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# **The College Persistence Questionnaire: Development and Validation of an Instrument That Predicts Student Attrition**

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## **ABSTRACT**

The investigators reviewed the retention literature and developed a 53-item questionnaire and tested its validity. Component analysis of the responses of 2,022 students at four schools yielded six reliable factors: Institutional Commitment, Degree Commitment, Academic Integration, Social Integration, Support Services Satisfaction, and Academic Conscientiousness. A second study on 283 first-semester freshmen examined whether factor scores predicted which students returned for their sophomore year. Logistic regression found that three factors were statistically significant predictors of enrollment status, after controlling for high school class rank and standardized test scores: Institutional Commitment, Academic Integration, and Academic Conscientiousness. Strategies are provided for making use of scores based on differences between institutions and between individual students.

Each year a substantial proportion of students who matriculate at American colleges fail to graduate (Education Commission of the States, 2004). A burgeoning literature has developed seeking to understand the causes and prevention of attrition (for reviews see Lotkowski, Robbins, & Noeth, 2004; Pascarella & Terenzini, 2005). Empirical investigations have identified many variables associated with persistence, causal models have been presented, and theories proposed. Colleges and universities are increasingly looking to this literature to guide their retention efforts.

Unfortunately, distinguishing between students who will and will not graduate remains a complex and imprecise endeavor. Although pre-admission screening can be helpful, many problems arise only after matriculation. If left unnoticed, adjustment problems frequently grow in magnitude, greatly reducing the likelihood of successful intervention. What is needed is an early warning system—one that detects adjustment difficulties before they result in low grades or departure from the university.

A major problem in developing early warning and intervention systems is that it is difficult to apply findings across schools and groups of students. Although some generality of research results is warranted, it is becoming increasingly apparent that variables that prominently influence the persistence decision of one student or one group of students may be weakly related or unrelated to the persistence of other undergraduates. Commonly studied variations in institutional characteristics such as size, the type of degree (2-year versus 4-year), residency (residential versus commuter), institutional control (public versus private), and the percentage of students within potentially important categories (e.g., minority or socioeconomic status, first-generation college student) can affect not only retention rates but also the salience of predictors. Likewise, programs that reduce attrition at one school may have little or no effect when introduced to other campuses.

In a summary of the extensive research on retention, Vincent Tinto (2006–2007) concluded, “We have come to understand how the process of student retention differs in different institutional settings, residential and non-residential, two- and four-year” (p. 4). George Metz (2004–2005) made a similar assessment after reviewing 30 years of retention research and urged that schools develop an understanding of predictors that operate specifically within their institutions. We join Tinto and Metz in arguing against a “one size fits all” approach to retention. Instead, we advocate for individualization, both at the level of the student and the institution. Because undergraduates drop out for a variety of reasons, the present study sought to develop an instrument that assessed a diverse array of variables that have been associated with retention.

An effective system for reducing attrition must not only target at-risk students; it must also facilitate the design of effective interventions. If a student has been selected or opted for one-to-one counseling, advisors and faculty need to quickly discover the reasons that the particular student is considering leaving the college or university. Those who are responsible for groups of students have somewhat different informational requirements; they need collective data. For example, instructors of freshmen orientation seminars (for review see Barefoot, Warnock, Dickinson, Richardson, & Roberts, 1998), learning communities (Andrade, 2007–2008), and

policy makers need to know the primary causes that compel students in classes or on their campuses to discontinue their education. The purposes of this exploratory investigation were to develop a short questionnaire, the College Persistence Questionnaire (CPQ), which would enable users to: (a) identify students at risk of dropping out, (b) discover why an individual student is likely to discontinue his or her education, and (c) determine the variables that best distinguish undergraduates who will persist from those who will not persist at their institutions.

## STUDY 1

This first study comprised the creation of an item pool, data collection at four colleges and universities, and a factor analysis of responses to identify clusters of items. A review indicated that variables within the following categories or themes were prominently represented in the retention literature: academic performance (e.g., high school and college grades, Scholastic Achievement Test scores), institutional and degree commitments, academic and social integration, support services satisfaction, finances, social support, and personality and psychological adjustment. A decision was made not to include academic performance indices in the CPQ, because these measures can usually be obtained from the student database. Special attention was given to those factors that provided the basis for retention theories and models (e.g., Astin's [1984] Involvement Theory, Bean's [1990] Student Attrition Model, Bean & Eaton's [2000] Psychological Model, Cabrera, Castaneda, Nora, & Hengstler's [1992] Integrated Model, and Tinto's [1975] Integrated Model, and Tinto's [1993] Student Integration Model) and to variables that reflect students' post-matriculation experiences. Because the overarching strategy for developing the items was guided by the organizational themes, some elaboration about them is warranted.

