Predicting Students' Academic Performance: The Joint Effect of Satisfaction and Motivation in Two Public Colleges in Southwest USA.

Edward O. Akoto
Henderson State University

Eunice V. Akoto
Henderson State University

Christie Hough
Southern Arkansas University

Nathan Campbell
Henderson State University

Ajay Aggarwal
Henderson State University

This study examines the mediating roles of goal motive, an SDT perspective, and satisfaction with college life on academic performance. A survey of two public higher education institutions in Southern USA showed that both samples reported autonomous learning climate and moderate satisfaction with college life. The regression analysis using the PROCESS Macros in SPSS revealed that the strongest predictors of academic performance were the learning climate and satisfaction with college life, but satisfaction mediates the effect of learning climate. Thus, satisfaction seems to be more important than motivation in the two contexts. The outcome provides critical insights that may inform SDT research in higher education and student's performance management.

INTRODUCTION

Students' performance is critical to their degree completion, and the two well-researched concepts that have a significant influence on academic performance are satisfaction and motivation. Motivation, the energizing force for behavior, is considered an enabler of performance in higher education (Linnenbrink & Pintrich, 2002). Thus, the effect of motivation on performance has been researched extensively in the academic setting (e.g., Kusurkar, Ten Cate, Vos, Westers, & Croiset, 2013; Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004; Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009). Similarly, research on satisfaction in the academic setting abounds (e.g., Martirosyan, Saxon, & Wanjohi, 2014; Elliott & Shin, 2002; Gallien & Oomen-Early, 2008; DeShields, Kara, & Kaynak, 2005).

Some studies suggest that satisfaction may also be an important determinant of students' engagement and performance (Douglas, Douglas, McClelland, & Davies, 2015). For instance, Bailey and Phillips (2016) have investigated whether student happiness, well-being, and performance are explained by the underlying motivations and adaptation to the university environment, and found that intrinsic motivation was associated with greater subjective well-being, meaning in life and academic performance.

Despite the numerous studies on motivation and satisfaction in the academic setting, there is a paucity of research on their joint influence on performance. There is an established relationship between motivation and satisfaction (e.g., Sheldon & Krieger, 2004), and it is unclear which construct would have preeminence in predicting students' academic performance. Self-determination theory (SDT), one of the most researched concepts in the education sector, suggests that motivation mediates the effect of the environment—the learning climate—on outcomes, including performance. The question however is, would satisfaction affect this relationship since satisfaction and motivations are related? A study examining the aspects of a student's educational experiences found that 'student centeredness,' 'campus climate,' and 'instructional effectiveness,' have a strong impact on how satisfied a student is with his/her overall educational experience (Elliott & Healy, 2001). This suggests that the educational environment may also affect students' satisfaction and possibly performance.

The goal of this study, therefore, is to test the concurrent effect of students' goal motive and college satisfaction on the climate-performance relationship. The study attempts to fill the gap in research on these two constructs by clarifying which construct has the better predictive effect on academic performance. The paper focuses on goal motive—hence the quality of motivation, an SDT perspective that is well applied in higher education and underlies most motivation theories (Gagné & Deci, 2005). The operationalization of goal quality in this study, based on the relative autonomy index, combines both the autonomous and non-autonomous aspects of motivation and allows the examination of the holistic view of one's motivational states. This approach is important because individuals' psychological states operate conjointly to affect behavior. Understanding students' satisfaction and motivation, and their simultaneous effect on academic performance are necessary for diagnostic purposes and the intervention role of stakeholders in higher education, including instructors, advisers, counselors, and administrators. Now, some public higher education institutions in the U.S. must adhere to performance management policies, including student graduation, for state funding. Therefore, studies such as this may have practical benefits by increasing the knowledge of stakeholders and enhance the management of students' performance and progression towards degree completion.

RELATED LITERATURE

SDT and Goal Quality

One key concept of SDT is the regulation of behavior that vary in their degree of relative autonomy—quality (Ryan & Connell, 1989; Ryan & Deci, 2000). Consequently, most work on SDT includes the autonomous and controlled regulations of behavior, and the associated autonomy-supportive versus controlling social contexts (Vansteenkiste, Lens, & Deci, 2006). Within the SDT framework, goal motive—why individuals do what they do—is the regulatory (autonomous or controlled) orientation of behavior. Autonomous regulation has an internal perceived locus of causality and is experienced as chosen and volitional (William & Deci, 1996), denoting a high-quality motivation. Controlled behavior, in contrast, has an external perceived locus of causality and is experienced as pressured or coerced by demands and contingencies, and perceived as low-quality. However, controlled behaviors may be internalized, by acquiring and accepting the values or goals, leading to autonomously motivated behaviors (Gagné, Chemolli, Forest, & Koestner, 2008). Thus, the various types of controlled motivation differ in their degree of autonomy or quality based on the level of internalization (Ryan & Connell, 1989; Ryan, Connell, & Deci, 1985).

SDT considers the quality of motivation (internalization of regulation) to be more important than quantity and describes a continuum of quality of motivation (Ryan & Deci, 2000) that make up the autonomous and controlled regulations. Included in the controlled motivation are external regulation

(doing an activity to obtain rewards or to avoid punishments) and introjected regulation (engaging in behavior out of guilt or compulsion) which denotes low self-regulation or quality. The autonomous motivation comprises identified regulation (value congruence), and intrinsic regulation (undertaking of activity for its sake), denoting high self-regulation or quality (Black & Deci, 2000; Vansteenkiste et al., 2009). Consequently, individuals' goal quality is examined by comparing the levels of autonomous and controlled composites termed the Relation Autonomy Index (RAI), with a high RAI indicating high-quality motivation.

