Academic Engagement: Hispanic Developmental and Nondevelopmental Education Students

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Hispanic students who enroll in developmental education have been shown to persist tward a college degree at higher rates than their nondevelopmental counterparts.

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ABSTRACT: *The purpose of this research is to identify any differences in the academic engagement of Hispanic students enrolled in a developmental course compared to those enrolled in a retention initiative course. Researchers proposed that personal interests and perceptions of instrumentality to future goals would help develop, guide, and direct successful academic engagement. The participants (N = 407) were Hispanic college freshmen. MANCOVA and SEM were employed to examine whether group differences emerged. Analyses revealed perceptions of instrumentality were a stronger predictor of self-regulation for nondevelopmental course students than for developmental education students.*

It is widely understood that the Hispanic population is overrepresented in developmental education, a trend that spills over from Hispanic student overrepresentation in noncollege preparatory high school classes (Solorzano & Ornelas, 2004). Arbona's (2007) work identified poor high school curriculum as a contributing factor to the lack of college preparedness of Hispanic students. Additionally, first generation college students typically do not complete college at the same rate as students with college-educated parents (Chen & Carroll, 2005; Pike & Kuh, 2005). However, Hispanic students who enroll in developmental education have been shown to persist toward a college degree at higher rates than their nondevelopmental counterparts (Crisp & Nora, 2010; Nora & Crisp, 2012). In a study of Hispanic students attending a Hispanic Serving Institution (HIS; 25% minimum Hispanic enrollment), Watt, Huerta, and Alkan (2011) found that taking a developmental course precluded many students from meeting operational definitions of college success; however, despite needing remediation, these students remained on track at a higher rate to graduate in a timely manner than "prepared" Hispanic freshmen. Attending an HSI has also been shown to have a positive effect on Hispanic student success (Crisp & Nora, 2010; Hurtado & Ponjuan, 2005).

Hispanic students and first-generation college-goers often choose to enroll in community colleges immediately after high school rather than in four-year institutions (Cabrera & La Nasa, 2000; O'Connor, 2009). Researchers (Hernandez & Lopez, 2004; Melguizo, 2009; Romo & Salas, 2003; Swail, Cabrera, Lee, & Williams, 2005) suggest that Hispanic students are more likely to earn their bachelor's degrees if they start their college careers at four-year institutions rather than at two-year institutions. In Watt, Huerta, and Reyes' (2013) study of Hispanic students attending two-year and four-year HSIs in Texas, university students were significantly more likely to meet the operational definition of college success and be on track to graduate from college within 6 years.

Lack of college preparatory courses, poor high school curriculum, and limited understanding of college experiences by parents and families are factors that contribute to the high percentage of Hispanic students who are assessed and recommended for developmental education course work. The percentages also suggest that these students arrive at college underprepared for college success; however, research suggests that those who enroll in a developmental course are persistent toward college completion. Research on Hispanic students and their enrollment in developmental education is abundant; however, there is a lack of empirical research focused on their self-regulation of academic engagement, a critical element for college completion. Academic engagement refers to a students' level of cognitive and metacognitive strategies used to acquire, integrate, and retrieve information (Hong, 1995; Zimmerman & Martinez-Pons, 1988). Self-regulation refers to the processes of self-monitoring, evaluation, and self-reaction (Bandura, 1986) which influences the student to adjust cognitive strategies, motivation, and behaviors to be successful. Most educational psychologists agree that effective learning requires students to self-regulate their academic cognition, motivation, and behavior (Zimmerman, 1990).

Understanding the critical elements that support student academic engagement is vital to helping students succeed in college. We propose that preparedness for college course work (academic

engagement) is supported by developing personal interests which help create, guide, and direct successful academic behavior. It is through developed personal interests that present and future academic, social, and occupational goals are established; these goals further enhance students' motivation to self-regulate academic engagement in college courses (Locke & Latham, 1984, 2002).

Brickman (2013) has drawn on career theory (Holland, 1966, 1997), future time perspective (Nuttin, 1984, 1985), and social cognitive theory (Bandura, 1986, 1993) to propose an interdisciplinary approach and explain how personal interests shape perceptions of the instrumental value of present tasks/courses to life-span future goals, which in turn enhances motivation to self-regulate effort and improve strategies and performance. Furthermore, Brickman proposed that through improved performance, knowledge continues to be elaborated upon and made personally useful, making strategies and plans to reach future academic, social, and occupational goals become more salient, thus more motivating. Therefore, when present course tasks contain knowledge of personal interest, the task is more likely to be perceived as useful or instrumental to the fulfillment of future goals. This research explores the influence of students' interests and perceptions of instrumentality of academic tasks and courses to future goals and their self-regulation of academic engagement.

