Strengths Use, Environmental Factors, and Academic Outcomes in Newly Matriculated College Students

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Abstract

College presents a number of challenges to new students. Few studies have examined how students' strengths may positively impact their college experience and what factors may promote or impede their success. This study examined the relationship between strengths use and academic satisfaction, academic meaning, and leadership, as well as the influence of two environmental moderators—strengths barriers and environmental support. Participants included 371 newly matriculated undergraduate students at a large, public university in the United States. Results partially supported our hypotheses and revealed a number of important relations. Specifically, strengths use did not predict academic satisfaction; however, strengths barriers negatively predicted academic satisfaction and environmental support positively predicted academic satisfaction. Further, neither strengths barriers nor environmental support moderated the relationship between strengths use and academic satisfaction. Strengths use and environmental support positively predicted academic meaning, and strengths barriers negatively predicted academic meaning. Moreover, strengths barriers and environmental support did not moderate the relation between strengths use and academic meaning. Finally, strengths use positively predicted leadership, and strengths barriers negatively predicted leadership; however, environmental support did not significantly predict leadership. Strengths barriers, and not environmental support, moderated the relation between strengths use and leadership. Implications of these findings are discussed.

Keywords Strengths barriers · Student success · Environmental support · Academic satisfaction · Academic meaning · Leadership

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College is a time of immense growth and development for students. During this period, students face a number of challenges, such as academic stressors, life transitions, financial difficulties, and forming and maintaining relationships (e.g., Brougham et al. 2009; Duan 2016; Misra et al. 2000). If challenges such as these go unaddressed or do not get resolved, students may be at higher risk for poor academic performance, mental health concerns, or dropping out of college (e.g., Beiter et al. 2015; Bovier et al. 2004; Woosley and Miller 2015). The first year of college is an especially important period to target prevention and promotive factors of student success, as approximately 27% of first-year students drop out after their first year (National Student Clearinghouse Research Center 2019). Moreover, students' early college experiences have been shown to predict important student outcomes, such as retention, persistence, and academic performance; however, this initial period in college and potential predictors are understudied in the literature (Woosley 2003; Woosley and Miller 2015).

From a positive psychology perspective, identifying factors that promote college student success early in their education is paramount and may help students adjust and succeed in college. One construct that may be particularly beneficial to examine from a prevention and promotion standpoint in the educational context is strengths (e.g., Quinlan et al. 2012; Waters and Loton 2019), as each student possesses a unique constellation of strengths which they can use to their advantage. A significant body of research highlights the many benefits of using strengths (see Louis and Lopez 2014). However, maximizing strengths may depend on the environmental conditions present and the extent to which individuals receive support or experience barriers to using their strengths (Owens et al. 2018). In regard to first-year students, research suggests traits, which are often thought of as fairly stable, can change during the transition from high school to college. In a sample of German college students, students became more agreeable, conscientious, and emotionally stable as they transitioned from high school to college (Lüdtke et al. 2011). Additionally, positive experiences during college were associated with increases in openness, agreeableness, and conscientiousness over time, suggesting traits can change as a result of one's college experience. Thus, identifying possible supports and barriers in the college setting could help improve the students' experience as they transition to college.

Strengths have been most readily studied in relation to how they enhance well-being or indicators of well-being (e.g., life satisfaction, positive emotions; Brdar and Kashdan 2010; Littman-Ovadia and Lavy 2012; Peterson et al. 2007). Less is known about the implications of strengths use on other important outcomes for college students, such as meaning and leadership, and variables that may moderate the relations between strengths and academic outcomes. The purpose of this study was to examine how environmental factors (i.e., strengths barriers and environmental support) moderate the relations between strengths use and academic outcomes (i.e., academic satisfaction, academic meaning, and leadership) in first-year college students early in their college experience.

1 Theoretical Background

For the purposes of this study, we used a broad definition of strengths—positive traits or skills that promote optional functioning (Owens et al. 2018). In terms of

what is considered “positive,” Pawelski (2016) outlines two forms: ‘directly positive’ and ‘indirectly positive,’ with directly positive involving experiencing an increase in something/outcomes that are preferred, and indirectly positive resulting in the absence of things that are dispreferred. Specific to strengths, this can involve overcoming adversity, or specific characteristics, traits, or skills that increase the likelihood of beneficial outcomes, such as success, well-being, or fulfillment across domains (King and Trent 2012). The rationale for using a broader conceptualization of strengths stems from an interest in examining strengths more globally, not necessarily a distinct classification of strengths (e.g., CliftonStrengths or VIA-Inventory of Strengths [VIA-IS]) or specific, individual strengths (e.g., hope, creativity). While most research on strengths involves strengths from the VIA-IS or CliftonStrengths, researchers have begun to examine strength constructs more broadly to gain a better understanding of how strengths globally influence people’s lives. Broad strengths constructs that have been examined include: strengths knowledge, strengths use (Govindji and Linley 2007), strengths self-efficacy (Tsai et al. 2014), and strengths level (Allan and Duffy 2014). To our knowledge, no study to date has examined strengths barriers, or the perceived barriers related to using one’s strengths (Douglass et al. 2015).