The Learning Climate – A Social Context of Motivation

In line with the postulation of SDT, the social environment—i.e., the context of motivation—is also critical. The learning climate may be characterized either as autonomy-supportive or controlling with implications for motivation. According to Deci and Ryan (2008), the factors facilitating internalization of motive include the influences of significant others such as parents, teachers, managers, and friends. In higher education, autonomy-support means allowing students to act upon their personal interests and values, such that their learning is accompanied by a sense of volition and psychological freedom (Reeve, 2009; cf. Vansteenkiste et al., 2012). Autonomy-support also includes accepting rather than countering irritation and anger that arises during the learning process, and the use of inviting language such as 'you can' (Vansteenkiste et al., 2006). This contrasts with a controlling context which tends to pressure individuals into thinking or acting in a particular way (e.g. 'you should').

SDT and Performance Outcomes

SDT research suggests that the motive for acting—whether a person perceives their behavior as motivated by their interests, values, and beliefs, or whether external or self-alien factors control the behavior—has significant consequences for their satisfaction and performance (cf. Sheldon & Krieger, 2004). The overwhelming research on SDT, including meta-analytic reviews (e.g., Cerasoli, Nicklin, & Ford, 2014; Vansteenkiste et al., 2009) also show that autonomous motivation has a greater predictive effect on performance. Specifically, research has shown that external and introjected regulations (controlled motivation) are typically associated with negative subjective well-being. Conversely, identified and intrinsic regulations (autonomous motivation) are associated with positive subjective well-being, persistence and performance (Deci & Ryan, 1991, 2000; Sheldon, Williams, & Joiner, 2003; cf. Sheldon & Krieger, 2004; Vansteenkiste et al., 2004). Subjective well-being is a broader construct that encompasses satisfaction (Diener, Emmons, Larsen, & Griffin, 1985; Pavot, Diener, & Suh, 1998). Hence, in one recent study, autonomous motivation was shown to have a predictive effect on satisfaction and meaning of life (Bailey & Phillips, 2016).

On the social context of motivation, SDT research suggests that autonomy-support environments enhance the quality of autonomous motivation (high-quality motivation) whereas controlling environments may diminish autonomous motivation (e.g., Grolnick & Ryan, 1989; Vansteenkiste et al., 2006). However, some research findings suggest that controlled motivation (extrinsic goals) may also be rated higher in the academic context (Vallerand et al., 1992, 1993). The SDT literature also suggests that motivation intermediates the effect of the social context on outcomes, including well-being and performance (Vansteenkiste et al., 2004).

Satisfaction and Performance

The satisfaction-performance relationship has been examined extensively in the work setting, including both qualitative and quantitative reviews (e.g., Judge, Thoresen, Bono, & Patton, 2001; Mohr, Young, Meterko, Stolzmann, & White, 2011). In a meta-analysis of 312 studies with a combined sample of 54,417, Judge and colleagues found a true correlation of 0.3 between overall job satisfaction and job performance. Research in varied contexts continue to support the satisfaction-performance relationship, including a longitudinal study in manufacturing plants (from 1996–2001; Böckerman & Ilmakunnas, 2012); and the effectiveness of primary care teams (Mohr et al., 2011).

Although research on college student satisfaction began decades ago, the effect of satisfaction on performance has not been extensively tested in the higher education setting. Only a limited number of extant studies have investigated college satisfaction with academic performance (e.g., Bailey & Phillips, 2016; Einarson & Matier, 2005). For instance, Einarson and Matier (2005) reported that students' satisfaction levels are positively associated with students' college experiences and outcomes such as persistence, graduation, and grade achievement. Bailey and Phillips (2016) recently found that students who were intrinsically motivated tend to feel a stronger sense of well-being, higher life satisfaction, and meaning, and also performed better academically. One study also investigated the influence of self-determination and students' feelings towards their academic result, on university service quality (USQ) evaluation. The results highlighted that students who felt good about their academic results were more self-determined and perceived a more favorable USQ experience (satisfaction) than those who did not (Chong & Ahmed, 2015). In another study, Garriott, Hudyma, Keene, and Santiago (2015) examined the relationship between intrinsic motive and satisfaction but not their concurrent effect on performance.

Purpose of Current Study

The present research comprises two samples in public higher education institutions in the Southern USA. The primary objective of this study is to assess how goal quality and satisfaction links to academic performance in an integrative regression model. It is important to understand what drives students' performance and to create the circumstances for them to perform at their best. This study's focus on goal quality provides a holistic view of one's motivational (psychological) states on academic performance in conjunction with satisfaction. College satisfaction may precede academic performance although the reverse could be true. Students' performance on assignments and tests, hence GPA, may also influence their overall satisfaction in college. For instance, research in the work setting suggests that high performance, if rewarding, may affect satisfaction (Lock & Latham, 1990). However, like motivation, satisfaction with college life may also serve as an intermediary of the associations involving the learning climate and performance since satisfaction precedes performance. The following research questions will guide this study:

1) Would learning climate, goal motive, and satisfaction with college life predict academic performance in the same model?
2) Does goal motive mediate the effect of learning climate on academic performance?
3) Does satisfaction with college life mediate the effect of learning climate on academic performance?
4) Does satisfaction with college life mediate the effect of goal motive or vice versa?

METHOD

Sample and Survey Procedure

We sampled the general student body of two public funded medium-sized universities (based on the College Board's classification) located in southern U.S.A., with enrollments of 3,283 and 3112 respectively at the time of the study. The Deans of students or their representatives sent the survey questions to the entire student population of both institutions through the respective mass email systems. Participation was voluntary, and rewards (gift cards) were offered (through a lottery draw) as an incentive. After three follow-up emails, institution one (referred to as "sample one" henceforth) recorded 440 usable responses while institution two (referred to as "sample one") registered 459 usable responses. Since the number of students that received or opened the email link cannot be determined, the exact response rate could not be calculated. This is not uncommon in academic research (see Han & Pistole, 2014) where confidentiality requirements do not allow direct access to student contacts. Nevertheless, non-response bias was examined in the results section.