Institutional and degree (or goal) commitment variables play a crucial role in contemporary causal models of retention and appear to exert direct effects on persistence decisions across the wide variety of colleges and students (for review, see Braxton, Sullivan, & Johnson, 1997). Institutional commitment is the extent to which students are confident in and satisfied with their selection of a college or university. Degree commitment is the level of importance they attach to earning a diploma. Sometimes these two qualities coexist in students. That is, they are high in both or low in both. However, there are students in whom the two do not correlate. For example, some undergraduates may feel attachment to their college but be quite uncertain about the value of a degree, and others may strongly want a degree but not from the school they currently attend. Therefore, it is important to consider and measure the two types of commitment separately.

A review of the items used in previous empirical studies failed to produce a widely accepted practice on measuring institutional and degree commitment. There were, however, recurrent elements across several studies that were incorporated into the instrument developed in the current study. The key elements in institutional commitment are students' intentions (to re-enroll and to earn a degree from that institution), their confidence (in having selected the right institution), and their thoughts (of continuing or stopping). Construct validity research indicates that the defining facets are aligned unidimensionally (Nora & Cabrera, 1993). The crucial

elements in degree commitment are students' intentions (to finish the degree), estimates of the likelihood or certainty that a degree will be achieved, and their self-appraised commitment to earning the degree.

Academic and social integration variables reflect the ways in which students change on the basis of their interactions with the campus environment, incorporating academic and social experiences into their perceptions and involvement behaviors. Tinto's (1975, 1993) prominent theory of student departure posits that the successful adjustment of students depends on the sequential steps of separation, transition, and integration into the academic and social fabrics of college life. The two types of integration, academic and social, have axiomatic status in the literature on persistence. They are routinely included in contemporary causal models either as outcome or mediator variables (for review, see Metz, 2004–2005).

Curiously, there is not a widely accepted metric for either academic or social integration. Different researchers operationalize the integration variables in somewhat different ways and, therefore, use different items to form scales. However, the indicators of integration ordinarily include involvement behaviors and/or perceptions (for review, see Milem & Berger, 1997). Also, some investigations have taken a molecular approach and focused on a specific aspect of integration. For example, Braxton, Duster, and Pascarella (1988) examined the role of academic advising in a path model of persistence. Other potent aspects of academic or social integration include engagement in class discussions (Braxton, Milem, & Sullivan, 2000), use of the library resources (Mallinckrodt & Sedlacek, 1987), and students' impressions of other students (McGrath & Braunstein, 1997). The selection of specific items in the current investigation was guided by three considerations: (a) the variable was empirically related to persistence in at least one other study, (b) the indicator was internally consistent with other items in several previous investigations, and (c) the variable had been used in prior research on diverse groups of students. The following are among the most widely cited studies used to generate the item pool: Bean, 1985; Bean and Metzner, 1985; Braxton, Vesper, and Hossler, 1995; Cabrera, Castaneda et al., 1992; Cabrera, Nora, and Castaneda, 1992; Kraemer, 1997; Pascarella and Terenzini, 1980.

Support services satisfaction variables address the attitudes students develop toward the school based on how well it meets their out-of-classroom, school-related needs. This theme dates back to the early research on student outcomes and retention (e.g., Astin [End Page 375] & Scherrei, 1980; Bean, 1985; Braxton & Brier, 1989; Pascarella, 1985). Through the years, investigators have collected satisfaction ratings on many institutional characteristics. The instrument developed in the current study focused on several variables that have been linked to persistence in prior research. Berger and Braxton (1998) found that students' ratings of the quality of communication about rules and regulations, the fairness of policies, and the amount of student participation in institutional decision making all played a statistically significant role in the causal model of persistence. Satisfaction with numerous aspects of the living environment is also predictive of persistence (e.g., Aitken, 1982). Johnson (1997) found that being able to get answers to questions about "things related to their education at the institution" (pp. 328–329) predicted persistence in commuters. Two variables pertain to issues known to be important in the persistence decision of minorities and students with disabilities: how well the institution

deals with their special needs (Gardner, Keller, & Piotrowski, 1996) and whether or not they experienced disrespect (Zea, Reisen, Beil, & Caplan, 1997).

Social support variables deal with the ways in which students' interpersonal network affirms their decision to pursue a college degree. When students have reservations about being in college, the support they receive from significant others can play a large role in allaying their concerns. Research has established associations between various types of support and intentions to persist: encouragement from friends or parents and/or other family members (Mallinckrodt, 1988; Nicpon et al., 2006–2007; Stage & Rushin, 1993), the students' belief that family members expect them to finish degree (Munro, 1981), the caring of faculty (Lundquist, Spalding, & Landrum, 2002–2003), and access to people within the institution with whom to discuss personal problems (Mallinckrodt). The instrument in this study had questions about these issues.

The relationship of personality and adjustment variables to retention has received increased attention over the last decade. Bean and Eaton (2000, 2001–2002) posited a psychological model of retention that incorporates the adaptive strategies students use to deal with stress. The model features variables that are prominent in the field of personality such as self-efficacy (e.g., Bandura, 1997), coping strategies (e.g., Aldwin, 2007), and personal control (e.g., Perry, 2003). An emerging body of retention research on these variables and other individual differences confirms their role in students' persistence decisions. For example, Bray, Braxton, and Sullivan (1999) found that positive coping (positive reinterpretation and growth) and negative coping (denial and behavioral disengagement) techniques were associated with integration and commitment. And Tross, Harper, Osher, and Kneidinger (2000) reported that conscientiousness, a global personality trait that is a factor in the Big Five Model of Personality (e.g., John & Srivastava, 1999; McCrae & Costa, 1999), was a predictor of retention.

