

Supplemental Material

CBE—Life Sciences Education

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Supplemental Material Appendix 1

Aspiring Scientists Summer Internship Program (ASSIP) Alumni Survey

1. Year(s) Attended ASSIP:

2007 2008 2009 2010 2011 2012

2. Did you participate in ASSIP as a high school and/or college student?

High School College Both

3. Highest education you will have completed in August 2012:

High School Diploma
Undergraduate Degree
Masters Degree
PhD
MD
other:

4. Educational Status in August 2012

High School Student
Undergraduate Student
Masters Degree Student
PhD Student
MD Student
I will not be enrolled in a educational program at this time
other:

5. As of Fall 2012, what will your educational status at your institution be?

Freshman/Year 1
Sophomore/Year 2
Junior/Year 3
Senior/Year 4
Year 5
Year 6
I will not be enrolled in an educational program in Fall 2012

6. Cumulative GPA at your current institution (please list GPA from your most recent institution if you recently graduated and have not taken classes at another institution):

4.0 3.5-3.99 3.0-3.49 2.5-2.99 2.0-2.49 Less than 2.0

7. What factors and experiences led you to become interested in science, technology, engineering, or math?

I was inspired by a childhood experience or encounter with nature, astronomy, etc.
I was inspired by a relative or friend who introduced me to science, technology, engineering or math
I was inspired by a high school teacher

I was inspired by a non-fiction book, TV show, or movie
I was inspired by a fiction book, TV show, or movie
I was inspired by visiting a museum
I was inspired by a hands-on project such as a science fair or research experience
I was inspired by performing laboratory experiments in class
other:

8. What was the strongest factor and experience that led you to become interested in science, technology, engineering, or math?

I was inspired by a childhood experience or encounter with nature, astronomy, etc.
I was inspired by a relative or friend who introduced me to science, technology, engineering or math
I was inspired by a high school teacher
I was inspired by a non-fiction book, TV show, or movie
I was inspired by a fiction book, TV show, or movie
I was inspired by visiting a museum
I was inspired by a hands-on project such as a science fair or research experience
I was inspired by performing laboratory experiments in class
other:

9. Please provide any additional details about the experience(s) which led you to become interested in science, technology, engineering or math.

10. What is your current or intended undergraduate degree?

Biology
Chemistry
Neuroscience
Engineering
Physics
Math
Public Health
Business
Communication
Nursing
Education
Medical Technology
other:

11. What degree/s do you intend to achieve?

Associates Degree
Bachelors Degree
Masters Degree
PhD
MD
Other Advanced Degree

12. If you are interested in pursuing or are currently pursuing a graduate/professional degree program, what is your intended major?

Biology
Chemistry
Neuroscience
Math
Engineering
Physics
Public Health
Business
Communication
Nursing
Education
Medical Technology
Medicine
Dentistry
Law
other:

13. Which best describes your current status?

I am a high school student
I am an undergraduate student planning to pursue a science, technology, engineering, or math related job after I graduate
I am an undergraduate student planning to pursue a career outside of the science, technology, engineering or math fields after I graduate
I am an undergraduate student and plan to immediately go to graduate school
I have graduated and am looking for a job
I have graduated and am working in the science, technology, engineering or math field
I have graduated and am working in a field outside of science, technology, engineering, or math.
other:

14. Which category(s) best describes your desired employment?

Laboratory/Scientific Research
Computer Science
Healthcare
Engineering
Education
Administrative, science related
Non-science, technology, engineering or math related employment
Other:

DEMOGRAPHIC INFORMATION: (Optional)

The following questions are for our information only. Your cooperation is requested and appreciated but not required. This information is voluntary and will not affect your participation in ASSIP

15. Gender:

Male Female

16. Ethnic Group/Race:

American Indian/Alaska Native: All persons having origins in any of the original peoples of North America and who maintain cultural identification through tribal affiliation or community.

Asian: A person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, including, for example, Cambodia, China, Japan, Korea, India, Malaysia, Pakistan, Thailand and Vietnam.

Black or African American: A person having origins in any of the black racial groups of Africa.

Native Hawaiian or Other Pacific Islander: A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

White: All persons having origins in any of the original peoples of Europe, North Africa, or the Middle East.

2 or More Races

Hispanic/Latino Origin: A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race.