Across strengths classifications and broad strengths constructs, several theoretical underpinnings hold. Each conceptualization of strengths argues that everyone possesses strengths and that strengths can positively affect important life outcomes across contexts (e.g., school, work, life; Anderson 2005; Louis and Lopez 2014). These positive outcomes most commonly occur when strengths are explicitly identified, used, and fostered by the person who possesses the strength(s) and supported by their environment and others in their life (Benson et al. 1998; Bowers et al. 2010; Owens et al. 2018). Moreover, the general process of developing strengths has been described as identifying strengths, internalizing their presence, and then putting actionable strength behaviors to use (Clifton et al. 2006). Missing from this sequence is the impact of environmental or contextual factors, such as barriers and supports in using one’s strengths, and consideration of how one might overcome obstacles to using their strengths and maximize factors that support their strengths.

As a whole, the field of psychology would benefit from a greater focus on environmental considerations and the intersection of the person and their environment (Neufeld et al. 2006). Whereas the importance of external assets, cultural strengths, and environmental strengths have been addressed in the literature (e.g., Benson et al. 1998; Owens et al. 2015; Owens and Woolgar 2018) and the influence of environmental factors on strengths development have been qualitatively explored (Owens et al. 2018), the vast majority of the strengths literature examines individual differences (e.g., how character strengths impact individual well-being). Rather than considering strengths—environmental or individual—discretely, it would be valuable to examine person-in-context considerations. The person-in-context perspective highlights that people continuously interact with and are influenced by their environment, and thus, individuals are simultaneously agents in and products of their environment (e.g., Kondrat 2013; Magnusson and Stattin 2007). Thus, in the case of college students, individual strengths are likely influenced by their most immediate context—the academic setting.

2 Strengths Use in College Students and Academic Outcomes

The relationship between strengths and a number of positive outcomes has been readily established with college students. For instance, several studies have demonstrated a positive relationship between students' strengths – measured in a number of ways – and indicators of well-being. Examples of the ways in which strengths have been measured include general strengths use (Govindji and Linley 2007), signature strengths use (i.e., using one's top character strengths from the VIA-IS; Allan and Duffy 2014), and specific character strengths (e.g., hope, zest; Proctor et al. 2011). Additional studies have shown positive relationships between strengths and a variety of other outcomes outside of well-being. For example, a number of character strengths are associated with greater general and personal courage (see Pury and Kowalski 2007) and positive coping (see Gustems-Carnicer and Calderon 2016). Strengths use is positively related to vitality, or feeling alive and full of energy (Govindji and Linley 2007; Ryan and Frederick 1997). Interpersonal strength, intellectual strength, and temperance strength, measured by the Brief Strengths Scale (Ho et al. 2016), each were associated with lower depression and anxiety symptoms when mediated by lower perceived stress (Duan 2016). Furthermore, strengths interventions involving college students have demonstrated success in enhancing indicators of well-being (Duan et al. 2014; Duan et al. 2018; Koydemir and Sun-Selişik 2016; Rust et al. 2009) and optimism (Dolev-Amit et al. 2020), as well as reducing stress (Wood et al. 2011) and psychological symptoms (Duan et al. 2018).

2.1 Academic Well-Being

A smaller body of research supports the relationship between strengths use and academic well-being (i.e., the experience of satisfaction or positive emotions related to one's education). In a sample of middle school students, all but one character strength (humility) from the VIA-Youth were positively related to school-related positive affect, with the character strengths of zest, perseverance, love of learning, and social intelligence having the strongest relationships with school-related positive affect (Weber et al. 2016). Additionally, several strengths were negatively correlated with school-related negative affect (Weber et al. 2016). The character strengths with the strongest negative relationships with school-related negative affect included teamwork, hope, self-regulation, and love. In addition, half of the VIA-IS strengths were positively related to positive school functioning, as reported by the teacher, with perseverance, zest, love of learning, perspective, and hope having the five strongest relationships. Several strengths (love of learning, perspective, perseverance, social intelligence, leadership, prudence, hope, and humor) were positively related to school achievement, as reported by the teacher (see Weber et al. 2016). Collectively, character strengths positively predicted positive school functioning – through greater school-related positive affect – which in turn was associated with higher school achievement (Weber et al. 2016). In a sample of college students, almost all of the VIA-IS strengths positively related to their GPA and college satisfaction (Lounsbury et al. 2009). Additionally, signature strengths use (i.e., using one's top strengths) was positively related to academic satisfaction in a sample of college students (Allan and Duffy 2014).

2.2 Academic Meaning

Although a substantial body of research supports the importance of promoting the experience of meaning in life with college students and meaningful work with adults, the examination of the construct ‘academic meaning’ is lacking. Meaning in the academic context has been defined as “the inner significance that education holds for students” (Henderson-King and Smith 2006, p. 196). Drawing from a related body of literature, meaning in the work context can be defined as valuable work based upon the individual’s own ideals or standards (May et al. 2004) or work that is personally significant, fosters personal growth, and has a positive impact on others (Steger and Dik 2009; Steger et al. 2012). Integrating these definitions to provide a more comprehensive understanding, we conceptualize academic meaning as academic/educational goals and pursuits that are personally valuable and significant, foster personal growth, and can potentially help others.

