

FOLLOW-UP QUALITATIVE EVALUATION REPORT FOR THE SMITH COLLEGE SUMMER RESEARCH PROGRAM

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This report summarizes findings from follow-up interviews conducted as the third part of a three part evaluation of the Smith College Summer Research program. Reference should be made to the earlier report on the more extensive interviews ¹ and to the survey report ² in order to place the findings in appropriate context. The three evaluation parts were: the in-depth interviews with a longitudinal, stratified sample of summer research alums; the subsequent survey sent to all of the program alums, informed by the findings of the in-depth interviews; and follow-up interviews with a sample of alums to further explore selected questions remaining after the survey. These questions, as provided by the researchers who conducted the survey were:

- What influence did the summer research program have on developing career aspirations?
- How did career aspirations influence the decision to participate in the summer research program?
- What influence did the summer research experience have in one's subsequent career?
- What influence did the summer research experience have on one's personal life, including
 - Personal interests and hobbies?
 - Transferable skills learned from the research experience (particularly for those interviewees who did not go into science-specific careers)?
 - Any other transferrable skills or effects?
- What influence did the summer research program have on one's self concept?
 - Do participants see themselves as scientists, whether or not they work as scientists?
 - Do participants see themselves as somehow different than their peers who did not have this experience (i.e., does their worldview seem different from others)?

A stratified sample of fifteen alums was drawn from a list of alums supplied by Smith College. The sample was stratified along the following criteria:

- Science discipline in which alums had majored, including biology, chemistry, geology, psychology, and math

¹ Pedersen-Gallegos, Liane "Qualitative Evaluation of the Summer Research Program at Smith College, 2007.

² Lopatto, David and Trosset, Carol, "Report on the Smith College Alumnae Survey," 2008.

- Minority status, with the goal of including at least one alum from an underrepresented racial group from each of the five science disciplines listed above
- Subsequent career, including those who went into careers in science and those who did not
- A “control group” of alums who did not participate in the summer research program but who did go on to work as scientists³
- Alums who had not been interviewed in the previous round of interviews

The sample design was as follows: five groups of three individuals all with the same science major in college. Each of the groups included one of the three following: participated in the program and went on to a science-specific career; participated in the program but did not go into a science-specific career; and a “control” who did not participate in the summer program, but who did go on to a science-specific career. One of the three persons in each of the five sciences was to be a person from an underrepresented racial group, distributed along the other criteria to include a minority alum from each major, subsequent career in science or not, and in the control group of non-program participants who had a career in science. Where possible, alums were also chosen to represent the span of the program from its early years to the most recent group included in the overall sample (see the initial sample universe as described in the first round of interviews).

It was possible to fill each of the “cells” in the ideal sample, with a couple of exceptions. The difficulty in securing an interviewee from each of the cells was due to the limited number of alums in some of the category “cells,” particularly the minority category, varying success in securing an interview with specific alums, and the availability of an alum in a particular stratification category who had not already been interviewed in the initial round of in-depth interviews. Refer to Illustration 1 and Illustration 2 below that depict the intended, ideal stratified sample, and the actual sample. The stratification of the final sample was adequate, given the consistency of responses from the interviewees.

³ The working definition of “scientist” used here included not only research scientists, but also those whose work involved the “practice” of science in some capacity. Examples include physicians and academics in scientific disciplines. “Non-science” careers included such professions as ministry and business.

ILLUSTRATION 1

IDEAL SAMPLE

	Research Yes	Science Career Yes	Research Yes	Science Career No	Rsch No	Science Career Yes
Biology	Caucasian					
Biology				Caucasian		
Biology				Minority		
Psychology	Caucasian					
Psychology				Minority		
Psychology				Caucasian		
Math	Caucasian					
Math				Minority		
Math				Caucasian		
Chemistry	Minority					
Chemistry				Caucasian		
Chemistry				Caucasian		
Geology				Caucasian		
Geology				Caucasian		
Geology	Minority					

ILLUSTRATION 2

ACTUAL SAMPLE

	Research Yes	Science Career Yes	Research Yes	Science Career No	Rsch No	Science Career Yes
Biology	Caucasian					
Biology	Caucasian					
Biology				Minority		
Psychology				Minority		
Psychology						
Math	Caucasian					
Math				Minority		
Math				Caucasian		
Chemistry	Caucasian					
Chemistry	Caucasian					
Chemistry				Caucasian		
Geology				Caucasian		
Geology				Caucasian		
Geology	Minority					

Findings

The findings described in this addendum are not different in kind from those reported in the earlier, more extensive, interviews. The strongest themes that emerged from this more recent set of interviews and the feedback related to the post survey questions are summarized below.

Influence of the Summer Research Program on Career Aspirations and in Subsequent Careers

The respondents generally regarded the summer research experience as a meaningful introduction to careers in science, and research in particular. For those who determined that a career as a scientist or researcher was not right for them, the summer research experience nonetheless contributed to their subsequent work roles, especially those who worked in scientific disciplines, albeit not in the role of a scientist (administration position in a science-oriented business, for example).

The program provided participants with the opportunity to “try on” working in science to see if it “suited” them. Participants who went on to work as scientists benefited from learning what research entails, by acquiring specific research skills and by gaining the confidence necessary for them to come to see challenging careers in science as within their grasp. The process appears to be sequential in this way:

- feeling flattered to be considered for, and then accepted into, this (prestigious) program;
- discovery of what research entails, including the requisite time, perseverance, and focus;
- developing and appreciating the capacity to work independently, seeking answers to questions on their own, as is done by scientists in their respective disciplines;
- feeling excited about working on meaningful, real world, projects;
- subsequently identifying themselves as legitimate participants in a genuine scientific endeavor;
- getting the satisfaction of completing a significant project, regardless of whether or not they “succeeded,” as in proving a specific hypothesis; and
- developing the confidence to take the next steps toward an ambitious career in science.

