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Promoting Competence in College Students: The Role of Psychological Flexibility

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PROMOTING COMPETENCE IN COLLEGE STUDENTS: THE ROLE OF PSYCHOLOGICAL FLEXIBILITY

A Dissertation Presented

by

Elyse Rubin Rosenberg

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of

The University of Vermont

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Abstract

Psychological flexibility (PF), the core process of Acceptance and Commitment Therapy (ACT; a third-wave cognitive-behavioral therapy), is the ability to stay focused on the present moment and intentionally engage in value-driven behavior despite experiencing difficult thoughts or feelings. This multifaceted construct includes components that target processes occurring both internally (e.g., cognitive processes) and behaviorally (e.g., value-consistent actions). Psychological flexibility has been applied to studies of adjustment in non-clinical samples and may be beneficial for college students as individuals navigate novel developmental stressors. Despite evidence suggesting the benefits of PF for psychological distress, additional work is needed to examine the potential of PF to foster adaptive functioning. The current study builds on previous research by a) conceptualizing distinct internal and behavioral components of PF as promotive factors and b) emphasizing competence-focused outcomes. This research examined the influence of components of PF over the course of an academic semester. A sample of college students ($N = 250$) completed self-report measures online at the beginning (Time 1) and end (Time 2) of a college semester. Measures included components of PF, competence, and demographic and academic information. Structural equation modeling was used to examine associations between components of PF at Time 1 on competence at Time 2, while accounting for the influence of competence at Time 1. Findings suggested that within the social domain, value-consistent action at Time 1 was associated with increased social competence at Time 2. Additional results indicated that baseline competence accounted for associations between components of PF and Time 2 competence. Implications for the dissemination of ACT-informed efforts to promote positive adjustment among college students are reviewed, and future research directions are discussed.
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Introduction

Emerging adulthood, the stage between adolescence and full adulthood, represents a significant developmental transition, during which individuals experience increased stress stemming from heightened autonomy and responsibility for building an adult life (Arnett, 2000). During this period, individuals develop competence in a variety of domains. Particularly for the increasing number of individuals who attend college during this stage (Federal Interagency Forum on Child and Family Statistics, 2014; U.S. Department of Labor, 2015), the successful navigation of emerging adulthood involves developing academic and social competence. Therefore, enhancing constructs that may help college students to effectively manage the stressors of this developmental stage may promote competence development.

The current study examines psychological flexibility (PF) as a construct that can be promoted in order to foster competence among college students. This construct, defined as the ability to stay focused on the present moment and intentionally engage in value-driven behavior despite experiencing difficult thoughts or feelings, represents the core process of Acceptance and Commitment Therapy (ACT), a third-wave behavior therapy (Hayes, 2004; Hayes, Luoma, Bond, Masuda, & Lillis, 2006). A growing body of research indicates that PF is predictive of well-being for normative samples (e.g., Danitz & Orsillo, 2014; Kashdan & Rottenberg, 2010). Further, evidence suggesting that constructs drawn from the ACT framework are malleable provides support for their examination as abilities that can be fostered (e.g., Chase et al., 2013; Ciarrochi, Bilich, & Godsell, 2010; Gloster, Meyer, & Lieb, 2017a). The current study focuses on specific components of the multifaceted PF construct: internal processes such as accepting
thoughts and emotions, and behavioral processes such as engaging in valued actions—observable behaviors that are guided by domains an individual identifies as important (Hayes et al., 2006; Hayes, Levin, Plumb-Vilardaga, Villatte, & Pistorello, 2013; Hayes, Pistorello, & Levin, 2012). This research builds on existing literature by examining the role of PF in predicting a multifaceted conceptualization of competence for college students via a longitudinal study design. Specifically, the current study examines the roles of cognitive and affective (referred to as internal) and behavioral (e.g., value-driven actions) processes within this construct as they relate to social and academic competence in college students.

This introduction first reviews the challenges of emerging adulthood generally as well as those that are specific to college students. Second, theoretical and empirical support for the ACT framework and the PF construct is discussed. Third, the rationale for integrating the ACT model with the resilience framework in the current study is reviewed. Fourth, specific internal and behavioral components of PF are reviewed, including both the theoretical rationale for why these constructs may distinctly predict competence, and relevant measurement-related considerations. Fifth, the applicability of these constructs to normative college students is discussed, as well as the rationale for this project’s conceptualization of competence. Finally, this section outlines the current gaps in the literature in addition to the current study’s aims and hypotheses.

**Challenges of Emerging Adulthood**

Emerging adulthood represents a developmental stage during which individuals typically begin building an adult life; in many Western cultures, this period spans ages 18-25 (Arnett, 2000; Nelson & Barry, 2005). Emerging adults are faced with a variety of
challenges, including increased stress levels, changes to their environments, and increased responsibility and autonomy as they transition to more adult roles (Arnett, 2000; Conley, Kirsh, Dickson, & Bryant, 2014). In addition to the more general challenges of emerging adulthood, college students may encounter additional specific challenges as they discover novel social and academic contexts (Bayram & Bilgel, 2008; Conley, Durlak, & Dickson, 2013; Conley et al., 2014; Pittman & Richmond, 2008). College students may be faced with unique social situations, such as navigating relationships with roommates, living in dorms, and cultivating social connections outside of previously familiar contexts (Welle & Graf, 2011). College students are also often required to independently implement tasks for which they previously received assistance, including registering for courses, obtaining and organizing materials for daily living, and managing schedules. Further, the academic environment in college may differ from the high school experience in several ways, such as the long-term nature of many assignments, increased independent reading requirements, and larger class sizes.

Not surprisingly, previous literature demonstrates the prevalence of difficult experiences among college students including stress, anxiety, negative affect, substance use, and hopelessness (American College Health Association, 2012; Baghurst & Kelley, 2014; Danitz & Orsillo, 2014; Ruthig, Marrone, Hladkyk, & Robinson-Epp, 2011; Sahker, Acion, & Arndt; 2015; Slutske, 2005). These types of challenges impact a growing number of individuals, as college enrollment has increased in recent decades (see Federal Interagency Forum on Child and Family Statistics, 2014; U.S. Department of Labor, 2015). Thus, better understanding how to foster positive adjustment among college students has important implications for the majority of emerging adults.
Additionally, negative adjustment during this developmental stage may be associated with challenges later in adulthood (Conley et al., 2014; Rao et al., 1995; Rao, Hammen, & Daley, 1999), suggesting that understanding how to best promote adaptive functioning for individuals during college has implications beyond this developmental stage.

Despite the challenges that college students face, evidence suggests that this period represents an opportunity to promote well-being by fostering positive adjustment throughout this developmental stage (Conley et al., 2013). Further, recent literature suggests the role of prevention programs in fostering college student retention (Eisenberg, Lipson, & Posselt, 2016). Primary prevention efforts for emerging adults targeting decreases in alcohol use and psychopathology symptoms (e.g., Buchanan, 2012; Cukrowicz & Joiner, 2007; Foxcroft, Ireland, Lister-Sharp, Lowe, & Breen, 2003) as well as increases in coping skills and individual-level protective factors (Steinhard & Dolbier, 2008) have demonstrated benefits for college students. In an effort to build on initial investigations of ACT-based prevention programs in this population (e.g., Danitz & Orsillo, 2014; Eustis et al., 2017; Muto, Hayes, & Jeffcoat, 2011), the current study examines components of PF, described below, as they relate to competence.

**Psychological Flexibility**

Within ACT theory, practice, and research, PF is a multifaceted construct comprised of six core components: acceptance, cognitive defusion, contact with the present moment, conceptualization of the self within context, identification and clarification of values, and committed action (Hayes et al., 2006). This framework emphasizes remaining focused on the present moment, accepting and tolerating thoughts and feelings, and altering one’s relationship to these internal experiences as necessary in
order to commit to and engage in behaviors guided by values. The ACT model focuses on valued actions as the primary indicator of functioning, rather than symptoms of psychopathology; theoretical and empirical support specifically for valued action is discussed further below.

Previous literature has outlined the components of psychological inflexibility, which within the ACT model is thought to contribute to psychopathology and may represent a transdiagnostic process that underlies a variety of psychological disorders (Hayes et al., 2006; Levin et al., 2014a). Much of the recent literature examining associations between PF and psychological distress conceptualizes a lack of PF as experiential avoidance—attempts to avoid or control difficult thoughts or feelings, even when doing so causes “behavioral harm” (Levin et al., 2012, p. 443). Facets of psychological inflexibility represent the opposite poles of the components of PF described above, such as cognitive fusion and avoidance of value-consistent action. When individuals demonstrate psychological inflexibility, they are more likely to remain “fused” with unhelpful cognitive and behavioral patterns and avoid engagement with valued activities in order to evade difficult thoughts or emotions.

A substantial body of evidence demonstrates that within the context of psychopathology and mental health treatment, protocols that implement skills targeting components of PF are associated with symptom decreases and functional improvement (Biglan et al., 2008; Casier et al., 2010; Ciarrochi et al., 2010; Hayes et al., 2006; Hayes, Strosahl, & Wilson, 2011; Hayes et al., 2013; Levin, Pistorello, Seeley, & Hayes, 2014b). Building on this work, researchers have suggested the applicability of this model outside of clinical samples, particularly given that the ACT framework emphasizes persistence in
value-driven behaviors rather than decreasing the frequency or severity of symptoms (Biglan et al., 2008; Kashdan & Rottenberg, 2010). Research exploring the role of PF in normative samples has demonstrated increases in emotion regulation skills, coping flexibility, and job satisfaction with increased PF (Hayes et al., 2006). Evidence also suggests the applicability of the PF construct for normative adolescent samples (Ciarrochi, Kashdan, Leeson, Heaven, & Jordan, 2011; Halliburton & Cooper, 2015) and within families (Brassell et al., 2016; Moyer & Sandoz, 2015; Williams, Ciarrochi, & Heaven, 2012). This extension of PF is consistent with other constructs and skills that have been generalized outside of treatment-based contexts, including coping skills, relaxation strategies, and mindfulness (e.g., Kuyken et al., 2013; Mendelson et al., 2010; Neil & Christensen, 2009). Of note, much of the empirical support for the ACT framework in non-clinical samples has focused on PF broadly and thus includes both internal and behavioral components of this construct.

To date, many studies examining PF within normative populations have been conducted in undergraduate student samples. Evidence from a series of single-time-point studies suggests that PF is negatively related to the experience of psychological distress. This body of research indicates that PF is negatively associated with symptoms of somatization, depression, and anxiety (Masuda & Tully, 2012), alcohol-related problems (Levin et al., 2012), academic procrastination (Glick, Millstein, & Orsillo, 2014), and both disordered eating cognitions (Masuda, Price, Anderson & Wendell, 2010; Masuda, Le, & Cohen, 2014; Wendell, Masuda, & Le, 2012) and behaviors (Masuda, Boone, & Timko, 2011).
Another line of research examining the ACT framework in normative undergraduate samples has examined the role of PF in prevention program contexts (e.g., Danitz & Orsillo, 2014; Eustis et al., 2017; Levin et al., 2014b; Muto et al., 2011). Evidence consistently points to the beneficial role of strategies aimed at enhancing components of the PF construct for college students, even those not currently reporting psychological distress or experiencing impairment due to mental health concerns. Importantly, these studies have employed strategies that are developmentally-informed, as they are designed to meet college student needs. These programs have been shown to be cost-effective, accessible, short-term (e.g., completed within a single semester), and able to be provided to many students simultaneously.