Although academic meaning is an individual experience, it is argued sociocultural or environmental factors, such as parental and social influences, institutional climate, and societal pressures, can influence the students’ experience of meaning (Henderson-King and Smith 2006). Of the limited research available examining academic meaning, qualitative results suggest college students’ meaning varies by context (i.e., the academic context or personal context) and these differences were partially explained by the students’ unique goals (Pizzolato 2008). The student goals identified from the qualitative analyses suggested students valued learning skills they could use in their professional lives and information to perform well in their classes, whereas in the personal context they valued developing independence, a sense of self, and their identity (Pizzolato 2008). In another study, various sources of meaning in the academic setting (i.e., learning critical thinking about new ideas and cultures, knowing and understanding oneself better, learning skills to make a difference in the world) were positively predicted by enjoyment academic motivation (i.e., motivated by the joy of the work; Henderson-King and Smith 2006). Extending beyond academic meaning, across samples of college students, meaning in life was positively related to indicators of well-being (e.g., King et al. 2006; Steger et al. 2006), self-efficacy (DeWitz et al. 2009), and optimism, self-esteem, and positive life regard (e.g., Steger et al. 2006). Meaningful work in adult samples has also been shown to be positively related to well-being (Arnold et al. 2007), life satisfaction, and meaning in life (Dik et al. 2015).

A small body of research suggests strengths and academic meaning may be positively related. In samples of both college students (Allan 2015) and adults (Brdar and Kashdan 2010; Wagner et al. 2018), all character strengths measured by the VIA-IS were shown to be positively related to the experience of meaning in life. Further, college students who participated in a positive psychology course that focused on character strengths, including a number of strengths-based assignments and in-class experiential activities (e.g., taking the VIA-IS, writing about their best possible life), reported increased meaning compared to students taking other psychology courses (Smith et al. 2020). Additional studies in the work context also supports the positive association between strengths and meaning in life and work. For instance, in a sample of workers, a number of character strengths (i.e., hope, love, gratitude, curiosity, and zest) were positively associated with meaningful work (Littman-Ovadia et al. 2016). In a sample of adult volunteers and paid workers, endorsing character strengths was positively related to meaning in life, whereas deploying character strengths was

positively related to meaning in life with both adolescent and adult volunteers and adult paid workers (Littman-Ovadia and Steger 2010). Additionally, the use of character strengths in the workplace resulted in a greater experience of meaningful work (Harzer and Ruch 2013). Meaningful work was also positively related to the presence of several character strengths (e.g., love, hope, perspective, and zest), and burnout was negatively related to the presence of several character strengths (e.g., forgiveness, honesty, hope, and self-regulation) in a sample of counselors (Allan et al. 2019b).

2.3 Leadership

Leadership development has long been a focus in higher education and is commonly perceived as a beneficial student characteristic (Astin and Astin 2000; Zimmerman-Oster and Burkhardt 1999a). A leader can be defined as “one or more people who selects, equips, trains, and influences one or more follower(s) who have diverse gifts, abilities, and skills and focuses the follower(s) to the organization’s mission and objectives” with the goal of advancing the organization’s mission and objectives (Winston and Patterson 2006). Student leadership is positively related to a number of advantageous outcomes, such as increased communication skills, problem solving, conflict resolution, self-esteem, civic responsibility and awareness, development of personal and societal values, and commitment to service and volunteerism (Cress et al. 2001; Zimmerman-Oster and Burkhardt 1999b). In addition, research suggests students’ experiential involvement, such as engagement with community service or student organizations, contributes to leadership qualities and development in a beneficial way (Dugan 2006; Soria et al. 2013a, b). Prior scholars have claimed strength-based approaches are likely worthwhile to examine in relation to student leadership, as an awareness of strengths may help positively contribute to leadership development (Soria et al. 2015). Similarly, scholars have argued that leaders who are aware of, develop, and use their strengths are in turn more likely to amplify the effectiveness of those they work with (Rath and Conchie 2009).

In the leadership literature, results have been mixed in regard to the relationship between strengths and leadership. With a sample of first-year college students, strengths awareness explained a significant amount of the variance in perceived leadership development beyond other student variables (e.g., demographics, GPA, pre-college leadership, academic engagement, involvement in campus activities; see Soria et al. 2015). In sample of U.S. college students from a private institution, strengths self-efficacy (i.e., students’ belief in their ability to apply their strengths) was positively related to individual leadership values—consciousness of self, congruence, and commitment (Lane and Chapman 2011). However, in a study of U.S. college student leaders from faith-based institutions, strengths ownership (i.e., the extent to which a person adopts a philosophy of strengths, is aware of the influence their strengths have, and attends to their strengths’ development) did not predict student leadership practices (Wisner 2011). However, in the same study, elements of “psychological capital”—hope and optimism, which are individual strengths in the VIA-IS classification—predicted different types of leadership practices.

Together, research suggests the use of strengths is valuable to students’ well-being and academic success. Thus, strengths use likely positively relates to other academic outcomes with college students, such as academic satisfaction, academic meaning, and leadership. However, research investigating these specific associations is necessary.