The summer research experience provided the training, support, and subsequent confidence to develop ambitious aspirations and then to gain the confidence to pursue them. Prior to the summer research, becoming a scientist frequently appeared to be out of one’s reach. The program afforded students with the opportunity to accomplish something to which participants did not previously have the confidence even to aspire to do.

In cases where students opted for non-research careers the program also provided encouragement and preparation. Benefits included the ability to relate science to their specific work roles and the confidence to respond confidently to sexist barriers when they arose. They also reported that their background in science (especially the summer program) gave them an advantage over their peers without similar experiences.

Students who did not participate in the summer program, but who went on to have science-related careers, reported benefiting from the hands-on research they experienced as part of their classroom-

based projects. In these cases they did not perceive an opportunity lost, but they also did not report the range of benefits described by program participants. For example, participants in the program reported gaining confidence in problem-solving and innovation that would not have been possible during the more limited course of a classroom-based project. In addition, the experience of conducting research as a member of a small, select group during the summer inspired them to rise to the challenges inherent in their subsequent work.

Both working alongside their advisors, and learning to work independently promoted them to the status of (albeit junior) teammates with and colleagues to their advisors. To not only be regarded and treated as responsible adults, but also as credible colleagues alongside their professors, was beyond what many students had envisioned prior to learning about the summer research program. Their motivation to rise to the challenges of their research projects was facilitated by feeling elevated to such an extent. This empowerment carried over into their careers, and as such, was life-changing.

Accordingly, those who did not have the summer research experience did not regard it as an opportunity lost—it remained beyond the horizon of their earlier aspirations and they did not appear to be aware of the magnitude of the gains participants made. They expressed appreciation for the general support and empowerment they received at Smith College, but did not describe the particular type of encouragement as did the summer research participants. In sum, these were:

- making presentations
- working independently
- innovating
- confidence when responding to discrimination

Those who had the summer research experience reported being more prepared than their peers in graduate school and in their first jobs. Their practical understanding about how to conduct research, and hence how to conduct themselves, in the scientific world, gave them the confidence to excel beyond what they thought they would have without the experience. This confidence enabled them to be leaders among their peers and to exceed the expectations of supervisors and/or graduate advisors and, as mentioned above, earlier expectations they had of themselves.

The Influence of Career Aspirations in Science on Decisions to Participate in the Summer Research Program at Smith College

In general, students did not plan ahead of time to apply to the program. Their previous interest in science was not a sufficient motivator for them to apply, nor was it always even a necessary reason. As one respondent explained, she developed an interest in science as a result of participating in the program, and applied only after encouragement from a professor. This indicates that, at least in this case, involvement with the program was not necessarily part of a long-term career plan. Motivations for applying varied widely, from a desire to stay on campus through the summer, to earn some money during the summer, as well as part of an overall career plan to pursue science. The range of answers implies that a “no” answer to a related question on the survey may have multiple meanings, such as:

- looking for a summer job
- desire to remain on campus for the summer
- curiosity about science
- attraction to a prestigious program, and
- feeling honored to be encouraged to apply.

It would seem, then, that the program has the potential of exposing students to science in a depth that is not possible during the regular school year and to attract students who might not otherwise enroll in science classes.

Influences on Research Participants who Did Not Pursue a Career in Science

Those who did not pursue careers in science were influenced enough that it affected the mentoring that they provided for their own children. That is to say, that even though the experience did not lead them into science careers themselves, they recognized the value of spending their summers studying a potential career path in science and promoted this in discussion with their own children.

They also credited the experience with providing them with “soft skills” in their professions, such as working effectively and collegially as part of a team, working and problem-solving independently, and making presentations. They appreciated these boosts in their professional development. Perhaps most importantly, they reported benefiting by learning to think in a scientific way, applying critical thinking to their non-science careers, and analyzing information in general in a more scientific way. They expressed appreciation for the increase in their confidence when responding to scientific issues related to their work, seeing themselves as different from their peers in this respect.

Other Influences on Self-perception

Similarly, participants reported bringing the critical thinking skills they gained from the summer research experiences to bear in their private, as well as professional, lives. For example, they observed things more carefully than their peers without similar experience in scientific research, approaching such things as research reports and others’ observations with a reserved, “scientific skepticism.” This “measured” worldview also carried over into personal relationships. It influenced their encouragement of their children to pursue science and summer research, as discussed above by project participants who did not pursue careers in science, and they chose friends with similar science backgrounds and education. For this reason, it was not so much that they regarded themselves as different from their peers, as it was that they associated with a higher achieving peer group, presumably as a result of their entrée into a more elite peer group. For instance, current friendships were likely to have originated in graduate school and/or their colleagues at work in science-relevant careers.

There were no reports of summer research influences directly influencing choices of hobbies or leisure activities. At the same time, their personal friends shared their expertise in and orientation to science, and it was common ground in these relationships that influenced their choice of leisure activities.

Conclusion

The general sentiment of these interviewees was that their experiences with the summer research program significantly enhanced their career paths, as well as their personal growth. In addition, they emphasized that the program is of ongoing importance. As one woman indicated, it is especially important right now with our global economic challenges, as there is an ever-greater need for people who can work independently and who know how to be innovative problem-solvers. As a couple of the other women noted, there are still situations in their professional lives in which women are intimidated. The overall experience at Smith College, and the summer research program in particular, prepared them to cope with these challenges. In both cases, self-confidence is key.

In sum, the rewards of the summer research program exceeded students' expectations, and indicators in the survey that a particular benefit was not gained by the experience is quite likely *not* a simple, all-encompassing "No." Instead, it is more likely to be in response to a specific benefit and not an indicator that there were no benefits.