A related strategy for studying undergraduates' adjustment is to examine their perceptions of the academic environment, exploring the connection between perceptual viewpoints and important indices of educational attainment and persistence. This approach was taken by Davidson, Beck, and Silver (1999) in studying six academic orientations that students develop based on their experiences in courses. Various combinations of the orientations (structure dependence, creative expression, reading for pleasure, academic efficacy, academic apathy, and mistrust of instructors) are associated with students' stress levels (Davidson & Beck, [End Page 376] 2006), self-actualization (Davidson, Bromfield, & Beck, 2007), grades (Beck & Davidson, 2001), and persistence (Davidson & Beck, 2006–2007). The questionnaire developed in the current investigation includes items that assess key variables in this personality and adjustment theme.

Financial and investment variables are important because students must attend to paying bills and juggling financial priorities. Financial variables have been the focus in several influential casual models of retention in terms of their direct effects on persistence (Cabrera, Nora, et al., 1992; Somers, 1995; St. John, Paulsen, & Starkey, 1996). Drawing from this literature, this investigation assessed students' satisfaction with institutional costs and the strain they experienced in meeting expenses.

From an investment perspective, the strength of people's commitment to their choices is determined by their views of rewards, costs, and the viability of alternative options (Rusbult, 1980). The value of this approach to understanding students' enrollment behavior was demonstrated by Hatcher, Kryter, Prus, and Fitzgerald (1992), who found that Investment Model variables were statistically significantly correlated with institutional commitment scores and attrition. One aspect of the Investment Model, cognitions about alternatives, also played a key role in withdrawal behavior in a study by Mashburn (2000–2001), and Bean and Metzner (1985) found that the opportunity to transfer (a viable alternative) was associated with discontinuing at the currently attended school. Investment variables, then, contributed to the item pool in the current investigation.

As the preceding examination of the literature indicated, many variables have been correlated with persistence. Although there is some agreement regarding the groups of variables (e.g., commitment, integration) that affect retention, there is much less agreement regarding the measurement of these constructs. An important benefit of a factor analytic approach is that the formation of psychometrically credible scales often clarifies the relationships among variables. Although single items sometimes provide useful information (see Robins, Hendin, & Trzesniewski, 2001), multiple-item scales tend to be more reliable and are, therefore, preferred by researchers and those who design interventions. Probably the greatest value of factor analysis is that it takes one beyond the well-known limitations of face validity (Furr & Bacharach, 2007) and furnishes empirical evidence of latent variables. In Study 1 we sought to write questions that reflected variables that have been associated with retention and then determine whether these items could be combined into meaningful scales.

## **METHOD**

### **Participants**

Two thousand twenty-two undergraduates from Angelo State University (n = 338), Appalachian State University (n = 634), Greenville Technical College (n = 872), and Troy University–Montgomery (n = 178) served as participants in order to obtain extra course credit. Greenville Technical is a community college; Angelo State, Appalachian State, and Troy University–Montgomery are 4-year institutions that also offer masters degrees. The Angelo State and Troy campuses are primarily commuter, and Appalachian State is primarily residential. Demographics for the sample were: 69% females, 31% males; 62% younger than 25 years of age, 38% 25 years or older; 2% Asians, 19% Blacks, 71% Caucasians; 7% Hispanics; 2% Native American and Other. Participants in this investigation and in Study 2 were treated in accord with the American Psychological Association Guidelines for Ethical Conduct.

