Identity, Self-Esteem, and Academic Motivation: An Analysis of Effects on Underrepresented STEM Majors

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Abstract

This study seeks to understand whether race and gender identities influence commitment to STEM (Science, Technology, Engineering, Math) majors. The research was conducted at the University of Central Florida. The participants in this study are undergraduate students in the Career Advancement Mentoring Program for Young Entrepreneurs and Scholars (CAMP-YES) Program. All students were invited to participate in an online survey study. Out of the 124 students, 32 participated in the study yielding a response rate of 25.8%, and 27 with complete responses. The survey was comprised of three constructs adapted from previously validated surveys measuring a) social identity on the Social Identity and Personal Identity Scale (SIPI) [1]; b) types of motivation on the Academic Motivation Scale (AMS) [2]; and c) temporal fluctuations in self-esteem on the State Self Esteem Scale (SSES) [3]. Data were analyzed using the Mann-Whitney U test on nine scales with three demographics comparing ethnicity (majority vs. underrepresented minorities), gender (male vs. female), and first-in-family to pursue a bachelor's degree (first generation vs. non-first generation). Preliminary results suggest that female students' motivation for four sub-constructs on the AMS were significantly higher their male counterparts. Female (Median=4.38 s=.55) *motivation to accomplish things* was significantly higher (p=.016) than male (Median=3.25 s=.93). Female (Median=3.63 s=.69) *motivation from stimulating experiences* was significantly higher (p=.029) than male

(Median=2.75 s=1.02). Female (Median=4.75 s=.68) *motivation for internalizing reasons for actions* was significantly higher (p=.022) than male (Median=3.75 s=.82). Female (Median=4.38 s=.62) *motivation for valuing a behavior* was significantly higher (p=.039) than male (M=3.5 s=.98). On the SIPI scale, preliminary results suggest that underrepresented students (Median=3.38 s=.54) had significantly higher (p=.007) social identity than the majority (Median=2.69 s=.78). No significant results were found for total SSES or social self-esteem tested by any of the three demographics. The findings from this study contribute to the understanding of how the cultural self may promote or hinder participation and progression in STEM for undergraduate students in group settings.

Background

Attracting and retaining underrepresented groups in STEM fields has been of great interest to universities. The need-to-belong influences human behavior, emotion, and cognition [4, 5]. In an attempt to explain lower participation of underrepresented groups in STEM, among many other things, researchers have examined factors such as racial-ethnic self schemas and group identification [6, 7]; social support as a predictor of adjustment to college especially for women [8]; and greater benefits of extra-curricular participation and peer interaction for first-generation college students [9, 10].

The CAMP-YES program design is based on the attributes described above, which are known to promote academic success, especially for under-represented groups. CAMP-YES is a S-STEM program funded by the National Science Foundation with a goal of preparing academically

talented, financially needy students to successfully transition to the workforce, graduate school, or create/work at a startup company. This diverse, cohort-based program has 124 junior and senior STEM students (48% First Generation, 28% Women, 39% Hispanic, and 11% African American). CAMP-YES students choose from three career preparation pathways (Internship, Research, or Entrepreneurship Path) to explore their professional interests and make informed decisions on their career or post-graduation. The program's group activities (socials, distinguished speaker lectures, and symposium); mentor pairing with industry, faculty, or entrepreneurship coach; experiential learning opportunities; and academic support services are designed to foster a "sense of community and inclusiveness." In this study, we are interested in understanding the role of the cultural self within this community of students in terms of academic motivation, social identity, and temporal self-esteem. There are varying definitions and debates around the concept of cultural identity [11]. For purposes of this study, cultural identity is operationalized as the reflection of identities in relation to gender, ethnic, and first-generation college status. Students self-selected to apply to the CAMP-YES program, thus it is possible that CAMP-YES participants have higher levels of academic motivation., social identity, and self-esteem than non-participants. However, the focus of this study was to compare differences between demographic groups of student participants in CAMP-YES in terms of these constructs.