Measures

Goal motive was measured with a variant of the Academic Self-Regulation Questionnaire (ASRQ), adapted to measure students' motive for studying in college (e.g., Hayamizu ,1997; Ryan & Connel, 1989). Following Black and Deci (2000), we adopted a shortened 18-item scale to measure autonomous (9 items) and controlled (9 items) regulations. Sample items for each respective dimension on the stem 'why do you study in college?' are: (controlled regulation) '*because I want my friends to regard me as smart*', '*because it seems to be a rule for students to study in college*', and (autonomous regulation) '*because the courses I take involve important things that I should study*' and '*because it is fun to excel in the courses I take.*' Responses were on a seven-point Likert-type scale ranging from 1 (*completely false*) to 7 (*completely true*).

The learning climate was measured with the 15-item learning climate questionnaire (LCQ) used in the college setting (e.g., Sheldon & Krieger, 2007). This questionnaire contains items that are related to students' experience with their instructors in the respective institution. Students were asked to rate their impression of their instructors. Sample items include, '*I feel that my instructors provide me with choices and options*' and '*My instructors listen to how I would like to do things.*' The items were rated on a seven-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). The alpha reliability coefficient of the -LCQ was .87 for sample one and .86 for sample two.

Academic life satisfaction was measured with an adapted 5-item scale from the Satisfaction with Life Scale (SWLS; Diener et al., 1985; Niemiec, Lynch, Vansteenkiste, Bernstein, Deci, & Ryan, 2006; Pavot, et at., 1998). Like Niemiec and colleagues, we adapted the items that measure students' present satisfaction with life on the response set: 1 (strongly disagree) to 7 (strongly agree). Sample items included; '*I would change nothing about my current life in college*' and '*I am satisfied with my current college life.*' The alpha reliability coefficient for this scale was 0.86 for sample one and .89 for sample two.

Finally, academic performance was measured with self-reported overall current GPA. Prior studies have successfully employed self-report measure of performance in educational research since they have been shown to provide an accurate estimation of actual grades (e.g., Bailey & Phillips, 2016; Vansteenkiste et al., 2009). Information on GPA is readily available to college students in the U.S.A.

SAMPLE I RESULTS

Apart from gender, the demographic distribution was a close approximation of the institutional proportions. This includes age (77.2% vs. 74.5% being 26 years or younger) race (whites-70.1% vs. 67.3, blacks-21.6% vs. 22.7%, Hispanics-3.6% vs. 3.9%, and others) and classification (majority juniors-26.4% vs. 22% and seniors-26.6% vs. 27.5%). The data was further examined for potential nonresponse bias by the extrapolation method. We compared the demographic variables between early and late respondents. Late respondents may exemplify characteristics of the non-respondents in a survey (Moore & Tanai, 2002). The independent sample t-test showed that there were no significant differences between the early and late respondents on the demographics variables; gender, age, race and classification (all mean difference ≤ 0.198, all p-values $\geq .096$). The finding together with the archival examination suggests that non-response bias may not be a major problem, and the sample is considered a valid representation of the population. This assertion is further examined in the regression model with a bootstrap technique which is a re-sampling of a sample to test its representativeness of the population.

Factor Analysis

Adequacy of the measurement model for the learning self-regulation scale was achieved by Confirmatory Factor Analysis (CFA) procedure with a two-factor structure as indicated by the following fit statistics: $\chi 2 = 236.91$, DF = 76, RMSEA = 0.070, CFI = 0.97, GFI = 0.93; AGFI = 0.90; NNFI = 0.96. The items loaded significantly onto the respective factor with loadings ranging from .43 to .80 after dropping four poor loading items (three control regulation and one autonomous regulation items). Item analysis further showed that the corrected item-total correlation ranged from .372 to .770 for both

dimensions. The alpha coefficients were .90 and .70 for autonomous and controlled regulations respectively. These outcomes together provide support for both discriminant and convergent validities (Hair, Anderson, Tatham, & Black, 2006). Deriving a two-factor solution for this measure instead of four is not uncommon as prior research (e.g., Black & Deci, 2000; Vansteenkiste et al., 2009) have reported two-factor structure using principal component analysis. Following this, the Relative Autonomy Index (RAI) was calculated by subtracting the z-scores for the controlled regulation from the autonomous regulation. A high score (above zero) indicates high RAI and a low score (below zero) imply low RAI (Black & Deci, 2000).

Descriptive Statistics

The means of the sample one variables are reported in Table 1. The mean RAI score is slightly above zero (.01, SD 1.19) and considered high (Black & Deci, 2000), suggesting an overall motivational preference of autonomous regulation. The mean score for the learning climate (LC) (5.31, SD 1.02) is also high, indicating an autonomy supportive academic context. The mean score for satisfaction with college life (SWCL) (4.60, SD 1.29) was slightly above the scale midpoint of 3.5 and suggest a moderate satisfaction with college life. The mean score for the self-reported GPA (academic performance) for this sample was 3.21 (SD .48). On correlations, LC correlates positively with RAI (r=.38) and SWCL (r=.53). RAI also correlates positively with the satisfaction construct (r=.36). Academic performance correlates positively with RAI (r=.14), LC (r=.16) and SWCL (r=.32). Evidently, age correlated with classification (r=.16).

TABLE 1
MEANS AND CORRELATIONS OF STUDY VARIABLES – SAMPLE I

Constructs	*Mean*	*SD*	*RAI*	*LC*	*SWCL*	*GPA*	*Gender*	*Age*
RAI+	**0.01**	**1.19**	-					
LC	**5.31**	**1.02**	.38**	-				
SWCL	**4.60**	**1.29**	.36**	.53**	-			
GPA	**3.21**	**0.48**	.14**	.16**	.32**	-		
Gender	**1.26**	**0.43**	.08	.09	.05	-.04	-	
Age	**23.14**	**5.53**	.34**	.17**	.10*	-.00	-.07	-
Classification	**2.91**	**1.15**	.22**	.19**	.19**	.24**	.07	.43**

[+]Standardized score. RAI = Relative autonomy index; LC = Learning climate; SWCL = Satisfaction with college life. Gender (1=female, 2=male), Classification (1=freshmen, 2=sophomore, 3=junior, 4=senior, 5=masters). *p < .05 **p < .01

Mediational Test

Multiple regression analysis was used to examine the associations between the study variables. Due to the bivariate correlations among the three key variables of interest (learning climate, satisfaction with college life (SWCL), and goal motive), a stepwise regression was used to explore their predictive effects. As expected, SWCL was the most significant predictor of academic performance while learning climate was the most significant predictor of SWCL among others. Hence, the data was subjected to a mediation procedure using the *PROCESS* Macros in SPSS (Hayes, 2013); by a bootstrap method and bias-corrected confidence intervals obtained with 5000 bootstrap samples (Preacher & Hayes, 2008). Bootstrapping involves resampling of a sample to derive an accurate statistical estimate of the population distribution.

