linked to better outcomes in several domains, including: greater happiness (Joybari & Sharifi, 2015), greater life satisfaction (Bronk, Hill, Lapsley, Talib, & Finch, 2009), greater meaning in life (Feldman & Snyder, 2005), better academic performance (Rand, 2009), better physical and mental health (Barnett, 2014), greater health related quality of life (Martins et al., 2018), and more engagement in physical exercise (Feldman & Sills, 2013).

Optimism

Scheier and Carver (1985) defined optimism as one's general expectation that good as opposed to bad events are likely. This expectancy may be based on a variety of sources, including one's personal abilities, luck, or being favored by others. Scheier and Carver (1985) suggested that greater optimism would significantly enhance life outcomes. In line with this, greater optimism has been associated with various well-being, performance, and health outcomes, including: greater life satisfaction (Mishra, 2013), greater self-esteem (Scheier & Carver, 1985), higher quality of life (Allison, Guichard, & Gilain, 2000), greater perceived social support (Brissette, Scheier, & Carver, 2002), better athletic performance (Gordon, 2008), more positive physical health outcomes (Rasmussen, Scheier, & Greenhouse, 2009), and quicker recovery from surgery (Scheier et al., 1989).

Comparing Hope and Optimism

There are two broad conceptual similarities between hope and optimism. First, both are generalized expectancies involving one's perception of the future. Second, both hope and optimism have roots in self-regulation theory (Carver & Scheier, 1998). Self-regulation theory posits that human behavior is primarily organized around the pursuit of goals. These goal-directed behaviors are influenced by one's beliefs about achieving them. For example, if one

holds high expectations for success in achieving a goal, they will be more likely to work toward achieving that goal. Conversely, if one holds low expectations for success in achieving a goal, they will spend little effort working toward it (Rand & Cheavens, 2009). Hope and optimism also share empirical similarities. The two constructs typically correlate around $r = .60$ (Feldman & Kubota, 2015; Fischer, Cripe, & Rand, 2018; Malinowski & Lim, 2015; Rand, 2009; Steed, 2001). Also, both hope and optimism have been correlated with similar well-being outcomes, such as greater life satisfaction (Bronk, Hill, Lapsley, Talib, & Finch, 2009; Mishra, 2013), higher meaning in life (Feldman & Snyder, 2005; Steger, Frazier, Oishi, & Kaler, 2006), better health related quality of life (de Moor et al., 2006; Martins et al., 2018), and fewer depressive symptoms (Arnau et al., 2007; Carver & Gaines, 1987; Zenger, Brix, Borowski, Stolzenburg, & Hinz, 2010). Although hope and optimism are related, there are conceptual and empirical differences that distinguish the two expectancy constructs.

Conceptually, there is one key difference between hope and optimism. Snyder's (1994) hope theory focuses on perceptions of one's ability to reach goals. In contrast, Scheier and Carver's (1985) optimism does not focus solely on personal ability, but also includes external factors that could influence goal attainment (e.g., good luck; Rand & Cheavens, 2009). Thus, while both hope and optimism involve perceptions of the future, hope is specifically derived from self-perception; whereas, optimism is broader and derived from perceptions of the environment (i.e., the world) as well as the self.

Research has supported distinctions between hope and optimism. Factor analytic studies have shown that the two constructs are structurally distinct (Bryant & Cvengros, 2004; Fowler, Weber, Klappa, & Miller, 2017; Gallagher & Lopez, 2009; Rand, 2009). Studies have also shown that hope and optimism are differentially related to certain types of cognitions. For

example, Bryant and Cvenegros (2004) found that greater optimism, but not hope, was associated with more positive reappraisal of stressors. Rand (2009) found that hope, but not optimism, predicted grade-specific expectancies among undergraduates, which then predicted their academic performance. These findings suggest that hope and optimism may influence well-being through different mechanisms. For example, greater optimism may lead to healthier interpretations of uncontrollable stressors (e.g., positive reappraisal), resulting in greater well-being. In contrast, hope may influence specific expectancies related to controllable outcomes (e.g., class grade), which then influences goal-directed coping efforts and goal attainment.

Although research concerning hope and optimism has primarily focused on their associations with positive aspects of well-being, there is increasing research examining their associations with psychological problems, such as: depressive symptoms (Arnau et al., 2007; Carver & Gaines, 1987), anxiety (Arnau et al., 2007; Fotiadou et al., 2008), obsessions and compulsions (van der Velden et al., 2007), and somatic problems (Murberg, 2012). Another psychological problem of increasing interest in this area is suicidality (Hirsch, Connor, & Duberstein, 2007; Range & Penton, 1994; Tucker et al., 2013).

Suicidal Ideation and Expectancies

Suicide is a growing public health concern, with rates increasing by a staggering 30% in the United States since 1999 (Curtin, Warner, & Hedegaard, 2016; Stone et al., 2018). Current research suggests that college students display some of the highest rates of suicidal ideation within nonclinical populations. For example, one nationally-representative study of American undergraduate students reported that within one school year, 9.3% of students seriously considered attempting suicide (The American College Health Association, 2007). More recent studies found that 3.3% of undergraduates experienced suicidal ideation within a given two-week

time frame, and 9.9% had suicidal thoughts within a 30-day time-frame (dos Santos, Marcon, Espinosa, Baptista, & de Paulo, 2017; Geisner, Kirk, Mittmann, Kilmer, & Larimer, 2015).

Suicidal ideation is a known risk factor for suicide. In a cross-national study, Nock and colleagues (2008) discovered that those who experienced suicidal ideation had a 29% chance of having attempted suicide. Moreover, of those with a suicide attempt history, over 60% had an attempt within one year of the onset of suicidal ideation (Nock et al., 2008). Thus, suicidal ideation is predictive of imminent suicidal behaviors. Additionally, Lim, Lee, and Park (2016) found that both individuals who have had impulsive suicide attempts and individuals who have had non-impulsive suicide attempts endorse experiencing some degree of suicidal ideation. Thus, suicidal ideation is present even in those who attempt suicide with a lack of premeditation.

Unfortunately, the detrimental effects of suicidal ideation expand beyond subsequent suicide attempts. Within undergraduates, suicidal ideation has been associated with a host of other maladaptive outcomes, including alcohol dependence (DeCou & Skewes, 2016), depressive symptoms (Nam, Hillmire, Jahn, Lehmann, & DeVlyder, 2018), loneliness (Pereira & dos Santos Cardoso, 2017), sleep problems (Becker, Dvorsky, Holdaway, & Luebbe, 2018), anhedonia (Winer, Drapeau, Veilleux, & Nadorff, 2016), and psychological distress (Eskin et al., 2016). Achieving a better understanding of the mechanisms that underlie changes in suicidal ideation is necessary to reduce its adverse impact.

Several studies have examined the relationships between hope and suicidal ideation in undergraduate populations. Hope has consistently been found to be associated with less suicidal ideation across a number of undergraduate samples (Chang, 2017; Chang et al., 2017; Hollingsworth, Wingate, Tucker, O'Keefe, & Cole, 2016; Mehrotra, 1998; Range & Penton, 1994). A study by An and colleagues (2012) found that college freshman experiencing current

suicidal ideation reported lower levels of hope than those who were not experiencing suicidal ideation. Research also suggests that hope may buffer against other risk factors for suicidal ideation. Hollingsworth and colleagues (2016) found that possessing high levels of hope reduced the risk for suicidal ideation even when experiencing low belongingness and high burdensomeness.

Research has also demonstrated a link between optimism and suicidal ideation within undergraduates (Chang et al., 2017; Hirsch & Connor, 2006; Hirsch, Wolford, LaLonde, & Brunk, 2007; Yu & Chang, 2016). Hirsch and colleagues (2007) found that greater optimism was associated with less suicidal ideation, even after controlling for the influence of depressive symptoms and hopelessness. Also, optimism has been shown to weaken the relationship between ruminative thinking and suicidal ideation when controlling for symptoms of depression (Tucker et al., 2013). Taken together, these findings suggest that hope and optimism may be important buffers against suicidal ideation in undergraduates.

Negative Expectancy: Hopelessness

In addition to positive expectancies, the relationship between negative expectancies, such as hopelessness, and suicidal ideation has extensive empirical support. Hopelessness, as described by Beck (Beck, Weissman, Lester, & Trexler, 1974, p.864), is “a system of cognitive schemas whose common denomination is negative expectations about the future.” In other words, hopelessness is vaguely characterized as a negative generalized expectancy.

Research has shown that hopelessness is predictive of many aspects of suicidality. Hopelessness has been shown to be significantly associated with suicidal ideation, engagement in past and present suicidal behaviors, and a history of suicide attempts (Lamis & Lester, 2013; Troister, D’Agata, & Holden, 2015; Zhang, Jia, Hu, Qiu, & Liu, 2015). Hopelessness has also

been shown to reliably predict suicide attempts among groups of women who were already at a high risk for suicide with a history of non-suicidal self-injury (Chapman, Gratz, & Turner, 2014). Lastly, Czyz and King (2015) conducted a study in which they recruited three groups of patients experiencing suicidal ideation with different trajectories: 1) a subclinical ideation group; 2) a group with elevated but declining suicidal ideation; 3) and a group with chronically elevated suicidal ideation. In each group, a variety of suicide risk factors were examined to determine the variables that differentiated severe suicidal ideation from less severe ideation. Hopelessness was shown to be the only predictor that distinguished chronically elevated, more severe suicidal ideation from elevated but fleeting ideation. Thus, hopelessness may be used to identify those already experiencing suicidal ideation that are at the highest risks of suicide.

Comparing Positive and Negative Expectancies

Hope, optimism, and hopelessness are all types of expectancies that are associated with suicidal ideation. In addition to their relationships with suicidal ideation, all three variables are associated with other negative life outcomes including: depressive symptoms (Hirsch et al., 2007; Shi, Liu, Wang, & Wang, 2016), anxiety (Arnau et al., 2007; Fotiadou et al., 2008; Salami & Walker, 2014), and post-traumatic stress (Liu et al., 2015; Scher & Resick, 2005). Similarly, these expectancies have each been related to various positive life outcomes such as quality of life (Allison et al., 2000; Martins et al., 2018; Scogin, Morthland, DiNapoli, LaRocca, & Chaplin, 2016), satisfaction with life (Bronk, Hill, Lapsley, Talib, & Finch, 2009; Chioqueta & Stiles, 2007; Mishra, 2013), and self-esteem (Chioqueta & Stiles, 2007; Vacek, Coyle, & Vera, 2010). Given these empirical findings, hope, optimism, and hopelessness appear to have similar predictive utility across a variety of outcomes. However, no studies to date have compared the unique predictive abilities of all three concepts simultaneously.

Hope, optimism, and hopelessness also have conceptual overlap. As expectancy variables, all three concepts consist of subjective beliefs about the future. Hope and optimism represent a belief in positive future outcomes; whereas, hopelessness represents a belief in negative future outcomes. However, beyond these simple comparisons, there is considerable ambiguity about other possible conceptual differences between hope, optimism, and hopelessness. Unfortunately, no compelling theories to date have been proposed to better understand the relationships among Snyder's (1991) hope, Scheier & Carver's (1985) optimism, and Beck's (1974) hopelessness.

Even when examining each theory individually, it is unclear how these concepts might differ. Specifically, hope is clearly conceptualized as a positive expectancy derived from a belief in one's personal abilities (Snyder et al., 1991). Similarly, optimism is clearly conceptualized as a positive expectancy derived from one's general belief about the world (Rand, 2009; Scheier & Carver, 1985). In contrast, Beck and colleagues' (1974) concept of hopelessness does not specify from where one's negative expectancies are derived. Moreover, Beck refers to his hopelessness scale (i.e., the Beck Hopelessness Scale; BHS; Beck et al., 1974) as a measure of both hopelessness and pessimism, which conflates the concepts of hope and optimism. Given that Beck did not explain the origins of negative expectancies in his brief conceptualization of hopelessness, the specific relationships between hope, optimism, and hopelessness are unknown.

Finally, there are differences among these three concepts in measurement. Specifically, the approach to the development of the BHS differs as compared to Snyder's hope scale (Adult Hope Scale; AHS; Snyder et al., 1991) and Scheier and Carver's optimism scale (Life Orientation Test- Revised; LOT-R; Scheier, Carver, & Bridges, 1994). The AHS and LOT-R are both theory-driven. That is, the theories of hope and optimism were developed first and *then*

measures were created to reflect this conceptualization. In contrast, the BHS is not theory-driven. Beck selected items for the BHS from measures of attitudes about the future and from “pessimistic statements” spoken by psychiatric inpatients who appeared hopeless (Beck et al., 1974). Therefore, the items were not chosen with the intention of following a theoretical conceptualization of hopelessness. BHS items are not centered on either self-focused or environment-focused expectancies, but include both. For example, the BHS contains self-focused items such as, “I might as well give up because I can’t make things better for myself” and environment-focused items such as “Things just won’t work out the way I want them to” (Beck et al., 1974). With the inclusion of both types of items, the content of the BHS appears to be, in part, related to both hope and optimism.

The Present Study

In order to fill these gaps in the literature, the present study has two main goals: 1) to identify the best structural conceptualization of hope, optimism, and hopelessness and 2) to apply this conceptualization to examine how different trait expectancies uniquely predict suicidal ideation. Three aims were tested to meet these goals.

Aim 1

Aim 1 was to examine the factor structure of hope as measured by the AHS (Snyder et al., 1991), optimism as measured by the LOT-R (Scheier, Carver, & Bridges, 1994), and hopelessness as measured by the BHS (Beck et al., 1974) when measured together in a sample of college students. Previous literature has demonstrated that hope and optimism are conceptually distinct (Bryant & Cvengros, 2004; Rand, 2009). However, it is unclear whether hopelessness is also distinct from hope and optimism. By examining the factor structure of these measures concurrently, I could determine the best conceptual model for the three constructs.

Based on theories behind hope, optimism, and hopelessness, the practical use of these terms, and the items within each measure, seven a priori models explaining the relationships among the AHS, LOT-R, and BHS were tested. Four models were created based upon the conceptualizations of hope, optimism, and hopelessness seen in the literature. These separate models examined hope, optimism, and hopelessness as a single general expectancy (Model 1), hope and hopelessness as a single construct (Model 2), optimism and hopelessness as a single construct (Model 3), and hope, optimism, and hopelessness all as separate constructs (Model 5). The final three models were created based on the theoretical differences between hope and optimism and the heterogeneity of items within the BHS. These models attempted to break the construct of hopelessness into parts that fit within the already developed theories of hope and optimism. One of these models suggests that hopelessness is simply a combination of hope and optimism (Model 4). The final two models suggest that hopelessness is part hope, part optimism, and part unique expectancy (Models 6 and 7). Models were numbered in order from least to most complex in terms of the number of factors. These models are shown in Figure 1 and more detailed explanations of each model are provided in Table 1.

Aim 2

Aim 2 was to determine the best conceptualization of suicidal ideation as measured by the Suicide Ideation Scale (SIS; Rudd, 1989) and was a preliminary step in order to accomplish the second main goal. This aim was achieved by examining the factor structure of two existing models of the SIS (Luxton et al., 2011). This aim was created in an effort to ensure the proper measurement and conceptualization of the SIS. By accomplishing this, I could measure how expectancy contributed to suicidal ideation more accurately.

Aim 3

Aim 3 was to examine how expectancy variables (i.e., hope, optimism, and hopelessness) differentially predicted suicidal ideation among undergraduates over the course of a semester. This aim was achieved by using the results from Aim 1 (i.e., the best conceptualization of hope, optimism, and hopelessness) to predict the finding from Aim 2 (i.e., the best conceptualization of suicidal ideation). The best conceptualization of these expectancies was used to predict concurrent suicidal ideation, longitudinal suicidal ideation, and a change in suicidal ideation over time. By examining the predictive abilities of these expectancy variables simultaneously, their differential abilities to predict suicidal ideation could be determined.

METHOD

Design and Setting

The present study used existing data from a longitudinal study collected in the fall of 2008. Participants first completed online self-report measures in a laboratory with approximately 20 other participants (N = 463). Data collected at this time point included demographic variables and measures of hope, optimism, hopelessness, and suicidal ideation.¹ Participants were asked to provide their names and email addresses on a paper sign-in sheet upon completion of Time 1 so that research assistants could contact them with information about Time 2.

Two months after completion of Time 1, participants were sent an email with a link to complete self-report questionnaires for Time 2 (N = 337). The questionnaires could be completed using any computer with internet access. Data collected at this time point included a measure of suicidal ideation.² To match Time 1 to Time 2 responses, participants provided an anonymous alpha-numeric code at both time points. This study was approved by the Institutional Review Board at Indiana University – Purdue University Indianapolis (IUPUI).