Three research questions guide this study:

RQ1: *What are the effects of race and gender identities on academic motivation?*

RQ2: *What are the effects of race and gender identities on social identity?*

RQ3: *What are the effects of race and gender identities on temporal self-esteem?*

Literature Review

Stryker and Burke [12] define *identity*, "with reference to parts of a self-composed of the meanings that persons attach to the multiple roles they typically play in highly differentiated contemporary societies" (p. 284). Identity is important to our study due to high ethnic or social identity being positively correlated with a student's global self-esteem, academic self-confidence, and purpose in life [13]. Similarly, social scientists have asserted the importance of ethnic identity to individual self-concept and psychological functioning [14]. Racial-ethnic minorities were also found to have less risk of academic disengagement when racial ethnic self-schemas contained both the minority group and the larger society in comparison to being aschematic or only containing the minority group [6]. There have been previous attempts to measure identity including the "Who Am I" test [15] and the Aspects of Identity Questionnaire (AIQ) [16]. The Social Identity and Personal Identity scale (SIPI) is similar to these past tests [1]. Where AIQ seeks to assess differences in aspects of internal identity (i.e. beliefs, abilities, emotions) and external identity (i.e. popularity, physical appearance, reputation), the SIPI scale differentiates social and personal identity and measures the variation individuals assign to both. Social identity is operationalized as an individual's tendency to categorize themselves in terms of a group identity. Personal identity is the tendency to categorize the self as distinct from the group. The SIPI has 16 total items; 8 personal identity and 8 social identity. For our study specifically, we only used the 8 items corresponding to social identity, since the focus of the study aims to look at how social identities affect student commitment.

Williams [17] states that *self-esteem* is a barometer that rises and falls by irrational factors. Self-esteem is measured as the proportional relationship of one's success divided by their pretensions. Maslow [18] states that satisfying the self-esteem need leads to feelings of self-confidence, worth, strength, and adequacy. However, lack of satisfaction generates inferiority, weakness, and helplessness which then lead to discouragement or compensatory behavior. Many scales have attempted measuring self-esteem. Such examples include Morse and Gergen [19] finding significant changes when subjects were shown superior or inferior competitors for a job application. Significant changes in self-esteem were found when subjects were instructed to be self-deprecating or self-enhancing [20]. The State Self-Esteem Scale (SSES) sought to construct a new measure of self-esteem that differentiates mood from an individual's self-esteem [3]. The SSES was created and modified using 20 items from the Janis-Field Feelings of Inadequacy Scale [21]. All 20 items from the SSES were used in this study.

Foote [22] defines *motivation* as, "the degree to which a human being … defines a problematic situation as calling for performance … and thereby his organism releases the energy appropriate to performing it" (p. 15). Perinbanayagam [23] introduces anticipation, objectification, and legitimation as processes that are in operation in the making of decisions. Motivation and motive do not tend to be differentiated in the field of sociology or social psychology as discussed by Franzese [24]. Motive tends to be the *specific* reason for action and motivation as an *underlying* reason for action. The Academic Motivation Scale (AMS) is translated from the French Echelle de Motivation en Education (EME); a measure of motivation toward education [2]. The AMS

has 7 sub-scales organized into three major types of motivation; intrinsic, extrinsic, and amotivation. Intrinsic motivation (IM) is broken into IM-to know (*Know*), IM-to accomplish things (*Accomplishment*), and IM-to experience stimulation (*Stimulation*). *Know* is related to constructs such as exploration, curiosity, and intrinsic intellectuality. *Accomplishment* is characterized as mastery or achievement motivation, where the focus is on the process instead of the actual outcome. *Stimulation* is described as the motivation to engage in an activity to experience stimulating sensations. Extrinsic motivation is categorized into external regulation, introjected regulation, and identified regulation. *External regulation r*efers to behavior that is regulated through rewards and constraints. *Introjected regulation* is the internalization of reasons for an action, "I work hard on my shifts because that is what a good employee is supposed to do." *Identified regulation* is when a behavior is valued through the individual such that "I work hard because it is important to me." Lastly, Amotivation opposes both intrinsic and extrinsic motivation. It can be exemplified when individuals perceive their actions to be caused by forces outside of their control, in which at some point the behavior may cease altogether. The AMS has 28 total items; 4 questions pertaining to each of the 7 scales and all 28 items are used by our survey.