Factors Contributing to Academic Engagement

Interests

Interest is conceptualized across several theoretical orientations as having cognitive, affective, and behavioral components (Gore, Cross, & Kanagawa, 2009; Keith, Yuna, Bergin, & Hilpert, 2010). The development of interest is a process involving cognitive and emotional processing occurring across time and experiences. Depending on the cognitive evaluation of a situation to satisfy needs, an individual is either motivated to approach, avoid, or abandon a situation. In other words, when an individual encounters a situation, there can be a positive, negative, or neutral emotion; the individual determines the worth of the situation to satisfy needs and then is motivated or not motivated toward that particular situational task. Research also has identified that interests can exist in two dimensions: situational and personal (Schraw, Flowerday, & Lehman, 2001; Schraw & Lehman, 2001). In the process of the development of interests, novel situations may motivate an individual to complete a task, but interest is soon abandoned if the knowledge gained in the situation does not satisfy a personal need. Over time and experiences an individual becomes cognitively alert to knowledge and environments that have

become personally valuable. Motivation toward those types of tasks is enhanced because needs are anticipated to be satisfied.

The self is linked to interests through a reciprocal relationship which ultimately shapes personality (Holland, 1997). As tasks are successfully completed, efficacy and personal interests are enhanced. Self-efficacy translates into the sense that one is moving forward while adapting to the environment. This is what Maher (1984) and Bandura (1986, 1995) refer to as continued motivation. A student will continue to make a personal investment of time and effort if they perceive that the effort will successfully fulfill their needs (Maehr & Braskamp, 1986; Maehr, & McInerney, 2004). The self begins to be defined by the types of knowledge, tasks, and environments preferred or, one could say, by the needs that have been fulfilled via the process of developing personal interests.

Career development theories also describe how individuals differentiate and guide actions toward preferred tasks that support personal inter-

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ests and needs (Brown, 1996). Holland's (1966) research in career development is based on the idea that over time and experiences individuals construct different personal knowledge that guides their interest toward different types of occupations. According to Holland (1992), interests in specific occupations are based on three types of knowledge: self-knowledge, concerning one's own skills, abilities, and preferences; educational knowledge, knowledge about what subject content is important to occupations; and occupational knowledge, knowledge about the types of activities in which self-perceived skills and abilities can be used to meet needs. Career theorists recognize that individuals attempt to develop a balance between their needs and the type of social context (e.g., education) in which activities become preferred (Holland, 1992; Super, Savickas, & Super 1996). In other words, students develop a preference for subject content and the type of educational context in which they use their skills and abilities.

There is an overwhelming amount of empirical evidence supporting Holland's (1996) assumption that behavioral patterns become stable over time and that most individuals can be categorized as exemplifying one of the six personality styles. Important to this study is the idea that education has a profound influence on the development of interests which ultimately help define the self in

general, the self among others in society, and the educational roles and occupations the student will choose. Ainley's (2006) research described students' individual interest as an affective state that influences motivation to self-regulate behaviors toward successful completion of school tasks. However, in order for a student to continue to be motivated to self-regulate behavior, he or she must have had valued needs fulfilled, transformed those needs to personal interests, and established anticipated goals in which future needs are expected to be fulfilled (Hirschfeld & Lawson, 2008; Nuttin, 1984).

Instrumentality

An important aspect of motivation is the role played by "perceived instrumentality" of present tasks. Perceived instrumentality refers to the extent to which performance on present tasks is perceived as being instrumental to the ultimate attainment of self-relevant future goals (Brickman & Miller, 2001). In this research personal interest is conceptualized as developing from needs that have been fulfilled with knowledge being developed to the point that an individual can anticipate the value of tasks for the future. Such underlying future goals include life-span goals: getting an education, a job, having a family, making money, joining the military, gaining social status, and making a contribution to society (Nurmi, 1989). Other researchers and theorists have noted the importance of perceived instrumentality to these future goals and have found that perceptions of instrumentality are related to persistence, effort, and level of cognitive engagement (Brickman & Miller, 1998; Hardré, Crowson, Debacker, & White, 2007; Walker & Greene, 2009).