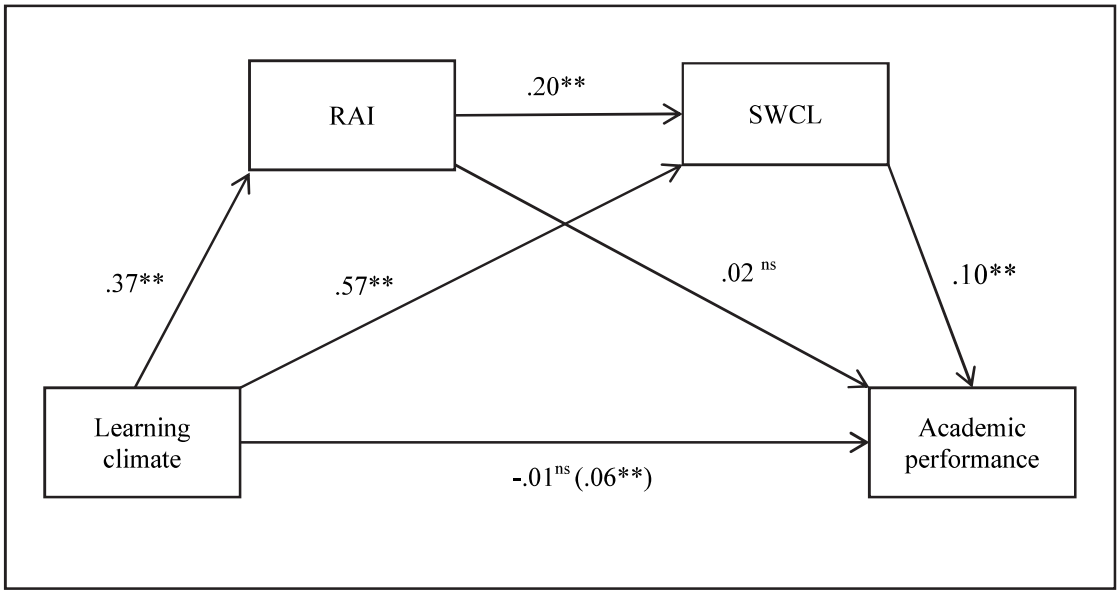
Hence, bootstrap provides an accurate statistical estimate when a sample size appears small (for details see Preacher & Hayes, 2008). Classification (p=.000), gender (p=.067, and age (p=.003) were added as covariates. We controlled for the cohort groups since students may increase the quality of motivation (internalization) as they progress in their academic journey. Also, research has shown gender and age differences in motivation and well-being (e.g., Ratelle, Guay, Vallerand, Larose, & Senecal, 2007; Vansteenkiste et al., 2009).

The result (reported in Figure 1) shows multiple mediating effects with two serial mediators (RAI and SWCL) on the effect of LC on academic performance. Examination of the output from this sample suggests three possible paths to academic performance:

LC→RAI→GPA …… mediation (1)
LC→RAI→SWCL→GPA ……... mediation (2)
LC→SWCL→GPA …… mediation (3)

However, the first mediating model; indirect effect of LC on GPA through RAI was not supported (Figure 1; β=.02, t = .962, p = .336). The second model was the effect of LC on academic performance through RAI and SWCL sequentially. LC is positively associated with academic performance (β=.06, t = 2.72, p <.01) and RAI (β=.37, t = 6.92, p <.001). RAI (the first mediator) also correlated positively with SWCL—the second mediator (β=.20, t = 3.97, p <.001). With both mediators introduced into the LC-performance path, only SWCL was significant, indicating a mediating effect. The 95% C.I. of the indirect effect obtained with the 5000-bootstrap sample confirmed the mediating role of RAI and SWCL in the relation between LC and academic performance (β =.008; C.I. = .003 to .017). The direct effect of LC on academic performance became nonsignificant (β = -.01, t = -.51, p = .610, see Figure 1). The third mediating model involves the path from LC to academic performance through SWCL only. As indicated earlier, LC is positively associated with academic performance. The 95% C.I. of the indirect effect obtained with the 5000-bootstrap sample again confirmed the mediating role SWCL on the direct effect of LC on academic performance (β =.006; C.I. = .03 to .09). Comparing the two mediating effects, the 95% bias-corrected bootstrap C.I. of the difference in the indirect effects (mediation 2-mediation 3) does not include zero (-.084 to -.030). This result shows that the indirect effect of LC on academic performance via SWCL (mediation 3) is stronger than the serial indirect effect (mediation 2).

FIGURE 1
INDIRECT EFFECT OF LEARNING CLIMATE ON ACADEMIC PERFORMANCE THROUGH RAI AND COLLEGE SATISFACTION– SAMPLE I



RAI = Relative Autonomy Index; SWCL = Satisfaction with College Life. *p < .05 **p < .01

SAMPLE II RESULTS

Demographic distribution for sample two is also close to the institutional totals except for gender. This includes age (74.2% vs. 74.9% being 26 years or younger) race (whites-69.7% vs. 63.9, blacks-23.0% vs. 26.5%, Hispanics-1.6% vs. 2.0%, and others) and classification (majority juniors-19.0% vs. 16.5% and seniors-25.1% vs. 26.8%). In spite of this, potential nonresponse bias was estimated by comparing the demographic variables between the early and late respondents. The independent sample t-test outcome showed that there were no significant differences in the demographics variables; gender, age, race and classification (all mean difference ≤ 0.262, all p-values $\geq .063$). These together suggest that non-response bias may not be a major problem. Nevertheless, this is further examined in the substantive analysis by the bootstrap technique.