Methodology

One hundred and twenty four CAMP-YES students were invited to take the survey, of which 32 students opted to respond to the survey, yielding a response rate of 25.8%. The survey was completed in its entirety by twenty-seven students. Review of the survey response data set suggests that about 15% of the survey responses (5 out of 32) were missing not at random

(MNAR). Little's missing completely at random (MCAR) test for missing data was not statistically significant, X^2=37.67, df=44, p=.739, and we failed to reject the null hypothesis that data are missing at random. Students were more likely to respond to survey items at the beginning of the survey compared to the end of the survey, thereby disproportionately impacting certain scales compared to others. Little's MCAR test for gender, ethnic group, and first generation was also not statistically significant, X^2=36.45, df=44, p=.783. McNeish used a simulation study to provide evidence that samples with missing at random (MAR) or missing not at random (MNAR) data have no inflation in type-1 error. This conclusion is true for samples missing at most 20% missing data, irrespective of the sample size [25]. Hence for this study, data was not imputed for missing records. To assure overall representation of our population, demographics of our sample size (n=27) were compared to the CAMP-YES population (n=124). First generation students were disproportionately underrepresented in the sample (n=8; 30%) compared with the population (48%). However, female (n=8; 30% sample and 28% population), Hispanic (n=10; 37% sample and 39% population), and African American representation (n=3; 11% sample and 11% population) were closely represented. All scales being compared are interval data. Item response Likert-type scales on the AMS (scale 1-7) and SIPI (scale 1-9) were modified to a five-point scale for consistency. Five-point scales may improve response rate and quality by reducing frustration level with longer surveys [25]; it also allows comparison with other research using five-point Likert scales. The original SSES scale was a five-point scale.

Student composite scores were calculated by averaging numerical responses per scale. Specifically for the AMS, the construct was disaggregated into its three sub-constructs; Intrinsic

Motivation, Extrinsic Motivation, and Amotivation. As shown in Table 1, the 3 sub-scales for

Intrinsic Motivation; *Know*, *Accomplish*, and *Stimulation* were obtained from further

categorization of Intrinsic Motivation. Each subscale is composed of 4 items. *External*,

Introjected, and *Identified* were obtained from further categorization of Extrinsic Motivation.

Each subscale is measured by 4 items. Further separation of Amotivation was not done in the

original study and so it remains its own subscale with 4 corresponding items. Motivation is

measured by the Academic Motivation Scale which is created from the aggregation of the seven

subscales. (see Appendix A; Q2: 1-10, Q3: 1-10, Q4: 1-8).

Table 1

Academic Motivation (AMS) and Corresponding Items

Academic Motivation Scale					
Intrinsic Motivation		Extrinsic Motivation		Amotivation	
Know	Q2: 2, 9, Q3: 6, Q4: 3	External	Q2: 1, 8, 5, Q4: 2	Q2: 5, Q3: 2, 9, Q4: 6	
Accomplish	Q2: 6, Q3: 3, 10, Q4: 7	Introjected	Q2: 7, Q3: 4, Q4: 1, 8		
Stimulation	Q2: 4, Q3: 1, 8, Q4: 5	Identified	Q2: 3, 10, Q3: 7, Q4: 4		

Computational guidelines for the SIPI's composite score were not made in the original article

(see Appendix A, Q1: 1-8). Averages for numerical responses were assumed. SSES was

analyzed as an entire scale (see Appendix A: Q5: 1-20) and not broken into its respective

sub-constructs, *Appearance*, *Performance*, or *Social* due to lack of power. To test normality of

data from all 3 instruments (AMS, SIPI, SSES), 54 Shapiro-Wilk's test were conducted (9

sub-scales x 3 demographic groups x 2 grouping variables). Of the 54 tests, 14 tests did not meet

the criteria for approximately normally distributed data ($p<.05$). Levene's Test was run to check

homogeneity of variance for each scale per grouping variable and results showed no significant

values when tested. Due to a small sample and lack of evidence to support normality

assumptions, the nonparametric Mann-Whitney U test was conducted to compare groups. Effect

size for significant constructs were also calculated using the following equation [26]:

$$r = \frac{Z}{\sqrt{N}}$$

where Z = *z score* and N = *total number of cases*

r=.10 (small effect), r=.30 (medium effect), r=.50 (large effect) [27, 28]