Not of Hispanic/Latino Origin

Other

Not Disclosed

EDUCATIONAL AND CAREER GOALS BEFORE YOU PARTICIPATED IN ASSIP

17. What degree/s did you plan to pursue before you participated in ASSIP?

Associates Degree

Bachelors Degree

Masters Degree

PhD

Medical Degree

18. What did you intend to major in before participating in ASSIP

Biology

Chemistry

Neuroscience

Math

Engineering

Physics

Public Health

Business

Communication

Nursing

Education

Medical Technology

Medicine

Dentistry

Law

ASWER PROMPTS FOR THE FOLLOWING QUESTIONS

Strongly Agree Agree Neither agree or disagree Disagree Strongly Disagree

19. I was confident that I would pursue a degree and future employment in science, technology, engineering or math before participating in ASSIP.

20. ASSIP contributed to my continued interest in science, technology, engineering, or math.

AFTER PARTICIPATING IN THE ASPIRING SCIENTISTS SUMMER INTERNSHIP PROGRAM:

21. I gained a greater understanding of scientific research.

22. I have enhanced critical thinking and scientific analysis skills.

23. I better understand material I learn in the classroom and/or read in scientific literature.

24. I am more efficient at identifying research questions and designing experiments.

25. I more creatively solve problems inside and outside of the classroom.

26. I am more aware of scientific career opportunities.

27. I have more self confidence.

28. I will apply for a graduate school or medical program.

29. I am more prepared for a career in science, technology, engineering or math than my peers who have not participated in hands-on research experiences.

30. I am more prepared for a non-science, technology, engineering or math career than my peers who have not participated in hands-on research experiences.

31. I am more prepared for a graduate degree program than my peers who have not participated in hands-on research experiences.

32. I will pursue a career in science, technology, engineering, or math.

33. I discovered that I am not interested in a science, technology, engineering or math related career.

34. I will recommend that others participate in ASSIP.

PERSONAL STATEMENT

35. Please provide any additional comments regarding your ASSIP experience.

Table 1 Supplement. ASSIP applicants and participants

Year	ASSIP Applicants (n)	ASSIP Participants (n)	ASSIP Acceptance Rate (%)
2007	20	14	80%
2008	68	21	31%
2009	99	23	23%
2010	156	39	25%
2011	306	47	15%
2012	362	50	14%
2013	624	62	10%

Table 2 Supplement. Multi-year ASSIP Participant Survey Responders

Student	Years Participated	Participation Status
Student 1	2007, 2008	High School and Undergraduate
Student 2	2007, 2009	High School and Undergraduate
Student 3	2008, 2009, 2011	High School and Undergraduate
Student 4	2009, 2010	High School and Undergraduate
Student 5	2009, 2010	High School and Undergraduate
Student 6	2009, 2010	High School and Undergraduate
Student 7	2009, 2010	Undergraduate
Student 8	2009, 2010	High School
Student 9	2009, 2010	High School and Undergraduate
Student 10	2009, 2010	High School and Undergraduate
Student 11	2009, 2010	High School and Undergraduate
Student 12	2009, 2010	High School and Undergraduate
Student 13	2009, 2010	High School
Student 14	2010, 2011	High School
Student 15	2010, 2011	High School
Student 16	2010, 2011	High School
Student 17	2010, 2011	High School
Student 18	2010, 2011	High School

Table 3 Supplement.

Alumni who Changed Aspiring Degree Preference
Before and After ASSIP

Year	Changed Degree Preference^a	
2007	1/5	(20%)
2008	1/5	(20%)
2009	6/17	(35.3%)
2010	4/20	(20%)
2011	12/30	(40%)
2012	14/42	(33.3%)
2013	12/49	(24.5%)

The number of students who reported a change in degree preference is compared to the total number of survey responders from each year.