Evidence from multiple investigations suggests that participation in ACT-based prevention programs is associated with decreased symptoms of depression, anxiety, and stress (e.g., Danitz & Orsillo, 2014; Eustis et al., 2017; Levin et al., 2014b; Levin, Hayes, Pistorello, & Seeley, 2016; Muto et al., 2011). In contrast to studies focusing on psychopathology symptoms, a smaller body of work provides preliminary evidence for PF as it applies to adaptive outcomes. For example, Butryn and colleagues (2011) demonstrated increased physical activity for college students who attended a two-session ACT workshop as compared to those in an education-only condition. In another study, Räsänen and colleagues (2016) investigated an ACT-based program for college students as compared to a waitlist control group; results suggested that participation in the intervention was associated with benefits for well-being (as assessed by the Mental Health Continuum, Short Form [MHC-SF]; Keyes, 2002; Keyes et al., 2008).
Taken together, this evidence demonstrates the beneficial role of applying PF to foster adaptive outcomes in normative samples. However, additional research is needed to more specifically examine the extent to which this construct is associated with competence-based outcomes. Further, research has yet to directly assess the relative predictive power of internal versus behavioral components of PF to examine the extent to which they may individually promote competence. These additional topics are described further in the following sections.

**Psychological Flexibility and the Resilience Framework**

The current study integrates the ACT model with the resilience framework by examining PF as a multifaceted construct that can be fostered. As described above, much of the existing research on PF has described the risks associated with psychological inflexibility and focused on symptom-based variables. However, rather than focus on the outcomes associated with deficits in PF, this study explores adaptive outcomes that may stem from fostering specific aspects of this construct (i.e., internal and behavioral components, discussed further below). This conceptualization builds on a considerable history in the field of resilience research that has examined the protective aspects of constructs previously thought of as risk factors (e.g., intelligence, familial factors; Masten et al., 1999; Masten, Cutuli, Herbers, & Reed, 2009). Further, the current study conceptualizes specific components of PF as promotive factors—assets or resources that are helpful in both low and high adversity conditions (Masten et al., 1999; Masten & Tellegen, 2012; Sameroff, 2000). Addressing promotive factors may be one method of increasing positive adjustment for non-disordered emerging adults enrolled in college.
The conceptualization of PF proposed here is consistent with a growing body of literature arguing for the incorporation of PF in prevention efforts within normative populations (e.g., Biglan, Hayes, & Pistorello, 2008; Gloster et al., 2017a) and in promoting positive mental health (e.g., Fledderus, Bohlmeijer, Smit, & Westerhof, 2010). Given its focus on persisting in value-driven behaviors despite the experience of difficult internal experiences, applying the ACT framework to non-clinical samples may have important implications for the prevention of distress and impairment (Biglan et al., 2008; Gloster, Klotsche, Chaker, Hummel, & Hoyer, 2011; Kashdan & Rottenberg, 2010; Moyer & Sandoz, 2015).

Additionally, the current study integrates the ACT model with the resilience framework by emphasizing developmentally-salient domains of competence as the primary outcomes of interest. A significant limitation of much of the research examining the PF framework in normative samples is that well-being has generally been conceptualized as the absence of psychopathology, despite evidence that PF may have more incremental utility in predicting functional impairment than in predicting symptom levels (Gloster et al., 2011). In an effort to address this limitation, the current study emphasizes competence as the primary outcome of interest. This conceptualization integrates the study of competence within the resilience framework with theoretical and empirical support from within the ACT model. Specifically, the ACT model posits that through strategies addressing tenets of PF, individuals experiencing impairment due to psychopathology symptoms can learn skills allowing them to accept symptom-related thoughts and feelings and persist in behaviors consistent with what is most important to them, which may decrease impairment and distress. The application of PF within the
current study is therefore theoretically aligned with this framework in that it aims primarily to assess competence as an outcome rather than focusing solely on the absence of psychopathology symptoms. The specific conceptualization of competence utilized in the current study will be discussed in further detail below.

**Psychological Flexibility: Internal Components**

Many of the significant components of the ACT model involve processes targeting cognitive and emotion-based experiences—in other words, processes that occur internally. In the ACT framework, this includes both accepting and changing one’s relationship to thoughts and emotions. Rather than expend resources aimed at controlling or reframing thoughts and feelings, the ACT framework posits that internal events can exist simultaneously with adaptive behaviors. The current research focuses on acceptance and defusion as internal processes, given the importance of these constructs to promoting change within the ACT framework (e.g., Hayes et al., 2006). In this context, acceptance refers to experiencing and tolerating thoughts and feelings, even when they are difficult or uncomfortable (Hayes et al., 2006). This process emphasizes the nonjudgmental experience of and ability to tolerate what may be labeled as negative emotions (e.g., anger; sadness) or thoughts (e.g., “I won’t do well on this test”). Notably, the ACT model promotes acceptance of thoughts and feelings as opposed to struggling to control, suppress, or restructure these experiences. Fostering acceptance within this model is promoted in an effort to decrease behavioral, avoidance-based choices aimed at evading difficult internal experiences. The ACT framework focuses on guiding individuals not to suppress or control their thoughts and feelings, but instead to observe them more
objectively, tolerate them as they arise, and use relevant value-driven information to make behavioral choices.

Another internal component related to acceptance is cognitive defusion, which refers to changing one’s relationship to thoughts (Gillanders et al., 2014; Hayes et al., 2006). When “fused” with their cognitions, individuals tend to believe their thoughts as necessarily being true. This can lead to becoming entangled with one’s cognitions as well as engagement with behaviors primarily driven by thoughts while excluding other relevant information, such as values. As discussed by Gillanders and colleagues (2014), an individual’s relationship with his or her own thoughts can range from highly fused (i.e., entangled) to defused (i.e., experienced more objectively as mental events that do not necessarily need to drive behavior). Through strategies aimed at defusion, or disentanglement, individuals can learn to experience thoughts as mental events that provide one source of information and subsequently change their relationship to these thoughts in order to integrate information from additional sources (Gillanders et al., 2014; Hayes et al., 2006). Thus, increasing cognitive defusion can help to decrease the power of thoughts to drive behaviors away from value-consistent actions.

Much of the empirical support described above for the application of the PF construct in non-clinical samples includes evidence for the benefits of targeting acceptance and defusion (Levin et al., 2014b; Masuda & Tully, 2012). Regarding acceptance specifically, widely-used measures of PF, such as the Acceptance and Action Questionnaire—II (AAQ-II; Bond et al., 2011) include items that may measure acceptance more so than behavioral processes, an issue that is addressed in further detail below. Thus, in addition to studies specifically targeting acceptance (e.g., Danitz &
Orsillo, 2014; McCracken, 2013; Scott, McCracken, & Norton, 2015), much of the research cited above provides evidence that acceptance is associated with increased well-being. Although fewer studies have addressed cognitive defusion, existing evidence suggests associations between cognitive fusion and psychological distress, coping processes, eating pathology, and quality of life (Ferreira, Trindade, Duarte, & Pinto-Gouveia, 2015; Gillanders et al., 2014; Gillanders, Sinclair, MacLean, & Jardine, 2015).

**Psychological Flexibility: Behavioral Components**

In recent years, clinical research and theory has increasingly included values-based components (e.g., Dahl, 2015; Danitz & Orsillo, 2014; Fitzpatrick et al., 2016; Hayes, Orsillo, & Roemer, 2010; Michelson, Lee, Orsillo, & Roemer, 2011; Sandoz, Kellum, & Wilson, 2017; Williams, Ciarrochi, & Heaven, 2015). Within the ACT framework, values are conceptualized as domains of behavior that are of particular importance to a given individual and are differentiated from goals in that they cannot be obtained or achieved (Chase et al., 2013; Dahl, 2015; Hayes et al., 2012). Values-based intervention components include value exploration, identification, and clarification as well as the delineation of incremental, concrete actions that can be taken towards these values (Gagnon, Dionne, & Pychyl, 2016; Hayes et al., 2012). These strategies are thought to influence adjustment through a) identification of specific actions that move individuals towards their valued domains and b) clarification of what is important to individuals in an effort to increase the amount of positive reinforcement gained from engaging in value-driven behaviors (Czech, Katz, & Orsillo, 2011; Michelson et al., 2011). The current study conceptualizes valued action as a malleable behavioral pattern that can be fostered in order to promote competence. Further, given its importance within
the ACT model of behavior change, valued action is examined as a construct that may promote competence independently of internal processes.

Previous research in clinical populations suggests that value-based actions are associated with decreases in symptoms of psychopathology and increases in positive adjustment (e.g., Hayes et al., 2010; Michelson et al., 2011). Existing literature also supports increasing valued action as a means of enhancing psychotherapy outcomes (e.g., Gloster et al., 2017b; Michelson et al., 2011; Wilson, Sandoz, Kitchens, & Roberts, 2010). Importantly, this theoretical rationale can be extended to normative samples, partly because a growing body of evidence supports the conceptualization of most common forms of psychopathology using dimensional models (e.g., Krueger, Watson, & Barlow, 2005). It follows that the benefits of fostering abilities that lead to increased engagement in value-based actions can be generalized from focusing strictly on decreasing psychopathology-related impairment for individuals who meet a specific set of symptom criteria to non-clinical populations. In other words, it may not be necessary that individuals experience diagnosable levels of psychopathology symptoms in order to benefit from engagement in valued action. Notably, although a small body of evidence does suggest the utility of applying interventions focusing on valued action to non-clinical samples (e.g., Chase et al., 2013; Doi, Yokomitsu, & Sakano, 2016; Sandoz et al., 2017), further research is needed in order to better understand the role of valued action in predicting competence across domains.

For college students, examples of value-driven behaviors may include devoting time to coursework, seeking assistance from professors or advisors, initiating and following through on social activities with peers, communicating with family members,
engaging in self-care routines, or participating in university or community events. However, the extent to which any of these behaviors are value-consistent depends on what is personally identified as important by a given student. Therefore, strategies aimed at helping students to identify and clarify valued domains and implement changes that result in increased value-consistent actions may help to foster the development and maintenance of adaptive behavioral patterns.

**Distinct Components of Psychological Flexibility: Theoretical Considerations**

Although internal and behavioral processes are highly linked within the ACT framework, these constructs may represent distinct processes that differentially impact competence development. The internal components of this construct involve largely cognitive-based processes, including accepting and altering one’s relationship to difficult thoughts or emotions; these processes may represent abilities that can be generalized to a range of difficult or stressful experiences. Alternatively, valued action is a behavioral construct that emphasizes observable actions that are guided by domains self-identified as important. It may be that intervention strategies aimed at identifying valued domains and addressing barriers to value-consistent behaviors can promote competence independently of internal processes.

This distinction between internal and behavioral processes within the PF construct draws parallels to empirical and theoretical debate within cognitive-behavior therapy (CBT) regarding the relative importance of treatment components, as researchers have discussed the significance of cognitive versus behavioral interventions (e.g., Foa et al., 2005; Jacobson et al., 1996). For example, despite empirical and theoretical support for the significance of cognitive interventions targeting core beliefs and skills aimed at
restructuring maladaptive thoughts (e.g., Beck, 2005; DeRubeis et al., 1990; Dobson, 1989), evidence suggests that behavioral activation and exposure are equally beneficial (Foa et al., 2005; Jacobson et al., 1996). Based on these findings, additional literature has questioned the utility of challenging cognitions over focusing on behavioral strategies (Hayes, 2004; Longmore & Worrell, 2007). Although the treatment elements that target cognitive processes vary between CBT and ACT, components of the latter framework nonetheless address how individuals approach and respond to thoughts and feelings. Thus, further investigation of the relative benefits of these components is important in order to inform efforts to promote positive adjustment.