Results

Scale Reliability: Internal Consistency

Composite reliability from the original studies were provided as a reference to the Cronbach

alpha test values from our study to verify internal consistency (Table 2). Sixteen items make the

Social Identity and Personal Identity Scale (SIPI) to measure the importance placed on social and

personal identity [1]; however, only 8 items measuring the social identity construct (α=.80) were

included on the survey. The Academic Motivation Scale (AMS) consists of 28 items [2], with 4

items for each of the 7 AMS subscales. AMS measures 3 types of intrinsic motivation (*to know*

α=.88, *to accomplish* α=.90, *for stimulation* α=.84); 3 types of extrinsic motivation (*external*

regulation α=.70, *introjected regulation* α=.79, *identified regulation* α=.61); and amotivation

(α=.78). The State Self Esteem Scale (SSES) contains 20 items [3]. This scale measures temporal

fluctuations in self-esteem (α=.91).

Cronbach's alpha values found for AMS *External* differed by a margin of more than .10. It lies

within acceptable range, but on the margin of questionable validity. Poor internal consistency

was found for AMS *Identified* α=.61 but when compared to the original study with an α=.62, alpha remained consistent. Test-retest correlations of the seven AMS subscales were run by Vallerand et al. [2] with a final α=.71 for this scale.

Table 2

Reliability Coefficients (Cronbach's α) for Each Construct

	SIPI[1]	SSES[3]	Constructs AMS Sub-Constructs						
			Intrinsic Motivation			Extrinsic Motivation			Amotivation[2]
α			Know[2]	Accomplish[2]	Stimulation[2]	External[2]	Introjected[2]	Identified[2]	
Original	.79	.92	.84	.85	.86	.83	.84	.62	.85
Study	.80	.91	.88	.90	.84	.70	.79	.61	.78

NOTE 1—Brackets refer to the reference number where α values were found

Study Sample Sizes and Sensitivity Power Analysis for the Mann Whitney U Test

The sample sizes for each demographic group reported in Tables 3-5 are:

Gender: Men=19, Women=8

Ethnicity: Majority=16, Underrepresented Minority=11

Generation: First Generation=8, Non-First Generation=19

A sensitivity power analysis was conducted for the Mann Whitney *U* test using the software *G*Power* to determine the expected level of effect for significant results for the group sample sizes listed above with $\alpha=.05$ and power=.80. The expected effect size for the gender and generation groups was Cohen's $d=1.26$ (large effect size), and for the ethnicity group Cohen's $d=1.17$ (large effect size); the equivalent *r* value for all groups was $r=.45$ (large effect size) [27].

Similar results were achieved for a sensitivity power analysis using more stringent levels at α=.01 and power=.90; the expected effect size for gender and generation groups was Cohen's *d*=1.79 (large effect size), and for the ethnicity group Cohen's *d*=1.66 (large effect size).

RQ1: What are the effects of race and gender identities on academic motivation?

From Tables 3 and 4, results from running a Mann-Whitney *U* indicate that Academic Motivation grouped by gender was significant for *Accomplish*, *Stimulation*, *Introjected*, and *Identified*. Although not displayed in the tables, effect sizes were calculated for groups with statistically significant differences and are denoted by *r*. Female students reported higher levels of intrinsic motivation in terms of the desire to achieve a goal (*Accomplishment, Median*=4.38, *U*=31, p=.016 , *r*=.46) than male students (*Median*=3.25); and to engage in stimulating experiences (*Stimulation, Median*=3.63, *U*=35, p=.029, *r*=.42) compared with their male counterparts (*Median*=2.75). Female students were also more likely to be extrinsically motivated by internalization of group norms (*Introjected Regulation:"what I am supposed to do,"* *Median*=4.75, *U*=33, p=.022, *r*=.44) compared to male students (*Median*=3.75); and importance of the behavior (*Identified Regulation: "what I choose to value," Median*=4.38, *U*=37, p=.039, *r*=.40) compared to their male counterparts (*Median*=3.5). These gendered findings are consistent with those of Vallerand et al. [2] for female Canadian college students. AMS grouped by ethnicity or first generation was non-significant for any of the three types of motivation.