^a Students shifted aspiring degree preference before and after ASSIP from:

Associate's degree to a more advanced degree (2)

Bachelors degree to post bachelorette degree (14)

Master's degree to PhD, MD, or dual MD/PhD (6)

PhD to MD or dual MD/PhD (2)

MD to dual MD/ PhD (8)

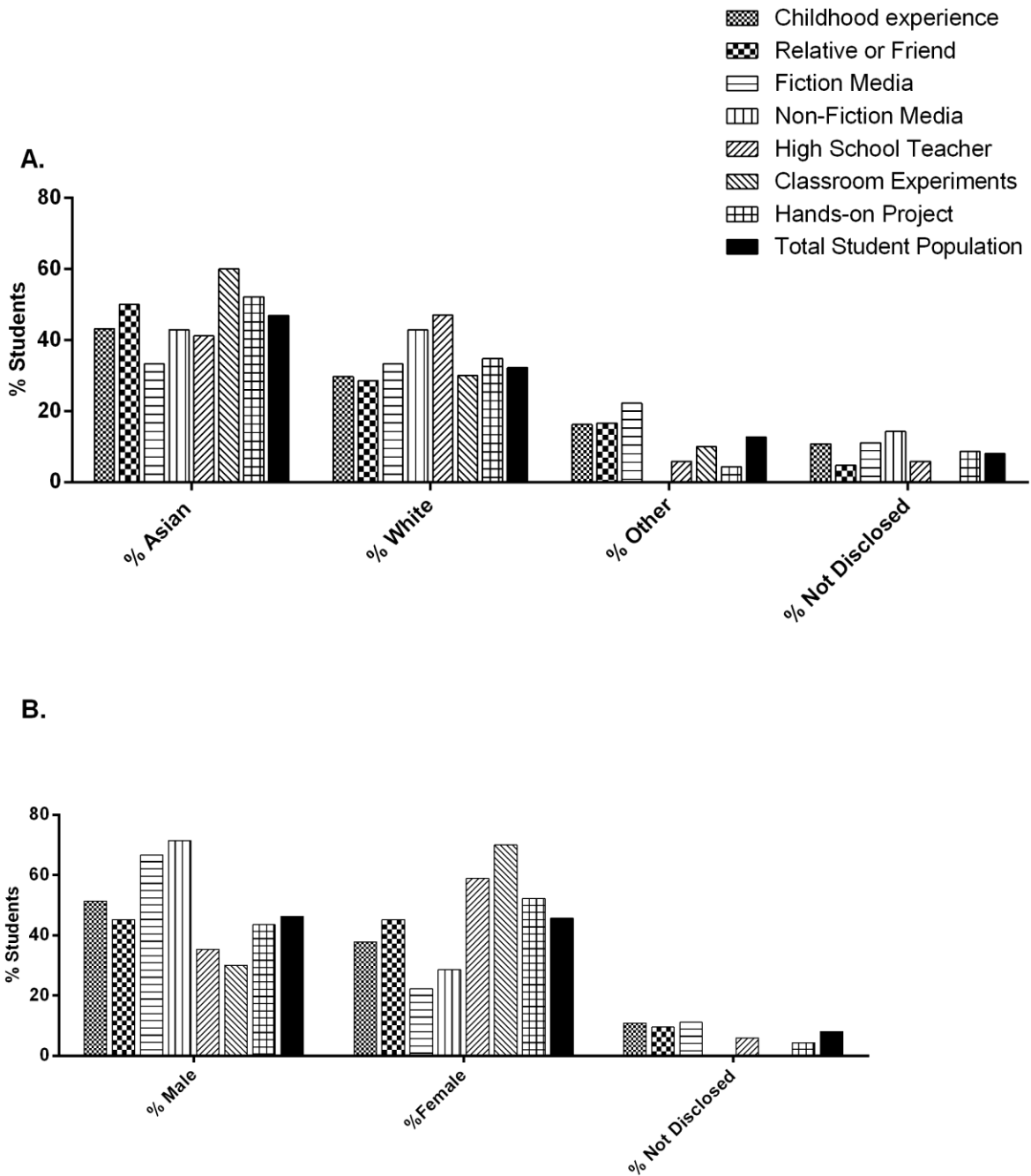
MD to Bachelors (3)

PhD to Master's (2)