3 Environmental Moderators

While the literature suggest strengths use is beneficial, there are likely a number of external factors that may interfere with or promote students using their strengths and receiving the subsequent benefits. However, across the strengths literature, there is a dearth of research examining environmental factors' impact on strengths, and no known study has examined environmental moderators related to college students' global strengths. One qualitative study explored influential factors on the development of strengths across the lifespan (i.e., categorized during childhood, adolescent, and adult experiences; Owens et al. 2018). Both individual/internal and environmental factors were identified as influential on the strength development process. Of the environmental factors identified, the following were most salient in adulthood: one's partner, children, societal influences/pressures, the work environment, and strengths identified by other people. With the exception of the strengths identified by other people theme, these environmental factors were described as both helpful and detrimental to the process of developing strengths. For instance, participants' partners could both encourage strength development and at other times interfere with the strength development process. Whereas people who explicitly identified the participants' strengths were described as a consistent, positive influence on strength development (Owens et al. 2018). Thus, it appears environmental supports and barriers are plausible moderating variables; however, research in this area is necessary.

3.1 Strengths Barriers

To date, there are no known studies that have examined the variable “strengths barriers,” or factors that interfere with the use of strengths (Douglass et al. 2015). However, select research suggests this may be a valuable avenue to explore. Previous research suggests that the degree to which people have a strength—or strengths level—moderated the relationship between signature strengths use (i.e., top strengths from the VIA-IS; Peterson and Seligman 2004) and life satisfaction in U.S. college students (Allan and Duffy 2014). Specifically, with students with low levels of calling (i.e., a personally meaningful career that includes other-oriented values and exists outside the self; Dik and Duffy 2009), greater strengths use was positively related to life satisfaction; whereas with students with high levels of calling and a high or moderate signature strengths level had a positive relationship between strengths use and life satisfaction (Allan and Duffy 2014). Therefore, if the degree to which strengths are used can influence satisfaction, it is possible barriers to using strengths may impact strengths use as well. In a sample of Chinese college students, perceived stress (a possible barrier to using strengths) fully mediated the relationship between the presence of strengths and psychological symptoms, and perceived stress partially mediated the relationship between the presence of strengths and psychological well-being, with greater strengths presence and lower stress associated with less psychological symptoms and greater well-being (Duan 2016). Given the dearth of research examining strengths barriers, research in this area is highly needed.

3.2 Environmental Support

A vast body of literature suggests the experience of environmental support, or external factors outside the individual person (e.g., family, friends, financial resources,

educational facilities, etc.), is critical to college student success. For instance, several studies have demonstrated a positive relationship between social support and student well-being (e.g., Brannan et al. 2013; Coffman and Gilligan 2002; Neely et al. 2009) and college adjustment (Dennis et al. 2005; Halamandaris and Power 1999). Social support in the university setting has also been found to be a significant mediator between a number of individual student factors and positive student outcomes. For example, greater perceived social support mediated the relationship between several personality factors and greater college adjustment (Aspinwall and Taylor 1992; Lidy and Kahn 2006), as well as less shyness and depression and less shyness and negative affect (Joiner 1997).

In addition, positive perceptions of the university environment and increased cultural congruity were positively associated with greater self-efficacy in completing college in Latino/a/x students (Gloria et al. 2005). Conversely, negative perceptions of the university environment was associated with decreased college persistence in Latino/a/x students (e.g., Castillo et al. 2006; Gloria et al. 2005). Finally, in a sample of Black and White college students, greater parental support was associated with less depression and loneliness. Additionally, campus belongingness fully mediated the relationship between perceptions of a hostile campus racial climate and depression for Black students and the relationships between parental support and depression for both Black and White students. Depression was positively related to perceptions of a hostile campus racial climate and negatively related to campus belongingness and parental support (Mounts 2004). Campus belongingness also partially mediated the relationship between parental support and loneliness, as well as the relationship between perceptions of a hostile campus racial climate and loneliness for Black students. Loneliness was negatively related to campus belongingness and parental support and positively related to perceptions of a hostile campus racial climate (Mounts 2004).

Limited research has examined the association between environmental support and strengths, meaning, or leadership in college students. In one study, when controlling for social support, greater academic integration mediated the relationship between the individual strengths of hope and gratitude and students' institutional commitment, with positive relationships between all variables (Browning et al. 2018). Students' perceptions of college environmental support for meaning searching moderated the relationship between the search for meaning in life and the presence of meaning in life, with perceptions of college environmental support for meaning searching being positively related to the search for meaning in life and the presence of meaning in life (Shin and Steger 2016). Finally, in a qualitative study, student leaders reported that receiving more encouragement and leadership experiences/opportunities from others promoted their leadership qualities (Shertzer and Schuh 2004).

4 The Current Study

In summary, research suggests there are many benefits to using strengths. However, less research has examined the relationship between strengths use and academic outcomes as well as potential environmental moderators of these relationships with college students. Therefore, the current study examined how strengths use related to academic satisfaction, academic meaning, and leadership and investigated strengths

barriers and environmental supports as possible moderators of these relationships. We hypothesized:

- (a) Strengths use would positively predict academic satisfaction, academic meaning, and leadership;
- (b) Strengths barriers would negatively predict academic satisfaction, academic meaning, and leadership;
- (c) Environmental support would positively predict academic satisfaction, academic meaning, and leadership;
- (d) Strengths barriers would significantly moderate the relationship between strengths use and academic satisfaction, strengths use and academic meaning, and strengths use and leadership, with lower levels of strengths barriers associated with higher academic satisfaction, academic meaning, and leadership;
- (e) Environmental support would significantly moderate the relationship between strengths use and academic satisfaction, strengths use and academic meaning, and strengths use and leadership, with higher levels of environmental support associated with higher academic satisfaction, academic meaning, and leadership.