Participants

The sample consisted of undergraduates enrolled in psychology courses at IUPUI who were above the age of 18. Participants were recruited through introductory psychology courses in exchange for course credit.

¹ The original survey also included the Beck Depression Inventory II, the Meaning in Life Questionnaire, the Multidimensional Scale of Perceived Social Support, the Experiences in Close Relationships Scale, the Neuroticism Subscale of the NEO- Five Factor Inventory 3, the Perceived Stress Scale, and questions about substance use at Time 1. These data were not analyzed in the present study.

² The original survey also included the Beck Depression Inventory II and Beck Hopelessness Scale at Time 2. These data were not analyzed in the present study.

Measures

Hope

Trait hope was measured using the Adult Hope Scale (AHS; Snyder et al., 1991). The AHS is a 12-item self-report scale consisting of four items measuring pathways (i.e., “There are lots of ways around any problem”), four items measuring agency (i.e., “I energetically pursue my goals”), and four distractor items. The AHS generates a total hope score as well as separate subscales for agency and pathways. Respondents indicate the degree to which each statement describes themselves using an 8-point Likert-type scale (e.g., 1 = Definitely False to 8 = Definitely True). The AHS is frequently used in undergraduate samples and has been shown to be a temporally reliable and valid measure (Bryant & Cvengros, 2004; Snyder, 2002). For the present study, Cronbach’s alpha for the total hope score was .88.

Optimism

Trait optimism was measured using the Life Orientation Test-Revised (LOT-R; Scheier, Carver, & Bridges, 1994). The LOT-R is a 10-item self-report scale consisting of six items measuring optimism (e.g., “In uncertain times, I usually expect the best”) and four distractor items. Respondents indicate the extent of their agreement with each statement using a 5-point Likert-type scale (e.g., 0 = Strongly Disagree to 4 = Strongly Agree). The LOT-R is frequently used in undergraduate samples and has been shown to be a temporally reliable and valid measure (Bryant & Cvengros, 2004; Scheier, Carver, & Bridges, 1994). For the present study, Cronbach’s alpha for the total optimism score was .84.

Hopelessness

Hopelessness was measured using the Beck Hopelessness Scale (BHS; Beck et al., 1974). The BHS is a 20-item self-report measure of generalized negative expectancies (“My

future seems dark to me”). Respondents of this instrument indicate whether each statement is true or false for them. The BHS has been shown to be reliable and valid in undergraduate and clinical samples (Boduszek & Dhingra, 2016). For the present study, Cronbach’s alpha for the total hopelessness score was .87.

Suicidal ideation

Suicidal ideation was measured at both Time 1 and Time 2 using the Suicide Ideation Scale (SIS; Rudd, 1989). The SIS is a 10-item self-report measure of general cognitions about dying by suicide. Respondents indicate how frequently they have behaved or felt in line with various statements (e.g., “I feel life just isn’t worth living”) in the past year using a 5-point Likert-type scale (e.g., 1 = never or none of the time to 5 = always or a great many times). This scale has been shown to be valid and reliable within a clinical, military sample (Luxton et al., 2011). However, the original validation article for this scale within an undergraduate sample remains unpublished (Rudd, 1989). Despite this, the SIS has been used in several studies involving undergraduates (Robins & Fiske, 2009; Rudd, 1989; Wong, Koo, Tran, Chiv, & Mok, 2011). For the present study, Cronbach’s alphas for the SIS were .93 for both Time 1 and Time 2.

Analytic Plan

Preliminary analyses

Descriptive statistics (i.e., means, standard deviations, ranges) of the sample’s demographics and study variables were calculated to characterize the sample. I examined the data for normality, linearity, and missingness. I assessed assumptions of normality and linearity using Kline’s (2011) guidelines (i.e., $-3 < \text{skewness} < +3$, $-10 < \text{kurtosis} < +10$). Differences between participants with missing data and complete data were examined in a series of

independent samples t-tests and chi-square tests. Individual missing items within a scale were replaced with the mean of the participant's other item scores on the measure if the amount of individual missingness was less than 5% (Kline, 2011). Participants missing entire questionnaire responses at Time 1 were removed from analyses. Missing responses for Time 2 data collection were imputed using full information maximum likelihood (FIML; Enders & Bandalos, 2001). All analyses using FIML were run once with this imputation strategy and once with only complete data in order to assess for differences.

Factor analyses

Confirmatory factor analyses (CFA) were conducted in LISREL 8.8 (Jöreskog & Sörbom, 2006). CFA was used 1) to compare seven hypothesized factor structures of measures of hope, optimism, and hopelessness when examined together (See Figure 1 for hypothesized models)³ and 2) to determine the most appropriate factor structure of the SIS. Attempts to use weighted least squares (WLS) and diagonally weighted least squares (DWLS) estimation methods were made as these are the suggested methods to use given the characteristics of the data (Flora & Curran, 2004). However, these estimation methods were not used in final analyses because they produced multiple nonsensical estimations (e.g., the latent variables for Hope and Optimism in Model 5 had a large and negative correlation of -.98). Due to these problems, final analyses were examined using Maximum Likelihood (ML) estimation method. This estimation method has been frequently used for testing this type of data (Fowler et al., 2017; Rand, 2009). Models were evaluated using several fit indices, including: the chi-square statistic, the Akaike Information Criterion (AIC; Akaike, 1987), the standardized root mean square residual (SRMR; Bentler, 1995), the root mean of approximate error (RMSEA; Steiger & Lind, 1980), the

³ Item nine on the AHS and item 10 on the BHS were removed from analyses because they read as the exact same item (i.e., My past experiences have prepared me well for my future).

comparative fit index (CFI; Bentler, 1990), and the nonnormed fit index (NNFI; Bollen, 1989), as suggested by Hu and Bentler (1999).⁴

A non-significant (i.e., $p > .05$) chi-square statistic represents acceptable model fit. However, this statistic is sensitive to large sample sizes and, therefore, its use is generally limited to comparing competing nested models (Gerbing & Anderson, 1993). The AIC is a comparative measure of fit used to compare competing non-nested models. With AIC, the model with the lower AIC value is considered the better-fitting model (Lin & Dayton, 1997). For all other indices, model fit guidelines vary (Browne & Cudeck, 1993; Hu & Bentler, 1999; MacCallum, Browne, & Sugawara, 1996). In general, good model fit is defined as: 1) $SRMR \leq 0.08$; 2) $RMSEA \leq 0.06$; 3) $CFI \geq 0.95$; and 4) $NNFI > 0.95$ (Hu & Bentler, 1999; Kline, 2011). However, these suggestions only specify that cutoffs for individual fit indices should be *close* to these values (Hu & Bentler, 1999). Thus, how models perform across the fit indices may be of greater importance than the performance of any single fit index achieving these cutoffs. If no a priori models demonstrated good model fit across the various goodness-of-fit indices, modification indices were used to develop plausible exploratory models based on the data.

Latent-variable path analysis

Expanding on the findings in the initial factor analyses, secondary analyses determined the relationships between the best fitting model of expectancies and the best fitting model of suicidal ideation. These analyses were used to determine which factors were most predictive of concurrent and future suicidal ideation, as well as a change in suicidal ideation over time.⁵ To

⁴ The ideal fit index is independent of sample size, indicates the degree of fit along a continuum from perfect fit to absence of fit, identifies distributional characteristics to aid in interpretation, and allows confidence interval construction (Gerbing & Anderson, 1993). However, there is no one fit index that complies with each of these requirements. To account for this, I examined several fit indices.

⁵ To model a change in suicidal ideation over time, I created residualized change scores for SIS items using regression in IBM SPSS Version 24.0 (IBM Corp., 2016). Specifically, I regressed Time 2 SIS items onto Time 1 SIS items. Then I saved the residualized terms and used them to create parceled indicators.

test this, I used latent-variable path analysis (LVPA) through structural equation modelling (SEM) in LISREL 8.8 (Jöreskog & Sörbom, 2006). This type of analysis permits the estimation of relationships between variables with measurement error accounted for. Thus, the unique and common influences of model factors on suicidal ideation can be examined (Kline, 2011). After determining acceptable model fit, I completed a nested-model comparison using equality constraints to examine the relative strengths of the predictor constructs on suicidal ideation.

Parceling strategy. To conserve degrees of freedom and maximize power to estimate model parameters (i.e., subject-to-parameter ratio), I used parceling techniques as described by Little, Cunningham, Shahar, & Widaman (2002) for LVPA analyses. As the purpose of the LVPA is to examine the relations among latent variables, the indicators were simply used as tools for building an appropriate measurement model. Given our use of parcels was for this and not for understanding the relations among the individual items (as was our goal for the CFAs), the use of parcels was appropriate (Little et al., 2002). As suggested by Little and colleagues (2002), I created three parceled indicators for each latent variable (see Table 2). I used random assignment with a random number generator as outlined by Little and colleagues (2002) to create parcels for each of the proposed model's factors. This approach is beneficial in creating parcels that contain approximately equal common factor variance (Little et al., 2002).

Power analysis

Both power of assessing model fit and power to estimate parameters were examined. First, I examined the power to assess model fit. According to Kline (2011), a sample size of at least 300 is necessary to obtain adequate power to assess overall model fit. The present sample size ($N = 456$) was above 300 and thus met Kline's criterion for power standards.

Next, I examined the power to accurately estimate model parameters. Per Kline (2011), a minimum of 10 participants per estimated parameter are required for sufficient power to accurately estimate individual parameters. The LVPAs tested contained 30 parameters. Thus, the present sample with longitudinal data ($N = 337$) had an 11.23 subject-to-parameter ratio. For LVPA analyses using FIML ($N = 456$), there was a 15.2 subject-to-parameter ratio.

RESULTS

Data Cleaning and Screening

Data were collected from a total of 463 undergraduates. First, I examined missingness. Three hundred and thirty-seven participants (72.79%) participated at both Time 1 and Time 2. Excluding participants who did not complete any Time 2 measures, 46 participants had at least one missing data point within the dataset. A series of independent samples t-tests and chi-square tests were conducted to examine differences in the data of 1) participants who participated at both time points compared to those who only participated at Time 1, 2) participants with and without at least one missing data point at Time 1, and 3) participants with and without at least one missing data point at Time 2. I used $p < .01$ as criteria for a significant difference to reduce Type I error (Cohen, 1992). Few differences were found at the item level and no significant differences were found when comparing total scores. (See Table 3 for significant differences).

Next, I corrected for missingness where needed. Of the 46 participants with missing data, seven participants were deleted from the sample for missing at least one entire questionnaire at Time 1. All of the other 39 participants had less than 5% of individual missingness. Thus, for these participants, missing data on a given measure were replaced with the mean of the participant's other item scores on that measure.

I then examined the data for normality. SIS scores were leptokurtotic (T1 Kurtosis = 10.75, T2 Kurtosis = 20.16) and positively skewed (T1 Skew = 3.10, T2 Skew = 4.25) at both time points according to Kline's (2011) criteria. SIS scores also contained 11 outliers at Time 1 and 9 outliers at Time 2 that were greater than 3 standard deviations from the mean. However, these outliers were within the range of possible scores on the SIS and were representative of a

small group of participant's high suicidal ideation. Although there was evidence of non-normality of total scores, all main analyses used item-level values. Thus, data were not adjusted to correct for non-normality.

Descriptive Analyses

After initial data cleaning, the final sample consisted of 456 participants (76% female). The average age of participants was 21.71 years ($SD = 5.36$), with the majority of participants (73%) identifying as White/Caucasian, followed by 13.4% African American/Black, 4.8% Asian, 3.7% Hispanic/Latino, and 0.8% identifying as American Indian/Alaskan Native or Native Hawaiian/Pacific Islander. Finally, 4.2% of the sample did not classify themselves within these categories. Total scores were calculated to examine means, standard deviations, Cronbach's alphas, and correlations between measures and are presented in Table 4. A paired samples t-test of Time 1 SIS and Time 2 SIS scores was conducted to determine if there was a significant change in suicidal ideation across time. Results indicated that there was a significant difference between SIS scores at Time 1 and Time 2 ($t(336) = 3.24, p = .001$). Suicidal ideation was significantly higher at Time 1 ($M = 12.28, SD = 5.09$) than at Time 2 ($M = 11.44, SD = 4.08$).

Confirmatory Factor Analysis of the AHS, LOT-R, and BHS

Aim 1 was to determine the best latent structure of hope, optimism, and hopelessness as measured by the AHS, LOT-R, and BHS respectively. To achieve this aim, I examined the goodness-of-fit of seven competing measurement models for the AHS, LOT-R, and BHS when analyzed together using CFA (See Table 1 and Figures 1-8). All tested models showed good fit to the data based on SRMR, but no models showed good fit based on RMSEA or acceptable fit based on chi-square (See Table 5). According to Kenny (2015), it is common for CFA models with over 400 cases to have statistically significant chi-square statistics. Considering our models

have 463 cases, poor fit according to the chi-square statistic across all models is unsurprising. Models did not achieve good fit according to Hu & Bentler's (1999) guidelines for RMSEA (i.e., < .06); however, Model 5 did achieve fair fit (i.e., .05 to .08) according to MacCallum, Browne, and Sugawara (1996) and Browne & Cudeck (1993).

After examining the statistical evidence, I concluded that Model 5 was the best-fitting model to these data. Although all models met fit criteria for SRMR, only Model 5 demonstrated good fit for CFI and NNFI (See Table 5). Also, when comparing competing non-nested models, Model 5 demonstrated the lowest AIC value. Finally, all indicators in Model 5 loaded onto their respective factors at or above .3, meaning that indicators met the minimal level of association to interpret the structure (Hair et al., 2006). Furthermore, all but six indicators had loadings above .5, meaning that they were of practical significance (Hair et al., 2006). In addition to these statistical considerations, Model 5 also provided the most intuitively appealing model as each factor corresponded to a separate established measure. Model 5 had moderate correlations among latent variables (Hope and Optimism = .75, Hope and Hopelessness = -.73, Optimism and Hopelessness = -.72; See Figure 6). These findings suggest that hope, optimism, and hopelessness, as measured by the AHS, LOT-R, and BHS respectively, are empirically distinct but related concepts.

In an attempt to improve model fit of Model 5, I examined the modification indices. However, no changes based on modification indices significantly improved model fit or provided compelling conceptual reasons for inclusion in the model. Thus, no modifications were made to the final model.

Confirmatory Factor Analysis of the SIS

Aim 2 was to determine the best factor structure of suicidal ideation as measured by the SIS. To achieve this aim, I examined the goodness-of-fit of two competing measurement models of the SIS using CFA. Model 1, a one-factor model, assumed that all 10 items on the SIS were reflective of a single dimension measuring Suicidal Ideation (See Figure 9). Model 2, a two-factor model, assumed two distinct but correlated dimensions of 1) Suicidal Desire and 2) Resolved Plans and Preparation as suggested by Luxton and colleagues (2011; See Figure 10).

I conducted two CFAs using Maximum Likelihood estimation method. The models demonstrated poor fit to the data whether I analyzed them using Time 1 SIS data or using Time 2 SIS data. Neither model showed good fit based on chi-square, RMSEA, or NNFI (See Table 6; See Figures 9 - 10). Both models showed good fit based on SRMR and only Model 2 showed good fit based on CFI. In an attempt to improve model fit, I examined modification indices in the most parsimonious model (Model 1). However, none of the indices significantly improved model fit. Additionally, there were no compelling conceptual reasons to add complexity to the model. Therefore, no modifications were made to the final model.

Because the CFA provided no acceptable fitting models of the SIS, I conducted an exploratory factor analysis (EFA). According to the scree plot, the EFA suggested that the SIS was best conceptualized as a one-factor model. Additionally, the SIS achieved excellent internal reliability within this sample (i.e. Cronbach's alpha of .93 for Time 1 and Time 2) suggesting unidimensionality. However, Cronbach's alpha has been found to be highly influenced by the presence of outliers within data with ordinal rating scales (Liu, Wu, Bruno, & Zumbo, 2010). Considering the SIS was found to have a large number of outliers (i.e., 11 outliers for Time 1 and 9 outliers for Time 2), I calculated the Cronbach's alpha again with these outliers removed. With

the removal of these outliers, Cronbach's alphas fell to .87 for Time 1 and .81 for Time 2. Thus, Cronbach's alphas for both time points were found to be inflated by the presence of outliers. However, even with the removal of these outliers, Cronbach's alpha still met good internal consistency.

