

An Adapted Self-Determination Measure and College Student First-Year Achievement

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Research indicates higher feelings of self-determination promote increased student achievement. As a result, self-determination theory (SDT) may provide a unique lens to view first-year college student motivation and achievement outcomes. Results included strong positive correlations between perceived self-determination and satisfaction with life in college ($N = 297$; 61% variance explained) and first-year achievement (i.e., first-term GPA; 33% variance explained). ANOVAS indicated students with higher levels of self-determination had significantly higher first-term GPAs (Low SD 2.69; High SD 3.00). As a second purpose, specific curricular and professional development strategies are described to increase students' feelings of autonomy and perceived self-determination.

More students than ever before are pursuing studies in higher education, as it is becoming increasingly necessary to earn a college degree to be competitive in the job market (Daly & Bengali, 2014). As a result, institutions of higher education have likewise increased their focus on academic performance and student retention rates (Friedman & Mandel, 2009; Jones & Braxton, 2009). Among students attending four-year universities, only approximately 60% of students have graduated within six years (U.S. Department of Education, 2016). As attrition rates are highest during and directly after a student's freshman year, the majority of research on retention rates has focused on this time period (Barefoot, 2004).

Because students are generally at higher risk for attrition during their first year of college, there are additional risks for those underrepresented students (i.e., students of color and first-generation college students) who are continuing to enroll in post-secondary institutions at an increasing rate (Bowen, Chingos, & McPherson, 2009; Hussar & Bailey, 2013). Graduation rates are much lower among first-generation students, with only 24% earning a degree within eight years (Chen & Carroll, 2005). This rate is also low among certain students of color, with about 31% graduating within six years (Knapp, Kelly-reid, Whitmore, & Miller, 2007). Such outcomes pose a grave concern to educators and universities alike.

Although an abundance of research has been conducted to address such first-year attrition concerns, many researchers are beginning to focus on degree completion as the critical measure of student success. Retention rates beyond the first year are valuable measures in academic research, but degree completion has come to hold more weight due to its necessity for both graduate school admission and many career opportunities (Donhardt, 2013). Researchers have thus begun to place more emphasis on attending to the impact that different academic pathways have upon the degree completion process. Additionally, early

recognition of those first-year students who are at a greater risk of leaving prior to degree completion provides universities with an opportunity to implement strategies to help retain these students (Campbell & Mislavy, 2012; Vaughan, Lalonde, & Jenkins-Guarnieri, 2014; Woosley & Shepler, 2011).

Many research studies examine high school GPA and aptitude tests (e.g., SAT) to predict college GPA and retention outcomes (Oseguera & Rhee, 2009). Although research demonstrates the validity of using high school GPA to predict college GPA (Friedman & Mandel, 2009), research has demonstrated this variable may have only an indirect impact on student retention (Brown et al., 2006). Conversely, a meta-analytic study found that cognitive variables such as academic goals, academic self-efficacy, and skills for academic success are better predictors of student persistence (Robbins et al., 2004). The same meta-analysis also indicated that the best predictors of college GPA are academic self-efficacy and motivation. As self-determination theory addresses issues of motivation and self-efficacy, this theory may provide a unique lens through which to address issues related to college student outcomes (Deci & Ryan, 2002; Vallerand, Koestner, & Pelletier, 2008).

Self-Determination Theory

According to self-determination theory (SDT), three basic needs must be met in order to achieve psychological well-being: autonomy, competence, and relatedness (Chia Liu et al., 2014; Deci & Ryan, 2000; Sheldon & Niemiec, 2006). Autonomy refers to our need for a sense of independence and the freedom to determine our own behaviors rather than letting external forces dictate our personal experiences. This construct is the foundation of SDT, as the experience of such autonomy allows us "to act in accord with, or be 'true' to [the] self" (Deci & Ryan 2002, p. 3). Competence denotes our need to perform tasks at varying degrees of difficulty while feeling capable and effective when doing

so. Relatedness involves our basic need to feel cared for, supported, and connected to others. As a central tenet, SDT maintains that psychological health and well-being suffer when we are unable to strike a reasonable balance among these three critical factors (Chia Liu et al., 2014; Deci & Ryan, 2000; 2002).