The body of literature examining PF in non-clinical samples described above includes many studies that incorporate both internal and behavioral components of PF (Butryn et al., 2011; Danitz & Orsillo, 2014; Fledderus et al., 2010; Glick et al., 2014; Levin et al., 2014b; Muto et al., 2011; Räsänen et al., 2016). Further, evidence across studies suggests that acceptance and valued action each (separately) predict outcomes including general health, mental health, and social functioning in addition to treatment response (Foote, Hamer, Roland, Landy, & Smitherman, 2015; Hayes et al., 2010; McCracken, 2013; Scott et al., 2015). Although existing research has included measures targeting components of PF in analyses (e.g., simultaneous regression; Glick et al., 2014, Sandoz et al., 2017), less is known about the extent to which these aspects uniquely predict competence-based outcomes across domains. Thus, additional research examining the extent to which internal versus behavioral components contribute to adaptive outcomes may further inform the development of effective, feasible prevention efforts.
Distinct Components of Psychological Flexibility: Measurement Considerations

The current study aims to address two separate measurement-related issues. The first issue concerns the measurement of PF as a general construct using the AAQ-II (Bond et al., 2011). This measure (as well as earlier versions, including the Acceptance and Action Questionnaire; Hayes et al., 2004) is widely used to measure PF as it relates to treatment gains in clinical samples, and many of the studies reviewed above provide evidence for the ACT framework as evidenced by the AAQ-II. Additionally, this measure has been used in studies of non-clinical samples as a predictor of psychopathology symptoms (e.g., Masuda & Tully, 2012) and as a measure of change in studies testing prevention programs (e.g., Levin et al., 2014b). However, given its item content, the AAQ-II may be more accurately described as measuring acceptance than PF more broadly. Notably, previous research (e.g., Hayes et al., 2010; Scott et al., 2015) has used the AAQ-II as a measure of acceptance, rather than of PF generally.

Items on the AAQ-II assess perceptions of difficult experiences as well as the extent to which individuals feel that internal experiences act as barriers in their lives. Although references to behavior patterns are mentioned generally (e.g., “experiences make it difficult for me to live a life that I would value”), these items do not assess the behavioral components of PF to the same extent as individuals’ views of their internal experiences. Further, the few references to behaviors on the AAQ-II assess only an individual’s beliefs regarding behavior patterns generally rather than the consistency of actions within valued domains.

In order to address this concern, the current study implemented measures of both internal ACT processes (acceptance and defusion) as well as behavioral processes. This
distinction is important when considering the implementation and evaluation of prevention programs rooted in the ACT model, as changes on measures of PF may not necessarily reflect changes in valued action (and vice versa). The use of additional measures focusing solely on valued action within ACT research (e.g., Danitz & Orsillo, 2014; Glick et al., 2014; Hayes et al., 2010) further indicates that PF may not be adequately assessed through the AAQ-II alone. As such, the current study will implement the AAQ-II as a measure of acceptance, rather than PF more generally.

Recent evidence points to the need to further examine the construct validity of the AAQ-II, and researchers have begun developing alternative measures aimed at assessing ACT processes more broadly (Francis, Dawson, & Golijani-Moghaddam, 2016; Wolgast, 2014). Thus, the current study includes an additional measure of acceptance, the Acceptance subscale of the Philadelphia Mindfulness Scale (PMS; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008), which has been previously used to measure acceptance in a similar sample (Danitz & Orsillo, 2014). Through measurement of both acceptance and cognitive defusion (using the Cognitive Fusion Questionnaire, described below; Gillanders et al., 2014), the present study aims to provide a richer and more accurate assessment of the internal processes that comprise PF.

The second measurement-related consideration involves the measurement of valued action. Previous studies have used cross-domain composite scores, taking into account valued action across areas including work, education, family, community, and self-care (e.g., Hayes et al., 2010; Michelson et al., 2011). However, additional research in normative samples has explored valued action within a more narrow scope, focusing instead on single domains (e.g., Danitz & Orsillo, 2014; Glick et al., 2014). Therefore,
the current study will include analyses examining valued action specifically for the
developmentally-salient areas of academic and social competence.

**Psychological Flexibility for College Students**

The current study integrated the PF model with the study of promoting
competence for college students for multiple reasons. As discussed above, previous
research suggests that components of PF are associated with more adaptive patterns of
functioning for emerging adults (e.g., Danitz & Orsillo, 2014; Glick et al., 2014; Masuda
& Tully, 2012). In addition, accepting and tolerating difficult thoughts and feelings and
persisting in value-consistent behaviors are likely important abilities as individuals
navigate the stressors associated with being enrolled in college during the emerging
adulthood period. The unique tasks of this period—including stressors stemming from
encountering novel social and academic environments—are likely to elicit difficult or
challenging thoughts and feelings. Thus, students who are able to effectively navigate
these experiences through the implementation of flexible cognitive and/or behavioral
patterns may demonstrate adaptive adjustment.

Stressful situations are likely to arise as students navigate challenges within the
academic environment and begin living more autonomously, functioning within novel
peer groups, and developing unique interpersonal relationships. The ubiquity of stressors
experienced by college students is an important reason that the current study
conceptualizes the internal and behavioral components of PF as promotive factors that
can be fostered to increase competence within a prevention framework. Although not all
students experience impairing symptoms of psychopathology, nearly all students will
encounter challenges that bring about the types of thoughts or feelings that would
interfere with competence development (American College Health Association, 2014; Welle & Graf, 2011). Further, PF may be associated with positive adjustment even when accounting for the influence of psychological distress; this builds on existing research pointing to the benefits of PF when accounting for worry (Hayes et al., 2010) and general distress (Levin et al., 2012). The idea that PF may positively influence adjustment even when considering the potential influence of psychopathology symptoms is consistent with both the ACT and resilience frameworks in suggesting that fostering adaptive functioning is not necessarily the opposite of reducing psychopathology symptoms (Hayes et al., 2006; Masten et al., 1999). This may have implications for the application of PF within a prevention framework for college students as it indicates that a) college students not experiencing impairment due to psychopathology may still benefit from working to enhance acceptance and engagement in value-driven behaviors and b) using strategies to foster these abilities may have positive influences on adjustment even when college students are experiencing psychological distress.

Promoting Competence

As discussed above, the current study emphasizes competence as the primary outcome of interest. Notably, a small body of prior work provides evidence for further research examining positive adjustment in relation to PF. For example, findings indicate that PF is positively associated with positive affect (Ciarrochi et al., 2011) as well as social, emotional, and psychological well-being (Fledderus et al., 2010). Further, two of the intervention studies reviewed above provide evidence for associations with cross-domain well-being (Räsänen et al., 2016) and adaptive behaviors (Butryn et al., 2011). Given the long-term impact of competence in developmentally-salient domains for
emerging adults (Roisman, Masten, Coatsworth, & Tellegen, 2004), research integrating the ACT framework with the study of positive adjustment should further examine associations with competence for college students.

**Conceptualization of competence.** Researchers across theoretical frameworks have developed models to define and examine competence. One definition, developed by Masten and Coatsworth (1995), describes competence as “…a pattern of effective performance in the environment, evaluated from the perspective of development in ecological and cultural context” (p. 724). This classification emphasizes the inclusion of domains of behavior that are important given an individual’s environment, and indicates that multiple domains of functioning can contribute to positive adjustment. Therefore, among several frameworks of competence, multifaceted models that take into account levels of functioning in a variety of developmentally-salient areas may most effectively incorporate developmental and environmental factors (Hawkins, Letcher, Sanson, Smart, & Toumbourou, 2009; Lerner et al., 2005; O’Connor et al., 2011). The current study includes two developmentally-salient components that are of particular relevance for college students: social competence and academic competence.

**Social competence.** For college students, social competence may involve initiating and maintaining relationships and participating in activities with peers with whom they live, take classes, and form friendships. Social competence has important developmental implications for college students, given the types of interpersonal relationships that are often formed during this stage and the future implications of successfully forming and maintaining social connections. As discussed by Conley and colleagues (2014), there is a significant shift in individuals’ social context during college
as they often experience increased distance or separation from family members and high school friends and must learn to interact with peers in new ways (e.g., as roommates). These abilities may contribute to students’ sense of university belonging, which has been linked to social adjustment and socio-emotional functioning (Pittman & Richmond, 2008). Social competence may therefore influence numerous aspects of a college student’s experience, and evidence suggests that the successful formation and navigation of these relationships is associated with both social connectedness and psychological well-being (Williams & Galliher, 2006). Importantly, findings suggest that social functioning during emerging adulthood is then associated with adaptive outcomes later in adulthood (Roisman et al., 2004).

**Academic competence.** The current study also includes academic competence as an indicator of positive adjustment. Although the challenges of the college environment span many areas, academics are central within this context and competence within this domain may influence adjustment more generally (Chung et al., 2014). Successful academic functioning may present challenges for students based on the varied structure of the academic environment as compared to many high school contexts, and many students experience increases in the rigor of academic material (Chung et al., 2014). Further, successful academic functioning is dependent on a variety of factors other than intelligence, such as grit, perseverance, and determination (e.g., Duckworth, Peterson, Matthews, & Kelly, 2007). Thus, college students may increasingly need to develop effective strategies for tasks such as learning academic material, taking exams, and completing assignments, as well as interacting with professors, mentors, deans, or teaching assistants in order to demonstrate competence within this domain. Previous
literature also suggests that academic competence during typical college-age years is associated with functioning across domains in mid-adulthood (Roisman et al., 2004).

Gaps in the Literature

Taken together, previous work demonstrates the potential applicability of PF to promoting competence for college students. However, there are currently significant gaps in the existing literature. First, research is needed to expand on evidence demonstrating the beneficial influence of PF on well-being as evidenced generally by symptom-focused measures by instead emphasizing strength-based outcomes that incorporate multifaceted conceptualizations of competence. Second, it is important for the field to understand the relative influence of distinct components of this construct as they relate to competence development over time. Studies to date have not adequately examined the roles of cognitive and affective versus behavioral processes in predicting competence across domains; this represents a gap in the literature given that the relative extent to which these processes predict competence can inform prevention efforts. Third, recent evidence indicates the need to address measurement issues related to the assessment of PF. In order to accurately inform prevention efforts, the measures used to assess the core processes of the ACT model should be examined as they relate to competence in non-clinical samples.

The Current Study

The current study aimed to test the conceptual model shown in Figure 1 in order to examine the role of multiple facets of PF in predicting competence in a non-clinical college student sample. Internal and behavioral tenets of PF and competence were each assessed via self-report at two time points over one academic semester. This model, analyzed using structural equation modeling (SEM), also included stability paths for each
key study variable across time points, associations between key study variables within each time point, and cross-domain paths estimated from both internal and behavioral PF at Time 1 to competence at Time 2. Further, the current study aimed to analyze this conceptual model when accounting for the influence of covariates (e.g., psychological distress, well-being).

**Aims and Hypotheses**

**Aim 1:** To examine whether components of the PF construct influence multiple competence-focused outcomes using a longitudinal design.

Hypothesis 1: Components of PF at Time 1 will be positively associated with both social and academic competence at Time 2 while controlling for social and academic competence at Time 1.

**Aim 2:** To simultaneously examine the influence of internal and behavioral components of PF on competence.

Hypothesis 2: Both internal and behavioral components of PF at Time 1 will be positively associated with competence at Time 2.

**Aim 3:** To address relevant measurement issues within the ACT framework by including multiple measures.

Hypothesis 3a: Valued action as measured by both the cross-domain composite score and domain-specific scores for social and education values (each at Time 1) will be positively associated with competence at Time 2.