Ultimately, I chose a one-factor model for the SIS for two reasons. First, while I could not find an acceptable fitting model of the SIS using CFA, EFA suggested that the SIS was best conceptualized as a single-factor construct. Second, a one-factor model was more parsimonious and is how the SIS is used most frequently in the literature. I ultimately was not concerned about the CFA of the SIS and only wanted to test this to inform how I constructed the LVPA models predicting suicidal ideation. Exploring this further was beyond the scope of the current study. For these reasons, I continued my analyses with a one-factor conceptualization of the SIS.

Latent Variable Path Analysis

The third aim of this study was to examine the differential associations among hope, optimism, and hopelessness and suicidal ideation within undergraduates. To achieve this aim, I used LVPA to examine the utility these expectancy variables had in differentially predicting suicidal ideation in three unique models: how expectancy predicted 1) concurrent suicidal ideation, 2) future suicidal ideation, and 3) change in suicidal ideation over time (i.e., Models 1, 2, and 3 respectively).

After creating parcels according to the hope, optimism, and hopelessness CFA Model 5 and the SIS CFA Model 1 (See Table 2 for parceling strategy), I conducted LVPA for all three models (See Figure 11 for Models 1 – 3). For Models 2 and 3, LVPAs were conducted once with data from all participants ($N = 456$) using FIML and once only using data from participants who completed both time points ($N = 337$) in an effort to add to the confidence of my final results.

The LVPA results for Models 2 and 3 were similar whether I used all available data with FIML or used only completed data. To assess fit in Model 1, Model 2 with complete data, and Model 3 with complete data, I used the same goodness-of-fit indices and criteria as in previous CFA analyses. To assess fit in Models 2 and 3 when using FIML, I used FIML chi-square and RMSEA, as these are the only goodness-of-fit indices available when using FIML in LISREL. However, standardized betas and correlations were interpreted using the FIML calculations given that this technique provides a larger sample size and greater power. For LVPA Models 1-3 (with FIML and with only complete data), all fit indices and standardized beta weights are reported in Table 7, correlations and residual variances are reported in Table 8, and standardized lambdas for parceled indicators are reported in Table 9.

I first examined the differential associations of hope, optimism, and hopelessness on concurrent suicidal ideation in undergraduates. To test this, I created a measurement model with the latent variables of hope, optimism, and hopelessness predicting the latent variable of suicidal ideation at Time 1 (See Figure 11). The variances of hope, optimism, and hopelessness were fixed at 1.0 and the covariances between latent variables were freed to be estimated to examine the unique ability of each expectancy latent variable to predict suicidal ideation. LVPA Model 1 showed acceptable fit to the data. This model met good fit criteria based on NNFI, CFI, and SRMR but did not meet acceptable fit criteria based on chi-square or RMSEA (Hu & Bentler, 1999). The model did achieve fair fit, however, based on RMSEA (Browne & Cudeck, 1993; MacCallum et al., 1996).

In LVPA Model 1, hopelessness was the only expectancy variable significantly associated with concurrent suicidal ideation ($\beta = .53, p < .001$). Neither hope ($\beta = .03, p = .71$) nor optimism ($\beta = .11, p = .23$) showed significant associations with concurrent suicidal

ideation. Results indicate that more hopeless undergraduates experienced more suicidal ideation. This finding is unsurprising given that the BHS was specifically created to detect current suicide risk (Beck et al., 1974). These results also suggest that hope and optimism do not have a significant relationship with concurrent suicidal ideation. This is not in line with previous research suggesting that high hope and optimism are protective against suicidal ideation (An et al., 2012; Chang et al., 2017).

Next, I examined how hope, optimism, and hopelessness differentially predicted future suicidal ideation (approximately 2 months later) in undergraduates. I created a structural model with the latent variables of hope, optimism, and hopelessness predicting the latent variable of suicidal ideation at Time 2 (See Figure 11 for LVPA Model 2). Again, the variances for hope, optimism, and hopelessness were fixed at 1.0, and the covariances between latent variables were freed to be estimated to examine the unique ability of each expectancy latent variable in predicting suicidal ideation. Using FIML, LVPA Model 2 did not show good fit to the data based on RMSEA or FIML chi-square according to Hu and Bentler (1999; See Table 7). However, this model did show fair fit based on RMSEA according to MacCallum and colleagues (1996) and Browne and Cudeck (1993). I next examined results for Model 2 using only complete data in order to examine fit across more indices. Using only complete data, Model 2 did not achieve good fit to the data based on RMSEA or chi-square. It did, however meet good fit criteria based on CFI, NNFI, and SRMR.⁶

In LVPA Model 2, both hopelessness ($\beta = .65$, $p < .001$) and hope ($\beta = .31$, $p < .01$) were significant predictors of future suicidal ideation. Optimism ($\beta = .11$, $p = .59$) was not a

⁶ In order to further justify interpreting the LVPA Model 2 findings, a multiple regression analysis was performed in which hope, optimism, and hopelessness predicted Time 2 suicidal ideation. Results indicated that hope ($\beta = .19$, $p = .01$) and hopelessness ($\beta = .48$, $p < .001$) significantly predicted Time 2 suicidal ideation ($R^2 = .20$, $F(3,333)=26.99$, $p < .001$). Optimism did not significantly predict Time 2 suicidal ideation ($\beta = -.09$, $p = .12$). These findings were in line with LVPA Model 2 findings.

significant predictor of future suicidal ideation. Higher hopelessness in students predicted higher levels of suicidal ideation two months later. Additionally, contrary to expectations, higher student hope predicted *greater* suicidal ideation two months later. This contradicts research suggesting that hope is a protective factor against suicidal ideation (Chang, 2017; Chang et al., 2017; Hollingsworth, Wingate, Tucker, O'Keefe, & Cole, 2016; Mehrotra, 1998; Range & Penton, 1994).

Lastly, I examined how hope, optimism, and hopelessness differentially predicted a change in suicidal ideation over a period of 2 months in undergraduates. To test this, I created a structural model with the latent variables of hope, optimism, and hopelessness predicting the latent variable of change in suicidal ideation over a 2 month period (See Figure 11 for LVPA Model 3). Standardized residualized change scores between Time 1 SIS parcels and Time 2 SIS parcels were created through regression in SPSS. Thus, the parcels for the latent variable of change in suicidal ideation in this model were residualized change scores created out of the Time 1 and Time 2 SIS parceled indicators. Consistent with LVPA Models 1 and 2, the variances of hope, optimism, and hopelessness were fixed to 1.0 and the covariances between latent variables were freed to be estimated to examine the unique influence of each expectancy latent variable on the change in suicidal ideation.

LVPA Model 3 using FIML did not show acceptable fit to the data. This model did not meet acceptable fit criteria based on FIML chi-squared. Also, the model did not show good fit based on RMSEA, but it did show fair fit (MacCallum et al., 1996; Browne & Cudeck 1993). In addition, the RMSEA 90% confidence interval crossed the .06 criterion (i.e., .051 - .076; See Table 7). I next examined results for Model 3 using only complete data in order to examine fit across more indices. Using only complete data, Model 3 did not achieve good fit based on chi-

square or RMSEA. However, the model showed fair fit based on RMSEA and the 90% CI for RMSEA crossed .06 (i.e., .058 - .088). Additionally, the model showed good fit according to CFI, NNFI, and SRMR.⁷

In line with LVPA Model 2, in LVPA Model 3, both hopelessness ($\beta = .57, p < .001$) and hope ($\beta = .36, p < .01$) were significant predictors of change in suicidal ideation. Optimism ($\beta = .05, p = .97$) was not a significant predictor of change in suicidal ideation. Higher baseline hopelessness predicted increases in suicidal ideation two months later. Interestingly, higher baseline hope also predicted increases in suicidal ideation over two months. These findings suggest that higher levels of *both* hopelessness and hope contributed to an increase in suicidal ideation over time. Consistent with LVPA Models 1 and 2, optimism showed no significant relationship with a change in suicidal ideation over time.

To further understand these relationships, I tested whether hopelessness or hope was a stronger predictor of an increase in suicidal ideation over time. I ran another LVPA of Model 3; however, in this analysis I constrained the beta weights between the regression paths of 1) hopelessness to suicidal ideation and 2) hope to suicidal ideation to be equal. Then, I examined the change in model fit to determine if the strengths of those relationship were significantly different. This analysis showed that there was no significant difference in chi-square between the nested models, $\Delta\chi^2 = 3.09, p = .079$. Thus, there is no evidence that hope or hopelessness is a stronger predictor of a change in suicidal ideation over time.

⁷ In order to further justify interpreting the LVPA Model 3 findings, a multiple regression analysis was performed in which hope, optimism, and hopelessness predicted the residualized change scores for suicidal ideation. Results indicated that hope ($\beta = .25, p < .01$) and hopelessness ($\beta = .38, p < .001$) significantly predicted an increase in suicidal ideation ($R^2 = .08, F(3,333) = 9.25, p < .001$). Optimism did not significantly predict a change in suicidal ideation ($\beta = -.01, p = .90$). These findings were in line with LVPA Model 3 findings.

Secondary Analyses

As a secondary, exploratory analysis, I examined LVPA Model 3 to determine if expectancy predicted a change in suicidal ideation differently in men and women. To test this, I ran LVPA Model 3 with FIML in the same way as described above twice: once with only female participants and once with only male participants. LVPA Model 3 with women (N = 214) showed poor fit to the data based on RMSEA or FIML chi-square (See Table 7-9). Although RMSEA did not meet good fit according to the .06 criterion, it did meet criteria for fair fit (Browne & Cudeck 1993; MacCallum et al., 1996) and the RMSEA 90% confidence interval crossed the .06 criterion (i.e., .050 - .079; See Table 7). The fit of this model with men (N = 109) did not meet criteria based on RMSEA or FIML chi-square (See Table 7-9). Considering the poor fit for these models, two multiple regression analyses were performed to examine these relationships for males and females.⁸

The first multiple regression analysis examined how hope, optimism, and hopelessness differentially predicted a change in suicidal ideation in women. The second analysis examined these relationships in men. For women, hope ($\beta = .32, p = .001$) and hopelessness ($\beta = .36, p < .001$) significantly predicted an increase in suicidal ideation ($R^2 = .071, F(3,259) = 6.63, p < .001$). Optimism did not significantly predict a change in suicidal ideation in women ($\beta = -.07, p = .45$). For men, only hopelessness was a significant predictor of change in suicidal ideation ($\beta = .505, p < .01; R^2 = .147, F(3,70) = 4.02, p < .05$). Neither hope ($\beta = .14, p = .33$) nor optimism ($\beta = .11, p = .45$) predicted a change in suicidal ideation. According to multiple regression results, expectancy may differentially predict increases in suicidal ideation depending on the gender of

⁸ Although the LVPAs for men and women were not interpreted due to poor fit, statistics for these analyses are reported in Tables 7, 8, and 9.

an individual. Despite this, the LVPAs for these models did not achieve good fit. Thus, I have less confidence that these results would replicate.

DISCUSSION

The main goals of the current study were 1) to determine the best structural conceptualization of hope, optimism, and hopelessness 2) to apply this conceptualization to examine how different trait expectancies uniquely predict suicidal ideation. I found that hope, optimism, and hopelessness were best conceptualized as three distinct but related constructs. Subsequently, I found that these constructs were differentially related to suicidal ideation in an undergraduate sample. Hopelessness predicted greater concurrent and future suicidal ideation, as well as an increase in suicidal ideation over time. Hope predicted greater future suicidal ideation and an increase in suicidal ideation over time. Optimism had no relationship with suicidal ideation at any time point.

Aim 1

Aim 1 was to examine the factor structure of hope as measured by the AHS (Snyder et al., 1991), optimism as measured by the LOT-R (Scheier, Carver, & Bridges, 1994), and hopelessness as measured by the BHS (Beck et al., 1974) when measured concurrently in a sample of college students. Findings suggested that hope, optimism, and hopelessness are best conceptualized as separate but related constructs.

These findings are consistent with prior research using CFA to examine the relationships between hope and optimism. CFAs conducted by Bryant and Cvengros (2004), Gallagher and Lopez (2009), and Rand (2009) showed that hope and optimism were best conceptualized as related but distinct constructs. This directly aligns with the current findings. In addition, Fowler and colleagues (2017) found through CFA that the relationship between hope and optimism may be best conceptualized as a bi-factor model with one underlying global expectancy factor as well

as two distinct factors of optimism and hope. Although different from the current findings, these results also support a structural distinction between hope and optimism.

One study has found similar results concerning the structural relations between hope and hopelessness. Huen, Ip, Ho, and Yip (2015) examined the factor structure of Chinese versions of the AHS and BHS using CFA. Their findings suggested that hope and hopelessness are best understood as separate but related constructs (Huen, Ip, Ho, & Yip, 2015). Apart from this evidence, no studies to date have examined the structural relationships between optimism and hopelessness. Further, no studies have examined the factor structure of all three expectancy variables simultaneously. Thus, the current findings should be replicated in future research to ensure that these results are reliable.

Theoretical differences between hope, optimism, and hopelessness have been frequently discussed in the literature (Grewal & Porter, 2007; Rand, 2009; Scheier & Carver, 1992). As mentioned previously, one important distinction between hope and optimism involves the source of the expectancy (Rand, 2009). Researchers have proposed that where trait expectancies are derived (i.e., self or environment) may influence when they are used to shape specific expectancy. Gallagher and Lopez (2009) suggested that hope may be used when an individual perceives control in changing an outcome; whereas, optimism may be used when an individual perceives that an outcome is personally uncontrollable. Thus, hope and optimism may influence coping and well-being in different situations.

Beyond hope and optimism, hope and hopelessness have also been proposed to be separate constructs. Grewal and Porter (2007) argued that possessing positive expectancies is fundamentally different from possessing negative expectancies. Thus, having few positive expectations (i.e., low hope) is not the same as having many negative expectations (i.e., high

hopelessness). This theoretical claim has empirical support. MacLeod and colleagues (1993) conducted a study examining the differences in expectancies between individuals who made a recent suicide attempt and matched controls. They discovered that those with a recent suicide attempt had fewer positive expectations about the future, but did not differ in the amount of negative expectations about the future. This suggests that positive and negative expectations are unique cognitive processes.

Finally, Scheier and Carver (1992) proposed that optimism and hopelessness theoretically differ as a function of content within the measures of the LOT-R and BHS. They proposed that Beck's (1974) measure of hopelessness assesses affective expectations and "giving-up tendencies" in addition to general expectancy. Given these additional components in measurement, Scheier and Carver (1992) suggest that hopelessness is theoretically different from optimism.

In addition to the factor analytic and theoretical support for a distinction among the concepts of hope, optimism, and hopelessness, several studies have examined their differential predictive abilities when examined together (Chang et al., 2017; Hirsch et al., 2017; Huen et al., 2015; Range & Penton, 1994). Results highlighting the differential predictive abilities of hope, optimism, and hopelessness add support to conceptualizing these constructs as distinct. Additionally, similar correlational relationships among hope, optimism, and hopelessness have been reported in the literature as were found within this study. Hope, optimism, and hopelessness have all been found to correlate around $r = .60$ (Carretta, Ridner, & Dietrich, 2014; Chang, 2017; Hirsch & Conner, 2006; Hirsch et al., 2012; Hirsch et al., 2017; Huen et al., 2015; Steed, 2001).

Even with empirical support for conceptualizing hope, optimism, and hopelessness as distinct constructs, researchers continue to conflate them as broad future expectations. For

example, low hopelessness, as measured by the BHS, has been referred to as hope in the literature (Kivlinghan III, Paquin, Hsu, & Wang, 2016; Satici & Uysal, 2017). Similarly, BHS scores have also been described as measures of optimism and pessimism (Chang, D’Zurilla, & Maydeu-Olivares, 1994; Steer, Kumar, & Beck, 1993). Beyond using the terms interchangeably, these constructs have been combined into unidimensional measures of expectancy. Several studies combined the AHS and LOT-R into a single measure called The Optimism and Hope Scale (OHS; Comtois et al, 2011; Jobes, Lento, & Brazaitis, 2011; O’Connor et al., 2012).⁹ If the current findings are correct, referring to hope, optimism, and hopelessness interchangeably or grouping them into a single measure may lead to erroneous conclusions.

Implications of general findings

Current results suggest that hope, optimism, and hopelessness are distinct constructs. If accurate, these findings specifically call for clear operational definitions and the use of consistent terminology when describing hope, hopelessness, and optimism. Specifically, hope and hopelessness should not be regarded as two ends of the same continuum. To emphasize the importance of this distinction, as is discussed in more detail below, this study found that both high hopelessness *and* high hope were associated with increased suicidal ideation. If hope and hopelessness were on a single continuum, this finding would be confusing.