**Table 1.**

**College Persistence Questionnaire Items and Rotated Pattern and Structure Coefficients and Communalities**

Factors and Items	Pattern Coefficients	Structure Coefficients	Communalities
<i>Academic Integration</i>			
How well do you understand the thinking of your instructors when they lecture or ask students to answer questions in class?	.68	.70	.51
How satisfied are you with the extent of your intellectual growth and interest in ideas since coming here?	.65	.72	.57
In general, how satisfied are you with the quality of instruction you are receiving here?	.61	.67	.54
How concerned about your intellectual growth are the faculty here?	.55	.59	.43
On average across all your courses, how interested are you in the things that are being said during class discussions?	.55	.62	.45
How much of a connection do you see between what you are learning here and your future career possibilities?	.50	.60	.48
I believe that many instructors deliberately impose unreasonable requirements on students and enjoy their distress.	.49	.53	.43
Students differ widely in how much interaction they want to have with faculty. How disappointed are you in the amount of interaction you have?	.44	.52	.38
<i>Social Integration</i>			
How much have your interpersonal relationships with other students had an impact on your personal growth, attitudes, and values?	.80	.79	.65
How much have your interpersonal relationships with other students had an impact on your intellectual growth and interest in ideas?	.79	.78	.64
How strong is your sense of connectedness with other faculty, students, staff on this campus?	.64	.67	.56
How much do you think you have in common with other students here?	.60	.63	.47
When you think about your overall social life here friendships, college organizations, extracurricular activities, and so on, how satisfied are you with yours?	.57	.62	.53
How many of your closest friends are here in college with you rather than elsewhere such as other colleges, work, or hometown?	.54	.54	.35
What is your overall impression of the other students here?	.53	.59	.51
How often do you wear clothing with this college's emblems?	.49	.51	.34
<i>Supportive Services Satisfaction<sup>a</sup></i>			
How satisfied are you with the academic advisement you receive here?	-.71	-.72	.54
How well does this institution communicate important information to students such as academic rules, degree requirements, individual course requirements, campus news and events, extracurricular activities, tuition costs, and financial aid and scholarship opportunities?	-.66	-.69	.50
How easy is it to get answers to your questions about things related to your education here?	-.63	-.66	.46
How much input do you think you can have on matters such as course offerings, rules and regulations, and registration procedures.	-.57	-.56	.38
If you have needs that are different from the majority of students here, how well does this university meet these needs?	-.55	-.62	.43
How fairly do you think students are handled here?	-.42	-.52	.44
<i>Degree Commitment</i>			
When you think of the people who mean the most to you (friends and family), how disappointed do you think they would be if you quit school?	.61	.61	.38
At this moment in time, how certain are you that you will earn a college degree?	.60	.65	.61
At this moment in time, how strong would you say your commitment is to earning a college degree, here or elsewhere?	.59	.64	.59
How strong is your intention to persist in your pursuit of the degree, here or elsewhere?	.49	.51	.37
How supportive is your family of your pursuit of a college degree, in terms of their encouragement and expectations?	.48	.49	.29
<i>Institutional Commitment</i>			
How likely is it that you will earn a degree from here?	.85	.83	.72
How confident are you that this is the right university for you?	.76	.82	.72
How likely is it that you will reenroll here next semester?	.73	.68	.49
How much thought have you given to stopping your education here perhaps transferring to another college, going to work, or leaving for other reasons?	.69	.69	.49
<i>Academic Conscientiousness</i>			
How often do you miss class for reasons other than illness or participation in school-sponsored activities?	.78	.77	.61
How often do you turn in assignments past the due date?	.67	.66	.53
I am disinterested in academic work and do as little as possible.	.49	.59	.52

Note. N = 2,022.

<sup>a</sup> The coefficients for Support Services Satisfaction items are negative because of small inverse relations with other factors.

## **Instrument**

We developed a list of variables that had been associated with retention in one or more empirical studies. Fifty-three questions were written to assess these indices. Questions were answered on a 5-point Likert-type scale. A sixth option, "not applicable," was included for students who felt that an item did not pertain to them (for example, issues of on-campus housing or services for students with special needs). Verbal labels for the response scales depended on the wording of the question. For example, a question that asked "how satisfied" students are with something used a response scale with "very satisfied" and "very dissatisfied" as end pegs. Another question that asked "how much" students liked something was answered with end pegs of "very much" and "very little." Depending on the content of the question, answers were later converted to 5-point "favorability" scores based on whether the response indicated something positive or negative about the student's college experience (-2 = very unfavorable, -1 = somewhat unfavorable, 0 = neutral, +1 = somewhat favorable, +2 = very favorable).

## **Procedure**

Students responded online at their convenience. They were told that the purpose of the investigation was to determine their views about many aspects of their life at college and were assured that their answers would remain confidential. After providing some demographic information, participants completed the CPQ, which typically took less than 30 minutes. Then a screen appeared which thanked them for responding to the questionnaire.

## **RESULTS AND DISCUSSION**

A principal components analysis was performed on the favorability scores of the 53 items using a direct oblimin rotation. An oblique rotation allowed for the possibility of correlations between components. The solution produced six factors with eigenvalues greater than 1.4. All items with pattern coefficients of .40 or higher were retained for further analysis (Tabachnick & Fidell, 2007).

A second principal components analysis with a direct oblimin rotation was conducted on the resultant 36 items to ensure that the deletion of questions did not cause substantial changes in the pattern coefficients. The findings of the two analyses were similar. Item deletion did not have a pronounced effect on the coefficients. The six factors yielded eigenvalues of 8.28, 3.62, 2.50, 1.92, 1.71 and 1.42 after rotation, explaining 41% of the variance. Correlations between components were negligible to small, ranging from -.02 to .27. The factor pattern and structure coefficients and communalities for each item can be found in Table 1. The pattern and structure coefficients, which represent the unique and shared contributions of each factor to the variance in the items, suggest that the factors are well defined by the items. Although we did not anticipate factorial differences between the data collected at the four-year schools ( $n = 1,150$ ) and at the two-year college ( $n = 872$ ), the component analyses described above were also

performed separately on the two groups. The overall similarity was so clear that Table 1 reports figures from the combined samples.