RQ2: What are the effects of race and gender identities on social identity?

When grouped by ethnicity, SIPI was found to be significant with a large effect size (Tables 3 and 4). Due to the sample size, White and Asian students were aggregated into one group (Ethnic Group 1), and Hispanic and African American students into a second group (Ethnic Group 2). White and Asians are also the majority groups overrepresented in STEM jobs, while Hispanics and African Americans are underrepresented [29]. Hispanic and African American students (Ethnic Group 2, *Median*=3.38) reported higher levels of social identity compared with White and Asian students (Ethnic Group 1, *Median*=2.69, *U*=34.5, p=.007, *r*=.51). These findings are consistent with Nario-Redmond et al. [1] with American minority college students and international college students from African and Latin American countries studying at an American school. Global social identity seems to be culturally rooted within these two groups. Overall, SIPI grouped by gender or first generation was non-significant. Interesting patterns emerged when looking at each item by demographic group (Table 5; see Appendix A, Q1: 1-8). Female and non-First Generation students identified more strongly with other students in the same major (Q1.1). Female, Hispanic, and African American students identified more strongly with their families (Q1.2) and, along with First Generation students, with the places they have lived (Q1.4). Hispanic and African American students identified more strongly with their own racial group (Q1.5) and with the color of their skin (Q1.7). Female students identified more strongly with their gender group (Q1.6). Female students were also found to identify strongly with their own racial group and the color of their skin, however this may be a confounding result of ethnicity. Male, Hispanic, African American, and non-First Generation students identified more strongly with being a U.S. Citizen or permanent resident (Q1.8). It was very rewarding to

see that female and First Generation students identified more strongly with the CAMP-YES program (Q1.3), as the program was designed to create a "sense of community and inclusiveness" among diverse students.

RQ3: What are the effects of race and gender identities on temporal self-esteem?

Non-significant results were found for SSES as an entire scale (see Appendix A; Q5: 1-20). When looking at each item by demographic group for the Performance (P) Self-Esteem subscale (see Table 6), emerging patterns suggested that at least half of all groups felt confident about their abilities (Q5.1); at least half of male, White, Asians, and First Generation groups felt as smart as others (Q5.9); and at least half of all groups, except female students, felt confident that they understood things (Q5.14). For the Social (S) Self-Esteem subscale (see Table 6), emerging patterns suggested that half of White, Asian, and First Generation groups felt worried if they were regarded as a success or failure (Q5.2); and at least half of the male, White, Asian, and First Generation groups felt self-conscious in social situations (Q5.8). In sum, at least half of Male, White, Asians, and First Generation groups felt confident about their abilities and as smart as others, but worried if they were regarded as a success or failure and self-conscious in social situations. At least half of female, Hispanic, and African American groups felt confident about their abilities.

Table 3

Mann Whitney U Tests (p)

Demographics	SIPI	SSES	Constructs						
			AMS						
			Sub-Constructs						
			Intrinsic Motivation			Extrinsic Motivation			Amotivation
			Know	Accomplish	Stimulation	External	Introjected	Identified	
Gender	.13	.55	.39	.02*	.03*	.13	.02*	.04*	.48
Ethnicity	.01*	.61	.79	.72	.79	.51	.94	.29	.34
Generation	.74	.36	.55	.33	.06	.18	.12	.70	.98

NOTE 1—* refers to statistically significant values at the $p < .05$ level

Table 4

Median Ranks (Standard Deviation) for Significant Tests

Demographics	SIPI	Constructs			
		AMS			
		Sub-Constructs			
		Intrinsic Motivation		Extrinsic Motivation	
		Accomplish	Stimulation	Introjected	Identified
Male	--	3.25 (.93)	2.75 (1.02)	3.75 (.82)	3.50 (.98)
Female	--	4.38 (.55)	3.63 (.69)	4.75 (.68)	4.38 (.62)
Ethnic Group 1	2.69 (.78)	--	--	--	--
Ethnic Group 2	3.38 (.54)	--	--	--	--