Investigations of future goals have indicated that more distant goals only play an incentive role when there is a perceived relationship between current performance and the distant future (Brickman, McInerney, & Martin, 2009; Brickman & Miller, 1998, 2001; Raynor & Entin, 1982). Simply put, students who cultivate more in-depth knowledge are more apt to see the instrumentality of present tasks. This in turn guides interest and motivation toward content areas because of the perception of how the acquisition of knowledge can contribute to the accomplishment of future goals. Therefore, as interests develop in content areas perceived as relevant to accomplishing tasks to reach self-relevant future goals students are more likely to self-regulate their academic cognition, motivation, and behavior.

Self-Regulation

By definition, self-regulated learners seek to accomplish academic goals strategically and to overcome learning obstacles by using a battery of cognitive, emotional, and tangible resources (Zimmerman, 1990). The self-regulated student is therefore aware of his or her own needs to accomplish the task and

develop the skills in order to create optimal fulfillment of learning needs and reach important future goals. This is consistent with Bandura's (1986) social-cognitive theory; most human actions are thought to be goal directed. Early research indicated that clear and specific proximal goals produce higher levels of achievement and personal satisfaction than vague and distant goals (for reviews, see Bandura, 1986; Locke & Latham, 2002; Schunk, 1990; Zimmerman, 1990). Nevertheless, distant goals play a role in human motivation: "Many activities are directed toward outcomes projected in the future." (Bandura, 1986, p. 336). The anticipation of distant outcomes and fulfillment of needs not only provides a general direction for choosing present activities but also raises the level of motivation and self-regulation toward them.

Students' perception of tasks as instrumental initiates the self-regulatory actions of cognitive, motivational, and behavioral strategies to sustain a particular level of investment until the task is accomplished. In this study we draw on the comprehensive work of Wolters and colleagues (Wolters, 2003; Wolters, Pintrich, & Karabenick 2005). According to their work, there are four phases in the self-regulation process: (a) forethought, planning, and activation; (b) monitoring; (c) control; and (d) reaction and reflection. In Phase 1 the student sets the target goal and the standards for the self-regulation process based on prior knowledge of similar tasks of interest and their instrumental value, their self-efficacy, and the environment in which the task will be accomplished. At the behavioral level the student plans time, effort, and the specific behavioral standards that will need to be monitored, evaluated, and reflected upon.

In Phase 2 the student monitors the task, employs metacognitive strategies, and monitors motivation and affect. Cognitive selection and adaptation of cognitive strategies for learning and thinking are employed during Phase 3: managing the motivation and affect. Behaviorally, the student increases or decreases effort and seeks help depending on the evaluation of the task to fulfill personal needs. At Phase 4, the student makes judgments of attributions for progress which result in affective reactions to the behavioral choices and ultimately evaluates performance on the task.

In summary, self-regulation of academic engagement for the purpose of this study is defined as "the activities through which students purposefully act to initiate, maintain, or supplement their willingness to start, to work toward, or to complete a particular activity or goal" (Wolters, Pintrich & Karabenick, 2005, p. 254). Students are motivated to regulate cognition, motivation, and behavior on tasks in which they have a personal interest and also perceive as being instrumental to important future goals that fulfill needs.

Research Questions

In this study we explore relationships between personal interest, perceptions of instrumentality, and self-regulation of academic strategies/engagement across two groups of students at-risk for low academic outcomes: (a) a large group of students required to take a course as part of a retention/graduation initiative and (b) a smaller subset of students from within that large group who have specifically been identified as in need of developmental course work. Specifically, we address three questions to examine if interests and perceptions of instrumentality influence the levels at which students are motivated to self-regulate their academic engagement in college. 1. Do students identified for developmental course work differ in their reported types and levels of interests from students who have been required to take a course embedded within a retention/graduation initiative? 2. Do the relationships between students' interests and perceptions of instrumentality differ across

Students' perception of tasks as instrumental initiates the self-regulatory actions.

these two student groups? 3. If student groups' relationships between these constructs differ, do they further differ in their predictive power to the self-regulation of academic behavior?