Hypothesis 3b: Acceptance as measured by both the AAQ-II and the Acceptance subscale of the PMS (each at Time 1) will be positively associated with competence at Time 2.
Methods

Participants

Participants ($N = 250$) were a sample of emerging adults recruited from local colleges and universities via several methods; recruitment procedures are further detailed below. The current sample represents all participants who indicated that they were between 18-25 years old, participated through collection of all primary study variables at Time 1 and Time 2, and provided information to link their responses from Time 1 and Time 2. Demographic information for participants at Time 1 ($N = 429$) and Time 2 ($N = 250$) can be seen in Table 1.

Measures

**Demographic and academic information.** Participants reported age, gender, race/ethnicity, estimated family income, primary caregiver(s) education, high-school GPA, current year in college, college enrollment status, number and type of academic majors, average hours per week of paid employment, and state and country of origin. Among continuous demographic and academic variables, only family income was non-normally distributed (skewness statistic $= 2.20$).

**Primary study variables.** Internal consistency values can be seen in Table 2. Across measures, internal consistency ranged from adequate to strong, with the exception of the Friends ASR subscale, for which internal consistency was lower.

**Internal components of psychological flexibility.** To measure acceptance, participants completed both the AAQ-II and the Acceptance subscale of the Philadelphia Mindfulness Scale (PMS; Cardaciotto et al., 2008). The AAQ-II asks participants to indicate how true each of seven statements is for them on a 7-point Likert scale ranging
from “never true” to “always true.” Example items include “My painful memories prevent me from having a fulfilling life” and “Worries get in the way of my success.” The AAQ-II is typically scored such that higher scores indicate greater inflexibility/less PF; for the current project, scores were reversed such that higher scores reflect greater PF.

Participants also completed the Acceptance subscale of the PMS. This scale includes 10 items that ask participants to indicate the frequency with which each item was experienced over the previous week on a 5-point Likert scale ranging from “never” to “very often.” Example items from this subscale are “There are things I try not to think about” and “I wish I could control my emotions more easily.” This subscale is scored such that higher scores represent higher levels of acceptance; negatively-worded items were reverse coded.

To assess defusion, participants completed the Cognitive Fusion Questionnaire (CFQ; Gillanders et al., 2014). This seven-item measure asks participants to rate how true statements are on a 7-point Likert scale ranging from “never true” to “always true.” Example items include “I get so caught up in my thoughts that I am unable to do the things that I most want to do” and “My thoughts cause me distress or emotional pain.” The CFQ is scored such that higher scores indicate higher levels of fusion; for the current project, scores were reversed such that higher scores reflect greater defusion.

**Behavioral components of psychological flexibility.** Participants completed the Valued Living Questionnaire (VLQ; Wilson et al., 2010), on which they indicated the extent to which each of ten domains is important to them and how consistent their actions have been with each domain within the previous week; each set of responses is scored on
a 1-10 scale. Domain-specific scores were created from the product of corresponding importance and consistency scores for each domain. A composite score created from the average of the products of each importance and consistency score was then created to measure valued action (Michelson et al., 2011; Wilson et al., 2010). The ten domains assessed are: family, romantic relationships, parenting, friendships/social relationships, employment, education/training, recreation, spirituality, citizenship/community life, and physical self-care. The composite score across all domains, as well as the educational value composite and social relationships value composite, are used in the current study.

Competence. Competence was assessed using an adapted version of the Self-Perception Profile for College Students (SPPCS; Harter, 2012). The current study uses the social acceptance, close friendships, and scholastic competence domains. Based on a previous adaptation of this measure (Wichstrom, 1995), participants were asked to indicate the extent to which each of a series of statements describes them by choosing one of the following options: “describes me very poorly,” “describes me quite poorly,” “describes me quite well,” “describes me very well.” Scores were averaged within domains to create a competence score for each domain, with higher scores representing higher levels of self-perceived competence. Example items are “I am confident in mastering my coursework,” “I am able to make new friends easily,” and “I have close friends with whom I can share my personal thoughts and feelings” for the academic, social acceptance, and close friendships scales, respectively.

In addition to the SPPCS, participants were asked to indicate their current and predicted grade point average (GPA). Participants also complete the Friends Adaptive Functioning Subscale of the Adult Self Report (ASR; Achenbach & Rescorla, 2004). On
this subscale of the ASR, participants were asked to indicate how many close friends they have, how well they get along with close friends, and the extent of their contact with close friends. Finally, participants completed an adapted measure of social competence designed to assess resilient functioning in adults (McGloin & Widom, 2001). Participants indicated the extent to which they have participated in a variety of social activities, including social engagements with close friends, social engagements with acquaintances or other peers, participating in hobbies or clubs, romantic social engagements, or other types of social activities. For each question, participants chose one of the following six options: daily, several times per week, once per week, several times per month, once per month, and never. To increase internal consistency, the measures of social activities were combined (see Table 2); these measures were combined using z-scores.

**Covariates.**

*Psychological distress.* Symptoms of depression were measured using the PHQ-2 (Patient Health Questionnaire-2; Kroenke, Spitzer, & Williams, 2003). Participants were asked to complete a two-item measure indicating how often they had been bothered by having little interest or pleasure in doing things and how often they had felt down, depressed, or hopeless over the past two weeks. Symptoms of anxiety were measured using the Generalized Anxiety Disorder-7 (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006). On this measure, participants reported how often they had been bothered by symptoms of anxiety, such as worrying too much and having trouble relaxing, over the past two weeks. The PHQ-2 and GAD-7 are each scored such that higher scores represent higher symptom levels.
Well-being. The MHC-SF (Keyes, 2002; Keyes et al., 2008) measures emotional, social, and psychological well-being. Participants were asked to indicate how often they experience signs of well-being within the past month on a 6-point Likert Scale ranging from “never” to “every day.” Examples of items include feeling “satisfied with life” and “that you had experiences that challenged you to grow and become a better person.” The MHC-SF is scored such that higher scores represent higher levels of well-being. The total well-being score was used in the current study.

Stress. Participants reported the amount of stress they experienced regarding the following aspects of the college experience: transition to college, daily life, academics, social interactions, family interactions since being in college, work life. Responses were on a 7-point Likert scale ranging from “not at all stressful” to “extremely stressful,” with higher scores representing higher levels of stress.

Awareness. Participants completed the Awareness subscale of the PMS (Cardaciotto et al., 2008). On the awareness subscale, participants were asked to indicate the frequency with which each of 10 items was experienced over the previous week on a 5-point Likert scale ranging from “never” to “very often.” Example items include “I am aware of what thoughts are passing through my mind” and “When talking with other people, I am aware of the emotions I am experiencing.” This subscale is scored such that higher scores represent higher levels of awareness.

Procedure

All procedures were conducted as approved by the University of Vermont (UVM) Institutional Review Board (IRB). Participants were recruited from local colleges and universities in the northeast U.S. using a variety of strategies. Prior to the beginning of
the Fall 2016 semester, faculty and administrators at a variety of institutions were contacted, provided with information about the current study, and asked whether they may be interested in providing students with information about the opportunity to participate in the current research. At UVM, these faculty included those teaching large-enrollment courses (e.g., Principles of Biology) as well as those affiliated with colleges within the university (e.g., College of Nursing and Health Sciences; Rubenstein School of Environment and Natural Resources). Outside of UVM, faculty included those associated with psychology departments at institutions in Vermont and Massachusetts (e.g., Castleton University, Tufts University) and those in administrative positions (e.g., at Community College of Vermont). Those faculty and administrators who demonstrated interest in providing students with information about the opportunity to participate in this study were provided with IRB-approved recruitment materials for emails and/or electronic postings. In addition, recruitment took place via flyers posted around the greater Burlington, VT area and via electronic advertisements across Vermont.

All data collection occurred electronically using institutional online software (Limesurvey); as feasible, data collection and reporting was informed by guidelines provided by the Checklist for Reporting Results of Internet E-Surveys (CHERRIES; Eysenbach, 2004). The current study utilized an open survey (i.e., not password-protected) and participants were primarily contacted electronically; those participants who were recruited via flyer postings were directed to an email address to access the survey electronically. There were separate versions of the survey used at each time point based on the type of compensation provided (gift-card drawing versus course credit, described further below). These surveys differed **only** based on a)} informed consent
information specifically regarding compensation and b) compensation information at the end of the survey.

Data was collected at the beginning (weeks 1-3) and end (weeks 14-16) of the Fall 2016 semester. At Time 1, participants were informed that a) the first phase of the current study would be available only for the first few weeks of the semester and b) should they choose to participate in Time 1, they would have the opportunity to participate in the second phase later in the semester. All participants who completed Time 1 were asked to provide an email address to be contacted to participate again at Time 2; all participants who provided an email address were contacted via email and were invited to participate in Time 2. At Time 2, all participants who had provided an email address received a series of three emails over a two-week period containing information about the study and compensation as well as a link to access the survey; the last of these three emails indicated the date after which the study would no longer be available. Participants were compensated through either course credit or by being entered into a raffle system to win gift cards to either Amazon.com or Best Buy. Those participants who were compensated via the gift-card raffle option had a one in 25 chance of being selected to win a $40 gift-card at Time 1 and a one in 10 chance of being selected to win an $80 gift-card at Time 2.

At each time point, participants completed a screener question asking them to indicate whether they were between 18-25 years old; only participants who indicated they were within this age range were directed to the remainder of the online survey. Participants also provided informed consent at each time point. All measures described above were completed at both time points, excepting demographic and academic information, which was only completed at Time 1 (participants provided current and
predicted GPA information at both time points). The order of questionnaires was such that measures assessing primary study variables appeared first, followed by measures assessing covariates; at Time 1, items regarding demographic and academic variables appeared prior to the measures assessing primary study variables. All multiple-choice survey items included a “choose not to answer” response option; open-ended survey items (e.g., family income, major, GPA, name, email address) were not mandatory. The survey spanned 16 separate screens (pages), including all screener questions, informed consent, questionnaires, and compensation information. The number of questions per page ranged from two to 21.

Upon visiting the survey website, participants were assigned a unique identification number (ID) by Limesurvey. As there was overlap in IDs based on survey type (i.e., the same number could be assigned to participants in the gift-card drawing and course credit survey versions), a separate, unique, 3-digit ID was assigned to all Time 1 participants. Data from Time 1 and Time 2 were linked manually by assigning the unique 3-digit ID from Time 1 to each participant at Time 2 using identifying information provided by participants.

The number of participants who completed various stages of the current study can be seen in Table 3. Participants were excluded from the current study due to one or more of the following reasons: indicating they were not within the 18-25 age range, reporting an age outside of the 18-25 eligible age range, providing duplicate responses, not providing responses to the primary study measures, or not providing identifiers to link responses from Time 1 and Time 2. As measures other than identifiable information provided by participants (i.e., cookies, IP address) were not used to assign unique
identifiers, several participants provided duplicate responses (i.e., completed the survey more than once). In these cases, participants’ initial response set was included and all others were excluded. Three attention-check items were included throughout the online survey, which asked participants to select a specific response (e.g., “Please select ‘somewhat infrequently.’”). Those participants who had incorrect responses on all three of these items (Time 1 \( n = 12 \); Time 2 \( n = 1 \)) were not included in the study to increase the validity of the data.

Statistical Analyses

Correlational analyses were conducted using SPSS version 22 (IBM Corp, 2012) to test hypotheses regarding the magnitude, statistical significance, and direction of associations between study variables. Additionally, \( t \)-tests and chi-square analyses were conducted using SPSS version 22 (IBM Corp, 2012) to test for differences in study variables based on attrition from Time 1 to Time 2. Exploratory factor analyses (EFA) were then conducted using Mplus 6.0 software (Muthén & Muthén, 2010) to test the measurement models for the social and academic competence latent factors. Next, confirmatory factor analyses (CFA) were conducted using Mplus 6.0 software (Muthén & Muthén, 2010) for the internal PF latent factor and the social and academic competence latent factors.