Factor Analysis

The CFA outcome for sample two also resulted in a two-factor solution for the learning self-regulation scale; autonomous regulation and controlled regulation. The adequacy of the model is indicated by the following fit statistics: $\chi 2 = 292.81$, DF = 76, RMSEA = .079, CFI = .96, GFI = .92; AGFI = .88; NNFI = .95. The items loaded significantly on the respective factor with loadings ranging from .42 to .78. However, like study one, four items with poor loading (three controlled and one autonomous regulation items) were dropped. This occurrence of these items in both studies confirms their problematic nature. Item analysis further showed that the corrected item-total correlation ranged from .371 to .753 for both dimensions. The alpha coefficients were .89 and .72 for autonomous and controlled regulations respectively, indicating satisfactory reliability estimates of the scales. These together provided support for both discriminant and convergent validities.

Descriptive Statistics

Table 2 outlines the sample means and correlations of the study variables. The composite motivation (RAI) score was negative but only slightly below zero (-0.03, SD 1.19), suggesting the moderately low-quality goal regulation. The mean score for learning climate (5.30, SD 1.06) was high, suggesting a perceived autonomy supportive context. Like sample one, the mean score for SWCL (4.86, SD 1.36) suggests moderately high satisfaction with college life. The pattern of correlation was similar to that of sample one. RAI correlated positively with LC (r=.19) and SWCL (r=.17). The highest correlations were between LC and SWCL (r=.54). The self-rated academic performance (GPA) correlated with RAI (r=.12), LC (r=.18), and SWCL (r=.22).

TABLE 2
MEANS AND CORRELATIONS OF STUDY VARIABLES – SAMPLE II

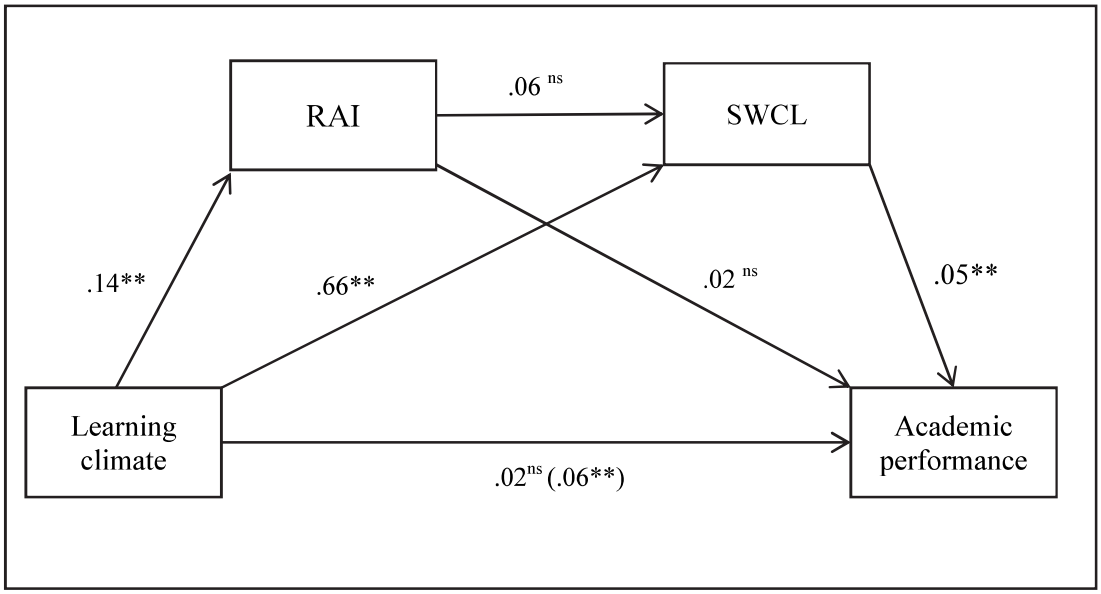
Constructs	*Mean*	*SD*	*RAI*	*LC*	*SWCL*	*GPA*	*Gender*	*Age*
RAI[+]	**-0.03**	**1.19**	-					
LC	**5.30**	**1.06**	.19**	-				
SWCL	**4.86**	**1.36**	.17**	.54**	-			
GPA	**3.34**	**0.44**	.12*	.18**	.22**	-		
Gender	**1.27**	**0.44**	.03	-.06	-.07	-.08		
Age	**24.18**	**6.25**	.30**	.23**	.19**	.08	-.06	
Classification	**3.09**	**1.37**	.26**	.17**	.13**	.17**	-.04	.55**

[+]Standardized score. RAI = Relative autonomy index; LC = Learning climate; SWCL = Satisfaction with college life. Gender (1=male, 2=female), Classification (1=freshmen, 2=sophomore, 3=junior, 4=senior, 5=masters).
*p < .05 **p < .01

Mediational Test

As in sample one, multiple mediation effects were tested [controlling for classification (p=.000), age (p=.001), and gender (p=.074)] by a bootstrap method with bias-corrected confidence intervals obtained with 5000 bootstrap samples (Preacher and Hayes, 2008). The result shows that only one mediating path (LC→SWCL→GPA) was supported (see Figure 2). LC is positively associated with the first mediator; RAI (β=.14, t = 2.69, p <.01), but RAI was not significantly related to SWCL (the second mediator). On the mediated model, LC was positively associated with academic performance (β=.06, t = 3.11, p <.01) and SWCL (β=.66, t = 11.96, p <.001). The 95% C.I. of the indirect effect obtained with the 5000-bootstrap sample confirmed the mediating role of SWCL in the link between LC and academic performance (β =.03; C.I. = .01 to .06). The direct effect of LC on academic performance became nonsignificant (β = .02, t (449) = .99, p = .322). When RAI was excluded from the mediation model (analyzed separately), the outcome showed no appreciable difference compared to the complete mediation model reported. Due to the no significant effect, we examined the effect of the autonomous and control regulations separately, but the outcome did not show any significant improvement. Autonomous regulation only had a marginal effect (β=.04, p <.05) on performance but not controlled regulation. This result confirms the need to use RAI which captures one's complete motivational states.