Method
Participants and Setting

The participants for this study were part of a larger data set of freshman students at an urban university in the southwestern region of the United States. The university has multiple campuses with an enrollment of 18,744 students in the year the study was conducted, with 88.5% of the student population self-identified as Hispanic. The participants were all attending at the major campus. The participants for analyses were Hispanic (N=407), predominantly female (60%), ranged in age from 17 to 39 years (M = 18.68, SD = 1.55), and were asked to volunteer. Volunteers were recruited from a course that is required for all freshman who either did not meet ACT or SAT admission cutoff scores or freshman who in their first semester did not maintain at least a 2.5 GPA when enrolled in 12 semester hours. The course was implemented as a retention and graduation initiative. The course focuses on learning and study skills and resources available on campus such as the writing center, learning assistance center, career services, and use of the library. This data set included students who also were enrolled in a developmental math, reading, or writing course. These students, in addition to not meeting ACT or

SAT requirements, did not meet the State Higher Education Assessment cut-off scores in content areas when they entered college.

Recruiting efforts began with permission from the Vice Provost of Undergraduate Studies, followed by meetings with professors of the course, and ultimately graduate assistants going to each classroom to explain the research and ask for volunteers. Professors of the course offered extra points for students who participated. Students who consented to participate completed an on-line survey which measured their interests, perceptions of instrumentality, levels of cognitive engagement, motivation, and academic behaviors.

Materials and Procedures

The reliability of the subscales used in this study have been confirmed in past research (Brickman, Dowson, & McInerney, 2006). Specifically, competing factor analytic models were used to assess the psychometric properties of the instruments measuring interests, instrumentality and present self-regulation. Results indicated that the data fit the factor analytic models very well, supporting the instrumentation used. For this study the college technology services adapted the survey for on-line completion. The surveys were available to the students for approximately 1 month, with log-on and log-off capabilities so students could complete the subscales as their time permitted.

Instruments. Interests were measured with the activities (interest) subscale of Holland's (1997) Self-Directed Search Inventory (SDS). This scale has abundant evidence of validity and reliability (Spokane, 1996). For this study coefficient alpha was .83. The subscale included 66 items asking students to rate their preference for content and tasks across interest areas. Example items include: (a) realistic, take a technology course, fix and build things; (b) investigative, take a physics, chemistry and/or mathematics course, work in a research laboratory; (c) artistic, take an art course, design and perform for others; (d) social, study sociology and/or psychology, teach or help others; (e) enterprising, take business classes, supervise or lead a group; (f) conventional, take accounting classes, organize/keep detailed records. Permission was granted for the use and modification of the interest subscale by the publisher. Modifications included the order in which the items appeared and the use of a 7-point Likert scale.

The perceived instrumentality measure (coefficient alpha .84 for this study) asked students to rate the extent to which course work was perceived as important to attaining expected life span future goals and the extent to which it was a part of a plan to finish a degree, get a job, have a family, make money, gain social status, and make a contribution to society. Stems for the instrumentality items were:

"I believe doing well in my courses is important." "I think about how the knowledge will help me," "I think about how courses fit within a plan," and "my courses contribute". Students rated how true each statement was for them on a 7-point scale.

Self-regulation. Wolters, Pintrich, and Karabenick's (2005) instrument evolved from the Motivation Learning Strategies Questionnaire (Garcia & Pintrich, 1996). It was used in this study because it measures the regulation of cognitive, motivational, and behavioral patterns (for a full review of instrument reliability and validity see Wolters, et al., 2005). Academic cognition measures the types of strategies students use to retain subject content. These strategies include rehearsal, elaboration, organization, and metacognitive strategies. Rehearsal items refer to different ways to memorize material. Elaboration strategies deal with strategies that link material to past knowledge. Organization strategies include the use of charts, diagrams, or tables to organize information. Metacognitive items represent how one thinks about how they can ensure learning the material thoroughly.

Motivation is measured by items that represent mastery self-talk, relevance enhancement, situational interest enhancement, performance/relative ability self-talk, performance/extrinsic self-talk, self-consequating, and environmental structuring. Mastery self-talk refers to regulating motivation by making self-statements as to why it is important to understand and learn material. Relevance enhancement refers to examining how the material will be useful in the future. Situational interest enhancement refers to students finding ways to make the content enjoyable to learn. Performance/relative ability self-talk depicts students as motivated to complete their work better, or at least as well as other students. Performance/extrinsic self-talk depicts students motivating themselves by reminding themselves that it is important to get good grades. Self-consequenting refers to ways students promise themselves some reward for completing their work. Environmental structuring refers to strategies to find or create an environment in which to complete work.