Structural equation modeling was then used to test for the influence of both internal and behavioral components of PF at Time 1 on competence at Time 2. These analyses included data from both time points to account for the influence of prior levels of independent and dependent variables within the model (Cole & Maxwell, 2003; see Figure 1). Separate models were tested for cross-domain (i.e., valued living composite
score; both social and academic competence) and domain-specific values and competence. Additionally, separate models were tested with acceptance as measured by (1) the AAQ-II and (2) the PMS; these models were compared based on fit (e.g. global fit, lack of improper solutions), factor loadings, and measurement invariance.

Maximum likelihood estimation with robust standard errors (MLR) was used to model missing data and account for non-normality. CFI and TLI values above .90 and RMSEA and SRMR values below .08 were used as cutoffs for good model fit (Hu & Bentler, 1999). Significant predictions were re-tested with covariates also included in order to determine the extent to which components of PF predict competence when accounting for the influence of symptoms of anxiety and depression, stress, well-being, and awareness.
Results

Descriptive Statistics, Correlations, and Attrition Analyses

Descriptive statistics for primary study variables can be found in Table 4. Correlations within each time point can be found in Table 5, and correlations between time points can be found in Table 6. Correlations between demographic and academic variables and primary study variables can be seen in Tables 7 and 8 for Time 1 and Time 2, respectively. For correlation analyses, demographic and academic variables are coded as follows: Gender 0 = Female, 1 = Non-female (Male/Other); Race 0 = Caucasian, 1 = All other races; Number of majors 0 = 1 Academic major listed, 1 = Two or more majors listed; Major type 0 = Psychology (with or without other majors), 1 = Non-psychology major; Caregiver education 0 = Neither caregiver with post-college education, 1 = At least one caregiver with post-college education; State 0 = Northeast U.S., 1 = Other state/outside of U.S; Country 0 = U.S.A., 1 = Other; Institution 0 = UVM, 1 = All other institutions; Enrollment Type 0 = Traditional, 1 = Continuing Education; Enrollment Status 0 = Full-time, 1 = Part-time.

The retention rate for the current study was 60.97%, calculated based on the number of participants who completed and provided linking information at Time 2 divided by those who completed and provided linking information at Time 1 (see Table 3). Attrition analyses were conducted to test for differences in primary study variables and academic and demographic variables assessed at Time 1 based on participation status at Time 2. Results indicated that individuals who participated in Time 2 had significantly higher current ($t[319] = 2.34, p = .020$), predicted ($t[316] = 2.01, p = .046$), and high-school ($t[342] = 3.40, p = .001$) GPAs than individuals who did not participate in Time 2.
Chi-square analyses of academic and demographic variables yielded significant results for academic institution and caregiver education. Whereas UVM students were more likely than expected to participate at Time 2, students at other institutions were less likely than expected to participate ($\chi^2[1] = 7.07, p = .008$). Further, participants who had at least one caregiver with graduate/post-college education were more likely than expected to participate at Time 2, whereas participants for whom neither caregiver had graduate/post-college education were less likely than expected to participate at Time 2 ($\chi^2[1] = 5.86, p = .015$).

**Exploratory Factor Analysis**

Exploratory factor analysis was conducted to determine the measurement model that most accurately represented the competence construct; specifically, this EFA tested 1- and 2-factor models. At both Time 1 and Time 2, results indicated that the 2-factor model had better fit than the 1-factor model. At Time 1, the 1-factor model had a statistically significant chi-square value, $\chi^2(9) = 260.41, p < .001$, CFI, TLI, and SRMR values of .519, .199, and .210, respectively, and an RMSEA value of .334 (90% CI = .300 to .370). The 2-factor model at Time 1, in contrast, did not yield a statistically significant chi-square value ($\chi^2[4] = 2.82, p = .588$), had CFI, TLI, and SRMR values that indicated good fit (1.000, 1.008, and .008, respectively), as well as an RMSEA value of .000 (90% CI = .000 to .082). Further, the pattern of factor loadings also suggested that the 2-factor model was a better fit for these data. In the 1-factor model loadings ranged from .18 to .97; alternatively, in the 2-factor model, current GPA, predicted GPA, and scholastic competence had loadings ranging from .49 to .94 on Factor 1, and social acceptance, close friendships, and social activities had loadings ranging from .70 to .81 on Factor 2.
Similarly, at Time 2, the 1-factor model yielded a statistically significant chi-square value $\chi^2(9) = 293.63, p < .001$, CFI, TLI, and SRMR values of .552, .253, and .197, respectively, and a RMSEA value of .356 (90% CI = .321 to .391). At Time 2, the 2-factor model indicated good fit, with fit statistics as follows: $\chi^2(4) = 4.44, p = .350$, CFI = .999, TLI = .997, SRMR = .011, RMSEA = .021 (90% CI = .000 to .100). Additionally, the pattern of factor loadings at Time 2 suggested that the 2-factor model was a better fit for these data. In the 1-factor model, loadings ranged from .004 to .85. By contrast, in the 2-factor model, current GPA, predicted GPA, and scholastic competence had loadings ranging from .47 to .99 on Factor 1, and social acceptance, close friendships, and social activities had loadings ranging from .78 to .86 on Factor 2.

For both time points, given the content of the competence indicators, Factor 1 was conceptualized as academic competence and Factor 2 was conceptualized as social competence. Scholastic competence, current GPA, and predicted GPA loaded onto academic competence, and social activities, social acceptance, and close friendships loaded onto social competence. Of note, EFA was not conducted for other latent variables; given the limited number of available indicators, solutions other than 1-factor models were not feasible.

**Confirmatory Factor Analysis**

A series of CFAs was conducted to determine the most appropriate measurement models at each time point. Within each time point, these measurement models included internal experiences, valued action, and competence. Due to problems with model specification, a general competence higher-order factor (with indicators defined by academic and social competence factors, themselves defined by observed indicators) was
not included in analyses. Additional problems with model specification occurred when including the academic competence latent factor; specifically, models resulted in poor model fit and modification indices suggested indicator cross-loadings that were not theoretically indicated. Therefore, this construct was instead analyzed as a manifest variable, defined as the mean of standardized (z-scored) current GPA, predicted GPA, and scholastic competence at each time point.

The CFA for Time 1 and Time 2 can be seen in Figure 2. At each time point, this model was specified as having a latent factor for internal experiences, an observed variable for valued action, an observed variable for academic competence, and a latent factor for social competence. Fit statistics across time points suggested that these measurement models were a good fit for these data. At Time 1, although the chi-square test was statistically significant ($\chi^2[10] = 22.56, p = .012$), the additional fit statistics, as follows, suggested good fit: CFI = .982, TLI = .962, SRMR = .026, RMSEA = .071 (90% CI = .031 to .110). Similarly, at Time 2, the chi-square test was statistically significant ($\chi^2[10] = 22.95, p = .011$). However, the additional fit statistics, as follows, suggested good fit: CFI = .984, TLI = .966, SRMR = .025, RMSEA = .072 (90% CI = .033 to .111).

In the context of SEMs detailed below, additional domain-specific measurement models were tested. For each domain, this model was specified as having an internal experiences latent factor as specified above, an observed manifest variable for domain-specific value composite scores (education values or social values), and an observed manifest variable for the corresponding domain-specific competence manifest variable (academic competence or social competence). The social competence manifest variable was defined as the mean of standardized (z-scored) social acceptance, close friendships,
and social activities scales at each time point. In the academic domain, this model
demonstrated generally adequate fit at Time 1 ($\chi^2[1] = 3.71, p = .054, \text{CFI} = .992, \text{TLI} = .955, \text{SRMR} = .012$) except for RMSEA (.10, [90% CI = .000 to .226]). At Time 1,
internal experiences factor loadings in this model were both .92. At Time 2, fit statistics
indicated good fit ($\chi^2[1] = .09, p = .759, \text{CFI} = 1.00, \text{TLI} 1.01, \text{SRMR} = .003, \text{RMSEA} = .000 [90\% \text{CI} = .000 to .114]$), with internal experiences factor loadings ranging from .83
to 1.06. Regarding the social domain, CFA results suggested good fit at Time 1 ($\chi^2[1] = 2.97, p = .085, \text{CFI} = .996, \text{TLI} = .975, \text{SRMR} = .008, \text{RMSEA} = .089 [90\% \text{CI} = .000 to .213]$), with internal experiences factor loadings ranging from .86 to .98. Fit statistics at
Time 2 also suggested good fit ($\chi^2[1] = 1.87, p = .172, \text{CFI} = .998, \text{TLI} = .989, \text{SRMR} = .010, \text{RMSEA} = .059 [90\% \text{CI} = .000 to .191]$), with internal experiences factor loadings
ranging from .85 to 1.03.

**Measurement invariance.** The latent factors included in the measurement
models described above were analyzed for longitudinal measurement invariance. These
CFAs included only the latent factors included in the measurement models (internal
experiences and social competence), for a total of 5 indicators per time point. In all
models presented here, factor variances were standardized and thus all indicator loadings
were estimated. Latent factors from both Time 1 and Time 2 were included in the
models.

Results of chi-square tests of model misfit indicated that these measurement
models were partially invariant over time. More specifically, when compared to the freely
estimated model, the model with all possible indicators constrained over time fit
significantly worse ($\chi^2[5] = 19.82, p = .001$). Further analyses were conducted in which
only one indicator was constrained per model; each of these models was then compared to the freely estimated model. Whereas the social acceptance ($\chi^2[1] = 5.56, p = .018$) and social activities ($\chi^2[1] = 4.61, p = .032$) indicators were not invariant over time, the close friendships ($\chi^2[1] = 3.80, p = .051$), acceptance ($\chi^2[1] = 2.50, p = .114$), and cognitive defusion ($\chi^2[1] = 3.55, p = .060$) indicators were longitudinally invariant.

For measurement models in which Internal was the only specified latent variable (utilized in SEMs described below), results of chi-square tests of model misfit suggested longitudinal measurement invariance. In these models, factor variances were again standardized and all indicators were estimated. Findings indicated that when compared to the freely estimated model, the constrained model did not fit significantly worse ($\chi^2[2] = 3.41, p = .182$), thus indicating that factor loadings were equivalent across time.

**Structural Equation Models**

**Cross-Domain Competence.** To test Hypotheses 1 and 2, a full SEM was specified that included longitudinal stability paths as well as directional paths from internal experiences and valued action at Time 1 to academic competence and social competence at Time 2. Results generally did not suggest adequate fit: $\chi^2(61) = 284.22, p < .001$, CFI = .901, TLI = .853, RMSEA = .121 (90% CI = .107 to .135), SRMR = .062. Another model was tested including correlated residuals to account for method effects between SPPCS subscales; however, this model yielded non-convergence.

To continue to test Hypotheses 1 and 2, another SEM was tested in which social competence was included as a manifest variable (rather than a latent variable), as described above. A consistent pattern of results emerged across SEM analyses such that
models including the social competence latent variable yielded poor fit statistics; thus, all subsequent models described included the social competence manifest variable.

This model can be seen in Figure 3. Results suggested that this model was an adequate fit for the data. Although the chi-square value was statistically significant, \( \chi^2(21) = 58.81, p < .001 \), all other fit statistics suggested adequate to good fit: CFI = .974, TLI = .949, RMSEA = .085 (90% CI = .060 to .111), SRMR = .050. However, the directional paths of interest, from internal experiences and valued action at Time 1 to academic competence and social competence at Time 2, were non-significant in this model. The models described here were further tested with an Internal manifest variable, defined as the mean of standardized (z-scored) acceptance and cognitive defusion at each time point; this did not change the overall pattern of results.

