

College Student Self-Assessment Survey (CSSAS)

Development of College Student Self Assessment Survey (CSSAS)

The collection and analysis of student achievement indicator data are of primary importance in describing the effects of participation in the ACE program on academic outcomes. But achievement indicators will not tell the full story of ACE. Many participants and the designers report that the program is “transformative.” To understand what effects the program has on factors such as self-efficacy, mindfulness, communication, teamwork, and other affective dimension factors, MPR designed a survey instrument called the College Student Self-Assessment Survey (CSSAS).

The CSSAS is intended to be administered electronically to ACE students at three points in time: prior to the Foundation Course (Pre), at the end of the Foundation Course (Post) and again at the end of the Bridge Semester (EBS). To date, it has been fully administered to three cohorts of ACE students at all of the colleges implementing the ACE model (including fall 2011). Data collected from the fall 2010 and spring 2011 cohorts are analyzed in this report. Initial school-wide administration of the CSSAS began in fall 2011 at Cabrillo and Hartnell Colleges and will occur school-wide at Los Medanos College beginning in spring 2012. School-wide data for the CSSAS from these colleges will provide a source of comparison data for the CSSAS results for the ACE students. This report examines outcomes on the affective dimensions for ACE students in fall 2010 and spring 2011 and compares outcomes for ACE students with those of non-ACE students who took the CSSAS in fall 2011 as part of a school-wide administration.

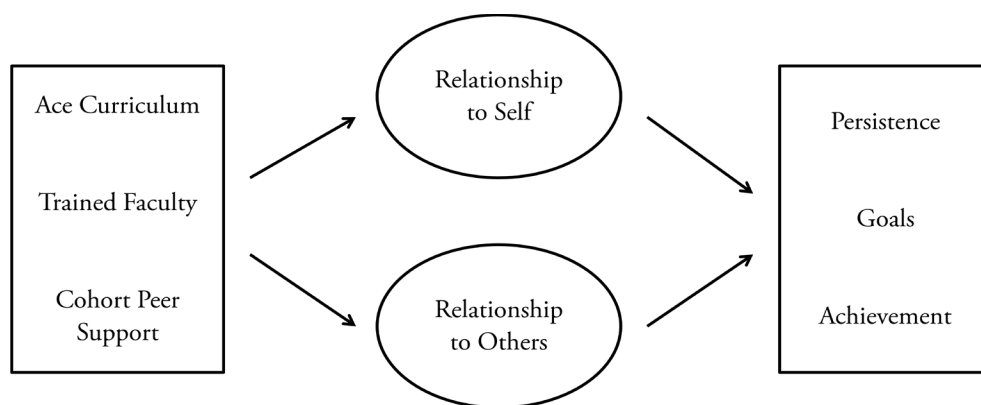
The CSSAS was designed to identify and measure important psychological constructs that are theorized to be outcomes of participating in the ACE program. ACE expects that students will score higher in many of the areas following the Foundation Course and will maintain or improve these scores when the survey is administered at the conclusion of the Bridge Semester. Ultimately, ACE expects that higher scores on the CSSAS will be associated with positive student outcomes of persistence, goals, and achievement. The underlying theory that

in large part prompted the design of the ACE model—as described by the founder, Diego Navarro—is that factors associated with the affective dimension are an instrumental part of being a success in school and life and that students who enroll in the ACE program typically have not developed these skills due to the negative circumstances of their lives and their prior negative experiences as students.

The CSSAS is based on several validated survey instruments used in other research studies to measure factors related to the affective dimension that are addressed in the ACE program. It also includes items developed to ensure collection of data on as much of the ACE process (see Figure 3 below) as possible. ACE posits that its program leads to transformational change in factors represented in the affective dimension and that it is these changes in students' increased understanding of themselves and others that leads to student success. The dimensions of relationship to self include academic self-efficacy, personal responsibility, awareness of self, and college identity. The dimensions of relationship to others include interaction and teamwork. Affective outcomes of these transformational changes include self-regulation behaviors, higher educational goals, and increased hope. Cognitive outcomes of these changes include higher achievement and decisions to persist in meeting educational and career goals.