There has been a significant amount of research done on SDT in recent years, particularly in applied fields of study such as sports, education, and health care, as well as on specific issues such as close relationships, parenting, well-being and health, sport and exercise, and ecological sustainability (Deci & Ryan, 2008; Jenkins-Guarnieri, Vaughan, & Wright, 2015). As applied to college student issues, SDT can be utilized in variety of ways to improve achievement outcomes. Niemiec and Ryan (2009) have reported several significant findings related to the use of SDT in educational contexts, such as its effect on how teachers create autonomy-supportive environments as well as its influence on the development of learning tasks that enhance intrinsic motivation among students. Intrinsic motivation tends to increase student learning and creativity, indicating that teachers can improve outcomes by presenting tasks in ways that meet student needs for autonomy and competence.

An array of empirical studies has examined how the components of self-determination positively impact educational settings, with several decades worth of findings to demonstrate that self-determination enhances student success (Chia Liu et al., 2014; Deci & Ryan, 1985; Jenkins-Guarnieri et al., 2015; Reeve, 2002). Research has shown that autonomously motivated students thrive in educational settings and students benefit when their instructors support their autonomy (Reeve, 2002). This has been further supported by evidence that students' perceived self-determination accounted for more than half of the variance in their life satisfaction at the university as a single variable (Jenkins-Guarnieri et al., 2015). Another study examining various aspects of motivation indicates that lower levels of self-determination are typically found among first and second-year college students, who tend to be more extrinsically motivated as a group (Köseoğlu, 2013). Fortunately, there are empirically-validated indications that instructional practices grounded in the tenets of SDT can significantly increase persistence from the first year to the second year (Pascarella, Salisbury, & Blaich, 2011).

Studies such as these indicate that while a large portion of undergraduate students have unmet needs related to autonomy, competence, and relatedness, integrating these factors into the design and implementation of undergraduate courses might serve to increase student persistence and achievement. By actively creating educational environments that meet these basic needs, instructors

and institutions can formulate effective means to help motivated and extrinsically motivated students become intrinsically motivated.

Purpose of the Study

The purpose of this study was twofold. First, to assess the relationship of perceived self-determination with satisfaction of life in college and first-year achievement. First-year achievement was represented by first-term GPA, which was selected due to its high reliability as a predictor of college persistence and completion (Beatty, Walmsley, Sackett, & Kuncel, 2015). Second, to provide specific curricular and professional development strategies for higher educational settings. Included in this are practical application suggestions for the presence of SDT within a classroom setting.

Method

Participants

Participants in this study included entering students who were first-time, full-time freshman college students enrolled at a medium-sized Western public research university. The total number of participants included 297 students where 213 (72%) students were female, 114 (38%) were students of color (SOC), and 137 (46%) were first-generation college students. Each of these percentages were similar to the typical percentages for entering full-time freshmen at this university. First-generation students and students of color were identified through self-report when entering the university. For SOC status, students could select the following ethnicities: African American, Asian, Pacific Islander, Native American, Hispanic, or White. If a student selected any ethnicity or ethnicities other than white, they were classified as "student of color" for the purposes of this study. Students completed the survey online in the computer lab on the last day of their first-year seminar course.

Measures

The Basic Needs Satisfaction at Work Scale. The Basic Need Satisfaction at Work Scale (BNSW-S; Deci et al., 2001; Ilardi, Leone, Kasser, & Ryan, 1993) was adapted to the first-year college student population and renamed as the Basic Needs Satisfaction at College Scale (BNSC-S; Jenkins-Guarnieri et al., 2015). The BNSW-S is a 21-item measure designed to assess perceived levels of autonomy, competence, and relatedness in a professional work environment. Adapting the BNSW-S to the BNSC-S consisted of three phases: rewording and removal of items to fit the

Table 1
Basic Needs Satisfaction at College Scale (BNSC-S)

Construct	Item #	Item
Autonomy	6	I am free to express my ideas and opinions at school
	12	I feel like I can pretty much be myself at school
	15	I understand the purpose of my classroom requirements
	16	I am encouraged by my professors at [university] to participate in my classes
Competence	3	People at [university] tell me I am good at what I do in school
	8	I have been able to learn interesting new skills in college
	9	Most days I feel a sense of accomplishment from attending class and studying
	10	At school, I do not get much of a chance to show how capable I am
Relatedness	1	I really like the people I go to school with
	4	I get along with people at [university]
	7	I consider the people I attend [university] with to be my friends
	11	There are not many people at [university] that I am close to

population of college students, creating new items for the autonomy sub-scale, and administering the adapted BNSC-S to demonstrate validity and reliability of the measure. An example of rewording an item included taking BNSW-S' "Most days I feel a sense of accomplishment for what I do" and adapting it to a BNSC-S statement of "Most days I feel a sense of accomplishment from attending classes and studying". Seven items were removed due to poor fit with the purpose of the BNSC-S measuring college student populations and two additional items were added for the autonomy subscale. This resulted in a 16-item BNSC-S that was then administered to ($n = 525$) undergraduate students enrolled in a First-Year Experience course. Confirmatory factor analysis was conducted, which resulted in three items being removed due to goodness of fit; this process yielded a 13-item three-factor model showing goodness of fit.