**Domain-specific competence.** To test Hypothesis 3a, additional models were examined which included the internal experiences and valued action variables as described above and either academic competence or social competence. A consistent pattern of results emerged across competence domains such that despite adequate fit statistics, the directional paths of interest from internal experiences and valued action at Time 1 to competence at Time 2 were non-significant. Therefore, further tests of Hypothesis 3a were conducted by testing models including domain-specific value composite scores (education or social life values) and corresponding domain-specific competence manifest variables. Figure 4 shows results of this model for the academic domain. Results of this model indicated adequate fit statistics: \( \chi^2(13) = 36.93, p = .000 \), CFI = .978, TLI = .954, RMSEA = .086 (90% CI =
.054 to .119), SRMR = .043. However, paths from both internal experiences and education values at Time 1 to academic competence at Time 2 were non-significant.

Figure 5 shows results of the domain-specific model for social values and social competence. Results suggested that this model was generally an adequate fit for these data: $\chi^2(13) = 44.49$, $p < .000$, CFI = .976, TLI = .949, RMSEA = .098 (90% CI = .068 to .131), SRMR = .036. Further, results suggested that although the path from internal experiences at Time 1 to social competence at Time 2 was non-significant ($\beta = -.02$, $p = .628$), social values at Time 1 was a significant predictor of social competence at Time 2 ($\beta = .21$, $p < .001$). To test for the influence of covariates, a model was tested including paths regressing both social competence at Time 2 and social values at Time 1 on baseline anxiety symptoms, depressive symptoms, stress, well-being, and awareness. Fit statistics suggested that the model including covariates was a good fit to these data: $\chi^2(20) = 50.81$, $p = .025$, CFI = .989, TLI = .979, RMSEA = .047 (90% CI = .017 to .071), SRMR = .029. Social values at Time 1 remained a significant predictor of social competence at Time 2 when accounting for the influence of baseline anxiety symptoms, depressive symptoms, stress, well-being, and awareness ($\beta = .20$, $p < .001$).

To further analyze the relative influence of each construct measured at Time 1 (i.e., internal experiences, valued action, competence) on domain-specific competence at Time 2, a series of SEMs was conducted in which competence was the only construct included at Time 2. For the academic domain, this included a series of models testing (1) the influence of internal experiences at Time 1 on academic competence at Time 2, (2) the influence of internal experiences and education values at Time 1 on academic competence at Time 2, and (3) the influence of internal experiences, education values,
and academic competence at Time 1 on academic competence at Time 2. In the first model, internal experiences at Time 1 was positively associated with academic competence at Time 2 (β=.28, p < .001). In the second model, both internal experiences (β=.21, p = .010) and education values (β=.15, p = .035) at Time 1 were positively associated with academic competence at Time 2. In the third model, only academic competence at Time 1 was significantly associated with academic competence at Time 2 (β=.78, p < .001). Thus, results of this series of models suggested that the positive associations between internal experiences and education values at Time 1 on academic competence at Time 2 became non-significant with the inclusion of the longitudinal stability path for academic competence.

An equivalent series of models was conducted for social competence; for this domain, this included a series of models testing (1) the influence of internal experiences at Time 1 on social competence at Time 2, (2) the influence of internal experiences and social values at Time 1 on social competence at Time 2, and (3) the influence of internal experiences, social values, and social competence at Time 1 on social competence at Time 2. In the first model, internal experiences at Time 1 was positively associated with social competence at Time 2 (β=.42, p < .001). In the second model, both internal experiences (β=.15, p = .008) and social values (β=.56, p < .001) at Time 1 were positively associated with social competence at Time 2. In the third model, both social values (β=.13, p = .021) and social competence (β=.76 p < .001) at Time 1 were significantly associated with social competence at Time 2. Thus, in the social domain, results suggested that although the positive association between internal experiences at Time 1 and social competence at Time 2 became non-significant with the inclusion of the
longitudinal stability path for social competence, the association between social values at Time 1 and social competence at Time 2 remained significant.

**Alternative Measure of Acceptance**

To test Hypothesis 3b, all models described above were also tested with the PMS Acceptance subscale as the measure of acceptance rather than the AAQ-II. As in the models described above, this measure of acceptance was analyzed as an indicator loading onto the internal experiences latent factor. Fit statistics for measurement models at Time 1 ($\chi^2[10] = 28.95, p = .001, \text{CFI} = .963, \text{TLI} = .922, \text{SRMR} = .030, \text{RMSEA} = .087 \ [90\% \ CI = .051 \text{ to } .125]$) and Time 2 ($\chi^2[10] = 22.91, p = .011, \text{CFI} = .980, \text{TLI} = .957, \text{SRMR} = .029, \text{RMSEA} = .072 \ [90\% \ CI = .033 \text{ to } .111]$), indicated adequate fit. This measurement model demonstrated partial invariance across time ($\chi^2[5] = 24.37, p < .001$); however, although the CFQ indicator in this model was longitudinally invariant ($\chi^2[1] = 3.68, p = .055$), the PMS Acceptance indicator was not ($\chi^2[1] = 5.28, p = .022$). A measurement model was also tested in which internal experiences was the only specified latent variable; the chi-square test of model misfit was significant, ($\chi^2[2] = 7.94, p = .019$), indicating that factor loadings were not equivalent across time.

Additionally, factor loadings for the PMS Acceptance subscale on the internal experiences factor were lower in these models than in the AAQ-II models described above. Across SEMs, a pattern of results emerged such that models including the PMS Acceptance subscale generally demonstrated worse fit as compared to models including the AAQ-II as a measure of acceptance.

**Exploratory Analyses: Multiple-Group Models**
Exploratory analyses were conducted to examine the extent to which components of PF may act as promotive factors for particular groups of students. Specifically, correlational and SEM analyses tested for associations between internal and behavioral components of PF at Time 1 and competence at Time 2 based on low (defined as below the median) and high (defined as greater than or equal to the median) levels of baseline depressive symptoms, anxiety symptoms, and stress levels. Median scores were used to create the low (below the median) and high (greater than or equal to the median) groups for anxiety symptoms (median = 6.00) and stress (median = 21.00). Given the low median value of depressive symptoms (1.00) relative to the possible range of scores, a cutoff score of 2.00 was used to create the low (below 2.00) and high (greater than or equal to 2.00), as this was the lowest score on which at least half of the sample (55.6%) scored below.

Results of correlational analyses can be found in Tables 9a, 9b, and 9c. For symptoms of anxiety, results suggest a general pattern of stronger, positive associations for participants reporting high levels of baseline symptoms as compared to low levels (see Table 9a). Fisher’s r-to-z transformations were conducted to test for significant differences between correlation values. Results showed a significant difference ($z = -2.20$, $p = .028$) in the correlation between acceptance at Time 1 and predicted GPA at Time 2 such that this association was stronger for the high anxiety symptoms group.

Results based on level of depressive symptoms were less consistent. A pattern emerged such that stronger, positive associations were generally observed between components of PF and social activities for participants reporting high baseline depressive symptoms as compared to low levels (see Table 9b). In contrast, results of Fisher’s r-to-z
transformations showed a significant difference ($z = 2.41, p = .016$) in the correlation between cognitive defusion at Time 1 and current GPA at Time 2 such that this association was stronger for the low depressive symptoms group.

A consistent pattern was not generally observed for correlations based on baseline stress level (see Table 9c). Further, multiple-group SEM analyses (including stability paths, as described above) did not yield significant associations between internal experiences or values at Time 1 and competence at Time 2 for participants reporting high levels of depressive or anxiety symptoms or stress levels.
Discussion

The purpose of the current study was to examine the extent to which components of PF influence competence in a non-clinical, college student sample using a longitudinal study design. This study aimed to integrate the ACT and resilience frameworks by assessing distinct internal and behavioral components of PF as well as developmentally-salient domains of competence at the beginning and end of a college semester. Using SEM analyses, the current study tested the influence of both internal and behavioral components of PF at the beginning of a college semester on social and academic competence at the conclusion of that same semester.

This study sought to provide a novel contribution to the literature in multiple ways. First, the current research assessed multiple components of the PF construct—specifically, distinct internal and behavioral processes—to examine the relative contribution of these facets to competence development. Second, given theoretical considerations within both the ACT and resilience frameworks, this study focused on competence-focused outcomes, rather than psychopathology symptoms. The current findings partially supported study hypotheses, and results may therefore inform efforts to foster college student competence through application of the ACT framework. This discussion section will (1) review support for study hypotheses, (2) discuss implications of study findings, (3) explore those results that did not support study hypotheses, (4) outline limitations of this research, and (5) provide conclusions and future directions.

Regarding the first study aim, results generally did not support Hypothesis 1. Results of correlational analyses suggested positive associations between acceptance, defusion, and valued action at Time 1 and multiple measures of competence at Time 2.
Despite these findings, SEM results did not provide support for Hypothesis 1 when including the general composite values score and both domains of competence. Specifically, results did not suggest significant associations between internal or behavioral components of PF at Time 1 with social or academic competence at Time 2 when also accounting for both social and academic competence at Time 1.

Findings also generally did not support Hypothesis 2. Although results suggested significant associations between both internal and behavioral components of PF at Time 1 with measures of social and academic competence at Time 2, these findings did not remain significant in SEM analyses when also accounting for the influence of baseline competence. Additionally, results indicated that, excepting baseline valued action in the social domain (discussed below), the positive associations between internal and behavioral components of PF at Time 1 on competence at Time 2 were generally accounted for by baseline competence.

Additionally, the current study aimed to address relevant measurement-related considerations regarding primary study constructs. Findings provided partial support for Hypothesis 3a. In SEM analyses, the general value composite score did not predict either social or academic competence; further, the domain-specific education value composite was not associated with academic competence at Time 2. However, results did indicate that within the social domain, valued action as it relates to social life and friendships at Time 1 was positively associated with social competence at Time 2. Notably, this component of Hypothesis 3a was supported both by correlations between constructs across time points as well as by results of the social-domain-specific SEM. Thus, findings provide evidence that valued action within this domain is predictive of competence when
accounting for the influence of baseline competence (in addition to other associations within the model).

Furthermore, valued action within the social domain at Time 1 remained a significant, positive predictor of social competence at Time 2 when accounting for the influence of symptoms of depression and anxiety, stress, well-being, and awareness. This is consistent with previous findings indicating the benefits of components of PF when accounting for psychological symptoms such as worry and general distress (e.g., Hayes et al., 2010; Levin et al. 2012). These findings suggest that within the social domain, promoting valued action may be associated with competence for college students. Further, these results identify valued action as a potential intervention point for fostering competence over and above symptoms of psychological distress, present-moment awareness, stress, and well-being.

The current study also examined the acceptance subscale of the PMS as an alternative measure of acceptance. Specifically regarding Hypothesis 3b, results did suggest positive associations between acceptance as measured by both the AAQ-II and the PMS at Time 1 with several measures of competence at Time 2. Despite these findings, results indicated that models including the PMS as a measure of internal experiences did not fit the data as well as those including the AAQ-II. Therefore, the current findings did not generally support the use of the PMS rather than the AAQ-II as a measure of acceptance.

Within the social domain, the current findings provide evidence for the conceptualization of valued action as a promotive factor within a non-clinical sample. Further, results suggest the potential benefit of promoting value-consistent behaviors for
college students as a method of fostering competence. Previous literature outlining the importance of social competence within this developmental stage (e.g., Conley et al., 2014; Roisman et al., 2004) highlights the relevance of constructs that can be fostered to promote adaptive functioning in this domain. Importantly, these findings provide support for the behavioral component of PF and expand on previous research suggesting the role of promoting valued action in normative samples. For example, the current results build on research documenting the role of values-based interventions over and above goal-setting strategies (Chase et al., 2013). Furthermore, recent findings suggesting that increases in valued action precede decreases in distress (rather than vice versa) provide additional support for specifically emphasizing valued action (Gloster et al., 2017b). Combined with the current results, this suggests that in the college student population, fostering engagement in value-driven behavior within the social domain may promote positive adjustment.