NOTE 1—Ethnic Group 1 refers to White or Asian and Ethnic Group 2 refers to African American or Hispanic

Table 5

SIPI Scale (Social Identity): % Reporting High Group Identity ("Extremely/very important to who I am" responses)

Demographic	Q1.1	Q1.2	Q1.3	Q1.4	Q1.5	Q1.6	Q1.7	Q1.8
Male	15.79%	31.58%	15.79%	31.58%	10.53%	26.32%	15.79%	**47.37%**
Female	**22.22%**	**55.56%**	**22.22**%	**55.56%**	**22.22**%	**55.56%**	**33.33**%	22.22%
Ethnic Group 1	18.75%	31.25%	18.75%	31.25%	12.50%	25.00%	18.75%	31.25%
Ethnic Group 2	16.67%	**58.33%**	16.67%	**58.33%**	**25.00%**	**50.00%**	**25.00**%	**50.00%**
First Gen	12.50%	37.50%	**37.50%**	62.50%	**25.00%**	25.00%	**25.00%**	12.50%
Non-First Gen	**21.05%**	47.37%	10.53%	31.58%	10.53%	36.84%	15.79%	**42.11%**

NOTE 1—Ethnic Group 1 refers to White or Asian and Ethnic Group 2 refers to African American or Hispanic

Table 6

SSES Scale: % Reporting High State of Self-Esteem for Performance (P) Self-Esteem ("Extremely/ very much true at this moment") and Social Self-Esteem (S) Subscales ("Not at all/A little bit true at this moment")

	Male	Female	Ethnic Group 1	Ethnic Group 2	First Gen	Non - First Gen
Q5.1 (P)	**63%**	**50%**	**50%**	**73%**	**50%**	**63%**
Q5.2 (S)*	47%	38%	**50%**	36%	**50%**	42%
Q5.4 (P)*	26%	38%	19%	46%	38%	26%
Q5.5 (P)*	5%	38%	19%	9%	25%	11%
Q5.8 (S)*	**58%**	38%	**63%**	36%	**63%**	47%
Q5.9 (P)	**53%**	25%	**56%**	27%	**50%**	42%
Q5.10 (S)*	16%	25%	19%	18%	25%	16%
Q5.13 (S)*	21%	25%	19%	27%	38%	16%
Q5.14 (P)	**84%**	38%	**69%**	**73%**	63%	**74%**
Q5.15 (S)*	32%	25%	38%	18%	50%	21%
Q5.17 (S)*	53%	13%	44%	36%	50%	37%
Q5.18 (P)*	32%	38%	44%	18%	38%	32%
Q5.19 (P)*	16%	13%	25%	0%	25%	11%
Q5.20 (S)*	21%	25%	19%	27%	25%	21%

NOTE 1—***Reverse coded

Discussion

Clear beliefs about one's cultural and personal identities are positively related to self-esteem and psychological well-being [11], which in turn, with social support are among the predictors of better adjustment to college [8]. Moreover, students who report higher levels of social integration are more likely to have higher GPAs, especially significant for female students [30, 31]. Practical applications from the preliminary findings of our study show that college campus social environments in which North American, female students can thrive should include opportunities that promote engagement such as community service, experiential learning, living-learning

communities, major-related organizations and groups, and engineering outreach support [30, 32].

Results suggest that social support is integral to the academic success of female students.

Specifically, that female students are more influenced by group norm values they deem

important, and their desire to accomplish a goal and to engage in stimulating academic

experiences. If they lack social support systems (peers, family, friends, institutional), failure to

realize these deeply entrenched needs may lead to disengagement from the pursuit of STEM

careers. The poignant story and experiences of "Inez" an engineering student from a

disadvantaged background is a prime example of the importance of feeling part of the

engineering community [33].