Figure 3 provides a conceptual model of the ACE process, illustrating how mediating factors emerging from the ACE curriculum contribute to specific student outcomes. In this model, Relationship to Self and Relationship to Others are psychological mediators between ACE inputs and student outcomes. ACE inputs include the ACE curriculum, trained ACE faculty, and Peer Support related to the ACE cohort model.

Figure 3. Conceptual Model of ACE Process



The CSSAS is divided into sections measuring factors related to the affective dimension and is administered via computer to all students who participate in the program. The survey is

administered at three time points during the ACE program: prior to beginning the Foundation Course, immediately following the Foundation Course (which lasts approximately two weeks), and at the end of the Bridge Semester. The research design going forward includes plans to administer the CSSAS one year later to students who participated in the program to determine if gains posted during the ACE experience have been sustained for students who have gone through the program. The research design also calls for CSSAS to be administered to comparison groups to determine if other students score differently on the CSSAS and in what ways these scores may be differentially related to student outcomes.

CSSAS Scoring

Scoring on the CSSAS is divided into separate scales based on the affective dimension factors being measured. Thus, the Academic Confidence section, which measures academic self-efficacy, has seven items that comprise the self-efficacy scale. Sample items include: “I usually do well in school”, “I know how to study for tests”, and “I am not able to ask questions in class (reverse coded).” Students rate how strongly they agree with each statement, based on a five point scale, from 1 = Strongly disagree to 5 = Strongly agree. Student scores on each item are summed to give an overall score for Academic Confidence, with higher scores indicating higher levels of academic self-efficacy. It is hypothesized that student scores on this scale will increase from initial scores when the CSSAS is given before the program begins, both after the foundation course and then again after completion of the Bridge Semester. However, we know that it is possible that scores in some areas will decrease when students become more aware of their habits, attitudes, and individual traits. Table 2 provides a summary of each section in the CSSAS, how it is scored, and the survey instrument or research upon which each scale is based.

CSSAS Design Process

The creation of the CSSAS was based on a pilot survey jointly designed and developed by MPR and ACE staff and given to ACE students in the spring of 2010. The pilot survey measured factors within the affective dimension similar to those that appear in the CSSAS, but the survey was much longer and needed to be streamlined. Exploratory Factor Analysis was used to determine which underlying constructs emerged from the survey data. Exploratory Factor Analysis reveals the number of factors produced by a survey and measures how well the items in the survey measure each of the factors. As expected, the EFA revealed the affective dimensions theorized to be measured by the survey, including self-efficacy, interaction with others, teamwork, college identity, mindfulness, and the ability to observe, describe, and accept one’s internal state.

Table 2. CSSAS Constructs and Sources

Affective Dimension	Section and Description of Items	Source ⁴
Self-Efficacy	Items relating to one's confidence in successfully completing school-related tasks and in one's ability to regulate learning and study behaviors. Also includes items related to student's hope regarding their academic future. Respondents rate the extent of their agreement on each statement using a five-point scale (1 = Strongly disagree; 5 = Strongly agree).	Academic Self-Efficacy Scale by Chemers, Hu, & Garcia (2001); Efficacy for Self-Regulated Learning Scale by Zimmerman, Bandura, & Martinez-Pons (1992); Domain Specific Hope Scale by Shorey and Snyder (2004)
College-Identity, Teamwork, Interaction with Others, and Challenges	Items relating to identifying as a college student communication skills and aspects of personal responsibility that affect interaction with others. Respondents rate the extent of their agreement on each statement using a five-point scale (1 = Strongly disagree; 5 = Strongly agree). Also includes two items on anticipated stress and ability to handle challenging stress levels, measured on a five-point scale.	Drafted by Dr. Martin Chemers based on previous survey research in each domain (2010); Personal Responsibility Questionnaire by Merger, Spencer, and Patton (2004)
Mindfulness, and Observing, Accepting, and Describing One's Internal State	Items relating to being mindful of one's behavior, and one's inner state, through observing, describing, and accepting one's actions, thoughts, and behaviors. Respondents rate how true specific statements are about themselves on a five-point scale (1 = Never or rarely true; 5 = Very often or always true).	Kentucky Inventory of Mindfulness Skills by Baer (2004)

Items with low factor loadings on a construct were eliminated because they did not provide a good measurement indicator for that construct. Also items that cross-loaded on to more than one factor were also eliminated because they did not do a good job of differentiating between factors. Items with the highest loadings on each factor were retained, while lower scoring items were dropped to decrease the length of the survey. EFA allows for parsimony in measurement of factors because items can be removed without sacrificing reliability or validity. Each identified factor was also subjected to a reliability test using Cronbach's Alpha, and scores for each factor were good, ranging from .71 to .92.