For the BNSC-S, respondents rate their level of belief in the truth of each scale item when applied to themselves by using a Likert-type scale ranging from 1 ("Not at all true") to 7 ("Very true"). See Table 1 for scale items. When adapting the scale, the previous study found an internal consistency reliability of .89. Similarly, the current analysis found the reliability to be .85.

Satisfaction with Life Scale. Student life satisfaction was measured using an adapted version of the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). Previous research has provided strong evidence for its reliability, convergent validity, and its unitary factor structure (Jenkins-Guarnieri et al., 2015; Pavot, Diener, Colvin, & Sandvik, 1991). The SWLS includes five brief statements and was modified to focus on satisfaction with life at a particular university instead of life in general. An example of a modified item includes, "the conditions of my life at this university are excellent".

Participants rated their level of agreement with each of these items using a Likert-type rating scale from 1 ("Strongly Disagree") to 7 ("Strongly Agree"). The Cronbach's α internal consistency estimate calculated from Jenkins-Guarnieri et al. (2015) previous data was .86, while the α calculated from the current data was .88.

Data Analysis

The first regression model was constructed to evaluate the proportion of variation in college satisfaction explained by self-determination scores, controlling for gender, SOC status, first-generation status, and index score (variable calculated by the state that combines high school GPA and college entrance exam scores to represent entering academic preparedness). The control variables of gender (specifically male students), first-generation status, and student of color identity were included, as the literature has provided consistent evidence that these students are at additional risk for academic achievement and even lower levels of motivation (Knapp et al., 2007; Pike, Hansen, & Childress, 2014; Spruill, Hirt, & Mo, 2014).

The second regression model evaluated the proportion of variation in first-term GPA (obtained from university datasets) controlling for the same variables as well as fall credit loads. In both cases, backward selection methods were used by deleting each variable that had the smallest non-significant contribution to the model. The last analysis provided another means to show the relationship of self-determination with first-term GPA. A one-way ANOVA was conducted to show the differences between students with self-determination scores above the mean as compared to students with scores below the mean.

Results

Descriptive statistics for continuous variables are presented in Table 2. To address missing data, mean scores were used to replace values, as missing scores were negligible (<1%) and missing completely at random MCAR (Kline, 2011).

For each of the models in the regression analyses, assumptions were tested by plotting histograms to show multivariate normality and standardized residuals were plotted to confirm linear relationships. All models displayed clear evidence of normality and linear relationships. Multicollinearity was also tested. Bivariate correlations between all independent variables were minimal ($r_{xy} \leq .2$; Kline, 2011) and the variance inflation

factors were all close to 1 (Lomax, 2001). Therefore, multicollinearity was not detected amongst the variables.

In the first regression analysis, all independent variables (self-determination, first-generation status, SOC status, gender, and index score) were entered into the model. The dependent variable was Satisfaction with Life in College. Subsequent models were analyzed by deleting the following in order due to the smallest, non-significant contributions to the model: SOC status, first-generation status, index score, and gender. The final model only included the self-determination variable. As a single variable, self-determination scores explained a significant proportion of variance in satisfaction with life in college, $R^2 = .60$, $F(1, 295) = 444.85$, $p < .0001$ (see Table 3).

Table 2
Variable Means and Scale Reliability Estimates (n = 297)

	<i>M</i>	<i>SD</i>	<i>α</i>
Self-determination	5.83	0.75	.85
Satisfaction	4.84	1.22	.88
Index score	104.29	14.43	--
First-term GPA	2.85	0.80	--
Fall credit load	14.32	1.99	--

Table 3
Results from Regression Analysis of BNSC-S Mean Scores on Satisfaction with Life and First-Term GPA (n = 297)

	Satisfaction with life in college				First-term GPA			
	<i>M</i>		<i>SD</i>		<i>M</i>		<i>SD</i>	
	4.84		1.22		2.85		0.80	
	<i>B</i>	<i>SE B</i>	β	<i>p</i>	<i>B</i>	<i>SE B</i>	β	<i>p</i>
Self-determination	1.25	0.06	.78	< .001	0.12	0.05	.11	.019
Fall credit load	--	--	--	--	0.11	0.02	.271	< .001
Students of color	--	--	--	--	-0.35	0.08	-.22	< .001
Index score	--	--	--	--	0.02	0.00	.36	< .001
R^2				.60				.33
<i>F</i>	444.85			< .001	35.92			< .001

Note. Fall credit load was only entered into the first-term GPA models.