Results suggest that Hispanic and African American students have a strong global social identity

that is culturally ingrained. Like female students, if they lack social support systems (peers,

family, friends, institutional), failure to realize culturally rooted needs may lead to

disengagement from the pursuit of STEM careers. Practical applications of these results overlap

with campus engagement opportunities those of female students. Engineering outreach support

and experiential learning activities appeal strongly to minority students [32]. No significant

results were found for First Generation students. However, temporal self-esteem discrete item

results suggest that First Generation students have some similar characteristics to White and

Asian students. They feel confident in their abilities, feel as smart as others, but feel worried

about how they are perceived by others and self-conscious in social settings. Although the need

for social support was not found to be significant for these groups, they can benefit from

participation in design competition teams and experiential learning [32]. Practical applications of

prior studies and the results of our study demonstrate that core features of the CAMP-YES program -- experiential learning, mentoring, and group activities that promote a "sense of community and inclusiveness"-- is one example of a program design based on sound, theoretical foundations.

Limitations and Future Directions

The preliminary findings presented in this paper should be treated with caution due to the small sample sizes. It was also not possible to perform further tests on intersectionality of each ethnic group (Hispanic, African American, etc.), nor confirmatory factor analysis on the modified AMS and SIPI scales due to the small sample size. The sample was limited to students participating in the CAMP-YES program. Future work should focus on larger sample sizes and longitudinal studies of whether the perception of self changes over time. Also of interest would be how the three scales, AMS, SIPI, and SSES relate to each other.

Acknowledgment

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Appendix A

CAMP-YES Survey (Adapted from [1], [2], [3])

Response options for Q1: SIPI

Not at all Important to who I am	Of little importance to who I am	Moderately important to who I am	Very important to who I am	Extremely important to who I am
1	2	3	4	5

Response options for Q2, Q3, Q4: AMS

Does not correspond at all to how I feel	Corresponds a little to how I feel	Corresponds moderately to how I feel	Corresponds a lot to how I feel	Corresponds exactly to how I feel
1	2	3	4	5

Response options for Q5: SSES

Not at all true	A little bit true	Somewhat true	Very much true	Extremely true
1	2	3	4	5

WHY DO YOU GO TO COLLEGE ?

_____

Q1 Being a male or female, being part of an ethnic group, being a member of your family, etc. may be an important part of how you see yourself. Please indicate to what extent how central or important various group memberships is to your sense of who you are: How do you see yourself as a member of a group?

1. The similarity I share with other students in my major.	1	2	3	4	5
2. My family nationality or nationalities.	1	2	3	4	5
3. The membership I have as part of the CAMP-YES program group.	1	2	3	4	5
4. The places I have lived.	1	2	3	4	5
5. My sense of belonging to my own racial group.	1	2	3	4	5
6. My gender group.	1	2	3	4	5
7. The color of my skin.	1	2	3	4	5
8. My being a citizen of this country.	1	2	3	4	5

Q2 Questions 2-4 ask you to indicate the extent to which each of the following items corresponds to one of the reasons why you chose your major: How do you feel right now about your choice of major?

1. Because with only a high-school degree I would not
     find a high-paying job later on.   1   2   3   4   5

2. Because I experience pleasure and satisfaction
     while learning new things.   1   2   3   4   5

3. Because I think that a college education will help me
     better prepare for the career I have chosen.   1   2   3   4   5

4. For the intense feelings I experience when I am
     communicating my own ideas to others.   1   2   3   4   5

5. Honestly, I don't know; I really feel that I am
     wasting my time in school. *   1   2   3   4   5

6. For the pleasure I experience while surpassing
     myself in my studies.   1   2   3   4   5

7. To prove to myself that I am capable of complet-
     ing my college degree.   1   2   3   4   5

8. In order to obtain a more prestigious job later on.   1   2   3   4   5

9. For the pleasure I experience when I discover
     new things never seen before.   1   2   3   4   5

10. Because eventually it will enable me to enter the
     job market in a field that I like.   1   2   3   4   5

* Reverse coded

Q3 Please indicate to what extent each of the following items corresponds to one of the reasons why you chose your major: How do you feel right now about your choice of major?

1. For the pleasure that I experience when I read
     interesting authors.   1   2   3   4   5

2. I once had good reasons for going to college;
     however, now I wonder whether I should
     continue. *   1   2   3   4   5

3. For the pleasure that I experience while I am
     Surpassing myself in one of my personal
     Accomplishments.   1   2   3   4   5

4. Because of the fact that when I succeed in

college I feel important.   1   2   3   4   5
5. Because I want to have the "good life" later on.   1   2   3   4   5

6. For the pleasure that I experience in broadening
      My knowledge about subjects which appeal   1   2   3   4   5
      to me.