Alternatively, these results could be artifacts of differences in measurement approach. The AHS, LOT-R, and BHS have different response scales. The AHS and LOT-R both use Likert-type scales with eight and five response options, respectively. In contrast, the BHS uses a dichotomous, true-or-false response scale. Also, the AHS and BHS both offer an even number of responses to choose from but the LOT-R offers an odd number of responses. Several studies

⁹ The factor structure of this scale has not been examined; however, studies using the OHS have reported acceptable levels of internal consistency (i.e., $\geq .70$; Comtois et al., 2011; Jobes, Lento, & Brazaitis, 2011; O’Connor et al., 2012).

concerning questionnaire design have found that the number of response scale options and whether a scale presents an odd or even number of response scale options affects how individuals answer questionnaires (Cronbach, 1951; Coelho & Esteves, 2007; O’Muircheartaigh, Krosnick, & Helic, 2000). Rather than reflecting true differences in these concepts, the present CFA findings could reflect a method effect driven by measurement differences between the scales. Thus, the method effect could have created the appearance of separate latent factors by scale. Although possible, this explanation seems unlikely given the differential abilities of the three constructs in predicting suicidal ideation. However, to ensure that results are not due to a method effect, future research should replicate these analyses while using a consistent response scale for all three measures (e.g., AHS, LOT-R, and BHS all using an 8-point Likert-type scale). Research has examined the validity and reliability of using a Likert-type scale for the BHS within undergraduates (Fisher & Overholser, 2013). Fisher and Overholser (2013) found that a modified, Likert-type BHS demonstrated similar test-retest reliability, internal consistency, and predictive abilities as the original BHS. Thus, modifying the BHS to a Likert-type scale has been demonstrated as appropriate and future research should replicate these findings with identical Likert-scales for the AHS, LOT-R, and BHS.

Implications for hopelessness

Beyond suggesting that hopelessness is empirically distinct from hope and optimism, this study offers little insight into a theoretical conceptualization of hopelessness, as measured by the BHS (Beck et al., 1974). However, it is possible that a post-hoc, theoretical explanation of hopelessness is not feasible or necessary. As a physician, Beck (1974) appears to have understood “hopelessness” as a syndrome: a group of symptoms (i.e., varying distressing thoughts and attitudes) that co-occur in suicidal clinical populations. Thus, he created an

empirically-supported aggregate of phenomena to use as a diagnostic tool for suicidality. This is in contrast to the theory-driven conceptualizations of hope and optimism and suggests that Beck's hopelessness may not be a coherent psychological phenomenon. However, the BHS has proven useful in predicting suicidality in various populations (Chapman et al., 2014; Czyz & King, 2015; Lamis & Lester, 2013; Troister et al., 2015; Zhang et al., 2015). Given its use as a diagnostic tool and its utility in predicting suicidality, developing a post-hoc theory of hopelessness is not necessary for the BHS to be useful in clinical practice. Moreover, as a significant and important predictor of suicidality, the presence of hopelessness may indicate that an individual has a goal of suicide.

However, it is possible that a better understanding of this measure is attainable and that the current study design was not appropriate for the aim of defining hopelessness. Future research should examine convergent and divergent validity of the BHS in an effort to better understand hopelessness' similarities and differences with other trait expectancy variables. Finally, hopelessness may differ as a function of the population that it is found in. The current study examined hopelessness within a healthy sample of undergraduates. However, hopelessness could fundamentally differ in clinical and non-clinical populations.

Aim 2

Aim 2 was to determine the best conceptualization of suicidal ideation as measured by the SIS. According to the present findings, the SIS may not be an appropriate measure of suicidal ideation in undergraduates. Both a priori models showed poor fit to the data (Hu & Bentler, 1999). Moreover, I was not able to discover a good-fitting factor model of the SIS, even after examining several alternatives based on modification indices.

There are two potential explanations for this finding. First, the SIS may not be an appropriate measure of suicidal ideation. Previous research validating this scale has used suboptimal analytic strategies. Luxton and colleagues (2011) validated the SIS in a large clinical military sample and found that a two-factor model showed good fit to the data. In order to obtain this finding, they first conducted an exploratory factor analysis (EFA). Then, Luxton and colleagues conducted a CFA to confirm EFA results using the same sample. Scholars have deemed confirming EFA findings with a subsequent CFA using the same data as inappropriate and misleading (Henson & Roberts, 2006; Hurley et al., 1997). In fact, this practice has even been labeled as “sneaky” in the statistics literature (Izquierdo, Olea, & Abad, 2014). Using this technique increases the likelihood of finding patterns that are due to chance or sample-specific characteristics. Beyond these issues, Rudd’s original validation article of the SIS, which outlines his factor structure findings, remains unpublished (Rudd, 1990).¹⁰ Given that the information regarding his original analysis of factor structure is unavailable, it is unknown whether he used appropriate statistical procedures, what results were found, or how these results were interpreted.¹¹

Second, the SIS may not be an appropriate tool for measuring suicidal ideation within certain groups. The SIS was originally developed and validated within an undergraduate sample but has been used in both clinical and non-clinical populations (Battersby, Tolchard, Scurrah, & Thomas, 2006; Claes et al., 2010; Robins & Fiske, 2009; Rudd, 1989; Wong, Koo, Tran, Chiv, &

¹⁰ In his 1989 article on SIS findings within college students, Rudd informed readers that “more detailed information about the scale’s development, including its factor structure,” was available within a separate 1988 manuscript submitted for publication titled, “The Suicidal Ideation Scale: A self-report measure of suicidal ideation.” However, this same article is also cited within a later 1990 publication by Rudd as an “unpublished manuscript”.

¹¹ In this time period, it was a common problem that behavioral researchers relied heavily on principal component analysis (PCA) to determine factor structure (Gorsuch, 1990; Pruzek & Rabinowitz, 1981; Velicer & Jackson, 1990). Thus, it is conceivable that Rudd may have used PCA which has been deemed inappropriate for determining factor structure (Costello & Osborne, 2005; Floyd & Widaman, 1995). Yet, given that his results were not published, this cannot be said for certain.

Mok, 2011). Notwithstanding its previous use, the SIS may not be an appropriate measure among undergraduate students who do not have extensive histories of suicidality. Although the SIS measures suicidal cognitions (e.g., I have been thinking of ways to kill myself), almost a third of the items assess past suicidal behaviors (i.e., I have told someone I want to kill myself; I have made attempts to kill myself; I have come close to taking my own life). Although populations comprising mostly healthy young adults may experience suicidal cognitions, they may not have a history of suicidal behaviors. Thus, while the SIS may be a valid tool in clinical populations, undergraduate suicidality may not be accurately captured using the SIS.

Because the proposed arguments for these findings are post-hoc speculations, the true reason behind the poor fit of the SIS is unknown. This was not probed further in the current study as it was beyond the scope of the research. The factor structure and validity of the SIS in college students should be explored further to determine whether this is a worthwhile tool in this population.

Despite these limitations I continued with a one-factor conceptualization of the SIS in order to examine how expectancies differentially predicted suicidal ideation. Although results were not as expected, they did not negate the fact that the SIS achieved good internal reliability within this sample, even when accounting for outliers (i.e. Cronbach's alpha of .87 for Time 1 and .81 Time 2). Thus, while the SIS may not be the ideal measure within this population, it likely provides useful information about the presence of suicidal ideation.

Aim 3

Aim 3 was to examine how expectancy variables differentially predict suicidal ideation. Findings revealed that there were differences in the predictive abilities of hope, optimism, and hopelessness. Only hopelessness was found to have an association with concurrent suicidal

ideation. However, both hope *and* hopelessness had a positive relationship with future suicidal ideation and change in suicidal ideation over time. This means that higher hopelessness and higher hope were both predictive of *more* suicidal ideation over time. Optimism had no significant relationship with suicidal ideation at any time point.

Predictive abilities of hope and hopelessness

The finding that both high hope and high hopelessness predict increases in suicidal ideation seems counterintuitive as hope is usually conceptualized as an adaptive trait. In fact, myriad research studies describe the benefits of hope on several well-being and quality of life outcomes (Barnett, 2014; Bronk et al., 2009; Feldman & Sills, 2013; Joybari & Sharisi, 2015; Rand, 2009). Despite these findings, Snyder theorized that high levels of hope can also lead to maladaptive outcomes, including heightened suicide risk (Snyder, 1994, 2000).

Hope theory does not indicate the specific goals about which one may be hopeful (Snyder, 2000). Thus, one could be hopeful in reaching adaptive goals, like exercising daily, or maladaptive goals, like suicide. In fact, Snyder himself stated that one who dies by suicide may be engaging in the “final act of hope” (Snyder, 2002, p. 267). Moreover, Snyder (2000) outlined how the three components of hope can facilitate suicide. In line with theory, he explained that one may first think about a goal to die (goal selection) and then develop a plan to achieve this (pathways thinking). Finally, before the suicide act, one may obtain a burst of motivation and energy that enables them to perform the act (agency).

Several clinical guidelines have warned about this mood-lifting change of energy before engaging in a suicidal act (Firestone, 2014, Jacobs et al., 2010). In 1916, the influential Swiss psychiatrist Eugen Bleuler reported (as cited in Mittal, Brown, & Shorter, 2009), “Especially dangerous are the periods of recovery, when the suicidal drive is still at least occasionally present

but the patient's energy is no longer extremely crippled" (p. 2). Others have written anecdotally about the elevated risk for suicide when highly depressed people begin to feel some initial relief in therapy (Mittal, Brown, & Shorter, 2009). In these instances, patients begin to feel the affective, agentic benefits of therapy before their distorted, maladaptive goals, desires, and views of life have changed. With this addition of agency, patients are given the final resource needed (i.e., motivation) to achieve suicidal goals (Snyder, 2002).

There has been one study to date which supports hope as a factor contributing to suicidality. Mitchell, Cukrowicz, Van Allen, & Seegan (2015) conducted a study with college students in which they investigated the roles of the components of hope (i.e., agency and pathways) in predicting an acquired capability for suicide. They discovered that both agency and pathways were positively related to greater acquired capability for suicide. Moreover, Mitchell and colleagues (2015) discovered that possessing high agency strengthened the relationship between experiencing painful and provocative events and an acquired capability for suicide. Thus, for those who have experienced higher levels of hardship and distress, hope may be maladaptive, at least temporarily. Despite the perception of hope as an unalloyed good, there is theoretical, anecdotal, and empirical evidence that it can be harmful in certain circumstances. Overall, the relationship between hope and the valence of its consequences is likely complicated by a variety of personality, situational, and other life factors.

The finding that *both* hope and hopelessness predicted future suicidal ideation is also difficult to conceptualize given that hope is typically understood as the antithesis of hopelessness. To aid in understanding this finding, one may recall that in spite of the lexical similarities, hope and hopelessness have been found to be related but fundamentally separate constructs (Gallagher & Lopez, 2009; Rand, 2009). As discussed previously, Snyder's (1994)

hope is conceptualized as one's perceived ability to achieve their goals; whereas, Beck's (1974) hopelessness does not currently have a clear theoretical definition. Thus, hopelessness may be best understood as an aggregate of several constructs, including having suicide as a goal. When hopelessness is conceptualized in this way, one can understand how both high hope and high hopelessness could simultaneously predict greater suicidal ideation. Specifically, having suicide as a goal (i.e., high hopelessness) in combination with believing that you possess the abilities to meet your goals (i.e., high hope) may increase the frequency in which one thinks about suicide. Of note, hopelessness was not found to be a stronger predictor of future suicidal ideation than hope. That is, both hope and hopelessness were equally strong predictors of increased suicidal ideation.

If these results are valid, the current research calls for a cautious approach in reducing suicide risk. These findings suggest clinicians should be careful increasing hope in patients who are severely depressed as the relationship between hope and suicidal ideation may be complex. Instead, it may be beneficial to reduce attachment to suicide as a goal by first building manageable and reasonable "living" goals (Snyder, 2002). Clinicians may have to adopt a more nuanced understanding of how fostering hope could affect clients.

Although a positive relationship between hope and suicidal ideation has been theorized and discussed in the literature, this relationship is not in line with the majority of empirical research. Several studies with undergraduates have found a negative relationship between hope and suicidal ideation (An et al., 2012; Anestis, Moberg, & Arnau, 2014). In a series of analyses using the same dataset, Chang and colleagues (Chang, 2017; Chang et al., 2017; Chang et al., 2018) found that hope acted as a protective factor against suicidal ideation in Hungarian college students. Within these studies, it was found that low hope and high hopelessness interacted to

produce the highest levels of suicidal ideation; whereas, high hope and high optimism interacted to produce the lowest levels of suicidal ideation (Chang, 2017; Chang et al., 2017). Other studies have shown that high levels of hope are associated with a lower risk of suicidal ideation even in the presence of other suicide risk factors (Hollingsworth et al., 2016). Given that there is currently more research depicting hope as a protective factor rather than a risk factor for suicidal ideation, the current findings should be interpreted with caution. More research is needed to explain the relationship between hope and suicidal thinking in the presence of maladaptive goals.

Predictive abilities of optimism

The finding that optimism did not predict suicidal ideation in any of the three models runs counter to the findings of previous research. Numerous studies have found negative relationships between optimism and suicidal ideation within undergraduate populations (Chang et al., 2017; Chin & Holden, 2013; Hirsch, Connor, & Duberstein, 2007; Hirsch et al., 2007; Yu & Chang, 2016). Additionally, regression analyses have shown that, when studied together, both hope and optimism independently predict suicidal ideation within undergraduate samples (Chang et al., 2017). However, Hirsch and colleagues (2006) completed a series of regressions comparing hopelessness, optimism, and depressive symptoms in predicting suicidal ideation and found that only hopelessness and depressive symptoms had a significant relationship with suicidal ideation. Hirsch and colleagues (2007) also compared hopelessness and optimism in predicting suicidal ideation while controlling for depressive symptoms, negative life events, and gender. Similar to his previous results, they found that hopelessness, but not optimism, predicted suicidal ideation.

Additionally, none of the research examining the link between optimism and suicidal ideation in undergraduates has controlled for the effects of both hope *and* hopelessness. Thus,

perhaps the conceptual component of optimism that overlaps with hope and hopelessness (i.e., general thoughts about the future) is the only portion that is related to suicidal ideation. In the present study, when examining the unique predictive abilities of optimism in the presence of hope and hopelessness, optimism did not predict suicidal ideation. This finding suggests that suicidal thinking may require positive expectations about one's abilities (i.e., hope) and more negative general expectations (i.e., hopelessness), but not necessarily fewer positive expectations about the world (i.e., optimism). In other words, the key may not be that suicidal individuals are anticipating fewer good things to happen in the future; rather, the critical piece may be how much an individual feels they can be an active participant and agent of change in their lives and if bad outcomes are imminent. This interpretation of the findings relies heavily on careful use of semantics when describing expectancies. Further research should test optimism's unique relationship with suicidal ideation to ensure that this finding was not spurious.

Differences in concurrent, future, and change in suicidal ideation

By examining the discrepancies between the models in predicting concurrent, future, and change in suicidal ideation, it was found that hope had a complicated relationship with suicidal ideation. While hopelessness and optimism had consistent relationships with SI over the three time points, hope was only predictive of future suicidal ideation and a change in suicidal ideation. No relationship between hope and suicidal ideation was found when measured concurrently.

This finding could be due to the timing in the semester of each time point. Time 1 took place at the beginning of the school semester, and Time 2 took place at the end of the semester. One important difference between these periods of time is stress. Perhaps, in line with the diathesis-stress model of mental illness, hope (i.e., the diathesis) requires major stressors in order

to predict the presence of suicidal ideation. This theory is in line with findings discussed previously by Mitchell and colleagues (2015). Hope may only be pernicious when an individual has experienced stress and possesses maladaptive goals. For instance, hope may not be maladaptive when a person has a goal to lose weight as it could lead to them running every day, eating more vegetables, and taking vitamins. However, if a person is constantly criticized about their weight, they may adopt a goal to lose weight at any cost. With this change in goal cognition, hope may lead one to skip a majority of their meals, exercise excessively, and purge after eating. In the same way, a student may have adaptive goals at the beginning of a semester but later adopt maladaptive goals in response to increased stress. It seems unlikely that hope, generally an adaptive trait, would predict suicidal ideation in those who have never before considered suicide as a potential goal. Perhaps end-of-semester stress increased students' appraisal of suicide as a reasonable goal, thus explaining this discrepancy.