Table 4
One-Way ANOVA Results (n = 297)

	<i>n</i>	<i>M(SD)</i>	95% CI	
			<i>LL</i>	<i>UL</i>
Low SD	123	2.69(0.85)	2.54	2.84
High SD	174	3.00(0.74)	2.86	3.08
<i>F</i>	9.047		<i>p</i> = .003	

Note. SD = Self-determination.

In the second regression analysis, all independent variables (self-determination, first-generation status, SOC status, gender, index score, and fall credit load) were entered into the model. The dependent variable was first-term GPA. Subsequent models were analyzed by deleting the following in order due to the smallest, non-significant contributions to the model: first-generation status and then gender. The final model included the self-determination, fall credit load, index score, and SOC status variables. This final model explained a significant proportion of variance in first-term GPA, $R^2 = .33$, $F(4, 292) = 35.92$, $p < .0001$ (see Table 3). The R^2 change between self-determination and the other variables was also significant.

Although the second model shows the relationship between self-determination and first-term GPA, a one-way ANOVA provided another means to view this relationship. The dependent variable was first-term GPA and the independent variable was self-determination scores. Students who scored above the mean in self-determination had significantly higher first-term GPAs than students who scored below the mean where $F(1, 295) = 9.047$, $p = .003$. Additionally, confidence intervals for the two means did not overlap (see Table 4).

Discussion

This research can assist educators and educational researchers in their understanding of student experiences of self-determination. In the current study, self-determination explained more than half (60%) of the variance in students' satisfaction with life in college. This result aligns well with Deci and Ryan's (2008) assertion that satisfying the basic needs of autonomy, competence, and relatedness can positively influence an individual's affect and well-being. These findings are perhaps even more representative of this relationship inasmuch as the measure is specific to both the college context and student reflections on their satisfaction within said context during their first year.

Self-determination also significantly contributed to first-term GPA. Combined with control variables index score, fall credit loads, and SOC status, this model explained 33% of the variance. Additionally, students whose perceived self-determination scores were above the mean had significantly higher first-term GPAs than those students whose perceived feelings were below the mean. The relationship of student achievement and higher perceived levels of self-determination has been consistent and clear in the literature (Chia Liu et al., 2014; Deci & Ryan, 2002). Furthermore, infusing SDT into academic curriculum and training designs may have an impact on attrition rates in terms of providing students with more opportunities to establish their own level of competency while feeling a stronger sense of

belonging and self-efficacy around their decisions to fully engage in the college experience. This highlights the importance of the findings from this research, as there is a need to continue developing and refining intentional curriculum and training protocols.

Implications for Pedagogy and Faculty Development

Using a context-specific self-determination measure can support universities that struggle to provide adequate programming for diverse populations. Combined with a focus on first-year persistence and a renewed emphasis on student completion, universities can use these findings and this measure in a variety of ways. Previous research has consistently supported the use of autonomy-supportive strategies to promote student feelings of self-determination (Reeve, 2002). When designing faculty professional development, especially training for first-year programs, and new faculty orientation programs, explicit instruction on incorporating these types of strategies in the classroom could be helpful. Some of the recommendations include:

- Providing meaningful feedback,
- Providing choices,
- Using informational rather than controlling language,
- Supporting internalization, and
- Providing rationales and acknowledging feelings. (Deci & Ryan, 2002)

Providing meaningful feedback includes using rubrics to set expectations coupled with written feedback that highlights both specific strengths and areas to improve. Providing choice can take countless forms, from allowing students to choose the types of assignments, to whether they work individually or in groups. Using informational rather than controlling language means avoiding "must" or "should". For example, a faculty member introducing an assignment might say, "you must complete this portion or you will receive no credit" versus, "by including these elements, you will gain the most from the activity and earn the highest possible grade". Similarly, it is also recommended to examine the language on any syllabi. For example, in listing assignments, adding purposes or objectives can be helpful (e.g., "exams are included to help you evaluate your comprehension of theories and principles shared in the course").