FIGURE 2
INDIRECT EFFECT OF LEARNING CLIMATE ON ACADEMIC PERFORMANCE THROUGH COLLEGE SATISFACTION– SAMPLE II



RAI = Relative Autonomy Index; SWCL = Satisfaction with College Life.
*p < .05 **p < .01

DISCUSSION

We sought to understand the joint effect of motivation (goal motive) and college satisfaction on academic performance. The associated flows of these variables were examined in a mediated model using two independent samples from universities in Southern USA. The findings revealed that the goal motive for studying as indicated by the relative autonomy index (RAI) was high in sample one but slightly low in sample two. The high index score, which denotes high-quality motivation (autonomy), implies that students may have a strong internal locus of causality. On the other hand, the somewhat low index score suggesting moderately low-quality (controlled regulation), suggests that students may have a mildly elevated level of perceived external locus of causality. Thus, students' goals may not be fully internalized.

The perceptions of the learning climate in both institutions were rated as autonomy supportive, meaning that students in these two higher education institutions feel supported in the pursuit of their interest in the learning process. Institutions of small to medium sizes tend to have smaller class sizes that increase student-faculty interactions and faculty support. Although the climate seems to contradict the motivational orientation in sample two, the outcome is plausible. The RAI index score was only slightly below zero. Therefore, students' goal motive may lie, for instance with the most internalized aspect of the controlled regulation which is referred to as introjected. This implies that they may accept or value some contingencies and pressured demands which are not uncommon in higher education.

Finally, the rating of satisfaction with college life is moderately high suggesting students may not be completely satisfied with their college life. This outcome is not surprising since multiple contributing factors may determine students' satisfaction in an institution. Students' satisfaction may be assessed by multiple factors or by a general measure (Elliott & Shin, 2002); this study only assessed students' overall satisfaction and did not target particular aspects of their life in college. Therefore, if one is satisfied with the teaching and learning process but dissatisfied with conditions at their housing or cafeteria, or has some other personal issues (e.g., finances, National Survey of Student Engagement, 2015), they are likely to rate their satisfaction moderate on a general scale.

The mediated models with both samples revealed that the learning climate was positively associated with the goal motive (RAI), despite the moderately low RAI in sample two. However, the relationship was stronger in sample one. Research has shown that autonomy support leads to self-determined forms of motivation than controlled motivation (e.g., Deci & Ryan, 2000; Vallerand, Pelletier, & Koestner, 2008). The learning climate and satisfaction with college life emerged as the key predictors of academic performance, but not the goal motive. It has been noted that motivation in the academic setting may affect performance through other factors (Kusurkar et al., 2013). In this study, we found that satisfaction with college life was rather important, which mediates the effect of the RAI (high-quality motive) on academic performance in sample one, but not in sample two probably due to the low RAI score (moderate-quality motive). Thus, the high-quality goal motive (unlike the low-quality motive) also predicts college satisfaction.

The findings also indicate that the learning climate has the most significant influence on respondents' satisfaction with college life. This outcome is not surprising since the institutional climate, as well as the environment of one's program, provides the context in which many interactions take place. According to Wimpenny and Savin-Baden (2013), the teaching style and approachability of an academic are critical to students' pleasure or displeasure. These outcomes are consistent with prior research on the effect of learning climate (autonomy support) as essential for academic performance (Vansteenkiste et al., 2004; Sheldon & Krieger, 2007). Our findings extend these studies by demonstrating that satisfaction may also intermediate the effect of the learning climate and motivation on performance.

Implications for Theory and Practice

The study outcome has implications for attitudinal researchers in higher education, particularly for motivation and satisfaction theorists. While SDT theory and research in higher education have focused exclusively on the mediated effect of motives on climate, satisfaction researchers have also focused exclusively on outcomes other than motivation. The findings of this study suggest that combining motivation and satisfaction theories may be more revealing than studying these separately. In this study, the motivation construct only predicted performance through satisfaction with college life. The quality of motivation may determine the level of self-determination which may fulfill a basic human need for autonomy, hence, the relation to satisfaction. Motivation and satisfaction are psychological states and may not operate independently of each other, but rather jointly affect outcomes. This finding suggests that theorizing the holistic view of students' attitudes on educational outcomes will be more informative and improve predictive models.

Also, the most revealing outcome of this study is the strong mediating influence of college satisfaction on academic performance which has implications for stakeholders in higher education. In both samples, the learning climate which may be influenced by students' interactions with their instructors was significantly related to the students' satisfaction with college life. A percentage change in the learning climate leads to more than 50% change in satisfaction with college life, which makes the findings necessary for instructors and stakeholders in academia. Except for the areas of limited instructor influence such as dormitories, fraternities, buildings, meal plans, among others, the instructor's ability to create a climate that values students' ideas and opinions (autonomy support) has a greater effect on students' satisfaction with college life.

Furthermore, the findings that the learning climate and satisfaction with college life were essential for students' performance (GPA) provide critical insight that may inform higher education management in the region of study and possibly beyond. For instance, higher education performance measures in the U.S.A include mandatory policy measures that require four-year institutions, like those sampled in this study, to measure students' progression toward degree completion (National Conference of State Legislatures-NCSL, 2015). This policy requires institutions to graduate the students they enroll to ensure continuous funding. Consequently, effective student management and engagement may be essential to the success of students' progress towards degree completion and overall survivability of the institution. This study has provided a diagnostic outcome that could be useful for understanding the factors that can energize students towards academic performance. In essence, those who are likely to graduate are those

who can maintain the required GPA, and this study has shown that satisfaction is a crucial ingredient for students' success. Although many other factors may affect students' satisfaction (Wiers-Jenssen, Stensaker, & Grogaard, 2002), the learning climate was important in these two institutions as echoed in prior research (e.g. Zepke & Leach, 2010; Bailey & Phillips, 2016). Hence, administrators and instructors may help increase students' satisfaction and performance through a supportive atmosphere.