However, the current study found that mean levels of suicidal ideation were greater at Time 1 than at Time 2. Other studies examining how suicidal ideation varies within college students across semesters have found that suicidal ideation is often highest in the summer as compared to spring and fall (Van Orden et al., 2008). Similarly, students within this study may have retained some elevated suicidal ideation from the summer at Time 1 which decreased as the end of the semester approached. While this was true at the group level, it is possible that many individuals did experience higher stress levels in accordance with greater suicidal ideation at Time 2. Beyond this hypothesis, the true relationship between hope and suicidal ideation is likely complex, and the current study cannot empirically explain the discrepancies in this relationship by time.

Discrepancies in men and women

The current study also discovered gender differences in the abilities of hope, optimism, and hopelessness to predict suicidal ideation. Specifically, in women, both hope and hopelessness predicted changes in suicidal ideation over time; whereas, in men, only hopelessness predicted changes in suicidal ideation. This difference could be related, in part, to the differences in self-injury between men and women. A recent meta-analysis examining the prevalence in non-suicidal self-injury across both clinical and non-clinical samples found that women are 1.5 times more likely to report engaging in non-suicidal self-injury than men (Bresin & Schoenleber, 2015). In addition, research shows that women are more likely to engage in non-suicidal self-injury for intrapersonal reasons, such as feeling unhappy or depressed; whereas, men typically exhibit interpersonal motivations, such as to join a group (Laye-Gindhu & Schonert-Reichl, 2005). The increased prevalence and possible affect-regulation purposes of self-injury in women could be associated with increased hope (i.e., beliefs in one's abilities to reach their goals of affect-regulation through self-injury). This association could, in turn, relate to women believing that they also have the abilities (i.e., increased hope) to reach further maladaptive goals, such as suicide.

Despite this possible connection, there are many limitations to these analyses that suggest these results may be unsubstantiated. First, these findings must be interpreted with caution as the sample sizes between these groups were different (i.e., 346 women and 109 men). Thus, the difference in hope's predictive abilities across gender could simply be due to a difference in the power of the analyses. Additionally, LVPAs attempting to measure this structural model did not achieve acceptable model fit. Given these limitations and the current findings reliance on multiple regression analyses, I am less confident in the replicability of these results. This

potential gender difference in predicting suicidal ideation should be examined in future studies with larger sample sizes and a more even distribution of men and women. If true gender differences are confirmed, this information could aid in understanding the gender differences across many other aspects of suicidality (e.g., women having higher attempted suicide rates, men having higher completed suicide rates, men using more violent methods for suicide, etc.; Schrijvers, Bollen, & Sabbe, 2012; Henderson, Mellin, & Patel, 2005).

Limitations

The current study contains a number of methodological, statistical, and theoretical limitations. Concerning methodology, this study relies exclusively on self-report data and may be subject to social desirability bias (Van de Mortel, 2008). Thus, those participating may have underreported thoughts and feelings that they deemed socially unacceptable, such as suicidal thoughts. Additionally, all undergraduates who participated in Time 1 of the study did not go on to complete Time 2, and results could be biased by differential attrition (Lavrakas, 2008). While this is a concern, it is unlikely that the drop-out rate influenced our results as those who did and did not complete the study were compared on all variables of interest and showed negligible differences (See Table 3). Finally, this study used data from a sample of undergraduate college students. Thus, results may not generalize to other populations.

Several statistical limitations are also of note. First, I was unable to use the DWLS estimation method with the given data. Although several attempts were made, the specified models within LISREL would not converge with the DWLS estimation method. Thus, the ML estimation method was used instead. Although not the preferred estimation method given the characteristics of these data, much of the multivariate research in this area has used the ML estimation method with data that has variety of response formats (Gallagher & Lopez, 2009;

Gomez, McLauren, Sharp, Smith, Hearn, & Turner, 2015; Iliceto & Fino, 2015; Magaletta & Oliver, 1999; Rand, 2009; Steed, 2001). Also, statistical research indicates that there are pros and cons to using ML over DWLS. Li (2016a) compared robust ML and DWLS in CFA with ordinal data and found that there were circumstances in which each outperformed the other. However, a separate study examining the factor structure of the Chinese version of the LOT-R found that DWLS was less biased in estimating factor loadings and inter-factor correlations as compared to ML (Li, 2012). Additionally, some statisticians have found that ML performs better in controlling Type 1 error over DWLS when latent variables are not normally distributed (Suh, 2015; Li, 2016a); whereas, others have found that DWLS outperforms ML in controlling for this (Li, 2016b). In light of this mixed evidence on the use of ML over DWLS, it is possible that the current results were artifacts of the use of ML estimation method. However, as is the case with many statistical decisions, both estimation methods likely have limitations.

A second statistical limitation is that I used parcels to conduct the LVPA. Some scholars have expressed concern about the multidimensionality and meaning of the constructed parcels within the measures used (Little et al., 2002). To reduce this concern, specific strategies outlined in the method were used to ensure that each parcel encompassed a single, unidimensional construct and clear meaning in line with its measure. Although precaution was taken, parceling could have biased the LVPA results if any subjective biases contaminated the construction of the parcels. Considering I used random assignment with a random number generator to create these parcels, this introduction of bias is unlikely. Third, the use of SIS in LVPA models is a limitation given the findings for Aim 2. The SIS may not be the preferred measure of suicidal ideation within college students, and findings are limited given the discussed issues with the validity of this scale. Additionally, the SIS demonstrated concerns in regard to skew and kurtosis that could

have influenced results. Despite this, the current study still provides useful information given expectancy's relationship with suicidal ideation.

Finally, one theoretical consideration given the findings should be noted. This study examined hope as conceptualized by Snyder (1991). However, there are two other measures and conceptualizations of hope that are frequently used within the positive psychology literature (Herth, 1992; Miller & Powers, 1988). One study comparing these three measures of hope (i.e., the Adult Hope Scale, Herth Hope Index, and Miller Hope Scale) found that the scales differ in their relationships with depressive symptoms, anxiety, and their inverse relationship with the BHS (Carretta et al., 2014). Thus, the present results may only pertain to Snyder's (1991) conceptualization of hope.

Future Directions

Future research should aim to replicate trait expectancy CFA findings in other samples. Research examining these relationships should aim to use DWLS estimation method if possible. In addition, future research should further explore hope's relationship with suicidality. Expanding the current findings, research should aim to identify the factors that contribute to hope's relationship with suicidality. Specifically, the hypothesis that both negative life events and depressive symptoms moderate the relationship between hope and suicidal ideation should be examined. Additionally, it should be tested whether hope also predicts other aspects of suicidality, such as suicidal behaviors and suicide attempts. If a strong relationship between hope and suicidality exists, research should examine whether identifying more adaptive "living" goals reduces the harmful impact of hope. Finally, future research should attempt to gain a better theoretical understanding of hopelessness by comparing the BHS to various like measures.

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TABLES

Table 1. A Priori CFA Models of the AHS, LOT-R, and BHS

Model	Factors	Factor Names	Description
1	1	General Expectancy	Model 1 is a one-factor model that assumes all 32 items are reflective of a single dimension measuring General Expectancy.
2	2	Hope, Optimism	Model 2 is composed of two factors. Factor one includes all scorable items on the AHS and all Items on the BHS. The factor is conceptualized as Hope, suggesting that the AHS and BHS are redundant and thus measure hope on a continuum. Factor two includes all scorable items on the LOT-R and is conceptualized as optimism.
3	2	Hope, Optimism	Model 3 is composed of two factors. Factor one includes all scorable items on the AHS and is conceptualized as hope. Factor two includes all scorable items on the LOT-R and all items on the BHS. This factor is conceptualized as optimism suggesting that the LOT-R and BHS are redundant and this measure optimism on a continuum.
4	2	Hope, Optimism	Model 4 is comprised of two factors. Factor one includes all scorable items on the AHS and “self-focused” items on the BHS. This factor is conceptualized as hope. Factor two includes all scorable items on the LOT-R and non-self-focused items on the BHS. This factor is conceptualized as optimism. Model 3 suggests that hopelessness is a pure conglomeration of both hope and optimism.
5	3	Hope, Hopelessness, Optimism	Model 5 is comprised of three factors. Factor one includes all scorable items on the AHS and is conceptualized as hope. Factor two includes all scorable items on the LOT-R and is conceptualized as optimism. Factor three includes all items on the BHS and is conceptualized as hopelessness. Model 5 suggests that hope, optimism, and hopelessness are each unique, distinct types of expectancies.
6	3	Hope, Optimism, Feelings about the Future	Model 6 is comprised of three factors. Factor one includes all scorable items on the AHS and “self-focused” items on the BHS. This factor is conceptualized as hope. Factor two includes all scorable items on the LOT-R and “environment-focused” items on the BHS. This factor is conceptualized as optimism. Factor three includes items on the BHS that are not “self-focused” or “environment-focused” (including affectively toned items and future uncertainty items). This factor is conceptualized as feelings about the future. Model 4 suggests that hopelessness is comprised of hope, optimism, and generalized feelings about the future.

(table continues)

Table 1, continued

7	4	Hope, Optimism, Affective Expectations, Uncertainty about the Future	Model 7 is comprised of four factors. Factors one and two are identical to factors one and two in Model 6. Factor three includes affectively toned items on the BHS and is conceptualized as Affective Expectations. Factor four includes uncertainty items on the BHS and is conceptualized as Uncertainty about the Future. Model 7 suggests that hopelessness is comprised of hope, optimism, affective expectations, and uncertainty about the future.
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Note: CFA= confirmatory factor analysis, AHS = Adult Hope Scale, BHS = Beck Hopelessness Scale, LOT-R = Life Orientation Test- Revised

Table 2. Parceling Strategy for LVPA Models

Name	Hope	Optimism	Hopelessness	Suicidal Ideation
Parcel 1	AHS6, AHS10, AHS2	LOT-R10, LOT-R9	BHS2, BHS13, BHS3, BHS8, BHS14, BHS11, BHS7	SIS5, SIS6, SIS3
Parcel 2	AHS12, AHS4	LOT-R3, LOT-R4	BHS18, BHS9, BHS16, BHS12, BHS20, BHS5	SIS9, SIS1, SIS8
Parcel 3	AHS8, AHS1	LOT-R1, LOT-R7	BHS4, BHS1, BHS15, BHS19, BHS17, BHS6	SIS10, SIS4, SIS2, SIS7

Note: AHS = Adult Hope Scale, BHS = Beck Hopelessness Scale, LOT-R = Life Orientation Test- Revised, SIS = Suicide Ideation Scale

Table 3. Independent T-Tests and Chi-Squared tests with Significant Differences for Missingness

Missingness Examined	Variables with Significant Differences (p < .01)
Participants who participated at Time 1 and Time 2 compared to participants who only participated at Time 1	Time 1 BHS Item 5 (p = .002) Time 1 AHS Item 2 (p = .009) Time 1 AHS Item 12 (p = .007)
Participants with no missing data at Time 1 compared to participants with at least one missing data point at Time 1	Time 1 SIS Item 9 (p = .003)
Participants with no missing data at Time 2 compared to participants with at least one missing data point at Time 2	Time 2 SIS Item 5 (p = .002)

Note: AHS = Adult Hope Scale, BHS = Beck Hopelessness Scale, SIS = Suicide Ideation Scale

Table 4. Means, Standard Deviations, Cronbach's Alpha, and Correlations

	1.	2.	3.	4.	5.
1. AHS	---	.65**	-.67**	-.40**	-.22**
2. LOT-R		---	-.66**	-.44**	-.30**
3. BHS			---	.52**	.42**
4. Time 1 SIS				---	.48**
5. Time 2 SIS					---
Mean	50.82	15.61	2.98	12.21	11.44
SD	8.28	4.86	3.58	4.98	4.08
α	.88	.84	.87	.93	.93

Note: * p < .05, **p < .01, AHS = Adult Hope Scale, BHS = Beck Hopelessness Scale, LOT-R = Life Orientation Test- Revised, SIS = Suicide Ideation Scale

Table 5. CFA Fit Indices for A Priori Models of the AHS, LOT-R, and BHS

Model	Factors	Factor Names	χ^2	df	p	SRMR (\leq 0.08)	RMSEA (\leq 0.06)	RMSEA 90% CI	CFI (\geq 0.95)	NNFI ($>$ 0.95)	AIC (Lowest)
1	1	Expectancy	2260.63	464	<0.001	0.075	0.110	0.100-0.110	0.89	0.88	2960.23
2	2	Hope, Optimism	1834.97	463	<0.001	0.071	0.096	0.092-0.100	0.94	0.93	2535.79
3	2	Hope, Optimism	1789.99	463	<0.001	0.069	0.094	0.090-0.098	0.94	0.93	2449.30
4	2	Hope, Optimism	1879.81	463	<0.001	0.074	0.098	0.094-0.100	0.94	0.93	2609.94
5	3	Hope, Hopelessness, Optimism	1489.41	461	<0.001	0.065	0.078	0.074-0.082	0.95	0.95	1862.42
6	3	Hope, Optimism, Feelings about the Future	1792.20	461	<0.001	0.075	0.092	0.088-0.096	0.94	0.93	2374.5
7	4	Hope, Optimism, Affective Expectations, Uncertainty about the Future	1680.46	458	<0.001	0.072	0.086	0.082-0.090	0.94	0.94	2134.98

Note: χ^2 = chi-square, df = degrees of freedom, RMSEA = Root Mean Square Error of Approximation, CFI = Confirmatory Fit Index, NNFI = Non-Normed Fit Index, SRMR= Standardized Root Mean Square Residual

Table 6. CFA Fit Indices for SIS Models for Time 1 and Time 2

Model	Factors	Factor Names	χ^2	df	p	SRMR (≤ 0.08)	RMSEA (≤ 0.06)	RMSEA 90% CI	CFI (≥ 0.95)	NNFI (> 0.95)	AIC (Lowest)
1	1	Suicidal Ideation	648.46 (474.12)	35	<0.001 (<.001)	.069 (.072)	.196 (.193)	.180 - .210 (.180 - .210)	.91 (.92)	.89 (.90)	688.46 (514.12)
2	2	Suicidal Desire, Resolved Plans and Preparation	354.93 (286.38)	34	<0.001 (<.001)	.060 (.061)	.144 (.149)	.130 - .160 (.130 - .160)	.95 (.95)	.93 (.93)	396.93 (328.38)

Note: Numbers in parentheses indicate results for Time 2 SIS data. χ^2 = chi-square, df = degrees of freedom, RMSEA = Root Mean Square Error of Approximation, CFI = Confirmatory Fit Index, NNFI = Non-Normed Fit Index, SRMR= Standardized Root Mean Square Residual

Table 7. Standardized Betas and Fit Indices for Latent Variable Path Models

	$\beta_{4,1}$	$\beta_{4,2}$	$\beta_{4,3}$	χ^2	df	<i>p</i>	RMSEA (≤ 0.06)	RMSEA 90% CI	CFI (≥ 0.95)	NNFI (> 0.95)	SRMR (≤ 0.08)
Model 1: Time 1 SIS	.03	.11	.53*	164.4	48	< .001	.073	.061 - .085	.98	.98	.04
Model 2: Time 2 SIS (FIML)	.31*	-.06	.65*	169.30	48	< .001	.074	.062 - .087			
Model 2: Time 2 SIS	.33*	-.08	.66*	163.69	48	< .001	.085	.071-.099	.98	.97	.05
Model 3: SIS Change (FIML)	.36*	.05	.57*	136.09	48	< .001	.063	.051 - .076			
Model 3: SIS Change	.38*	.03	.58*	133.56	48	< .001	.073	.058-.088	.98	.98	.04
Model 3: Female SIS Change (FIML)	.49*	-.10	.49*	117.44	48	< .001	.065	.050 - .079			
Model 3: Male SIS Change (FIML)	.22	.50	1.05*	86.38	48	< .001	.086	.056 - .110			

Note: : * $p < .05$, SIS = Suicide Ideation Scale, FIML= Full Information Maximum Likelihood, χ^2 = chi-square, df = degrees of freedom, RMSEA = Root Mean Square Error of Approximation, CFI = Confirmatory Fit Index, NNFI = Non-Normed Fit Index, SRMR= Standardized Root Mean Square Residual