Initial CSSAS Analysis

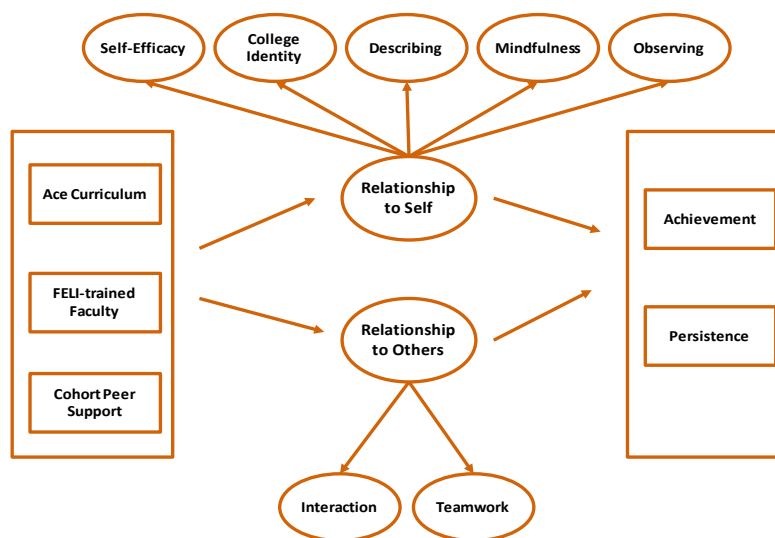
The final pilot CSSAS was administered in fall 2010 to all cohorts participating in the Foundation Course at the beginning of the ACE semester. It was administered again two weeks later, and then again at the end of the Bridge Semester. Exploratory and confirmatory factor analysis of these administrations of the CSSAS confirm the validity of the instrument. Confirmatory Factor Analysis revealed high overall measurement scores for each factor, plus high factor loadings for each measured item. Cronbach's alpha reliability scores also were good, remaining in the .7 to .95 range for each dimension.

⁴ See list of References for full citations.

Structural Equation Modeling and the CSSAS

Latent variable analysis of the CSSAS data will be used to test the theory of change for the ACE model. The elaborated conceptual model shown in Figure 4 shows how structural equation modeling will be used to test the relationship between psychosocial factors and student achievement. The use of latent constructs is based on the theory that many general concepts—such as identity, efficacy, and engagement—are best captured as unobserved variables that are explained by multiple observed indicators. Ultimately, Structural Equation Modeling will be used to test the structural relationships between ACE program components, latent psychological mediators, and student outcomes. It includes the latent constructs related to Relationship to Self and Relationship to Others, as well as the observed variable outcomes of Persistence (as measured by choice of courses, going to school full or part-time, and other variables) and Achievement (measured by credit accumulation and successful completion of “Gateway” math and English courses).

Figure 4. Conceptual Diagram of Structural Equation Model of ACE Process and Outcomes



Exploratory and Confirmatory Factor Analysis of CSSAS

MPR continued to pilot the CSSAS instrument in spring 2011 with all students participating in ACE. Exploratory and Confirmatory Factor Analysis (CFA) were used after each administration (Pre, Post, and EBS) to examine the validity of the instrument and determine if items were performing poorly. Confirmatory Factor Analysis follows Exploratory Factor Analysis in the research process. In CFA, the researcher specifies which items load on to identified factors, instead of allowing the computer software (Mplus 6.0) to determine which items hang together as factors based on statistical characteristics. Appropriate analysis techniques require that the EFA and CFA be conducted on different random samples pulled from the entire data set. Use of the same data for both analyses may yield unreliable results.