7. Because this will help me make a better choice
      regarding my career orientation.   1   2   3   4   5

8. For the pleasure that I experience when I feel
      completely absorbed by what certain authors   1   2   3   4   5
      have written.

9. I can't see why I go to college and frankly,
      I couldn't care less. *   1   2   3   4   5

10. For the satisfaction I feel when I am in the
      process of accomplishing difficult academic   1   2   3   4   5
      activities.

***Reverse coded**

<u>Q4 Please indicate to what extent each of the following items corresponds to one of the reasons why you chose your major</u>: How do you feel right now about your choice of major?

1. To show myself that I am an intelligent person.   1   2   3   4   5

2. In order to have a better salary later on.   1   2   3   4   5

3. Because my studies allow me to continue to
      learn about many things that interest me.   1   2   3   4   5

4. Because I believe that a few additional years
      of education will improve my competence   1   2   3   4   5
      as a worker.

5. For the "high" feeling that I experience while
      Reading about various interesting subjects.   1   2   3   4   5

6. I don't know; I can't understand what I am
      doing in school.*   1   2   3   4   5

7. To prove to myself that I am capable of completing
      my college degree.   1   2   3   4   5

8. Because I want to show myself that I can
      succeed in my studies.   1   2   3   4   5

***Reverse coded**

Q5 Please indicate the extent to which each of the following items presently corresponds to what is true for you at this moment: What are you thinking at this moment?

1. I feel confident about my abilities.	1	2	3	4	5
2. I am worried about whether I am regarded as a success or failure.*	1	2	3	4	5
3. I feel satisfied with the way my body looks right now..	1	2	3	4	5
4. I feel frustrated or rattled about my performance.*	1	2	3	4	5
5. I feel that I am having trouble understanding things that I read.*	1	2	3	4	5
6. I feel that others respect and admire me.	1	2	3	4	5
7. I am dissatisfied with my weight.*	1	2	3	4	5
8. I feel self-conscious.*	1	2	3	4	5
9. I feel as smart as others.	1	2	3	4	5
10. I feel displeased with myself.*	1	2	3	4	5
11. I feel confident about my abilities.	1	2	3	4	5
12. I am pleased with my appearance right now.	1	2	3	4	5
13. I am worried about what other people think of me.*	1	2	3	4	5
14. I feel confident that I understand things.	1	2	3	4	5
15.I feel inferior to others at this moment.*	1	2	3	4	5
16. I feel unattractive.*	1	2	3	4	5
17. I feel concerned about the impression I am making.*	1	2	3	4	5
18. I feel that I have less scholastic ability right now than others.*	1	2	3	4	5
19. I feel like I'm not doing well.*	1	2	3	4	5
20. I am worried about looking foolish.*	1	2	3	4	5

*Reverse coded

Q6 Please indicate to what extent each of the following items presently represent your post-graduation intentions.

1. I plan to look for employment in my field or
     related field.   1   2   3   4   5

2. I plan to apply to graduate or professional
     school in my field or related field.   1   2   3   4   5

3. I plan to look for employment and apply to
     graduate or professional school in my
     field or related field.   1   2   3   4   5

4. I plan to look for employment outside of my field.   1   2   3   4   5

5. I plan to apply to graduate school or professional
     school outside my field.   1   2   3   4   5

6. I plan to look for employment outside of my field
     and apply to graduate or professional school
     in my field or related field.   1   2   3   4   5

7. I plan to look for employment in my field and apply
     to graduate or professional school outside my field.   1   2   3   4   5

8. I plan to do something other than any of the choices
     listed above.   1   2   3   4   5

Q7 Please indicate your gender.
Male (1)   Female (2)

Q8 Please indicate your ethnic group.
American Indian (1)
Asian (2)
African American (3)
Hispanic (4)
Multiracial (5) _____
Pacific Islander (6)
White (7)

Q9 Are you the first in your family to pursue a bachelor's degree?
Yes (1) No (2)

Q10 How many times have you changed majors?
1 (1)   2 (2)   3 (3)   0 - I have never changed majors (4)