Strategies that measure behavioral regulation include effort, time, study environment and several types of intentions to seek or avoid needed help, and teacher support of questioning. Effort is defined by strategies that students use to keep working when they find school tasks as boring, uninteresting, or too difficult. Time and study environment items address the use of strategies to regulate when and where to study. The areas related to seeking help include: general intentions to ask for help or avoid seeking help from peers and/or teachers. The benefit of seeking help when needed (instrumental help-seeking) depicts students perceiving that getting help will help them learn more. Expedient (executive) help seeking depicts the student as getting help so they don't have to work as hard. Avoid help seeking relates to students not wanting to appear not smart enough to do the work or avoiding help to appear they do not care about learning. Perceived teacher support of questioning refers to students' perception of the willingness of the teacher to be available for help.

Results

MANCOVA analyses were utilized to examine whether students identified for developmental courses differed in their reported types and levels of interest from students who were not identified for developmental courses; mothers' and fathers' level of education were entered as controls. Parent education was defined as did not graduate from high school, General Education Degree, some college, college degree. Findings indicated that developmental education students did not differ based on type of interests when compared to nondevelopmental education students ($F(6,392) = 1.13$, $p = .34$; see Table 1 for descriptive information).

Additional MANCOVA analyses were utilized to determine if developmental education students differed on their self-reported types and levels of instrumentality and self-regulation. Developmental education students reported similar levels of instrumentality ($F(7,391) = .33$, $p = .94$) and self-regulation ($F(3,395) = .18$, $p = .91$) when compared to nondevelopmental education students.

Multiple group structural equation modeling (utilizing AMOS 18.0) was employed to examine whether group differences emerged in the relation between interests and students' perceptions that the course work is important for their future. Acceptable model fit was determined by examining

Table 1

Means (Standard Deviations) for Developmental and Nondevelopmental Education Students

	Developmental Education (*n* = 179)	Nondevelopmental Education (*n* = 222)
Types of Interest		
Reality interests	3.02 (1.60)	3.10 (1.60)
Investigative interests	3.28 (1.45)	3.56 (1.57)
Artistic interests	3.73 (1.49)	3.88 (1.58)
Social interests	4.11 (1.33)	4.16 (1.33)
Enterprising interests	4.02 (1.39)	4.00 (1.43)
Conventional interests	3.25 (1.48)	3.36 (1.58)
Types of Instrumentality		
College	5.71 (1.40)	5.46 (1.29)
Job	5.38 (1.16)	5.31 (1.25)
Money	5.26 (1.38)	5.21 (1.40)
Family	5.21 (1.48)	5.24 (1.42)
Military	2.54 (1.77)	2.45 (1.72)
Status	4.64 (1.61)	4.54 (1.77)
Contribution Society	5.27 (1.22)	5.25 (1.37)
Types of Self-Regulation		
Academic Cognition	4.52 (1.08)	4.46 (1.16)
Academic Motivation	4.83 (0.96)	4.77 (1.10)
Academic Behavior	4.34 (0.71)	4.29 (0.81)

a combination of indices such as a χ^2/df ratio below 3, RMSEA values below .08, and values of .90 or higher for the GFI and CFI (Carmines & McIver, 1981; Hatcher, 1994; Kline, 2005). The initial model, which provided a good fit to developmental students' and nondevelopmental students' data (see Table 2), was compared to a model that constrained the path from interest to instrumentality to be equal for developmental and nondevelopmental students. The constrained model was a good fit to the data (see Table 2). This model was retained because it was comparable in fit compared to the initial model (χ^2 difference (1) = .10, p = .75), which indicated that it is more parsimonious (Kline, 2005). The nonsignificant finding indicated that strength of the relation did not differ based on students' enrollment in developmental education courses. Interest was significantly and positively related to both developmental students' and nondevelopmental students' perceptions of instrumentality.

As indicated previously, students did not report group differences in their academic self-regulation scores based on enrollment in developmental education courses. Thus, following the procedures outlined in question 2, multiple-group analyses were utilized to examine whether group differences emerged in the relations between self-regulation and student interest and the relation between self-regulation and instrumentality.