Limitation and Future Research

Generalizability of the findings constitutes the major drawback of this study because the response rate could not be calculated. On the other hand, the archival and response biased test and the bootstrap technique employed suggests that the analytical outcome is replicable in the populations of study. Nevertheless, the two institutions sampled in this study are considered medium-sized and are teaching-focused colleges with predominantly white students in the U.S. southwest. Hence, the institutional environments may be different from some of the large institutions or more diverse institutions. Therefore, the question that may arise is whether the findings will endure in different contexts. Further research may answer this question by testing the outcomes with other samples in multiple contexts, including historically and culturally diverse colleges. Also, research over the years has successfully examined mediation with cross-sectional data, but conceptually, mediation is inherently a process that should unfold over time. The estimates of a longitudinal mediating effect may be more robust (Maxwell & Cole, 2007); therefore, a replication of our mediated-effect with repeated measures (student panels) will also be informative.

CONCLUSION

The findings of this study indicate that the learning climate, influenced by instructors, is a significant predictor of academic performance, but satisfaction completely mediates this relationship. This study provides some insight for the continued application of SDT in higher education, by showing that satisfaction may be a more important intermediator of the climate-performance link than the goal motive. The ability of institutions to promote supportive learning climates will help increase satisfaction and academic success, and ultimately the degree competition.

REFERENCES

Bailey, T. H. & Phillips, L. J. (2016). The influence of motivation and adaptation on students' subjective well-being, meaning in life and academic performance, *Higher Education Research and Development,* 35(2), 201-216.

Black, A. E., & Deci, E. L. (2000). The effects of instructors' autonomy support and students' autonomous motivation on learning organic chemistry: A self-determination theory perspective. *Science Education*, 84(6), 740-756.

Böckerman, P. & Ilmakunnas, P. (2012). The Job Satisfaction-Productivity Nexus: A Study Using Matched Survey and Register Data. Industrial Relations Review, 65 (2), 244-262.

Cerasoli, C. P., Nicklin, J. M., & Ford, M. T. (2014). Intrinsic motivation and extrinsic incentives jointly predict performance: A 40-year meta-analysis. *Psychological Bulletin*, 140(4), 980-1008.

Chong, Y. S., & Ahmed, P. K. (2015). Student motivation and the 'feel good' factor: an empirical examination of motivational predictors of university service quality evaluation. *Studies in Higher Education*, 40 (1), 158-177.

Deci, E. L. & Ryan, R. M. (2008). Facilitating optimal motivation and psychological well-being across life's domains. *Canadian Psychology*, 49(1), 14-23.

Deci, E. L., & Ryan, R. M. (1991). A motivational approach to self: Integration in personality. In R. Dienstbier (Ed.), *Nebraska symposium on motivation: Vol. 38. Perspectives on motivation* (pp. 237-288). Lincoln, NE: University of Nebraska Press.

Deci, E. L., & Ryan, R. M. (2000). The ‘‘what’’ and ‘‘why’’ of goal pursuits: Human needs and the self-determination of behaviour. *Psychological Inquiry*, 11(4), 227-268.
DeShields Jr, O. W., Kara, A., & Kaynak, E. (2005). Determinants of business student satisfaction and retention in higher education: applying Herzberg's two-factor theory. *International Journal of Educational Management*, 19 (2), 128-139.
Diener, E., Emmons, R., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49(1), 71-75.
Douglas, J. A., Douglas, A., McClelland, R. J., & Davies, J. (2015). Understanding student satisfaction and dissatisfaction: an interpretive study in the UK higher education context. *Studies in Higher Education*, 40 (2), 329-349).
Einarson, M. K., & Matier, M. W. (2005). Exploring race differences in correlates of seniors' satisfaction with undergraduate education. *Research in Higher Education*, 46, 641-676.
Elliott, K. M., & Healy, M. A. (2001). Key factors influencing student satisfaction related to recruitment and retention. *Journal of Marketing for Higher Education*, 10 (4), 1-11.
Elliott, K. M., & Shin, D. (2002). Student Satisfaction: An alternative approach to assessing this important concept. *Journal of Higher Education Policy and Management*, 24 (2), 197-209.
Gagné, M. & Deci, E.L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior*, 26 (4), 331-362.
Gagné, M., Chemolli, E., Forest, J., & Koestner, R. (2008). A temporal analysis of the relation between organizational commitment and work motivation. *Psychologica Belgica*, 48 (2/3), 219-241.
Gallien, T. & Oomen-Early, J. (2008). Personalized versus collective instructor feedback in the online courseroom: Does type of feedback affect student satisfaction, Academic Performance and Perceived Connectedness with the Instructor? *International Journal on ELearning*, 7 (3), 463-476.
Garriott, P. O., Hudyma, A., Keene, C., & Santiago, D. (2015). Social cognitive predictors of first- and non-first-generation college students' academic and life satisfaction. *Journal of Counseling Psychology*, 62(2), 253-263.
Grolnick, W. S., & Ryan, R. M. (1989). Parent styles associated with children's self-regulation and competence in school. *Journal of Educational Psychology*, 81(2), 143-154.
Hair, J. F. J., Anderson, R. E., Tatham, R. L., & Black, W. C. (2006). Multivariate Data Analysis. Englewood Cliffs, NJ: Prentice Hall.
Han, S., & Pistole, M. C. (2014). College Student Binge Eating: Insecure Attachment and Emotion Regulation. *Journal of College Student Development*, 55(1), 16-29.
Hayamizu, T. (1997). Between intrinsic and extrinsic motivation: Examination of reasons for academic study based on theory of internalization. *Japanese Psychological Research*, 39(2), 98-108.
Hayes, A. F. (2013). Introduction to mediation, moderation, and conditional process analysis. New York: The Guilford Press.
Judge, T. A., Thoresen, C. J., Bono, J. E., & Patton, G. K. (2001). The job satisfaction–job performance relationship: A qualitative and quantitative review. *Psychological Bulletin*, 127(3), 376-407.
Kusurkar, R. A., Ten Cate, T. J., Vos, C. M. P., Westers, P., & Croiset, G. (2013). How motivation affects academic performance: a structural equation modelling analysis. *Advances in Health Sciences Education*, 18(1), 57-69.
Linnenbrink, E. A., & Pintrich, P. R. (2002). Motivation as an enabler for academic success. *School Psychology Review,* 31(3), 313.
Lock, E. A., & Latham, G. P. (1990). Work Motivation and Satisfaction: Light at the end of the tunnel. *Psychological Science*, 1 (4), 240-246.
Martirosyan, N. M., Saxon, D. P., & Wanjohi, R. (2014). Student satisfaction and academic performance in Armenian higher education. *American International Journal of Contemporary Research*, 4(2), 1-5.
Maxwell, S. E., & Cole, D. A. (2007). Bias in cross-sectional analyses of longitudinal mediation. *Psychological Methods*, 12(1), 23-44.