A review of the content of the items within the clusters yielded interpretive labels that are similar to those used to define five organizational themes: Academic Integration, Social Integration, Support Services Satisfaction, Degree Commitment, and Institutional Commitment. The sixth factor, however, is composed of a small subset of items within a rather eclectic theme, Personality and Adjustment. Recall that this theme includes a mixture of variables that represent the ways in which unrelated traits interact with academic situations. The three items that formed the sixth factor dealt specifically with students' assiduousness in completing course work. An appropriate label for this component is Academic Conscientiousness.

Using the results of the component analysis, six scales were constructed by summing the scores on the relevant items. The means, standard deviations, internal consistency coefficients, and intercorrelations are presented in Table 2. These descriptive statistics indicate that the scales are composed of homogeneous sets of items and assess distinctly different constructs. In addition to this descriptive information about the CPQ, one of the schools participating in this investigation collected test-retest data on the responses of 66 students to the Institutional and Degree Commitment items across a 5-week interval of time. The correlations indicated that the scores were fairly stable across time: Institutional Commitment,  $r = .78$ ,  $p < .0001$ ; Degree Commitment,  $r = .67$ ,  $p < .0001$ .

## **STUDY 2**

The six factors that comprise the CPQ appear to reflect groups of variables that have been associated with attrition in the literature. Although these data support the use of the CPQ, a much stronger argument could be made if the instrument were shown to actually predict whether students return to college. Therefore, a second investigation was performed to assess the ability of the CPQ to predict whether freshmen would return for the sophomore year.

Some institutions will use the CPQ by itself to identify at-risk students. For these schools, a predictive validity test in which retention is regressed on the six CPQ factors will evaluate the utility of the instrument. Other colleges and universities will use the CPQ in conjunction with predictors found in the student database such as high school grades and standardized test scores. For these schools, incremental predictive validity is a central issue. That is, they need to know if the CPQ improves the prediction of retention above that afforded by the precollege performance indices alone. In order to address the concerns of a broad array of institutions, Study 2 assessed both the predictive validity and the incremental predictive validity of the CPQ.

**Table 2.**

Means, Standard Deviations, Reliability Coefficients and Intercorrelations of College Persistence Questionnaire Scale Scores

	1	2	3	4	5	6
<b>Intercorrelation of Scale Scores</b>						
1. Academic Integration	1.00	0.25	0.43	0.35	0.37	0.35
2. Social Integration		1.00	0.31	0.12	0.27	-0.01
3. Support Services Satisfaction			1.00	0.13	0.21	0.09
4. Degree Commitment				1.00	0.28	0.34
5. Institutional Commitment					1.00	0.23
6. Academic Conscientiousness						1.00
<b>Mean Favorability Scores, Standard Deviations and Alphas Values</b>						
<i>M</i>	1.04	0.25	0.77	1.70	1.15	1.25
<i>SD</i>	0.58	0.73	0.66	0.44	0.88	0.73
$\alpha$	0.81	0.82	0.74	0.70	0.78	0.63

Note. *N* = 2,022.

## METHOD

### Participants

Two hundred eighty-three students enrolled in a freshmen orientation course at Angelo State University during the fall semester of 2004 or 2005 served as participants. They earned extra credits points as an incentive. The sample included 55% of those enrolled in the course and had the following characteristics: age mean = 19.63, *SD* = .90; 50% females, 50% males; 70% Caucasian, 18% Hispanic, 12% African-American. Although these characteristics are similar to those of all the first-semester freshmen (of which approximately one third enrolled in the orientation course), the sampling method was not random.

### Procedure

Students responded to the 53 item version of the CPQ. Items which did not load on the six retained factors were included for purposes unrelated to the current investigation. Participants responded to the questionnaire between the 7th and 11th weeks of the first semester of their freshmen year following the same procedure as Study 1. After completing the CPQ, students granted permission to obtain their standardized test scores (STS) and high school ranks (HSR) from the registrar. They also allowed us to determine if they returned to Angelo State the following fall semester, which provided a metric of the commonly used retention benchmark, freshmen to sophomore persistence (Mortenson, 2005).

## RESULTS

Twenty-four students who took the CPQ were excluded because the registrar's records did not contain STSs and/or HSRs. These scores were missing because students (a) were classified as "non-degree seeking," (b) had transfer hours prior to admission, or (c) were not required to report their HSR because of age or other factors. Analyses were performed on the remaining 259 respondents with complete data sets.

### Predictive Validity

Students' CPQ responses were converted to favorability scores for each of the items that loaded on one of the six factors. Mean scale scores were then computed, excluding the items that the student responded to as "not applicable." Data screening identified two outliers with Mahalanobis distance scores of greater than  $\chi^2(6) = 22.46$ ,  $p < .001$  (Tabachnick & Fidell, 2007). An examination of the outliers' responses to individual items revealed an improbable sequence of answers (the same response choice to all questions), suggesting that these two students gave little thought to the questions. Their data were not included in subsequent analyses.