5 Method

5.1 Participants

Participants included in the analyses were a total of 371 undergraduate students at a large, public research university in the Midwestern U.S. Participants ranged in age from 18 to 53 ($M = 18.56$ and $SD = 2.70$) and all were first-year students. Of the sample 58% ($n = 215$) identified as women, 41.5% ($n = 154$) as men, and 0.3% ($n = 1$) as genderqueer, and 0.3% ($n = 1$) as gender questioning. In terms of race and ethnicity, most participants self-identified as White/European American (74.4%, $n = 276$), followed by 11.6% as Asian/Asian American ($n = 43$), 4.0% as Hispanic/Latino/a/x American ($n = 15$), 3.5% as Asian Indian ($n = 13$), 3.2% as Multiracial ($n = 12$), 1.9% as African/African American ($n = 7$), 0.8% as other ($n = 3$), and 0.5% as Arab American/Middle Eastern ($n = 2$). A majority of participants reported being continuing-generation college students (88.7%, $n = 329$) while 11.3% ($n = 42$) reported being first-generation college students. Although students represented a breadth of academic majors, several reported being within a STEM major, with 17.2% ($n = 64$) studying engineering and 3.8% ($n = 14$) studying computer science; 7.3% ($n = 27$) were undecided (i.e., majors were not yet declared).

5.2 Instruments

5.2.1 Strengths Use

To measure strengths use, we employed the Strengths Use Scale developed by Govindji and Linley (2007). The scale is a 14-item questionnaire that is scored on a 7-point Likert scale with responses ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Sample items include, “I always try to use my strengths,” and “I am able to use my strengths in

lots of different ways.” In the scale development study, scores from the scale loaded onto a single factor, had high internal consistency ($\alpha = .95$), and correlated positively with self-efficacy, self-esteem, and psychological well-being (Govindji and Linley 2007). In the present study, scores from the scale had an internal consistency of $\alpha = .94$.

5.2.2 Strengths Barriers

The Strengths Barriers Scale was used to measure perceived barriers to using one’s strengths (Douglass et al. 2015). This scale measures the general prevalence of strengths barriers, rather than identifying specific barriers. Participants responded to four items by indicating the extent to which they agree with each on a 7-point Likert scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Sample items from the scale include, “Outside influences limit the use of my strengths,” and “There are barriers that prevent me from using my strengths.” In the scale development study, the authors found the scale to correlate negatively with life satisfaction, and each item loaded on one factor at values of .67 or above. The authors reported an internal consistency of $\alpha = .80$. In the current study, the scale had an internal consistency of $\alpha = .79$.

5.2.3 Environmental Support

To assess the presence of academic support for college students, we administered the Environmental Support Scale (Lent et al. 2005a). The questionnaire consists of nine items where participants rate the degree to which they agree with each statement on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Sample items include, “I feel support for my decision to attend college from important people in my life,” and “I have received helpful assistance from a teacher or tutor when I felt I needed such help.” Past research (Lent et al. 2005a) on the scale has displayed sufficient internal consistency and validity by indicating adequate alpha coefficients between .81 and .84 and correlations with conceptually related variables. In the current study, the internal consistency of the scale was $\alpha = .83$.

5.2.4 Academic Well-Being

Academic well-being was measured by the 7-item Academic Satisfaction Scale (Lent et al. 2005b). Participants answered items on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Sample items include, “For the most part, I am enjoying my coursework,” and “I am generally satisfied with my academic life.” Lent et al. (2005b) found the scale to have good internal consistency ($\alpha = .86$). Lent et al. (2005b) also found that the scale had good criterion validity, finding scores on the scale to positively correlate with academic self-efficacy, goal progress, positive affect, and life satisfaction. In the current study, the scale demonstrated good internal consistency ($\alpha = .88$).

5.2.5 Academic Meaning

To measure academic meaning, we adapted the Meaningfulness scale (May et al. 2004) for use in an academic population. Sample items include, “My school-related activities

are personally meaningful to me” and “The schoolwork I do is worthwhile.” Participants answered items on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The original scale correlated in the expected direction with a host of well-being variables, including meaning in life and subjective well-being (Allan et al. 2019a, b). However, because this was an adapted scale, we conducted an exploratory factors analysis on scores from the scale, with principal axis factoring and promax rotation, to determine if the scale still represented a unidimensional construct. All items loaded on a single factor with loadings of .68 and above, and the factor explained 63.06% of the variance. The internal consistency of the adapted scale in the current study was $\alpha = .89$.

5.2.6 Leadership

To measure leadership, we created three items that asked participants to rate the extent to which each statement applied to them. The items included: “I am a leader,” “I naturally lead others,” and “I am able to develop my leadership knowledge/skills to be a better leader.” Items were scored on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Given that this was a new scale, we conducted an exploratory factor analysis with principal axis factoring and promax rotation on scores from the scale. All items loaded on a single factor with factor loadings of .69, .87, and .96. In the current study, the internal consistency was $\alpha = .87$.