Supporting internalization is the specific process of helping students understand how particular activities and content are directly related to students achieving their own goals. By promoting internalization, faculty members can help students see the value in the activities and as a result, increase student motivation.

The last recommendation, providing rationales and acknowledging feelings, are directly related to the process of internalization. By sharing with students “why” an activity is included or how it is tied to knowledge or skills gained as well as acknowledging any potential difficulties helps students internalize the activity and increases motivation and commitment to the task (Deci & Ryan, 2002). Alternatively, asking students themselves to provide the rationale or justification can strengthen this commitment even further. Although some of these recommendations may seem like subtle changes in the classroom (e.g., avoiding must or should), intentionally combining all of these strategies using a consistent delivery can affect real change in the classroom and subsequently, students’ levels of motivation.

These recommendations can specifically lead to curriculum development efforts and program design. As discussed earlier, many first- and second-year students tend to be more extrinsically motivated (Köseoğlu, 2013). As a result, the following strategies could have an even greater impact on first-year programs. Some of the suggestions described are more specific to a first-year program and others would be appropriate for any class.

Using SDT as a framework, the following are described in terms of autonomy, competence, and relatedness. Autonomy means providing choice as well as highlighting how activities are related to students’ personal and professional goals. Within the classroom, this could mean connecting course projects and tasks to career pathways. It could mean simply providing choice within a research project in terms of topics or more extensive choices around designing attendance policies and assignments. Allowing students to design their own attendance policy and choose the consequences and rewards helps to hold themselves accountable for their responsibilities. Providing students the opportunity to share their interests around the topic and how it is related to potential assignments is also an effective way to build commitment to the course and their education from the beginning.

Competence can also take many forms. Allowing students opportunities to identify strengths and weaknesses can lead to personalized learning efforts that further promote success and achievement. In addition, providing scaffolded environments can continuously highlight small successes and progress. Within larger projects, this means breaking it down into smaller elements and providing feedback at each step. This can also be seen in professional communication components where students are provided opportunities to exchange emails with instructors. By providing feedback on these professional communication avenues, students can be better equipped for career setting communication styles.

Lastly, relatedness means building community within the classroom. This can be seen in providing students with

small group activities that link to larger group discussions. Offering a means for students to share their work and engage one-on-one with their peers can lead to in-depth discussions and ownership of their knowledge and ideas. First-year programs can enhance student’s understanding of community building by providing avenues for campus involvement such as sporting events, university clubs, and leadership opportunities.

These suggestions build upon previously established literature and add additional evidence to the growing trend of pedagogical preparation training that includes more active student-centered approaches and holistic learning environments (Baxter Magolda, 2009; Fink, 2013). The promotion of these types of learning environments counter traditional lecture-based pedagogy and engage students in an active inquiry manner to help students make meaning for themselves based on the learning experiences provided (Baxter Magolda, 2009).

With each of these suggestions, the BNSC-S can be used to measure the effectiveness of a given training and/or curriculum on student outcomes. There are virtually countless creative opportunities for educators to grow autonomy, relatedness, and competence in the classroom environment.

Limitations and Future Research

Although this university is representative of many medium intuitions with larger populations of underrepresented student groups (e.g., first-generation students and students of color), there is a limitation due to collecting data from a single university. Using the same measure, an abundance of future research might be accomplished that would contribute to our growing understanding of college student self-determination. In their review of self-determination research, Vallerand and colleagues (2008) indicate that most of the research within this domain has been correlational. Likely, this is due in part to the natural constraints of conducting educational research. For example, effective studies on the relationship of perceived self-determination within a first-year program could be limited by student self-selection and the inability to form random samples. Vallerand et al. (2008) thus call for more experimental designs, which carry their own set of challenges. A potentially rigorous alternative would involve using a quasi-experimental design with a hierarchical propensity score that creates matched control groups across two levels of data (i.e., student and college level; Vaughan et al., 2014). In essence, expansive research designs from multiple universities are avenues for future research that can potentially establish more solidified data points around more diverse populations for the effectiveness of SDT curriculum and training protocols in higher education settings.

Conclusion

A primary purpose of higher education is to prepare students for success in academia that can transfer to career environments; therefore, providing opportunities for students to find themselves, establish healthy relationships with others, and solidify skills necessary are crucial aspects of every post-secondary classroom. The introduction of the Basic Needs Satisfaction at College Scale simply serves to provide a reliable and valid means of quantifying the results of any given intervention or strategy designed to enhance these important student needs so as to build greater student self-determination and success.

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