Table 8. Correlations and Residual Variances for Latent Variable Path Models

	$\Psi_{2,1}$	$\Psi_{3,1}$	$\Psi_{3,2}$	$\Psi_{4,4}$	$\Theta_{1,1}$	$\Theta_{2,2}$	$\Theta_{3,3}$	$\Theta_{4,4}$	$\Theta_{5,5}$	$\Theta_{6,6}$	$\Theta_{7,7}$	$\Theta_{8,8}$	$\Theta_{9,9}$	$\Theta_{10,10}$	$\Theta_{11,11}$	$\Theta_{12,12}$
Model 1: Time 1 SIS	.76	-.77	-.77	.65	.2	.32	.48	.33	.35	.30	.34	.31	.33	.22	.13	.24
Model 2: Time 2 SIS (FIML)	.76	-.77	-.77	.76	.21	.31	.47	.33	.35	.30	.34	.30	.35	.21	.13	.17
Model 2: Time 2 SIS	.76	-.78	-.75	.75	.23	.29	.41	.30	.32	.28	.35	.27	.33	.23	.13	.17
Model 3: SIS Change (FIML)	.76	-.77	-.77	.87	.20	.31	.47	.33	.35	.30	.34	.30	.35	.24	.22	.17
Model 3: SIS Change	.76	-.78	-.75	.87	.22	.29	.41	.30	.32	.28	.35	.27	.33	.24	.22	.17
Model 3: Female SIS Change (FIML)	.79	-.78	-.74	.89	.18	.29	.45	.36	.36	.29	.36	.28	.31	.38	.34	.14
Model 3: Male SIS Change (FIML)	.66	-.73	-.83	.66	.23	.40	.50	.25	.30	.32	.29	.35	.42	.06	.12	.19

Note: SIS = Suicide Ideation Scale, FIML= Full Information Maximum Likelihood

Table 9. Standardized Lambdas for Indicators for All Latent Variable Path Models

	$\lambda_{1,1}$	$\lambda_{2,1}$	$\lambda_{3,1}$	$\lambda_{4,2}$	$\lambda_{5,2}$	$\lambda_{6,2}$	$\lambda_{7,3}$	$\lambda_{8,3}$	$\lambda_{9,3}$	$\lambda_{10,4}$	$\lambda_{11,4}$	$\lambda_{12,4}$
Model 1: Time 1 SIS	.90	.82	.72	.82	.81	.83	.81	.83	.82	.85	.90	.87
Model 2: Time 2 SIS (FIML)	.89	.83	.73	.82	.81	.83	.81	.84	.81	.89	.93	.91
Model 2: Time 2 SIS	.88	.84	.77	.84	.82	.85	.81	.85	.82	.89	.93	.91
Model 3: SIS Change (FIML)	.89	.83	.73	.82	.81	.83	.81	.84	.81	.87	.88	.91
Model 3: SIS Change	.88	.84	.77	.84	.82	.85	.81	.85	.82	.87	.88	.91
Model 3: Female SIS Change (FIML)	.90	.85	.74	.80	.80	.84	.80	.85	.83	.79	.81	.93
Model 3: Male SIS Change (FIML)	.88	.77	.71	.87	.84	.82	.84	.81	.76	.97	.94	.90

Note: SIS = Suicide Ideation Scale, FIML= Full Information Maximum Likelihood

FIGURES

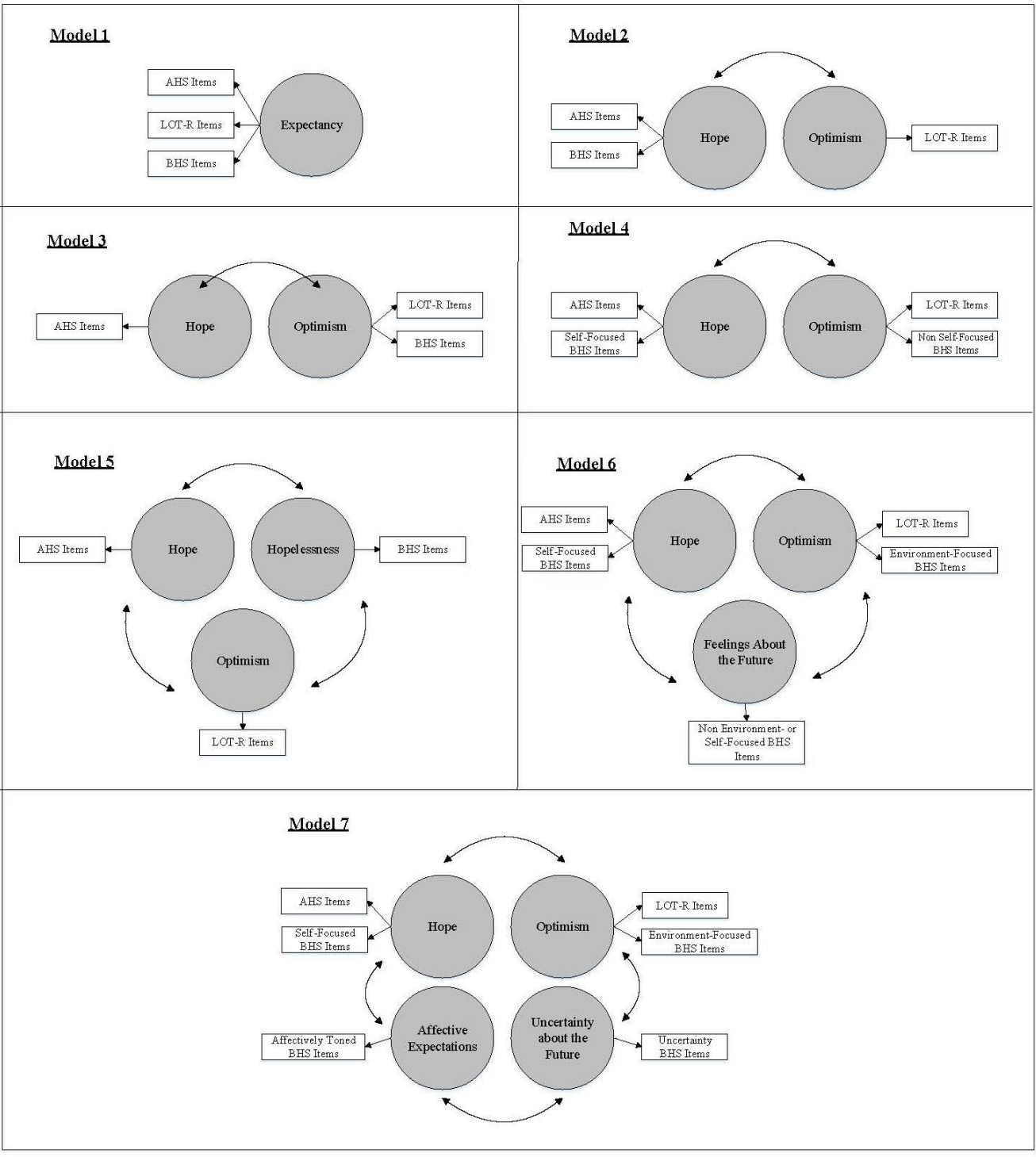


Figure 1. Conceptual Confirmatory Factor Analysis Models of the AHS, LOT-R, and BHS (See Figures 2-8 for statistical models)

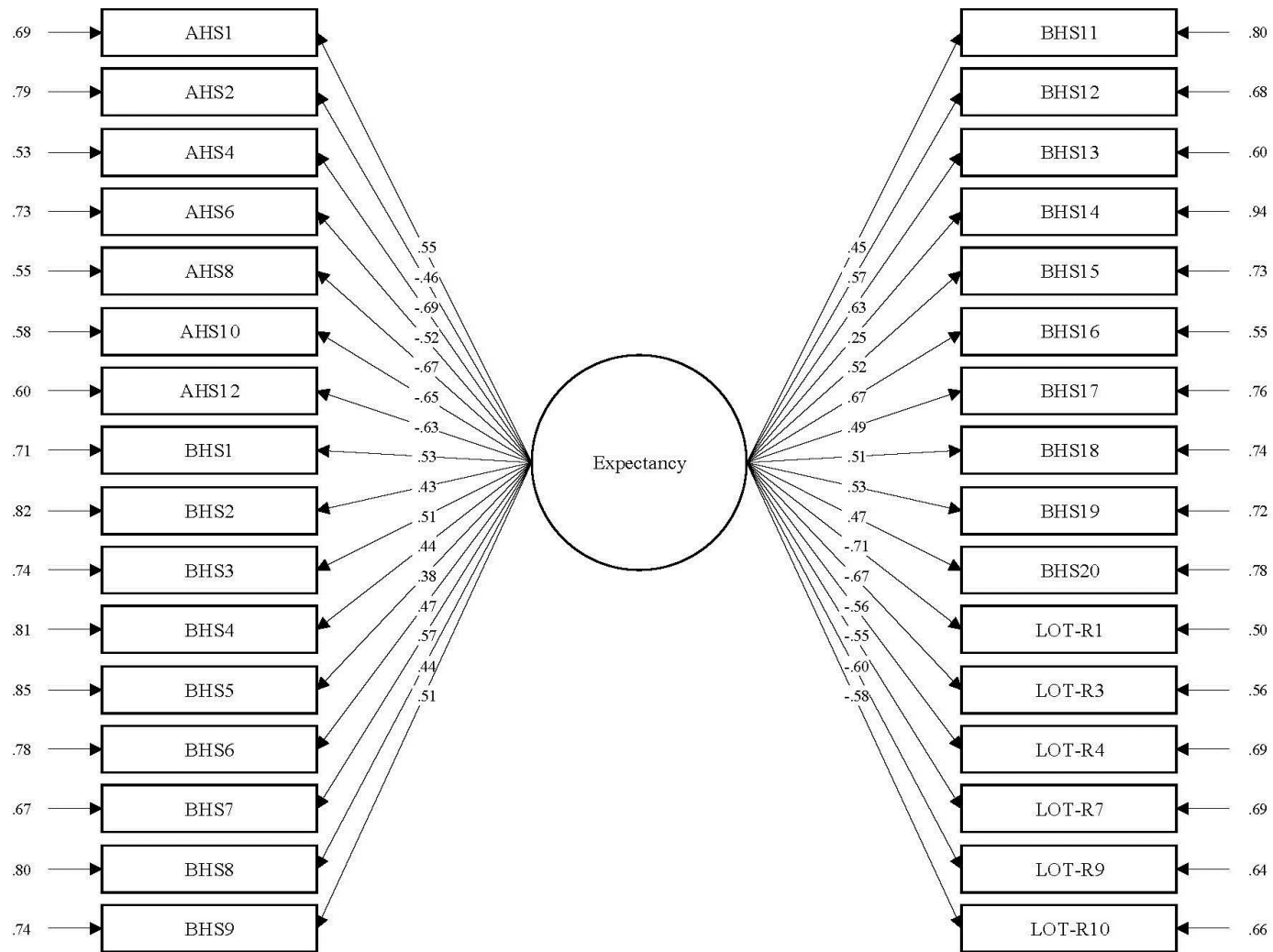


Figure 2. Confirmatory Factor Analysis of the AHS, LOT-R, and BHS: Model 1 ($\chi^2 = 2260.63$, $p < .001$, SRMR = .075, RMSEA = .11, RMSEA 90% CI = .100 - .110, CFI = .89, NNFI = .88, AIC = 2960.23)

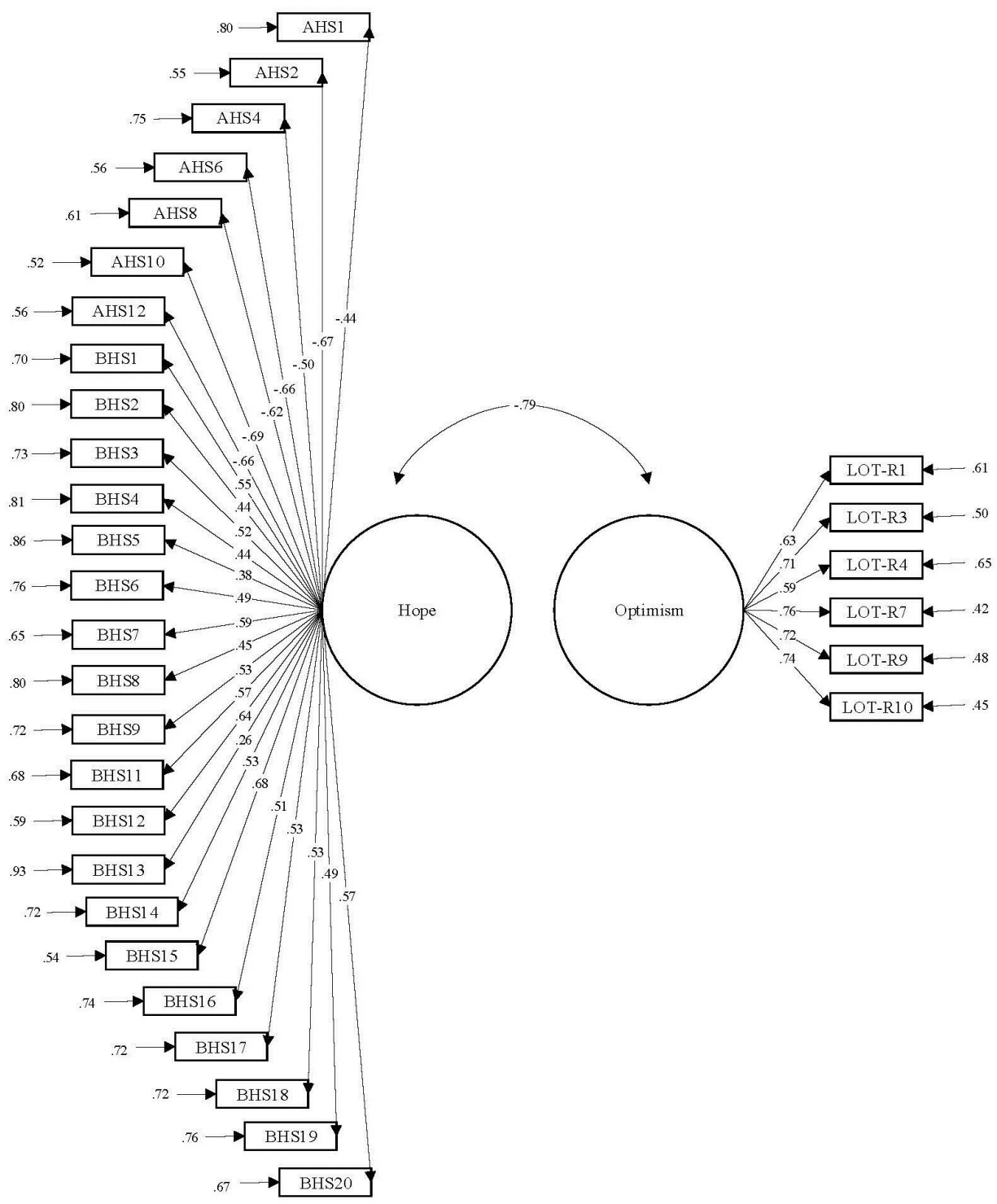


Figure 3. Confirmatory Factor Analysis of the AHS, LOT-R, and BHS: Model 2 ($\chi^2 = 1834.97, p < .001, SRMR = .071, RMSEA = .096, RMSEA\ 90\% \text{ CI} = .092 - .100, CFI = .94, NNFI = .93, AIC = 2535.79$)