Of the remaining 257 freshmen, 146 (57%) returned and 111 (43%) did not return for their sophomore year. Validity was assessed using a direct logistic regression. Retention was the outcome and mean scores on the six CPQ factors were predictors. A test of the full model against a constant only model attained statistical significance,  $\chi^2(6, N = 257) = 38.03$ ,  $p < .001$ , Nagelkerke  $R^2 = .19$  (Nagelkerke index is adjusted so that the maximum value is 1.00; Tabachnick & Fidell, 2007, pp. 460–461), indicating the set of CPQ factors reliably distinguished between freshmen who did and did not return as sophomores. Overall 66% of students were successfully classified using .43 as the cutoff point.

Table 3 contains the regression coefficients, Wald statistics, odds ratios, and 95% confidence intervals for the odds ratios for each predictor. The Wald criterion indicates that Institutional Commitment was the best predictor of retention,  $\chi^2(1, N = 257) = 16.79$ ,  $p < .001$ . Two other factors, Academic Conscientiousness,  $\chi^2(1, N = 257) = 7.43$ ,  $p < .01$ ; and Academic Integration,  $\chi^2(1, N = 257) = 3.86$ ,  $p < .05$ , also made statistically significant contributions to the prediction of retention.

**Table 3.**

Regression of Retention on High School Rank, Standardized Test Scores and CPQ Scales

	$\beta$	SE	Wald	df	p	Odds Ratio
<b>Regression of Retention on CPQ Scales</b>						
Academic Integration	-0.689	.351	3.851	1	.050	0.502
Social Integration	-0.084	.239	0.125	1	.724	0.919
Supportive Services Satisfaction	-0.338	.300	1.273	1	.259	1.402
Degree Commitment	0.174	.309	0.317	1	.573	1.190
Institutional Commitment	0.685	.167	16.785	1	.000	1.984
Academic Conscientiousness	0.540	.198	7.429	1	.006	1.716
Constant	-0.180	.433				
<b>Regression of Retention on High School Rank, Standardized Test Scores and CPQ Scales</b>						
High School Rank	0.021	.008	7.093	1	.008	1.022
Standardized Test Scores	0.000	.001	0.127	1	.722	1.000
Academic Integration	-0.736	.360	4.172	1	.041	0.479
Social Integration	-0.104	.244	0.182	1	.670	0.901
Supportive Services Satisfaction	0.260	.309	0.709	1	.400	1.297
Degree Commitment	0.106	.315	0.114	1	.735	1.112
Institutional Commitment	0.684	.170	16.278	1	.000	1.982
Academic Conscientiousness	0.454	.205	4.909	1	.027	1.575
Constant	-1.528	.925				

Note.  $N = 257$ . Retention was coded as 1 if student returned for sophomore year or 0 if student did not return.

### Incremental Predictive Validity

Each student's high school rank was computed ( $HSR = \text{Student Rank} \div \text{Number of Graduating Class} \times 100$ ), higher percentages reflecting better rankings. Some students' records contained both SAT and ACT scores, and others contained only one of the two types of scores. To facilitate comparisons, tables, prepared jointly by ACT, Inc. and the Educational Testing Service, were used to convert ACT assessment scores to their SAT equivalents. This yielded the STS. For students who submitted the SAT and ACT, their STS was the higher of the two scores.

A sequential logistic regression tested the incremental predictive validity of the CPQ. First STS and HSR were entered as a block into the equation,  $\chi^2(2, N = 257) = 17.22, p < .001$ ,

Nagelkerke  $R^2 = .09$ . Fifty-nine percent of students were correctly classified on the basis of STS and HSR.

The six CPQ factors were added on Block 2,  $\chi^2(8, N = 257) = 48.78, p < .001$ , Nagelkerke  $R^2 = .23$ . A comparison of log-likelihood ratios found that the inclusion of CPQ factors produced a statistically significant increment in the ability of the model to predict retention,  $\chi^2(6, N = 257) = 31.56, p < .001$ . The overall correct classification rate improved to 68% when CPQ factors were added to the model.

Table 3 shows the contribution of individual variables. Three CPQ factors and one precollege academic performance measure increased prediction,  $p < .05$ . Institutional Commitment was the single most reliable predictor of retention. HSR, Academic Conscientiousness, and Academic Integration made lesser but statistically significant contributions to the model.

## GENERAL DISCUSSION

The objectives of this investigation were to develop and validate a questionnaire that could be used to reduce attrition at a variety of colleges and universities. Study 1 produced an item pool that yielded six factors or internally consistent scales that generally correspond to groups of variables in the literature that have been related to attrition. The second investigation tested the predictive and incremental predictive validity of the CPQ. Validity was assessed by administering the questionnaire to a sample of first-semester freshmen and then using scale scores to predict whether these students returned for their sophomore year. The results of a logistic regression were statistically significant, correctly classifying 66% of the students. Institutional Commitment, Academic Integration, and Academic Conscientiousness made statistically significant contributions to the prediction of attrition.