Analyses of the CSSAS were conducted by using a random sample of 40% of the survey takers for the EFA and 60% from the CFA. Items were dropped or reworded (from negative to positive) if the EFA or CFA revealed that items had low factor loadings or loaded on to more than one construct. The CFA for this report was conducted on the Pre-Foundation CSSAS data from fall 2010 and spring 2011 ($N = 646$) as well as on the school-wide CSSAS administered to non-ACE students in fall 2011 ($N = 1107$). Analysis of survey results administered to different populations of students adds validity to the instrument by showing that the factor analysis results are comparable, even when different types of students take the instrument. The results for the Confirmatory Factor Analysis of the model are shown in Figure 5. This model provides the factor loadings for each of the items on each affective dimension factors as well as the correlation between each factor. Ideally, in Confirmatory Factor Analysis, factor loadings will be above .4 and correlations of latent factors (the affective dimensions in the large circles) will be less than .7. The figure shows that the CSSAS meets both of these criteria. The factor loadings are all above .5 and the factor correlations are less than .7. The correlation between factors is used to determine if factors are measuring separate constructs or if they should be collapsed into one smaller factor (generally if the correlation is higher than .8). These results suggest that the CSSAS is a valid instrument.

Another way to measure the validity of an instrument is to use CFA to generate fit statistics for the model. These fit statistics measure the model as a whole, while the size of the factor loadings measure the validity of each individual construct and item. Standard fit statistics reported in the research literature include the Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and the Standardized Root Mean Square Residual (SRMR). All fit statistics for the two data sets tested here met the criteria required to claim that a survey is a valid and reliable instrument (see Table 3). A RMSEA score below .05 is considered necessary to indicate a well-fitting model. Scores between .05 and .07 are adequate, between .08 and .10 are poor, and any score above .10 indicates that the model is not acceptable. In addition, a 90% confidence interval for the RMSEA score should not exceed .10 on the upper-bound level. The model tested here had excellent RMSEA scores (.039 and .042), and both confidence intervals had an upper bound-level below .05. Scores above .9 on the CFI indicate a good model, and scores above .95 indicate excellent model fit. The CFA of the model tested here and depicted in Figure 5 produced CFI results of .93, indicating that the model is very strong. The final fit statistic, the SRMR, should provide values as close to 0 as possible. The scores for these analyses were .045 and .038, respectively, again indicating excellent fit of the model. The CSSAS instrument was refined and tested over numerous administrations, with excellent statistical results each time. The final instrument consists of 41 items measuring affective dimension factors as well as two items measuring students' response to stress. This instrument is now final and will be administered in its current form for the remainder of the study.