Interest and Self-Regulation

A model that constrained the path from interest to self-regulation (sequentially constrained Model 2) was a good fit to the data (see Table 2) and was a comparable fit (χ^2 difference (1) = .01, p = .92) to sequentially constrained Model 1. The nonsignificant finding indicates that the strength of the relation did not differ based on students' enrollment in developmental education courses. Specifically, findings indicated that interest was significantly and positively related to both developmental students' and nondevelopmental students' self-regulation.

Instrumentality and Self-Regulation

The model that constrained the path from instrumentality to self-regulation (sequentially constrained Model 3) was a good fit to the data (see Table 2) and was compared to sequentially constrained Model 2. Comparisons of the models indicated a significant difference in fit (χ^2 difference (1) = 6.26, p < .01). Specifically, sequentially constrained Model 2 was a better fit to the data when compared to the model that constrained the path from instrumentality to self-regulation to be equal for students in developmental courses and students in nondevelopmental courses. These findings indicated that sequentially constrained Model 2 should be retained for the final model. Specifically, although Hispanic students' reports of instrumentality were significantly and positively

related to their reports of self-regulation in both the developmental and nondevelopmental groups, instrumentality was a stronger predictor of nondevelopmental students' self-regulation (see Figure 1).

Discussion

Hispanic students, historically, have been over-represented in university developmental education courses (Chen & Carroll, 2005; Pike & Kuh, 2005). Academic cognition and behavior have been found

to contribute to academic performance (GPA), and academic motivation has been found to relate to effort, persistence and retention (Wolters et al., 2005). Understanding the relationship between interest, instrumentality, and self-regulation can contribute to understanding why some students might be more motivated than others to self-regulate their academic engagement and complete college.

The review of literature for this study posed interests and perceptions of instrumentality as

Table 2

Fit Indices

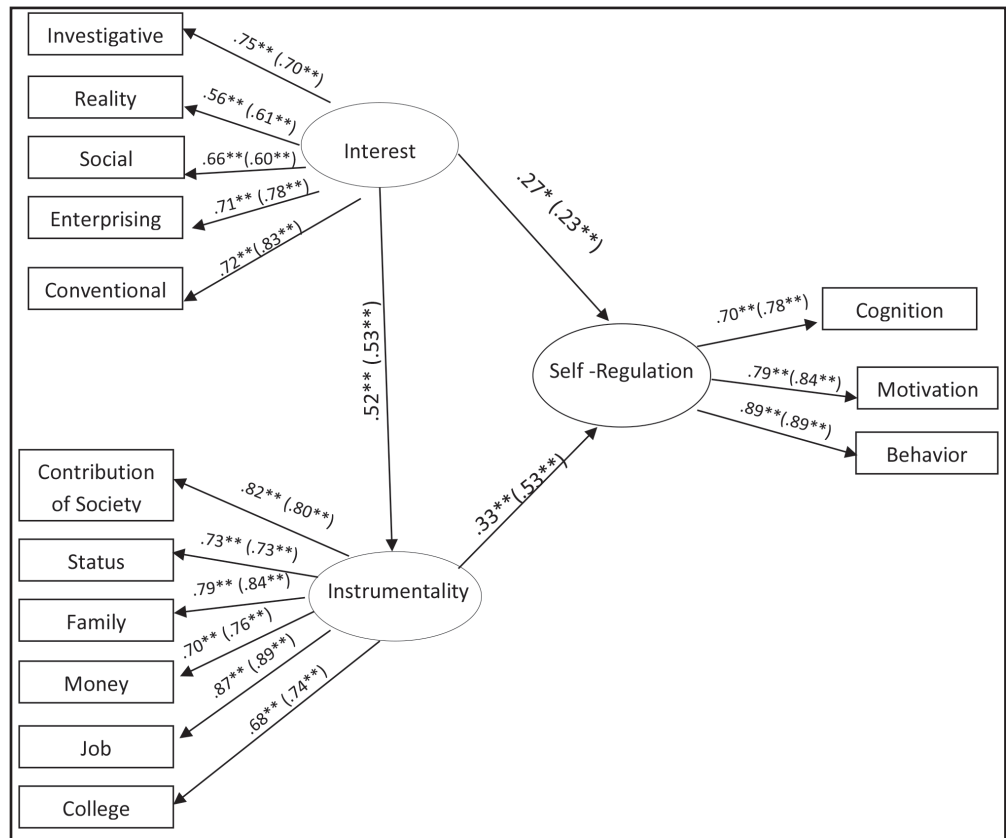| Model	N	χ^2	df	χ^2/df ratio	CFI	RMSEA	AIC
Initial model	407	397.31	142	2.79	.93	.07	533.31
Sequentially Constrained Models (Paths constrained to be equal)							
1. Interests → Instrumentality	407	397.41	143	2.78	.93	.07	531.40
2. Interest → Self-Regulation (Final Model)	407	397.42	144	2.76	.93	.07	529.92
3. Instrumentality → Self-Regulation	407	403.68	145	2.78	.93	.07	533.68