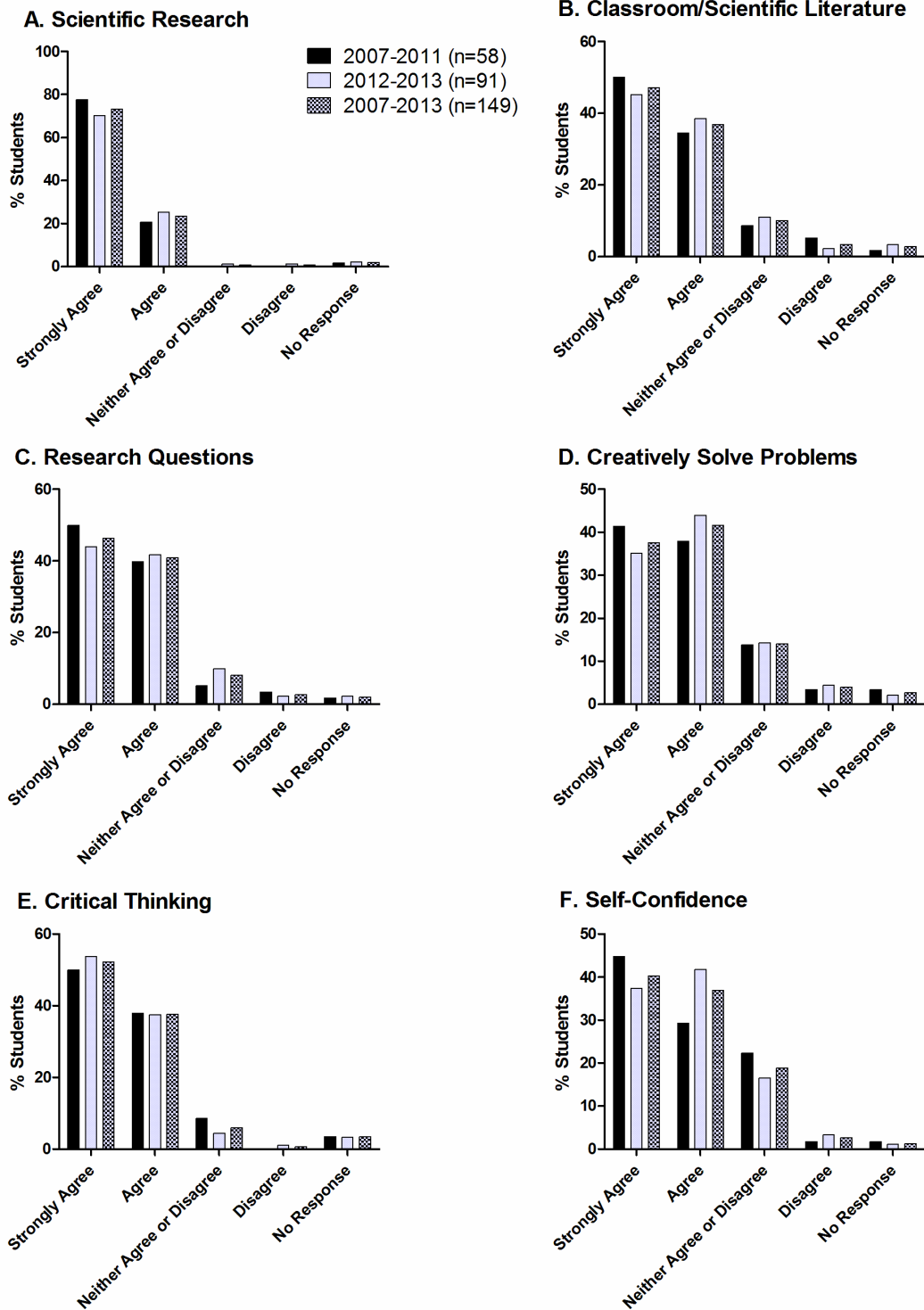
Dual MD/PhD to MD (2)

Not Disclosed to a Degree Preference (5)

Degree Preference to Not Disclosed (2)