5.3 Procedure

Before starting college in the fall, incoming students age 18 years or older were emailed and invited to participate in our study. The email included information about the study and a link to the survey. Students who were interested selected the link, were directed to the informed consent document, and then directed to the initial survey. The data from the current study was drawn from the second wave of a four-wave longitudinal study (Allan et al. 2019c), which was collected after their first month of college in late September.

We selected data from the second wave of the study because the first wave was from before students entered college, and the second wave would allow us to examine students’ initial impressions of their college experience. Much of the existing research on first-year students takes place much later in the first semester or academic year, missing a prime window related to the initial phase of students’ transition and the potential impact of early student retention efforts that commonly take place in the first few weeks of class (e.g., Welcome Week; see Woosley and Miller 2015). Students who would likely benefit from environmental supports and that may be more prone to having difficulty overcoming environmental barriers may otherwise be missed if assessment takes place later in the semester or year.

5.4 Analysis Plan

First, we conducted preliminary analyses, including examining normality, outliers, and missingness. We also calculated correlations among study variables; effect sizes were identified as small if $r = .1$ to $.29$, medium if $.3$ to $.49$, and large if $.5$ to 1.0 (Cohen

1992). To analyze the data, we used hierarchical regression, which allowed us to evaluate if the interaction terms were significant and explained variance in the outcomes beyond the predictors. We conducted three separate regressions for the three outcomes. In Step 1, we added the predictor (i.e., strengths use) and the moderators (i.e., strengths barriers and environmental support). In Step 2, we added the interaction terms, which we created by centering the predictor and moderator variables and multiplying them together. A significant interaction term indicates significant moderation. We also examined whether the interaction terms explained significant additional variance in the outcomes.

6 Results

6.1 Preliminary Analyses

All variables had absolute values of skew or kurtosis within acceptable ranges (maximum skew = -1.02 ; maximum kurtosis = 2.17 ; Weston and Gore 2006) and appeared normally distributed on histograms and box plots. We removed one case, which had outliers greater than 4.5 standard deviations from the mean on two variables, that resulted in our final sample size of 371. We identified no other outlier variables. To assess patterns of missing data, we conducted Little's missing completely at random test in SPSS for all study variables. This test was not significant, $\chi^2(33) = 31.79$, $p = .527$, suggesting that the data was missing completely at random. Therefore, we did not detect any bias in missing data patterns and used pairwise deletion with each analysis. We also analyzed the data with age and gender as covariates. This did not change the pattern of results, so we reported results without these covariates.

Table 1 displays the Pearson's correlation coefficients among the study variables. Strengths use had medium positive correlations with strengths barriers, environmental support, academic satisfaction, and academic meaning. Strengths use also had a large correlation with leadership. Strengths barriers had small negative correlations with academic satisfaction and academic meaning, and a medium negative correlation with leadership. Environmental support had a small positive correlation with leadership, medium positive correlation with academic meaning, and large positive correlation with academic satisfaction. Strengths barriers and environmental support had a small negative relation with one another.

6.2 Regression Analyses

6.2.1 Academic Satisfaction

Table 2 shows the hierarchical regression for academic satisfaction. In Step 1, strengths use did not predict academic satisfaction, but strengths barriers negatively predicted academic satisfaction, and environmental support positively predicted academic satisfaction. In Step 2, neither strengths barriers nor environmental support moderated the relation between strengths use and academic satisfaction. The final regression explained 28% of variance in academic satisfaction.

Table 1 Correlations and descriptive statistics for study variables

	1	2	3	4	5	6
1. Strengths use	—					
2. Strengths barriers	-.38**	—				
3. Environmental support	.46**	-.23**	—			
4. Academic satisfaction	.35**	-.29**	.50**	—		
5. Academic meaning	.38**	-.29**	.46**	.58**	—	
6. Leadership	.50**	-.30**	.26**	.15**	.17**	—
<i>M</i>	74.98	14.39	52.38	27.62	20.58	15.73
<i>SD</i>	12.81	4.54	7.31	4.64	3.34	3.53

* $p < .05$, ** $p < .01$

6.2.2 Academic Meaning

Table 3 shows the hierarchical regression for academic meaning. In Step 1, strengths use and environmental support positively predicted academic meaning, and strengths barriers negatively predicted academic meaning. In Step 2, neither strengths barriers nor environmental support moderated the relation between strengths use and academic meaning. The final regression explained 27% of variance in academic meaning.

6.2.3 Leadership

Table 4 shows the hierarchical regression for leadership. In Step 1, strengths use positively predicted leadership and strengths barriers negatively predicted leadership, but environmental support did not significantly predict leadership. In Step 2, only

Table 2 Hierarchical regression examining strengths barriers and environmental support as moderators of the relation between strengths use and academic satisfaction

Variable	β	<i>B</i>	<i>SE B</i>	R^2	ΔR^2	<i>F</i>
Step 1						
Strengths use	.09	.03	.02			
Strengths barriers	-.15**	-.16**	.05			
Environmental support	.42**	.27**	.03	.28	.28**	41.09**
Step 2						
Strengths use	.09	.03	.02			
Strengths barriers	-.15**	-.16**	.05			
Environmental support	.41**	.26**	.04			
Strengths use X Strengths barriers	-.02	-.07	.22			
Strengths use X Environmental support	.01	.03	.22	.28	.00	24.54**