Mohr, D. C., Young, G. J., Meterko, M., Stolzmann, K. L., & White, B. (2011). Job Satisfaction of Primary Care Team Members and Quality of Care. *American Journal of Medical Quality*, 26(1), 18-25.

Moore, D. L., & Tarnai, J. (2002). Evaluating nonresponse error in mail surveys. In R. M. Groves, D. A. Dillman, J. L. Eltinge and R. J. A. Little (Eds.), Survey nonresponse (pp. 197-211). New York: John Wiley and Sons, Inc.

National Conference of State Legislatures (NCSL, 2015). *Performance-based funding for higher education*. http://www.ncsl.org/research/education/performance-funding.aspx (Retrieved January, 3, 2016).

National Survey of Student Engagement (NSSE, 2015). *Engagement insights: Survey findings on the quality of undergraduate education*. Annual Results.

Niemiec, C. P., Lynch, M. F., Vansteenkiste, M., Bernstein, J., Deci, E. L., & Ryan, R. M. (2006). The antecedents and consequences of autonomous self-regulation for college: A self-determination theory perspective on socialization. *Journal of Adolescence,* 29(5), 761-775.

Pavot, W., Diener, E., & Suh, E. (1998). The temporal satisfaction with life scale. *Journal of Personality Assessment*, 70(2), 340-354.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879-891.

Ratelle, R. F., Guay, F., Vallerand, R. J., Larose, S., & Senecal, C. (2007). Autonomous, controlled, and amotivated types of academic motivation: A person-oriented analysis. *Journal of Educational Psychology*, 99(4), 734-746.

Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. *Educational Psychologist*, 44(3), 159-175.

Ryan, R.M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology*, 57(5), 749-761.\

Ryan, R.M., Connell, J. P., & Deci, E. L. (1985). A motivational analysis of self-determination and self-regulation in education. In C. Ames and R. E. Ames (Eds.), *Research on motivation in education: The classroom milieu* (pp. 13-51). New York: Academic.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68-78.

Sheldon, K. M., & Krieger, L. (2004). Does law school undermine law students? Examining changes in goals, values, and well-being. *Behavioral Sciences and the Law*, 22(2), 261-286.

Sheldon, K. M., & Krieger, L. (2007). Understanding the negative effects of legal education on law students: A longitudinal test of self-determination theory. *Personality and Social Psychology Bulletin*, 33(6), 883-897.

Sheldon, K. M., Williams, G., & Joiner, T. (2003). *Applying self-determination theory in the clinic: Motivating physical and mental health*. New Haven, CT: Yale University Press.

Vallerand, R. J., Pelletier, L. G., & Koestner, R. (2008). Reflections on self-determination theory. *Canadian Psychology*, 49 (3), 257-262.

Vallerand, R. J., Pelletier, L. G., Blais, M. R., Briere, N. M., Senecal, C., & Vallieres, E. F. (1992). The academic motivation scale: A measure of intrinsic, extrinsic, and amotivation in education. *Educational and Psychological Measurement,* 52(4), 1003-1017.

Vallerand, R. J., Pelletier, L. G., Blais, M. R., Briere, N. M., Senecal, C., & Vallieres, E. F. (1993). On the assessment of intrinsic, extrinsic, and amotivation in education: Evidence on the concurrent and construct validity of the academic motivation scale, *Educational and Psychological Measurement,* 53(1), 159-172.

Vansteenkiste, M., Lens, W., & Deci, E. L. (2006). Intrinsic versus extrinsic goal-contents In self-determination theory: Another look at the quality of academic motivation. *Educational Psychologist*, 41(1), 19 –31.

Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. M., & Deci, E. L. (2004). Motivating learning, performance, and persistence: The synergistic role of intrinsic goals and autonomy-support. *Journal of Personality and Social Psychology*, 87(2), 246-260.

Vansteenkiste, M., Sierens, E., Soenens, B., Luyckx, K., & Lens, W. (2009). Motivational profiles from a self-determination perspective: The quality of motivation matters. *Journal of Educational Psychology*, 101(3), 671-688.

Vansteenkiste, M., Sierens, E., Goossens, L., Soenens, B., Dochy, F., Mouratidis, A., Aelterman, N., Haerens, L., & Beyers, W. (2012). Identifying configurations of perceived teacher autonomy support and structure: Associations with self-regulated learning, motivation and problem behavior. *Learning and Instruction,* 22(6), 431-439.

Wiers-Jenssen, J, Stensaker, B., & Grogaard, J. B. (2002). Student Satisfaction: Towards an empirical deconstruction of the concept. *Quality in Higher Education*, 8(2), 183-195.

William, G. C. & Deci, E. L. (1996). Internalization of Biopsychosocial Values by Medical Students: A Test of Self-Determination Theory. *Journal of Personality and Social Psychology*, 70(4), 767-779.

Wimpenny, K., & Savin-Baden, M. (2013). Alienation, agency and authenticity: A synthesis of the literature on student engagement. *Teaching in Higher Education*, 18(3), 311-326.

Zepke, N., & Leach, L. (2010). Improving student engagement: Ten proposals for action. *Active Learning in Higher Education*, 11(3), 167-177.