As expected, some but not all of the CPQ factors were related to persistence at the university where Study 2 was conducted. Social Integration, Support Services Satisfaction, and Degree Commitment did not improve prediction. However, there is substantial evidence (e.g., Aitken, 1982; Berger & Braxton, 1998; Braxton et al., 1997; Milem & Berger, 1997) that these variables are associated with persistence at other institutions. The most probable interpretation is that the factors that predict retention vary from school to school and from one group of students to another (Metz, 2004–2005; Tinto, 2006–2007). For example, Social Integration may be less important on nonresidential campuses or among students who have extensive outside employment. Support Services Satisfaction might be less predictive on campuses where there is little need for such assistance. And Degree Commitment may be less predictive at “feeder” schools from which many students intend to transfer to other institutions. The lack of generalizability of the predictors from one school to another argues for the use of an instrument like the CPQ, which assesses a diverse array of variables.

Although some colleges or universities may use the CPQ as a stand-alone instrument, many other institutions will combine CPQ factors with measures of precollege academic performance. The utility of the CPQ will be enhanced for these schools if it provides information that is not

redundant with data already available from students' records. Incremental predictive validity was examined by first including HSR and STS, then adding the six CPQ factors to the model. Inclusion of CPQ scores produced a statistically significant increment in the reliability of prediction above that obtained by academic performance measures alone. Institutional Commitment was the best single predictor; HSR, Academic Conscientiousness, and Academic Integration also produced statistically significant augmentations. Interpretation of the results on the Academic Conscientiousness scale should take into account that it is a brief measure (three items) with an internal reliability coefficient (.63) slightly below a desirable level of .70.

The CPQ scales were much better predictors of retention than were the precollege performance measures. However, neither of these indices was costly to obtain. Precollege metrics, such as high school rank and standardized test scores, are generally available in the student database, and the CPQ takes less than 30 minutes to administer. When used together, the CPQ and precollege measures reduced the percentage of incorrect classifications from 43% to 33%, a substantial improvement in the ability to distinguish at-risk freshmen. Of course, we are not advocating that efforts to improve retention be limited to at-risk individuals. A number of students predicted to return would no doubt profit from increased interaction with counselors, advisors, and faculty.

Taken together, the results of Studies 1 and 2 establish the validity of the CPQ for predicting retention. The remainder of this discussion will focus on the theoretical and practical implications of this research and on how information from the CPQ can be used to improve retention.

### **Theoretical and Practical Implications**

Although the primary purpose of this investigation was to validate a measuring instrument, the results have ramifications for persistence theories. Obviously, the scale scores that predicted attrition confirm the propositions of those theories and models that include the constructs measured by the scales. In addition, the process of building scales via factor analysis contributes to persistence theories by clarifying the operational definitions of key constructs. When seemingly independent events, as represented by the content of the items, are conjoined into homogeneous scales, light is cast on the nature of the latent variable and its defining elements. For example, the Academic Integration scale was composed of students' understanding of lectures, believing that faculty care about their intellectual growth, taking an interest in class discussions, and seeing a connection between courses and careers, among other things. By finding covariation in these elements, one gets a clearer sense of the meaning of academic integration.

The same can be said of the other scales. As future research generates additional item pools, there will be a growing understanding of the latent constructs and their distinctiveness from related constructs. From a practical standpoint, the focus on individual items within the scales also aids interventions. Those who have used students' responses to the CPQ in individual

counseling sessions have reported that the individual items sometimes serve as a better, more specific guide to action than do global scales.

Persistence theories emphasize the temporal and cause–effect relationships between key variables. However, it is important to keep in mind that the research presented here was correlational. The statistical associations do not indicate temporal nor causal connections between the variables. Attempts to change students as prescribed by constructs measured on the CPQ should be mindful of this limitation. Research that utilizes experimental or quasi-experimental procedures or causal modeling enables more definitive conclusions about the cause–effect nature of relationships. Also, exploration of the temporal aspects of key variables will elucidate the points in time during which specific factors most affect students' decisions.

### **Identifying At-Risk Students**

A simple way for academic support personnel to distinguish those students who are most at risk is to calculate the mean Institutional Commitment score for each individual in their case loads. For instance, a student whose favorability scores were –1, 0, +2 and +2 on the four Institutional Commitment items would have a mean of .75. Any items that were checked “not applicable” would not be used to compute the mean. The mean scores could then be ranked. Students with the lowest positive or most negative score would be at the greatest risk. College support personnel could then concentrate their energies on those students who are most in need of their services.

An advantage in using Institutional Commitment scores to identify at-risk undergraduates is that the scores can be calculated as soon as the student takes the CPQ. A disadvantage with Institutional Commitment scores is that the intent to return to a college or university is not perfectly correlated with retention. Fortunately, the data from this investigation indicate that Institutional Commitment scores were a reasonably accurate predictor of persistence.

A more complex but more accurate procedure is to develop a regression equation for each institution. This would require administering the CPQ, recording which students returned the following fall, then regressing retention upon the six factors. The CPQ could then be given to the next freshman class and their scores inserted into the equation. As mentioned previously, when used together with precollege performance scores (STS and HSR), the six CPQ factors classified 68% of the Angelo State students correctly.