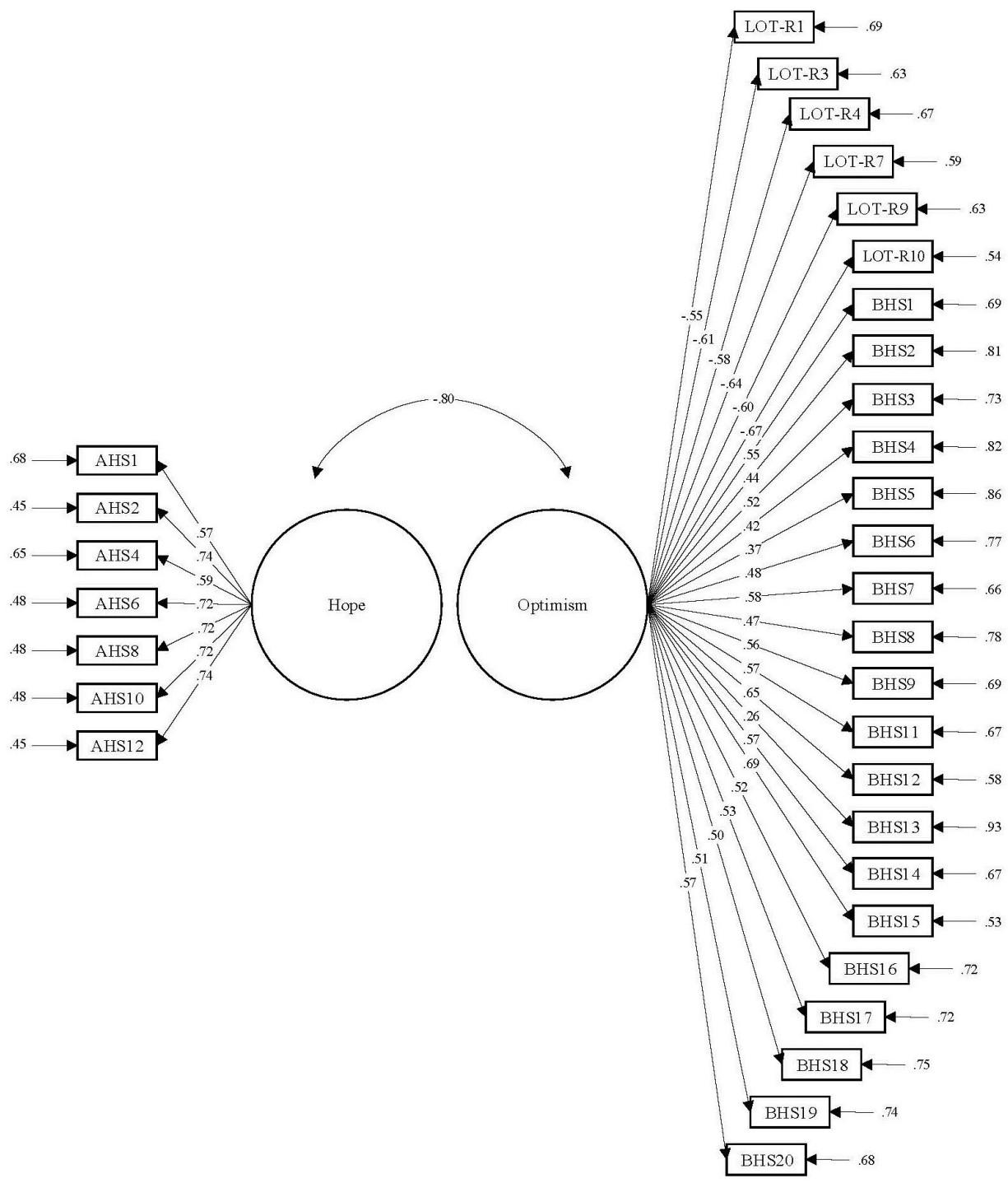


Figure 4. Confirmatory Factor Analysis of the AHS, LOT-R, and BHS: Model 3 ($\chi^2 = 1789.99, p < .001, SRMR = .069, RMSEA = .094, RMSEA\ 90\% \text{ CI} = .090 - .098, CFI = .94, NNFI = .93, AIC = 2449.30$)

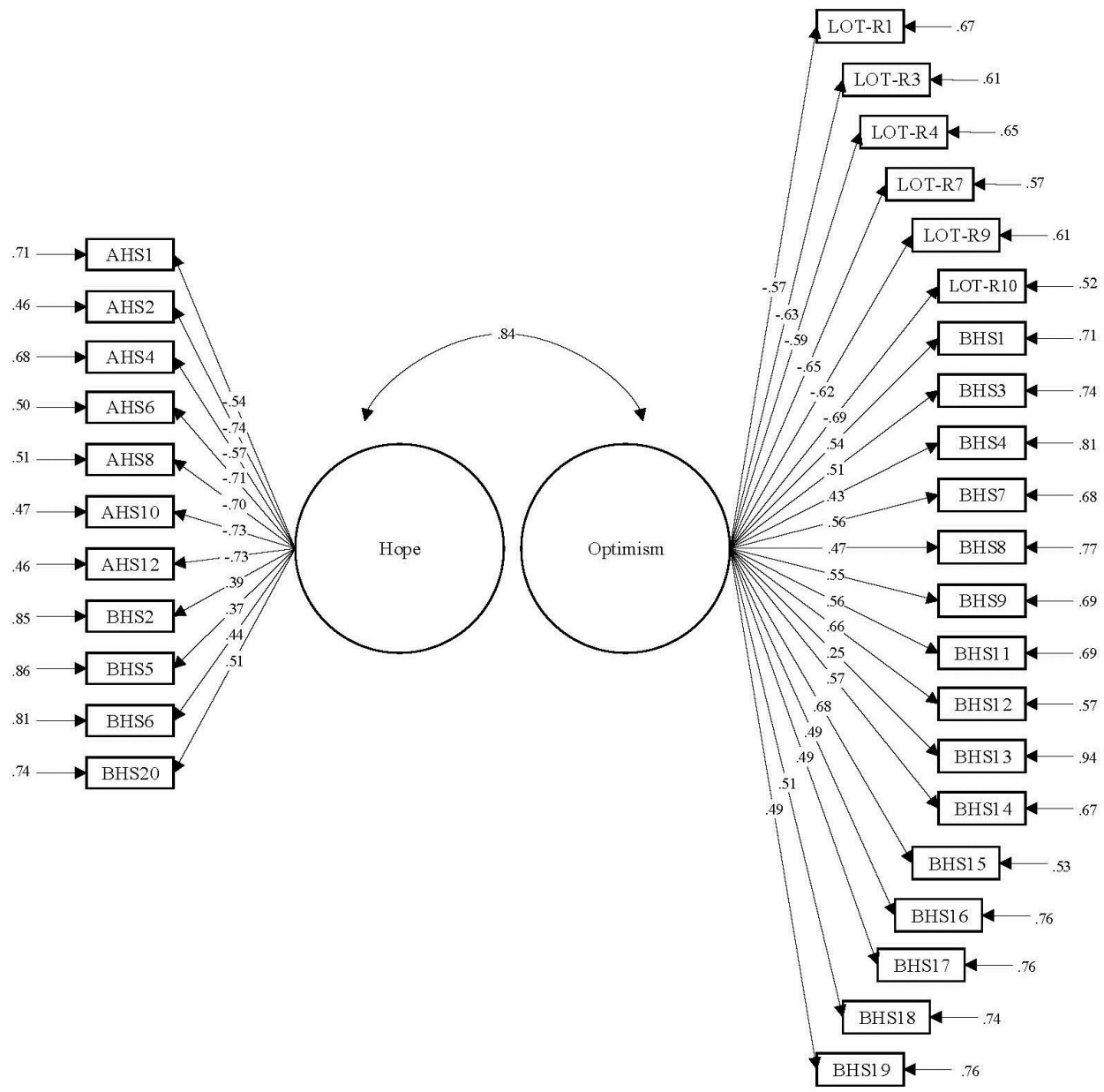


Figure 5. Confirmatory Factor Analysis of the AHS, LOT-R, and BHS: Model 4 ($\chi^2 = 1879.81, p < .001, SRMR = .074, RMSEA = .098, RMSEA\ 90\% \text{ CI} = .094 - .100, CFI = .94, NNFI = .93, AIC = 2609.94$)

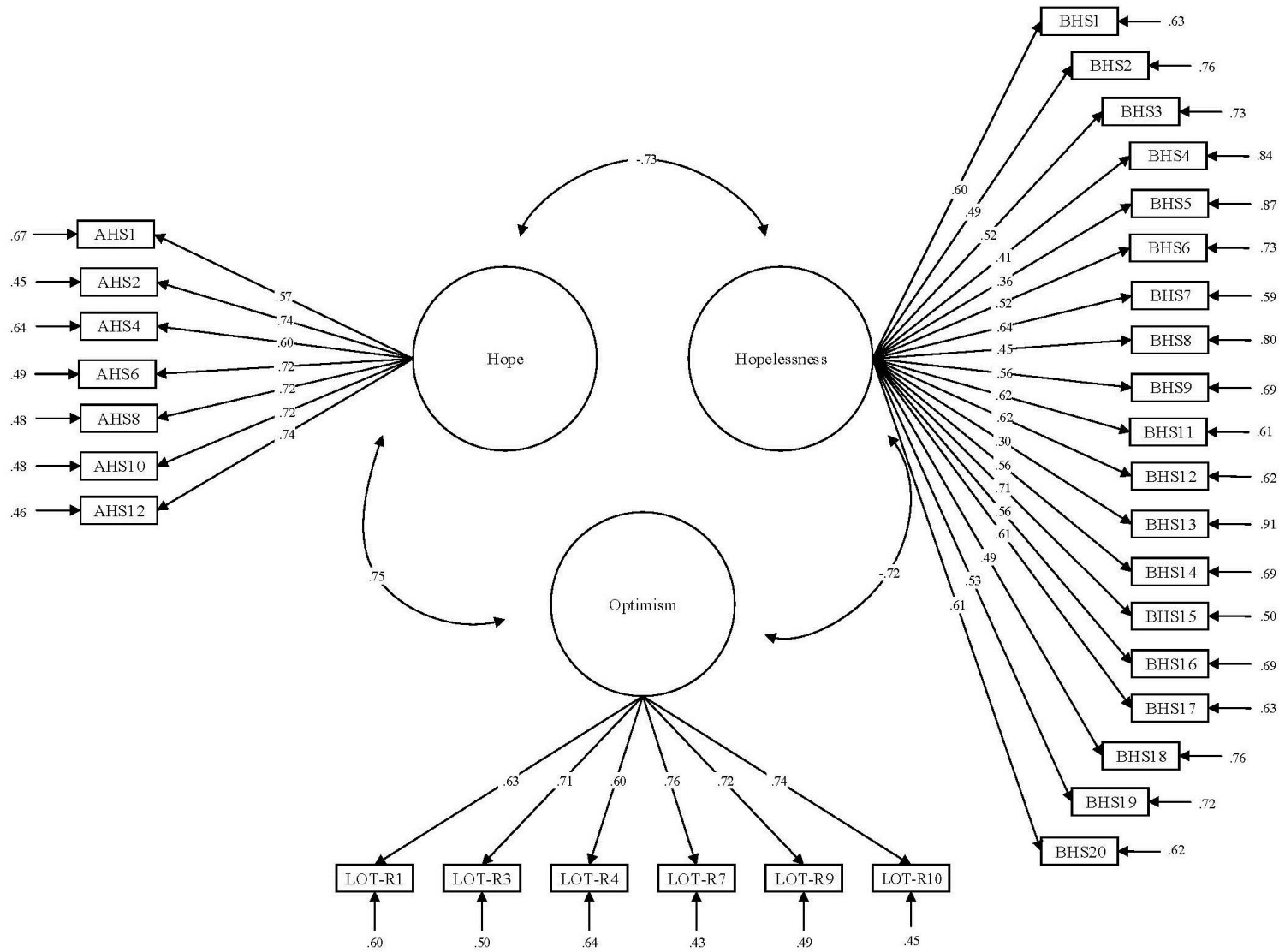


Figure 6. Confirmatory Factor Analysis of the AHS, LOT-R, and BHS: Model 5
 $(\chi^2 = 1489.41, p < .001, SRMR = .065, RMSEA = .078, RMSEA\ 90\% \text{ CI} = .074 - .082, CFI = .95, NNFI = .95, AIC = 1862.42)$

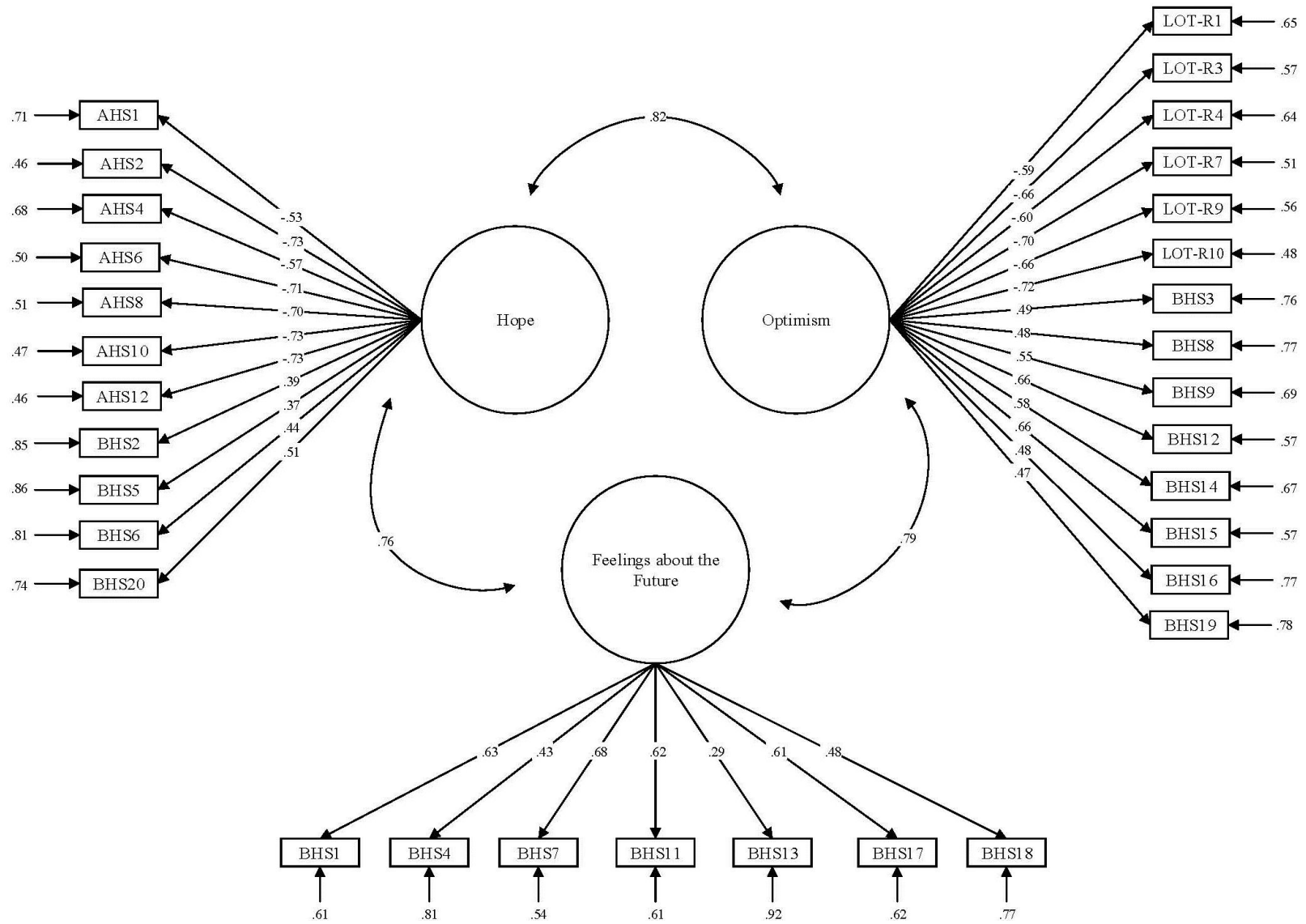


Figure 7. Confirmatory Factor Analysis of the AHS, LOT-R, and BHS: Model 6 ($\chi^2 = 1792.20$, $p < .001$, SRMR = .075, RMSEA = .092, RMSEA 90% CI = .088 - .096, CFI = .94, NNFI = .93, AIC = 2374.50)