Although limited to the social domain, these results provide evidence for the relative role of behavioral versus internal processes in a normative, college student sample. Specifically regarding social competence, findings suggest that fostering adaptive behavioral patterns may be a more effective approach than emphasizing internal processes such as acceptance and defusion. This is consistent with theoretical and empirical literature from the CBT framework emphasizing the importance of behavioral intervention components (e.g., Foa et al., 2005; Jacobson et al., 1996).

The current findings may inform efforts to disseminate values-based interventions to promote social competence within the college student population. Results suggest that both the importance of this value and the consistency of behaviors with this value should
be included as components of these interventions. Thus, programs should include strategies emphasizing values exploration, identification, and clarification in addition to discussions of the consistency of one’s behavior with self-identified values and delineating actions that may move one towards these domains (e.g., Fitzpatrick et al., 2016). This may include discussing types of social relationships, important components of interpersonal interactions, overcoming challenges when navigating social situations, and behavioral strategies for increasing engagement in these types of activities. Providing students with opportunities to engage in these types of interventions may be particularly important at this developmental stage, given the novel social challenges and stressors they are likely to encounter within the college environment. Results of this study suggest the value of emphasizing valued action in the social domain in the context of effective programs identified in previous literature (e.g., Dantiz & Orsillo, 2014, Levin et al., 2014b; Levin et al., 2016). Specifically, programs such as those utilizing in-person workshops or online platforms may be particularly beneficial for promoting social competence to the extent that they emphasize valued action in the social domain. In addition, the current results should be incorporated with research and theory pointing to the role of committed action to value-consistent behaviors (e.g., Gagnon et al., 2016; Hayes et al., 2006) to further examine behavioral processes within this framework.

The current findings indicate that offering students the opportunity to enhance valued action may help to promote the extent to which they maintain close friendships, feel socially accepted by others, and engage in social activities. Furthermore, results suggest that this is likely to be a beneficial strategy even when accounting for the influence of psychological distress, overall well-being, stress, and present-moment
awareness. Thus, findings highlight the utility of emphasizing valued action in the social
domain as a point of intervention for college students, over and above strategies to
decrease psychological symptoms or stress, or increase overall well-being or present-moment awareness. This is consistent with previous research suggesting associations
between PF and positive adjustment when accounting for the influence of psychological
distress (e.g., Hayes et al., 2010; Levin et al., 2012).

As discussed above, several study hypotheses were not supported by the current
findings. For example, results of SEM analyses suggest that when accounting for the
stability of competence over the course of a college semester, internal components of
PF—as defined by acceptance and defusion—did not predict competence. Of note,
findings indicated that positive associations between internal components of PF at Time 1
and competence at Time 2 were accounted for by the strong stability of competence
measures across time points. This suggests that, for the current sample, social and
academic competence may be better fostered by strategies directly targeting these
domains (e.g., tutoring; social skills development) rather than efforts to promote internal
components of PF.

Although this finding does not support previous literature supporting the benefits
of PF, it is important to note that many studies have not accounted for the influence of
outcome measures over time (e.g., Masuda & Tully, 2012) or have included intervention
components targeting tenets of PF (e.g., Butryn et al., 2011; Danitz & Orsillo, 2014;
Fledderus et al., 2010; Glick et al., 2014; Levin et al., 2014b; Muto et al., 2011; Räsänen
et al., 2016). Thus, it may be that when accounting for baseline competence, intervention
may be necessary in order to foster adaptive outcomes through internal components of
PF. At the same time, other studies have shown that even within the context of ACT-based interventions, adaptive outcomes are not necessarily associated with changes in measures of internal components of PF, such as the AAQ-II (e.g., Levin, Haeger, Pierce, & Twohig, 2017; Sandoz et al., 2017). Therefore, it is possible that within the ACT framework, intervention outcomes may not necessarily be associated with measures of internal processes.

Additionally, findings did not provide support for the general VLQ composite score as a predictor of competence when also accounting for baseline competence. This again suggests the possibility that social and academic functioning may be better promoted by strategies targeting these areas of functioning directly as opposed to promoting valued action across all domains. One reason for this finding may be that certain domains assessed by the VLQ are potentially less relevant to emerging adults enrolled in college (e.g., parenting; community engagement). Therefore, focusing instead on promoting value-consistent behavior in specific, developmentally-salient domains may be warranted. This strategy is supported by methodology employed by previous research evaluating domain-specific valued action measures for college students (e.g., Danitz & Orsillo, 2014; Glick et al., 2014; Sandoz et al., 2017).

Furthermore, the current results did not support hypotheses related to domain-specific valued action within the academic domain. Rather, findings indicated that positive associations between components of PF and academic competence were accounted for by baseline academic competence. One reason for this finding may be the potentially lower quality of self-report data regarding GPA; this is supported by the weaker correlations between GPA and other primary study variables both between and
within time points, as compared to associations between other study variables. Further, although the current findings are inconsistent with previous literature demonstrating the benefits of PF for academic functioning (e.g., Glick & Orsillo, 2015; Sandoz et al., 2017), important methodological differences exist such as the use of university records, assessment of GPA over a longer time period, and the inclusion of ACT-based intervention components.

In addition, findings did not support the PMS acceptance subscale as an alternative to the AAQ-II as a measure of acceptance. This suggests that for these data, the PMS acceptance subscale did not capture the construct of internal PF to the extent that the AAQ-II did. Of note, this measure was selected as an alternative to the AAQ-II due to its implementation in previous research (Danitz & Orsillo, 2014) as well as for feasibility reasons (e.g., smaller number of items as compared to other measures, presence of subscales). Thus, further research should explore additional measures of acceptance not assessed in the current study (e.g., the Brief Experiential Avoidance Questionnaire; Gámez et al., 2014).

In addition to the proposed analytic plan, exploratory analyses examined the extent to which hypothesized associations differed based on psychological distress and stress levels. These analyses were conducted based on previous literature suggesting the presence of moderators of associations between PF and adaptive outcomes (e.g., Craske et al., 2014; Pots, Trompetter, Schreurs, & Bohlmeijer, 2016). Correlational results were tentatively suggestive of the protective role of both internal and behavioral components of PF, such that associations between these constructs at Time 1 and multiple measures of competence at Time 2 were stronger among participants experiencing high (compared to
low) levels of anxiety symptoms. Overall, these results indicate that assessment of baseline levels of psychological distress may inform the extent to which components of PF can promote competence development among college students. However, interpretation of these findings is limited, as these associations were not observed when also accounting for the influence of competence over time.

**Limitations**

The current study has several limitations. First, all data were self-reported. Although individuals’ perceptions of their own PF, value-consistent behaviors, and competence provide important information, some of the constructs included in this study could have been more optimally assessed using additional measures. In particular, obtaining more objective reports of participants’ competence (e.g., university records; interviews with peers) may have provided a more thorough and/or accurate assessment. Second, despite the longitudinal design, longer-term assessments of competence were not obtained. The one-semester timeline for the current study was selected partially to inform programs that may be implemented within this time frame, as this is common within many higher education institutions. However, it may be that constructs examined in the current study have longer-term impacts not captured by the current results. Third, not all components of PF were directly addressed in the current study. Although this study represents a step towards a more nuanced examination of the PF construct in non-clinical college student samples, additional research should assess components of PF such as committed action. Fourth, this study did not assess the PF construct as it compares to additional strategies aimed at fostering competence for college students, such as cognitive restructuring or problem-solving techniques. Thus, results cannot speak to the relative
benefit of these constructs in comparison to other types of strategies. Fifth, despite recruitment efforts aimed at obtaining a diverse and representative sample, the current sample is relatively homogeneous in regards to variables such as race/ethnicity and academic institution. Therefore, results may not be generalizable to other college-student populations. Finally, the sample retention rate may be a limitation of this research, given how differences between those individuals who did and did not participate at Time 2 may have impacted study findings.

**Conclusions and Future Directions**

Overall, this study provides limited additional support for the application of PF to normative populations. Despite the limited evidence found for study hypotheses, the current findings advance the literature in several ways. First, results tentatively support the integration of the ACT and resilience frameworks and the conceptualization of PF as a promotive factor that can be fostered to support competence development over the course of a college semester. In addition, model fit statistics across SEM analyses provide evidence for the conceptualization and assessment of distinct components of PF. Further, although limited to the social domain, findings suggest the potential differential contribution of behavioral versus internal processes as they relate to competence.

Future research should continue to utilize longitudinal designs to examine associations between components of PF and competence-based outcomes. Additional studies should build on the current findings by evaluating ACT-based programs for college students that emphasize and assess distinct components of this framework. Furthermore, future research should continue to address measurement-related issues within the ACT framework by including measures of additional components of PF (e.g.,
committed action) as well as measures of PF more broadly (e.g., CompACT; Francis et al., 2016). The current findings also provide support for future examination of competence-focused outcomes; additional research using more objective measures such as university records and peer ratings and interviews may provide an increasingly thorough assessment of developmentally-salient competence domains. Finally, additional studies focusing on moderators and mediators may help researchers to better understand particular groups for whom ACT-based interventions may be most helpful as well as mechanisms through which components of PF can foster competence. Through these continued investigations, researchers can better understand effective methods for implementing and assessing ACT-based strategies to promote competence for the college student population.
Table 1

*Sample Demographic Characteristics*

<table>
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<th>Participated in Time 1 (N = 429)</th>
<th>Participated in Both Time Points (N = 250)</th>
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<td>($60,615.33)</td>
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<td>22.0%</td>
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<tr>
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<td>7.2%</td>
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<td>86.0%</td>
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<td>7.6%</td>
</tr>
<tr>
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<td>9.2%</td>
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<tr>
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<td>Graduate/Post-College</td>
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<td>32.4%</td>
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*Note.* The descriptive statistics presented for Time 1 (*N* = 429) represent those participants who participated through collection of primary study variables. Descriptive statistics for family income are calculated with the exclusion of outliers. The descriptive statistics presented here represent *N* = 290 at Time 1 and *N* = 166 at Time 2.
Table 2

*Internal Consistency of Study Measures*

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<tr>
<th>Measure</th>
<th>Time 1</th>
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<tbody>
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<td>1. Acceptance (AAQ-II)</td>
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<tr>
<td>2. Cognitive Defusion</td>
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<td>.96</td>
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<tr>
<td>3. Acceptance (PMS)</td>
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<td>.89</td>
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<tr>
<td>4. Valued Living Composite</td>
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<td>.85</td>
</tr>
<tr>
<td>5. Scholastic Competence (SPPCS)</td>
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<td>.79</td>
</tr>
<tr>
<td>6. Social Acceptance (SPPCS)</td>
<td>.87</td>
<td>.87</td>
</tr>
<tr>
<td>7. Close Friendships (SPPCS)</td>
<td>.88</td>
<td>.90</td>
</tr>
<tr>
<td>8. Social Activities</td>
<td>.68</td>
<td>.73</td>
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<tr>
<td>9. Friends ASR</td>
<td>.50</td>
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<td>10. Social Activities Z-Score</td>
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<td>.80</td>
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<td>.69</td>
</tr>
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<td>12. Depressive Symptoms</td>
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<td>.86</td>
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<tr>
<td>13. Anxiety Symptoms</td>
<td>.93</td>
<td>.92</td>
</tr>
<tr>
<td>14. Well-Being</td>
<td>.94</td>
<td>.94</td>
</tr>
<tr>
<td>15. Awareness</td>
<td>.79</td>
<td>.83</td>
</tr>
</tbody>
</table>