* $p < .05$, ** $p < .01$

Table 3 Hierarchical regression examining strengths barriers and environmental support as moderators of the relation between strengths use and academic meaning

Variable	β	<i>B</i>	<i>SE B</i>	<i>R</i> ²	ΔR^2	<i>F</i>
Step 1						
Strengths use	.16**	.04**	.02			
Strengths barriers	-.14**	-.11**	.04			
Environmental support	.36**	.17**	.03	.52	.52**	38.52**
Step 2						
Strengths use	.16**	.04**	.02			
Strengths barriers	-.14**	-.11**	.04			
Environmental support	.37**	.17**	.03			
Strengths use X Strengths barriers	.03	.10	.16			
Strengths use X Environmental support	.05	.17	.16	.52	.003	23.30**

* $p < .05$, ** $p < .01$

strengths barriers, and not environmental support, moderated the relation between strengths use and leadership, and the interaction terms explained 3% of significant additional variance in leadership. Figure 1 displays the moderation of strengths use and leadership by strengths barriers. Based on standardized scores, subgroups for the figure were classified as low (less than -0.5 standard deviations from the mean; $n = 117$), moderate (between -0.5 to 0.5 standard deviations from the mean; $n = 137$), and high (greater than 0.5 standard deviations from the mean; $n = 116$). As seen in the figure, people high in strengths barriers had a stronger positive relation between strengths use and leadership than those with moderate or low levels of strengths barriers. The final regression explained 30% of variance in leadership.

Table 4 Hierarchical regression examining strengths barriers and environmental support as moderators of the relation between strengths use and leadership

Variable	β	<i>B</i>	<i>SE B</i>	<i>R</i> ²	ΔR^2	<i>F</i>
Step 1						
Strengths use	.44**	.12**	.02			
Strengths barriers	-.13*	-.10*	.04			
Environmental support	.04	.02	.03	.28	.28**	40.33**
Step 2						
Strengths use	.44**	.12**	.02			
Strengths barriers	-.14**	-.11**	.04			
Environmental support	.03	.02	.03			
Strengths use X Strengths barriers	.17**	.58**	.17			
Strengths use X Environmental support	.02	.06	.17	.30	.03**	27.46**

* $p < .05$, ** $p < .01$

Fig. 1 Moderation of strengths use and leadership by strengths barriers

7 Discussion

The purpose of this study was to investigate whether there was: (a) a positive relationship between strengths use and academic satisfaction, academic meaning, and leadership; (b) a negative relationship between strengths barriers and academic satisfaction, academic meaning, and leadership; (c) a positive relationship between environmental support and academic satisfaction, academic meaning, and leadership; (d) whether strengths barriers moderated the relationships between strengths use and academic satisfaction, academic meaning, and leadership; and (e) whether environmental support moderated the relationships between strengths use and academic satisfaction, academic meaning, and leadership. Participants in this study included first-year U.S. undergraduate students, surveyed at one time point.

Results partially supported our hypotheses, with some findings being incongruent with our expectations and current literature. Strengths use positively predicted academic meaning and leadership. It did not positively predict academic satisfaction. Environmental support positively predicted academic satisfaction and academic meaning, but not leadership. Strengths barriers negatively predicted academic satisfaction, academic meaning, and leadership. In terms of moderators, strengths barriers, and not environmental support, moderated the relationship between strengths use and leadership. Neither strengths barriers nor environmental support moderated the relationship between strengths use and academic satisfaction or strengths use and academic meaning.

Previous research examining academic outcomes related to strengths is lacking, but some research has found positive associations between related variables (signature strengths and academic satisfaction; Allan and Duffy 2014 and character strengths and meaning; Allan 2015). The current study examined strengths more broadly, and not the students' best

or strongest strengths, unlike previous studies, which may be a contributing factor to the lack of association found with these academic constructs. In addition, given that students were likely still transitioning to the college environment after their first month in school, it is plausible that the relationship between these variables could be significant later in the semester or further along in their academic careers, once they become more acclimated or involved. On the other hand, strengths barriers were negatively associated with academic satisfaction, academic meaning, and leadership, as expected. To our knowledge, this is the first study that examined strengths barriers within the college student literature; thus, specific barriers that may significantly affect these relationships to a greater extent can only be speculated. For example, adjustment to college, perceived lack of support from professors/advisors, and/or difficulty with establishing social supports could be barriers that affected students' ability to use their strengths. Nonetheless, these findings suggest barriers to using strengths is detrimental to the academic experience early on and that awareness and intervention to help circumvent or address strength barriers would likely be beneficial. Lastly, environmental support had a positive relationship with leadership, academic meaning, and academic satisfaction, with the largest correlation with academic satisfaction. Literature has consistently found that environmental supports – including social support of friends and family – positively affects first-year students' satisfaction (e.g., Dennis et al. 2005; John et al. 2018; van der Zanden et al. 2018). Continued emphasis on and attention to environmental supports as students begin college appears valuable and is encouraged.