The main disadvantage with the regression approach is that college support personnel must wait one academic year before they would have the retention data necessary to generate a prediction equation. Therefore, it is recommended that Institutional Commitment scores be used to identify at-risk students during the first year that the CPQ is given at a particular school. During the second and each subsequent year, the regression equation built from the prior freshmen class could be employed to distinguish those students least likely to return as sophomores. Eventually, other indices of retention, such as graduation rates, could be regressed upon CPQ scores.

## **Determining Those Variables That Most Affect Retention**

As we have emphasized, factors affecting retention are often specific to the institution and the individual student. In planning persistence-oriented courses or funding institutional changes, it is important to know which variables most strongly affect attrition at a particular school or for a certain group of undergraduates (e.g., first-generation or minority students). A good beginning is to examine the bivariate correlations with retention. Although the factors provide an overall perspective, a more detailed picture is gained from examining individual CPQ items. For example, at Angelo State University scores on an item that asked about class attendance had an especially strong relationship with the retention variable. Administrators, taking this finding as a guide, decided to implement a program in which students who are not attending class regularly are contacted and asked to meet with a departmental representative to discuss their academic progress.

If a single at-risk student is being counseled, then the goal is to determine the contributory variables. Counselors, faculty, and academic advisors who examine responses to the CPQ will learn a great deal about that individual student's perspectives of the college environment. A number of college support personnel have commented that personalities seem to emerge after reading students' answers. Responses on the CPQ will likely suggest issues that should be more deeply explored at individual counseling sessions. Normative data, which can be requested from the first author of this article, would also aid in interpreting students' responses to the CPQ.

## **Policy Makers and the CPQ**

One of the objectives in designing the *CPQ* was to provide administrators with information allowing them to concentrate funds and resources on those variables that most need attention at their institutions. Probably the most useful data in making resource allocation decisions is that which distinguishes students who will persist from students who will not persist at a given college or university. Policy makers may also find it instructive to compare the CPQ responses at their schools to the responses of students at other institutions. Copies of the instrument, scoring keys for the items and scales, and norms can be obtained from the first author.

Comparing the CPQ responses of different groups of students at the same school can also be a key to successful retention efforts. For instance, minority students may base persistence decisions on a different set of criteria than the student body as a whole (Pascarella & Terenzini, 2005, chap. 8). If administrators hope to maintain a diverse student population, it is imperative that they understand the issues that are most important to minority students.

Another application of the CPQ is to help colleges and universities better understand why their retention efforts are successful or unsuccessful. Typically, if any evaluation is conducted, it is limited to comparing attrition rates over time. Although useful, overall retention rates do not pinpoint the specific reasons why attrition is increasing or decreasing. Institutional researchers often have little option except to speculate upon why attrition rates fluctuate. Because the CPQ

items derive from variables that have been associated with attrition, attention to changes in these variables across academic years enables an empirically based and more detailed understanding of the forces producing changes in overall retention measures.

## **Future Directions**

Although the current set of questions offers users reliable scales that assess important variables in understanding and predicting students' persistence, future investigations can improve the instrument in at least two ways. First, some of the scales would benefit from additional items, based on the complexity of the constructs they assess. For example, the Academic Conscientiousness scale has only three items; its internal reliability and content validity would improve with the addition of several items. The Support Services Satisfaction scale could also benefit from additional items; i.e., it is likely that the six items omit some services that mediate the persistence decision in some students. Future research can test new items by examining their relationships with those currently comprising these scales.

A second way in which the CPQ can be strengthened is by including groups of variables that did not form factors in Study 1 but have been related to attrition in other investigations. For example, items pertaining to key variables in finances, personality and psychological adjustment, social support, and classroom practices did not form distinct scales. Therefore, their value is determined by the information they provide as stand-alone indicators of the variables they assess, or they may play a role in future research as "marker variables" in the development of additional scales. Presently, scores on these isolate items broaden the content of the CPQ considerably into potentially important areas, providing some insight into the reasons why students persist or not. However, the development of multiple-item, homogeneous scales will improve the reliability of scores on the variables they represent.

## **Conclusions**

The CPQ provides colleges and universities with a multipurpose tool for decreasing attrition. The questionnaire assists in identifying at-risk students, allowing college support personnel to concentrate their energies on those undergraduates most in need of their services. Furthermore, examination of factors scores and single items often reveal the circumstances prompting a particular student's departure. Instructors of persistence-oriented courses and policy makers tasked with managing groups of students can employ CPQ scores to determine the variables that are most predictive of retention at their institutions. The CPQ can also facilitate program evaluation, permitting a more precise assessment of retention efforts. By comparing changes in CPQ scores, policy makers and institutional researchers can better understand why persistence rates vary over time. The CPQ enables counselors, advisors, faculty and policy makers to advance beyond a "one size fits all" approach to attrition by individualizing retention efforts at the level of the student and institution.

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