*Note.* AAQ-II = Acceptance and Action Questionnaire—II. PMS = Philadelphia Mindfulness Scale. SPPCS = Self Perception Profile for College Students.
### Table 3

**Number of Participants at each Study Stage**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Time 1</th>
<th>Time 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed Age Screen</td>
<td>776</td>
<td>382</td>
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<tr>
<td>Eligible Based on Age Screen</td>
<td>616</td>
<td>378</td>
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<tr>
<td>Consented to Participate</td>
<td>573</td>
<td>356</td>
</tr>
<tr>
<td>Participants when Accounting for Invalid Responses†</td>
<td>549</td>
<td>305</td>
</tr>
<tr>
<td>Participated through all Primary Study Variables</td>
<td>429</td>
<td>253</td>
</tr>
<tr>
<td>Participated through all Primary Study Variables and Provided Linking Information</td>
<td>410</td>
<td>250</td>
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</tbody>
</table>

†Invalid responses refer to those removed due to errors on attention-check items, reported age outside of the eligible range, and/or duplicate responses.
Table 4

**Descriptive Statistics for Primary Study Variables**

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<tr>
<th>Variable Description</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acceptance (AAQ-II)</td>
<td>26.07</td>
<td>9.39</td>
<td>1.00 – 42.00</td>
<td>26.10</td>
<td>9.37</td>
<td>0.00 – 42.00</td>
</tr>
<tr>
<td>2. Cognitive Defusion</td>
<td>23.10</td>
<td>10.10</td>
<td>0.00 – 42.00</td>
<td>23.48</td>
<td>10.08</td>
<td>0.00 – 42.00</td>
</tr>
<tr>
<td>3. Acceptance (PMS)</td>
<td>27.27</td>
<td>7.76</td>
<td>10.00 – 48.00</td>
<td>27.35</td>
<td>7.39</td>
<td>8.00 – 48.00</td>
</tr>
<tr>
<td>4. Valued Living Composite</td>
<td>60.21</td>
<td>17.07</td>
<td>12.30 – 99.00</td>
<td>58.20</td>
<td>18.05</td>
<td>2.00 – 100.00</td>
</tr>
<tr>
<td>5. Social Value Composite</td>
<td>68.24</td>
<td>25.47</td>
<td>5.00 – 100.00</td>
<td>65.43</td>
<td>26.59</td>
<td>2.00 – 100.00</td>
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<tr>
<td>6. Education Value Composite</td>
<td>72.68</td>
<td>21.90</td>
<td>6.00 – 100.00</td>
<td>66.76</td>
<td>24.04</td>
<td>1.00 – 100.00</td>
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<tr>
<td>7. Current GPA</td>
<td>3.34</td>
<td>0.43</td>
<td>2.00 – 4.00</td>
<td>3.36</td>
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<td>8. Predicted GPA</td>
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<td>3.40</td>
<td>0.39</td>
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<td>2.85</td>
<td>0.76</td>
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<td>11. Close Friendships</td>
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<td>0.83</td>
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<tr>
<td>12. Social Activities</td>
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<tr>
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<td>1.79</td>
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<td>16. Anxiety Symptoms</td>
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<td>6.05</td>
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</tbody>
</table>

*Note. Time 1 N ranges from 244-250 (177-180 for variables involving GPA). Time 2 N ranges from 248-250 (214-219 for variables involving GPA). AAQ-II=Acceptance and Action Questionnaire—II. PMS=Philadelphia Mindfulness Scale. GPA=Grade Point Average.*
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<td>2. Cognitive Defusion</td>
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<td>16. Well Being</td>
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</table>

Table 5

Correlations among Study Variables at each Time Point
<table>
<thead>
<tr>
<th>Variables</th>
<th>Correlations between Time Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acceptance (AVG.1)</td>
<td>0.37</td>
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<tr>
<td>2. Cognitive Distraction</td>
<td>0.30</td>
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<td>3. Acceptance (PMS)</td>
<td>0.41</td>
</tr>
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<td>4. Academic Limits Composite</td>
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<td>5. Social Value Composite</td>
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<td>6. Election Value Composite</td>
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<td>7. Current GPA</td>
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<td>8. Problem GPA</td>
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<td>9. Social Competence</td>
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<td>11. Close Friendships</td>
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<td>12. Social Activities Z-Score</td>
<td>0.36</td>
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<td>17. Awareness</td>
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</table>

Note: Correlation values measured at Time 1. Table 6 presents correlations among study variables between time points.
Table 7: Correlation among Demographic and Study Variables at Time 1.

<table>
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<tbody>
<tr>
<td>Awareness</td>
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<td>15. Anxiety Symptoms</td>
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<td>13. Stress</td>
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<td>12. Social Activities</td>
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<td>11. Close Friendships</td>
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<td>10. Social Acceptance</td>
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<td>9. School Connectedness</td>
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<td>8. Predicted GPA</td>
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<td>7. Current GPA</td>
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<td>6. Education Venue Camp</td>
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<tr>
<td>5. School Type Camp</td>
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<tr>
<td>4. Valley Living Camp</td>
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<td>3. Academic (PSI)</td>
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<td>2. Cognitive Decline</td>
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<td>1. Acceptance (AAuf)</td>
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</tbody>
</table>

Note: Values range from 170 to 290.
Table 8

Correlations among demographic and study variables at Time 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Partial R²</th>
<th>Partial Adjusted R²</th>
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</thead>
<tbody>
<tr>
<td>Income</td>
<td>0.09</td>
<td>0.13</td>
<td>0.10</td>
<td>0.01</td>
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</tr>
<tr>
<td>Education</td>
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<td>0.14</td>
<td>0.13</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>0.08</td>
<td>0.10</td>
<td>0.09</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Age</td>
<td>0.15</td>
<td>0.17</td>
<td>0.16</td>
<td>0.03</td>
<td>0.03</td>
</tr>
<tr>
<td>Gender</td>
<td>0.20</td>
<td>0.22</td>
<td>0.21</td>
<td>0.05</td>
<td>0.05</td>
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</tbody>
</table>

Note: Partial R² and Partial Adjusted R² values are given for the full model.
Table 9a  

*Correlations among Time 1 Components of Psychological Flexibility and Time 2 Competence based on Time 1 Level of Anxiety Symptoms*

<table>
<thead>
<tr>
<th></th>
<th>Time 1 Acceptance (AAQ-II)</th>
<th>Time 1 Defusion</th>
<th>Time 1 Valued Living Composite</th>
<th>Time 2 Current GPA</th>
<th>Time 2 Predicted GPA</th>
<th>Time 2 Social Acceptance</th>
<th>Time 2 Close Friendships</th>
<th>Time 2 Social Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low Anxiety Symptoms (N = 115)</td>
<td>High Anxiety Symptoms (N = 134)</td>
<td></td>
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</tr>
<tr>
<td>Time 2 Current GPA</td>
<td>-.10</td>
<td>-.04</td>
<td>.02</td>
<td>.09</td>
<td>.10</td>
<td>-.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 2 Predicted GPA</td>
<td>-.05</td>
<td>.01</td>
<td>.04</td>
<td>.25**</td>
<td>.25**</td>
<td>.02</td>
<td></td>
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<tr>
<td>Time 2 Scholastic Competence</td>
<td>.16</td>
<td>.08</td>
<td>.17</td>
<td>.36**</td>
<td>.28**</td>
<td>.22*</td>
<td>.41**</td>
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</tr>
<tr>
<td>Time 2 Social Acceptance</td>
<td>.30**</td>
<td>.18*</td>
<td>.40**</td>
<td>.27**</td>
<td>.22**</td>
<td>.41**</td>
<td>.36**</td>
<td></td>
</tr>
<tr>
<td>Time 2 Close Friendships</td>
<td>.20*</td>
<td>.14</td>
<td>.28**</td>
<td>.31**</td>
<td>.28**</td>
<td>.36**</td>
<td></td>
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<tr>
<td>Time 2 Social Activities</td>
<td>.14</td>
<td>.03</td>
<td>.34**</td>
<td>.25**</td>
<td>.22*</td>
<td>.37**</td>
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</tr>
</tbody>
</table>

*Note.* Pairwise N ranges from 98-115 for Low Anxiety Symptoms and from 113-134 for High Anxiety Symptoms.  
* = p < .05, ** = p < .001. AAQ-II = Acceptance and Action Questionnaire—II. GPA = Grade Point Average.
Table 9b

**Correlations among Time 1 Components of Psychological Flexibility and Time 2 Competence based on Time 1 Level of Depressive Symptoms**

<table>
<thead>
<tr>
<th></th>
<th>Low Depressive Symptoms (N = 139)</th>
<th>High Depressive Symptoms (N = 110)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time 1 Acceptance (AAQ-II)</td>
<td>Time 1 Defusion</td>
</tr>
<tr>
<td>Time 2 Current GPA</td>
<td>.15</td>
<td>.20*</td>
</tr>
<tr>
<td>Time 2 Predicted GPA</td>
<td>.12</td>
<td>.17</td>
</tr>
<tr>
<td>Time 2 Scholastic Competence</td>
<td>.34**</td>
<td>.26**</td>
</tr>
<tr>
<td>Time 2 Social Acceptance</td>
<td>.27**</td>
<td>.21**</td>
</tr>
<tr>
<td>Time 2 Close Friendships</td>
<td>.20**</td>
<td>.22**</td>
</tr>
<tr>
<td>Time 2 Social Activities</td>
<td>.06</td>
<td>-.002</td>
</tr>
</tbody>
</table>

*Note. Pairwise N ranges from 124-139 for Low Depressive Symptoms and from 88-110 for High Depressive Symptoms. * = p < .05, ** = p < .001. AAQ-II=Acceptance and Action Questionnaire—II. GPA=Grade Point Average.*
Table 9c

Correlations among Time 1 Components of Psychological Flexibility and Time 2 Competence based on Time 1 Level of Stress

<table>
<thead>
<tr>
<th></th>
<th>Low Stress (N = 114)</th>
<th>High Stress (N = 135)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time 1 Acceptance (AAQ-II)</td>
<td>Time 1 Defusion</td>
</tr>
<tr>
<td>Time 2 Current GPA</td>
<td>.16</td>
<td>.20*</td>
</tr>
<tr>
<td>Time 2 Predicted GPA</td>
<td>.14</td>
<td>.23*</td>
</tr>
<tr>
<td>Time 2 Scholastic Competence</td>
<td>.31**</td>
<td>.27**</td>
</tr>
<tr>
<td>Time 2 Social Acceptance</td>
<td>.40**</td>
<td>.24**</td>
</tr>
<tr>
<td>Time 2 Close Friendships</td>
<td>.37**</td>
<td>.31**</td>
</tr>
<tr>
<td>Time 2 Social Activities</td>
<td>.29**</td>
<td>.19*</td>
</tr>
</tbody>
</table>

Note. Pairwise N ranges from 97-114 for Low Stress and from 116-135 for High Stress. * = p < .05, ** = p < .001. AAQ II=Acceptance and Action Questionnaire—II. GPA=Grade Point Average.
Figure 1. Hypothesized Conceptual Model.
Figure 2. Measurement Model across Time Points.  
Note. Factor loadings and associations before the slash represent measurement at Time 1; factor loadings and associations after the slash above the diagonal represent measurement at Time 2. * = p < .05, ** = p < .001.
Figure 3. Structural Equation Model including Cross-Domain Competence.
Note. * = p < .05, ** = p < .001.
Figure 4. Structural Equation Model for Academic Competence.
*Note. * = $p < .05$, ** = $p < .001$. 

Figure 5. Structural Equation Model for Social Competence.
Note. ** = p < .001.
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