Figure 1. **Final Model; standardized coefficients presented for developmental education and nondevelopmental education Latino students.**

*p < .01 **p < .001

contributors to the motivation of self-regulatory academic engagement. This study set out to explore the relationships between these constructs across two groups of Hispanic students, both at-risk. The first question we addressed was: Do students identified for developmental course work differ in their reported types and levels of interests from students who have been required to take only a course embedded within a retention/graduation initiative? We did not find differences in the type and level of interests between these two groups. Additional analyses revealed that students did not differ in the types and levels of perceptions of instrumentality to the various future goals nor did students' across these two groups differ in their self-reported levels of self-regulation of cognition, motivation, and academic behaviors. Therefore, we can state that participants were more similar than different in the types of courses and activities that interested them and similar in their perception as to the importance of their course work to more distant future goals. As well, students were more similar than different in how they regulated their engagement for studying for their college courses.

To answer the second question: Do the relationships between students' interests and perceptions of instrumentality differ across these two student groups? Structural Equation Modeling revealed that the differences in strength of relationships between interests and self-regulation between the two groups did not differ. However, importantly for both groups, interest was significantly and positively related to both developmental students' and nondevelopmental students' self-regulation.

Addressing the third question: If student groups' relationships between these constructs differ, do they further differ in their predictive power to the self-regulation of academic behavior? Although relationships did not differ between interest and self-regulation, as theoretically implied in this study, interest is an important element to college success due to its power to predict that the student will use self-regulatory strategies to academically engage in college course work.

The final SEM model retained for determining differences between these two groups of students examined the differences in the strength of relationships between instrumentality and self-regulation. The model revealed that instrumentality, as with interest, was positively related to both developmental and nondevelopmental students' self-regulation. However, the relationship between nondevelopmental students' perceptions of instrumentality and self-regulation was significantly stronger and thereby was a stronger predictor of their self-regulation than for the developmental course students.

Frequently, students are identified for developmental education course work based upon entrance exam scores, and many times some type of content

area assessment. This study examined how students differed in self-regulation of academic engagement. Social cognitive theory (Bandura, 1986) indicates that developing clear goals (paths) contributes to goal development and continued motivation. The significantly stronger relationship for nondevelopmental students' perceptions of instrumentality to self-regulation suggests that these students may have more elaborate knowledge, enabling them to see more clearly why course tasks are important to the future and how college courses fit within a plan to reach more distant future goals. Although this study cannot delineate from this the data, one must take into consideration that these students were not identified for developmental education courses based on entrance exam scores nor did content area exams identify them for developmental course work.

Limitations

Although the fit indices for our proposed model are encouraging, this does mean that our data would not fit other types of relationship models.

Instruction can be specifically designed to support both the development of interest and perceptions of instrumentality.

Constructs were measured at a single time point via self-report and participants were volunteers giving rise to the possibility of method bias. Only survey data was analyzed and therefore we cannot state that developing interest and perceptions of instrumentality would improve outcome performance such as course grades or overall grade point average. Finally, the sample was drawn from a Hispanic population and the results may not generalize to other cultural groups. Future research should include replication across cultures to validate the results of this study.

Future Research and Implications for Practice

Future research would benefit from including additional methodological techniques beyond self-report, such as qualitative real-time reports by the student about what strategies they are employing to complete at task, in order to better identify what types of self-regulation strategies the student is actually applying. Although this study lacks student outcome data such as retention and GPA, the knowledge gained from this study provides a sound basis for designing a longitudinal study and a basis for developing possible interventions.