Our hypotheses were supported that strengths use positively predicted students' leadership, and strengths barriers negatively predicted leadership. Other studies have had similar results (Lane and Chapman 2011; Soria et al. 2015) with students from public institutions. Leadership in college students is a growing area of research but has long been important in workplace settings. With leadership being an important characteristic for students during and after college, this study furthers the notion that encouraging students' strengths use is beneficial in building their leadership skills prior to graduating and entering the workforce. Previous research suggests that students with higher strengths awareness are more likely to have greater perceived leadership qualities (Soria et al. 2015). The current study is in line with this finding, as well as extends this work by identifying strengths barriers as having a negative relationship with leadership. However, inconsistent with our hypothesis, environmental support did not predict leadership. Other previous studies point to the importance of environmental support, including from academic advisors (Soria et al. 2017) and learning communities (Nahavandi 2006). Given the inconsistent findings, additional research examining the relationship between environmental support and leadership with college students would be beneficial.

Results from this study also showed strengths barriers moderated the relationship between strengths use and leadership, with those with higher strengths barriers having a stronger positive relationship between strengths use and leadership, contrary to what might be expected. This suggests the greater the perceived strengths barrier, the more likely students are to exhibit leadership in relation to their strengths use. One interpretation of this might be that student leadership characteristics are more likely to surface or be more fully maximized when faced with challenges. Whereas barriers can often be difficult to overcome, they may allow student leadership qualities to shine. For instance, past research has found that students involved in leadership opportunities – especially those from underrepresented backgrounds – are more likely to experience academic success and equity (Rodrigues et al. 2016).

7.1 Implications

This study provides initial findings related to college students' strengths use and academic outcomes; therefore, several important considerations can be garnered. Foremost, results from this study could help inform universities how to potentially increase student retention. This is a serious issue at universities across the U.S., with about one-third of students transferring schools one time, one-half of those transferring more than once, and over 50% of students at four-year institutions dropping out of school at some point during their enrollment (NSC Research Center 2015). Findings from a previous study (Soria et al. 2017) provided guidance on the importance of supports and barriers to strength use that could be implemented by University faculty and staff to prevent student retention difficulties. Faculty and advisors could take the time to have one-on-one meetings with students – noting and encouraging their strengths use – which aids in community building and making the student feel noticed (Soria et al. 2017). Furthermore, support from classmates and peers has also been shown to promote strengths use (Kim et al. 2017), which could also be more readily encouraged and facilitated by faculty and staff.

Additionally, previous literature suggests leadership skills develop over students' college careers, and it is beneficial when those skills align with their future goals (Sherer 2006). Whether leadership is a students' strength or a skill they are working to develop, students can be encouraged to use their strengths to either further develop their leadership skills or use their strengths to manage hesitation toward these skills (Greenleaf 1997). As a result, students may be more likely to see how their strengths play an important role in leadership development and motivate them to pursue leadership experiences further. Thus, it seems it is not only important that students identify their strengths, but it is also important that they use those strengths to improve their leadership skills. Furthermore, as noted previously, it appears strengths barriers can be a positive challenge in regard to the relationship between strengths use and leadership. However, perhaps there is a line where strengths barriers become so detrimental that they no longer result in a positive relationship with student leadership. Future research is necessary to examine the gradation of strengths barriers on leadership and which strengths barriers are more or less influential.

7.2 Limitations and Future Directions

While this study sheds light on new findings related to strengths use in college students, the current study also includes some limitations. Given the cross-sectional design, this limits our ability to make causal claims. In addition, although there was some diversity among our sample, it was still fairly homogenous. For example, the student age range was quite wide, but the mean represented the typical age for this level of students. Strengths use for non-traditional first-year students or students further along in their college careers may be different from those who enter college following high school. Furthermore, student majors were primarily STEM-related, which leaves many other majors yet to be studied. Finally, we created a new leadership measure for this study, because few short and validated measures of leadership were available. While the scale had good internal consistency and correlated with other variables in the expected way, future studies may continue to validate it with other populations.

These limitations provide areas for continued research within the strengths literature. Future studies could examine these same constructs over time. Additionally, future studies could also consider examining specific strengths and using corresponding assessment of those strengths; for example, with character strengths using the with Character Strengths Rating Form (CSRF; Ruch et al. 2014). Furthermore, an examination of specific strength barriers is also suggested in future studies. Second, our study could be re-examined with a more diverse sample of students to determine if, for example, there are differences between non-traditional and traditional students, student majors, or other cultural identities. Additionally, these variables and the same research questions could be examined with students later in their academic career and compared to first-year students to determine if there are any considerable differences. Moreover, given the dearth of research on strengths use and contextual supports and barriers with college students, we believe this area presents great promise for additional areas to be explored, including intervention studies.

8 Conclusion

The current study provided an initial examination of first-year U.S. college students' strengths use, academic outcomes, and environmental influences. This was an important investigation because previous research has suggested students' environment (e.g., degree to which they feel supported) may affect perceptions of their strengths or potential barriers to utilizing those strengths. Strength barriers appeared to be of particular relevance related to student academic and leadership outcomes, which merits further exploration. Subsequently, first-year students may need unique attention related to their strengths, especially in relation to perceived strength barriers. Given the many practical implications of student strengths use, continued investigation into these constructs appears promising.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval The authors complied with all ethical standards during this study, which involved human subjects. An ethics committee, Purdue's Human Research Protection Program, approved the study.

Informed Consent All participants provided their informed consent before participating in the study and the data was anonymous.

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