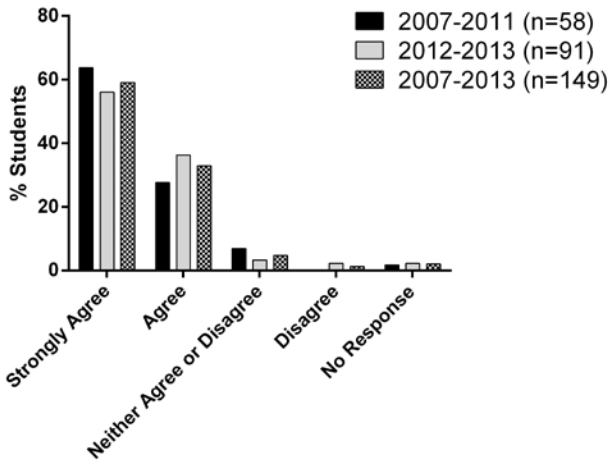


Supplemental Figure 1. The strongest factors that inspired the 2007-2013 ASSIP alumni’s initial interest in STEM were independent of gender and ethnicity. A) We tracked the percentage of students in each ethnic category that chose a particular factor that inspired their initial interest in STEM. The percentage of each ethnic category compared to the total survey responders is shown in solid black. The ethnicity of the responders was categorized as Asian, White, Other, or Not Disclosed. A population of 19 students who were American Indian or Alaskan Native, Black or African American, Hispanic/Latino, and Native Hawaiian or other Pacific Islander were classified as “other” to create a population size sufficient for comparison. **B)** The percentage of male and female students is reported for each factor that inspired their initial interest in STEM. The proportion of male and female responders in the total population is shown in solid black.

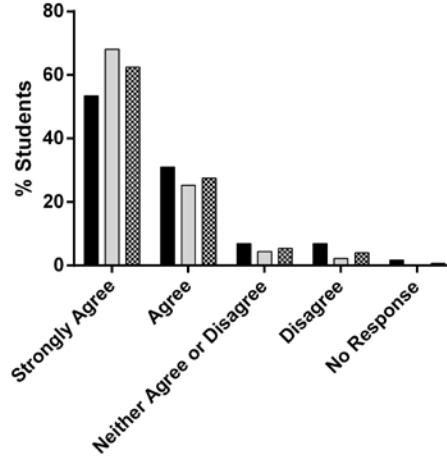


Supplemental Figure 2. There were no differences in the perceived influences of ASSIP on academic and scientific readiness among the 2007-2011 and 2012-2013 groups. The percentage of responses from the 2007-2011 and 2012-2013 cohorts were compared regarding their perceptions of the impact of ASSIP on **A)** understanding scientific research ($p > 0.3507$), **B)** comprehending material learned in the classroom and/or read in scientific literature ($p > 0.3778$), **C)** identifying research questions and designing experiments ($p > 0.3688$), **D)** solving problems inside and outside of the classroom ($p > 0.49$), **E)** advancing critical thinking and scientific analysis skills ($p > 0.3147$), and **F)** developing more self confidence ($p > 0.1636$). The percentage of students from the entire data set (2007-2013) is also reported.

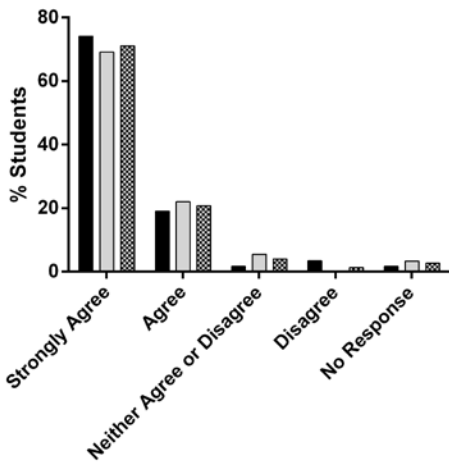
A. Awareness of Career Opportunities



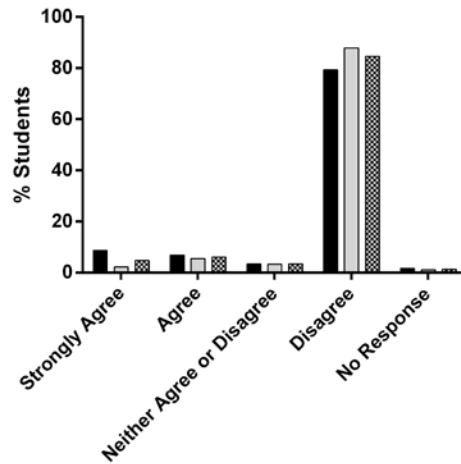
B. Interested in STEM Career Before ASSIP



C. Interested in STEM Career After ASSIP



D. Not Interested in STEM Career After ASSIP



Supplemental Figure 3. There were no differences in perceived career awareness and STEM career aspirations among the 2007-2011 and 2012-2013 groups. The percentage of responses from the 2007-2011 and 2012-2013 cohorts were compared regarding their **A)** awareness of STEM career opportunities ($p>0.2894$), **B)** interest in a STEM career before ASSIP ($p>0.084$), **C)** interest in STEM career after ASSIP ($p>0.1499$), and **D)** disinterest in a STEM career ($p>0.11$). The percentage of students from each cohort and the entire data set (2007-2013) are reported.