The positive relationships between interest and perceptions of instrumentality to self-regulation found in both groups support the need to develop personal interests and perceptions of instrumentality to enhance student self-regulation of academic engagement. Interventions to help students develop personal interests and perceptions of instrumentality align with Holland's (1966) life-career theory. His theory described three types of knowledge necessary to establish an occupational goal, the primary motivational incentive for attending college. The three types of knowledge that underlie an occupational goal include self-knowledge, identifying strengths and weaknesses of the self; educational knowledge, how knowledge is important to occupations; and occupational knowledge, the knowledge and skills needed for specific occupations. Identifying strengths and weaknesses of the self is a primary goal for career counseling as well as the role of course work for the accomplishment of a specific occupation. Clearly, career counseling is a primary step to identifying and supporting the development of personal interest. Career counseling for students is most commonly perceived as being addressed individually or during an educational information session led by a guidance counselor. However, instruction can be specifically designed to support both the development of interest and perceptions of instrumentality.

Instructional design theory lends advice for establishing support for developing interest through nine elements of design (Collins, Brown, & Newman, 1989, Gagne`, Yekovich, & Yekovich, 1993). Each lesson should begin with how and why the skills learned in a particular lesson are important to the future (instrumentality), followed by guided support for learning, and concluding with meaningful activities that support developing personal interest and retention of knowledge. The future goals embedded in the perception of instrumentality items in this study—getting an education, a job, having a family, making money, making a contribution to society, gaining social status, and joining the military—have been found to be similar across cultures (Brickman & Miller, 1998, 2001; Nurmi, 1989, 1991). Therefore, it would be practical for teachers to generally explain how learning history, math, science, and language can be of benefit to each of the future goals, given the diversity of possible occupational goals among students in any one given classroom. However, instructors that do have career interest information about their students can prepare activities that highlight how subject content is applied to an occupation.

Life-career development (Holland, 1997) also has a long history in school counseling. This study highlights the importance for students to complete

career interest inventories to identify preferred subjects in school and identify their strengths and weaknesses (self-knowledge). Additionally, occupational knowledge as well as development of occupational goals can be enhanced through instruction that supports the students in making critical connections between subject content and skills-based educational knowledge (instrumental value of courses).

Conclusion

Preparing college students for success has become an important focus on university campuses. Although there are an abundance of services available, including developmental course work and courses designed to teach students how to learn, there continues to be a large number of students who either fail or drop-out of college, especially within the Hispanic population. It is estimated that only 9 out of 100 Hispanic students complete a college degree (Villalpando, 2010). The constructs integrated in this study help shed light on how interdisciplinary research can contribute to helping find solutions to aid students in completing college.

Getting an education leads to getting a job and supporting a family and can be pursued along with any one or combination of the other socially expected life-span future goals. The extended history of research evidence linking Holland's (1966) personal interest categories to occupational goals has been an important contribution helping the college student plan careers. The finding that personal interests and perceptions of instrumentality significantly predict academic self-regulation adds to the important body of research on student academic engagement, retention, degree completion, and accomplishing life-span future goals.

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on all mobile devices. For example, to verify whether they used algorithms correctly to solve a quadratic equation, students could enter the equation into *Algeo Graphing Calculator* (Veges, 2013; Android) or *Desmos* (2012; iOS) and view the resulting graph to check their answers. To do more basic calculations, students could use *MyScriptCalculator* (Vision Objects, 2013; Android, iOS), which recognizes handwriting and provides simplified input for mathematical symbols such as square roots and exponents.

Conclusion

The AIT model does not require an instructor to cycle through each of the four stages. Rather, an instructor can select the appropriate stage to use depending on the content and the students' background knowledge. For example, instead of modeling, an instructor can begin a lesson with guided practice in error analysis if the students already know the basics of solving quadratic equations. Similarly, these recommended apps do not have to be used at a particular stage; their purpose could be adapted to fit different stages. For instance, *Evernote* (Evernote Inc., 2013; Android; iOS) could be useful at any stage, so that students can share their algorithms and collaborate with each other.

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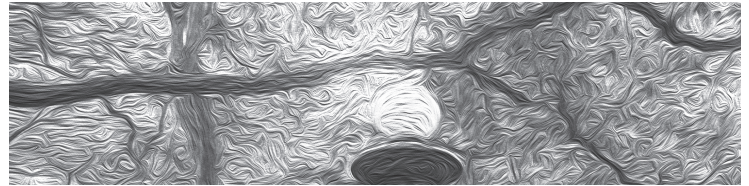
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