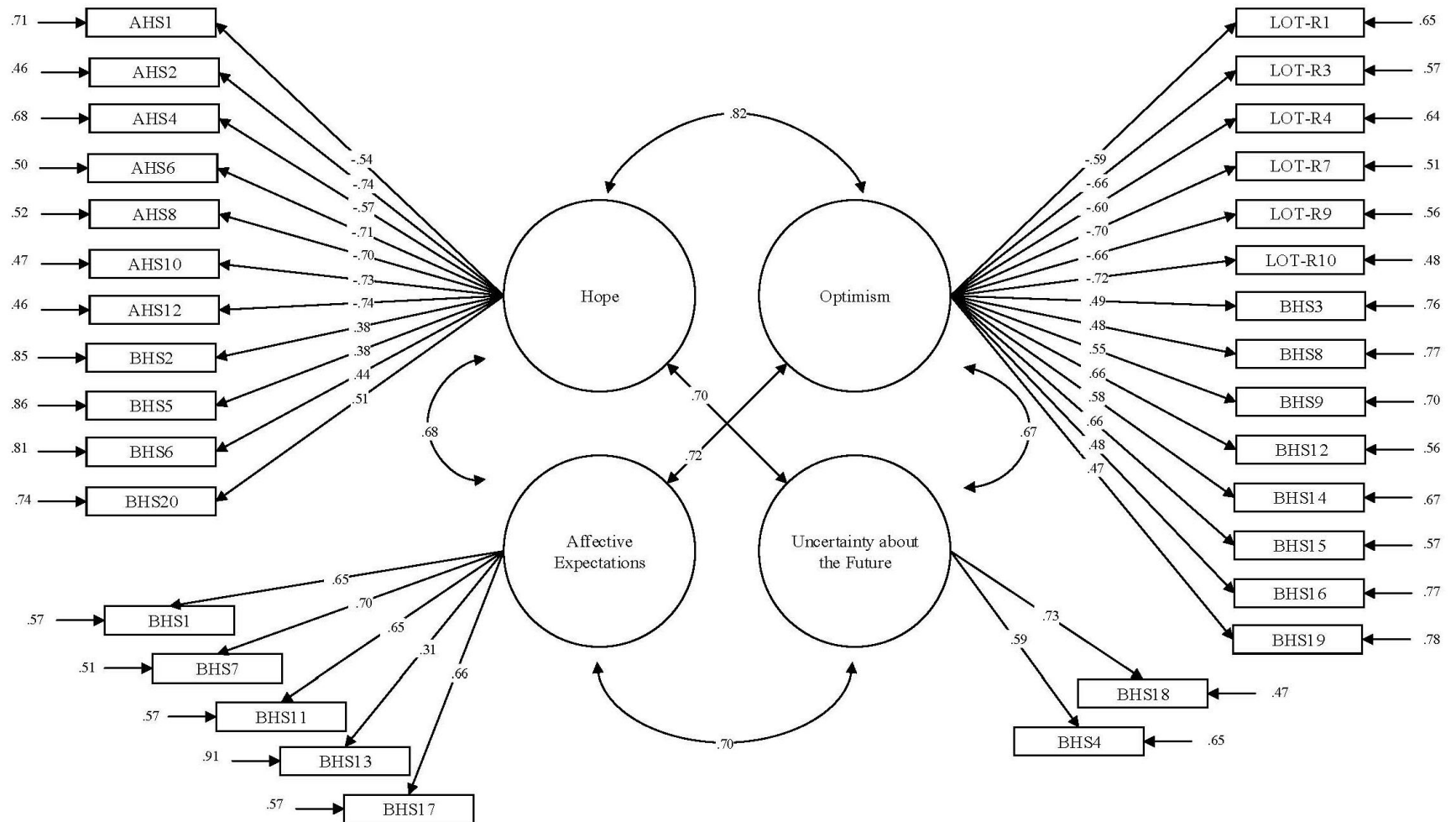


Figure 8. Confirmatory Factor Analysis of the AHS, LOT-R, and BHS: Model 7
 ($\chi^2 = 1680.46$, $p < .001$, SRMR = .072, RMSEA = .086, RMSEA 90% CI = .082 - .090, CFI = .94, NNFI = .94, AIC = 2134.98)

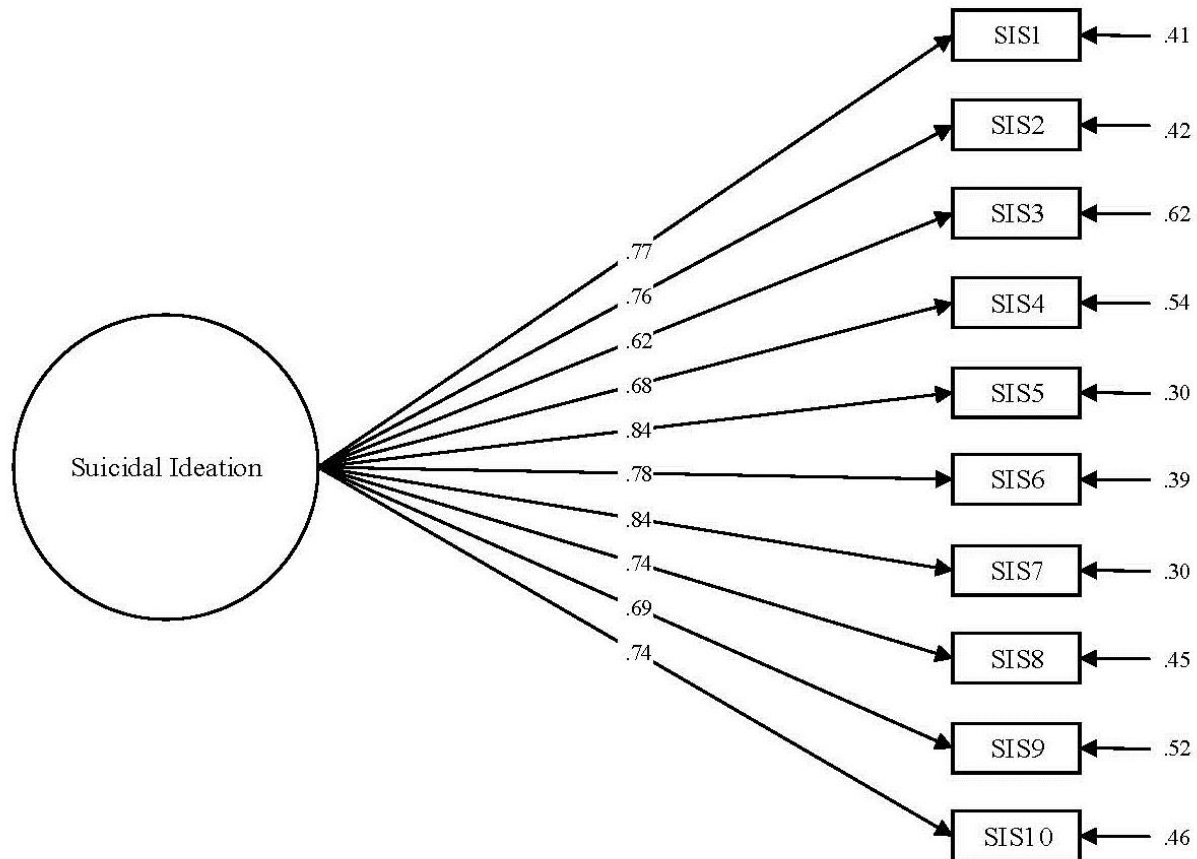


Figure 9. Confirmatory Factor Analysis of the Suicide Ideation Scale: Model 1
 ($\chi^2 = 648.46$, $p < .001$, SRMR = .069, RMSEA = .196, RMSEA 90% CI = .180 - .210, CFI = .91, NNFI = .89, AIC = 688.46)

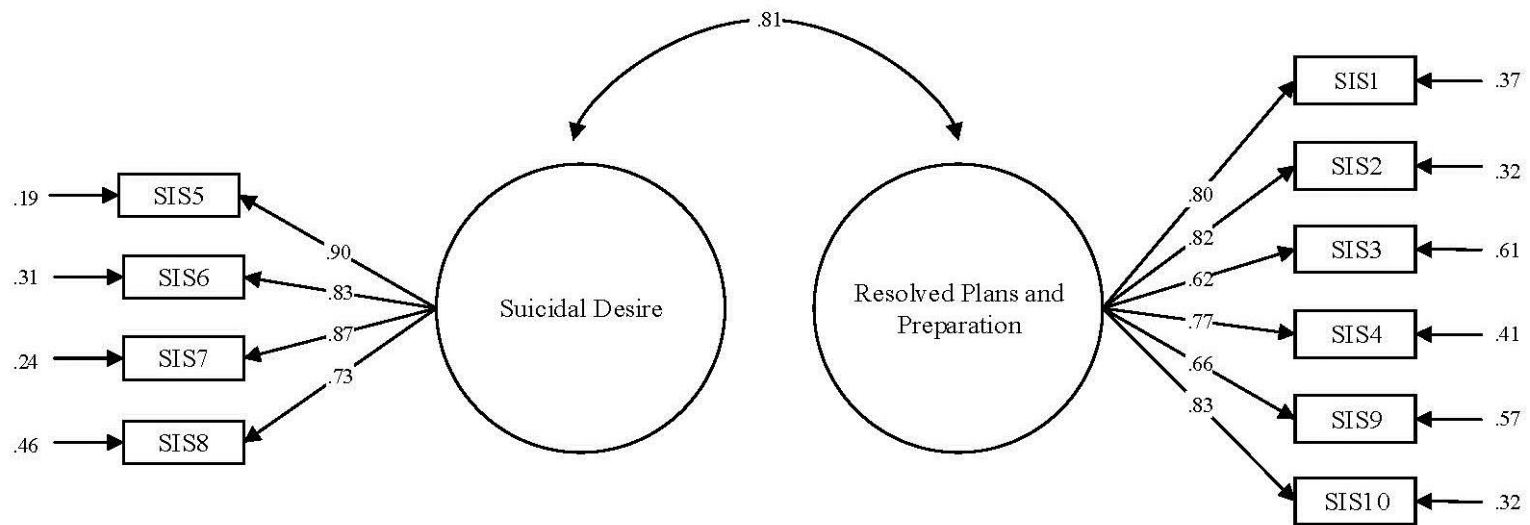


Figure 10. Confirmatory Factor Analysis of the Suicide Ideation Scale: Model 2
 ($\chi^2 = 354.93$, $p < .001$, SRMR = .060, RMSEA = .144, RMSEA 90% CI = .130 - .160, CFI = .95, NNFI = .93, AIC = 396.93)

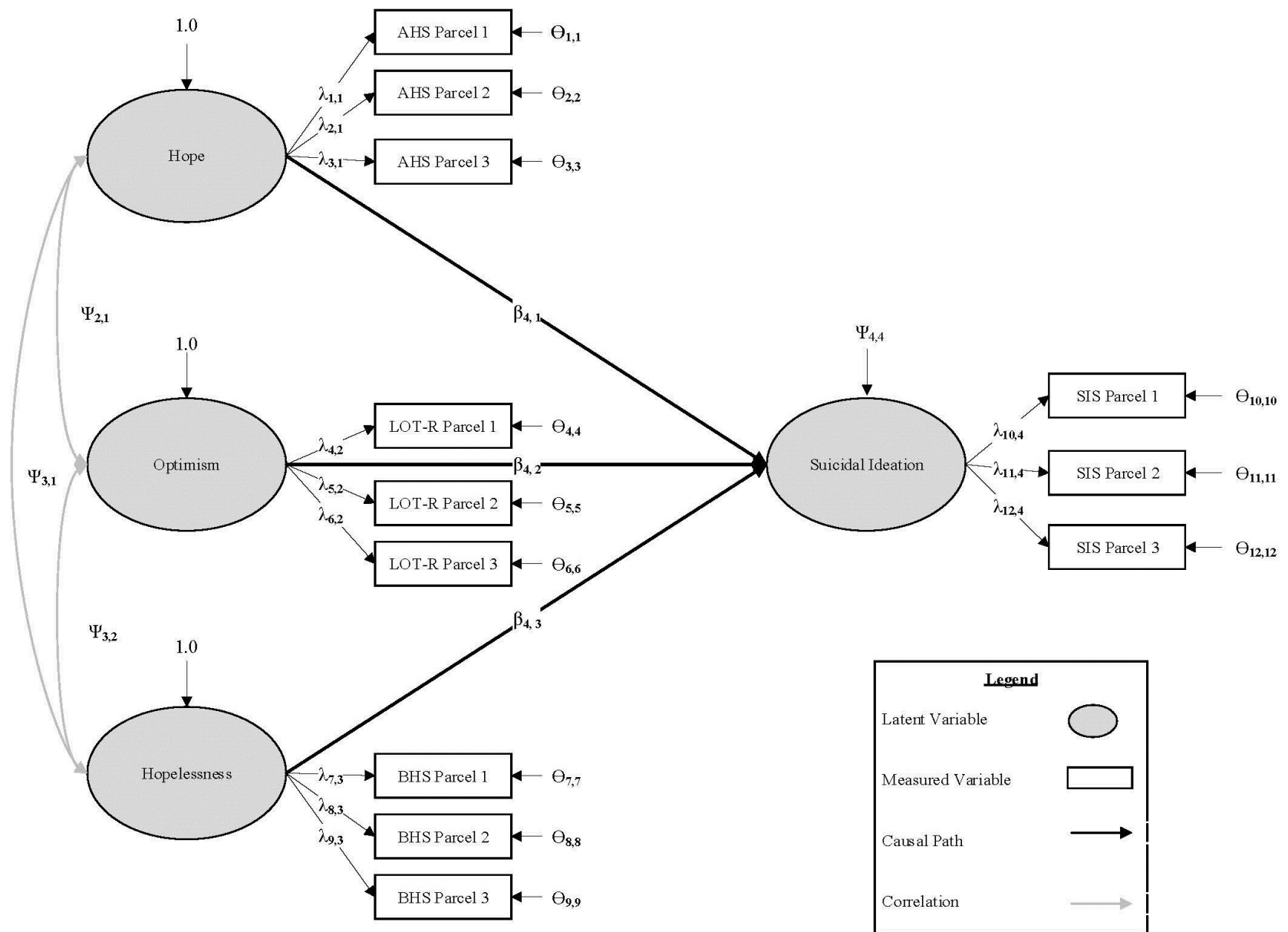


Figure 11. Latent Variable Path Analysis of Expectancies Predicting Suicidal Ideation: Models 1-3

APPENDIX

Adult Hope Scale (Snyder et al., 19991)

Goals Checklist

Directions: Read each item carefully. Using the scale shown below, please select the number that best describes YOU and put that number in the blank provided.

1 = *Definitely False*

2 = *Mostly False*

3 = *Somewhat False*

4 = *Slightly False*

5 = *Slightly True*

6 = *Somewhat True*

7 = *Mostly True*

8 = *Definitely True*

- ___ 1. I can think of many ways to get out of a jam.
- ___ 2. I energetically pursue my goals.
- ___ 3. I feel tired most of the time.
- ___ 4. There are lots of ways around any problem.
- ___ 5. I am easily downed in an argument.
- ___ 6. I can think of many ways in life to get the things that are most important to me.
- ___ 7. I worry about my health.
- ___ 8. Even when others get discouraged, I know I can find a way to solve the problem.
- ___ 9. My past experiences have prepared me well for my future.
- ___ 10. I've been pretty successful in life.
- ___ 11. I usually find myself worrying about something.
- ___ 12. I meet the goals I set for myself.

Life Orientation Test- Revised (Scheier, Carver, & Bridges, 1994)

Instructions: Please answer the following questions about yourself by indicating the extent of your agreement using the following scale:

0 = strongly disagree

1 = disagree

2 = neutral

3 = agree

4 = strongly agree

Be as honest as you can throughout, and try not to let your responses to one question influence your responses to other questions. There are no right or wrong answers.

- _____ 1. In uncertain times, I usually expect the best.
- _____ 2. It's easy for me to relax.
- _____ 3. If something can go wrong for me, it will.
- _____ 4. I'm always optimistic about my future.
- _____ 5. I enjoy my friends a lot.
- _____ 6. It's important for me to keep busy.
- _____ 7. I hardly ever expect things to go my way.
- _____ 8. I don't get upset too easily.
- _____ 9. I rarely count on good things happening to me.
- _____ 10. Overall, I expect more good things to happen to me than bad.

Beck Hopelessness Scale (Beck et al., 1974)

Directions: Read each item carefully. Please indicate if each item is true or false for you.

1. I look forward to the future with hope and enthusiasm.
2. I might as well give up because I can't make things better for myself.
3. When things are going badly, I am helped by knowing they can't stay that way forever.
4. I can't imagine what my life would be like in 10 years.
5. I have enough time to accomplish the things I most want to do.
6. In the future, I expect to succeed in what concerns me most.
7. My future seems dark to me.
8. I expect to get more of the good things in life than the average person.
9. I just don't get the breaks, and there's no reason to believe I will in the future.
10. My past experiences have prepared me well for my future.
11. All I can see ahead of me is unpleasantness rather than pleasantness.
12. I don't expect to get what I really want.
13. When I look ahead to the future, I expect I will be happier than I am now.
14. Things just won't work out the way I want them to.
15. I have great faith in the future.
16. I never get what I want so it's foolish to want anything.
17. It is very unlikely that I will get any real satisfaction in the future.
18. The future seems vague and uncertain to me.
19. I can look forward to more good times than bad times.
20. There's no use in really trying to get something I want because I probably won't get it.

Suicide Ideation Scale (Rudd, 1989)

Directions: Carefully read the items below. Using the scale below, please indicate how often you have felt or behaved that way during the past year.

1= Never or None of the Time

2

3

4

5=Always or A Great Many Times

1. I have been thinking of ways to kill myself.
2. I have told someone I want to kill myself.
3. I believe my life will end in suicide.
4. I have made attempts to kill myself.
5. I feel life just isn't worth living.
6. Life is so bad I feel like giving up.
7. I just wish my life would end.
8. It would be better for everyone involved if I were to die.
9. I feel there is no solution to my problems other than taking my own life.
10. I have come close to taking my own life