Figure 5: Confirmatory Factor Analysis Model of CSSAS

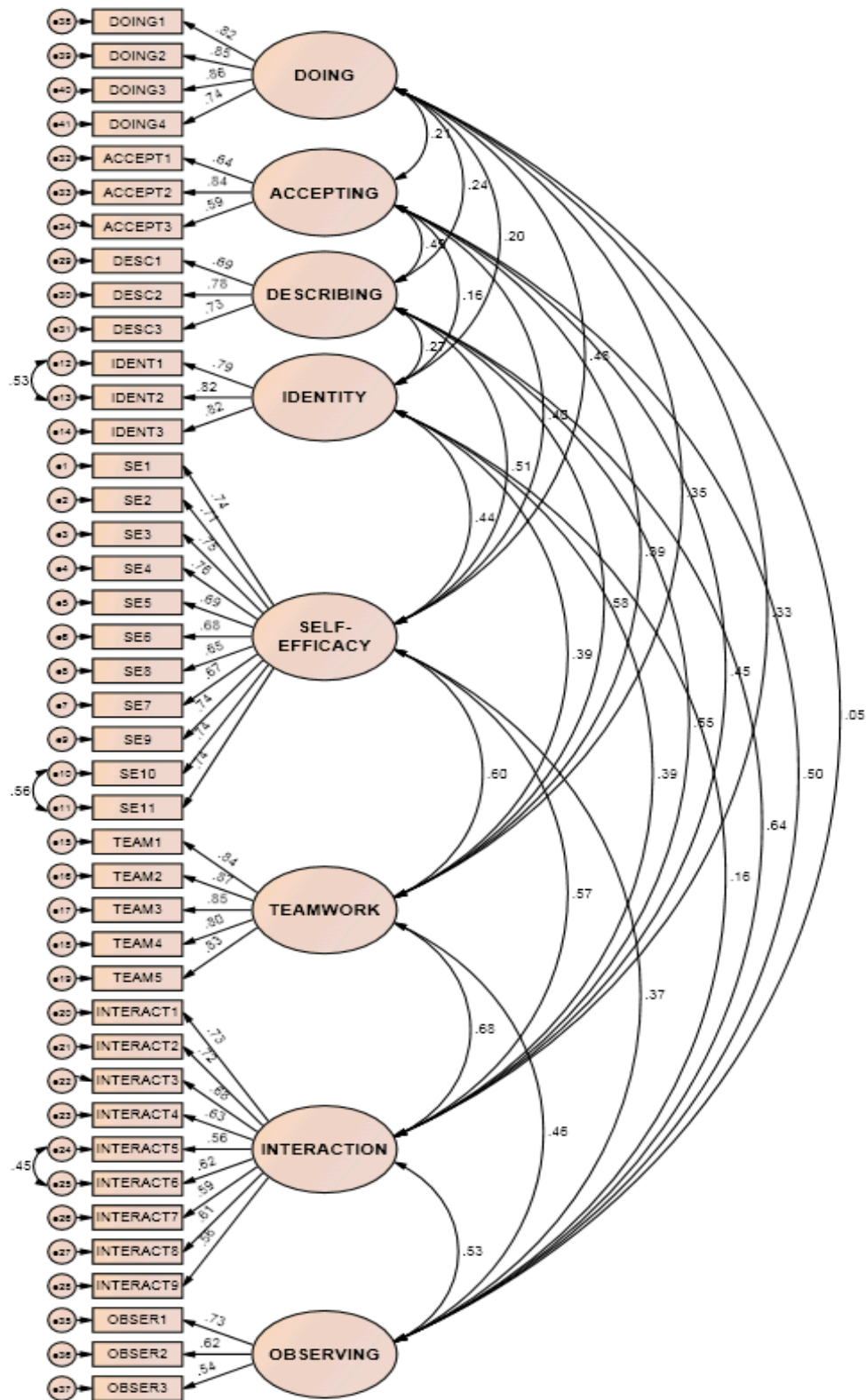


Table 3. Fit statistics for Confirmatory Factor Analysis of fall 2011 S-CSSAS (N = 821)

	RMSEA	RMSEA 90% Confidence Interval	CFI	SRMR
School CSSAS (n = 821)	0.042	0.039 to 0.044	0.948	0.038

To further confirm the validity of the instrument, Cronbach's Alpha reliability scores were calculated along with the EFA and CFA analyses. Cronbach's Alpha is widely used in the research community to determine validity of survey instruments, with .9 indicating excellent fit and scores above .7 indicating adequate fit for a model to be accepted as a reliable indicator of the constructs being measured. The Cronbach's Alpha scores for the overall instrument were .95 and .94, considered excellent. Individual reliability scores were also conducted on each construct and generated scores ranging from .7 to .95, again indicating that each construct is reliable in addition to the survey in its entirety being a reliable measure. Reliability scores are reported along with survey items and factor loadings in Appendix Table 1. Correlations among the latent factors are reported in Appendix Table 2.

Analysis of Change in ACE Student Scores on the CSSAS

For this report, MPR used data collected from ACE students in fall 2010 and spring 2011. Because the study examines change over time, the sample is limited to ACE students who had survey results for all three CSSAS administrations, including Time 1 (pre-test CSSAS), before beginning ACE, Time 2 (post-test CSSAS), after completing the Foundation Course, and Time 3, after the end of the first ACE Bridge Semester (EBS). It is necessary to have a matched sample of students if analysis of change over time is to be valid. The total N for this analysis is 293 students from 7 colleges participating in the ACE program. A breakdown of respondents by college is presented in Table 4. To measure change over time, we created a scale score for each of the affective dimension factors and then calculated what percentage of students scored in the top quartile (a score above 75%) of the scale at each time point. We also tested the change in percentage scores from Time 1 and Time 3 to see if the change in scores was statistically significant. These results are reported in Appendix Table 3.

Table 4. CSSAS Respondents by College (N = 293)

College	Number	Percent
Berkeley City College	18	6.1
Cabrillo College	186	63.5
Delaware County Community College	25	8.5
Hartnell College	23	7.8
Las Positas College	11	3.8
Los Medanos College	26	8.9
Southwest Virginia College	4	1.4