

**Expectations and Perceptions of Undergraduate Research Mentoring: Comparing
First Generation, Low Income White/Caucasian and African American Students**

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This study examines how student scholars from first generation college and low income (FGLI) backgrounds and/or African American students perceive a research mentoring relationship. There has been much literature on the positive benefits of participating in mentored undergraduate research for student development (Bauer and Bennett, 2002; Nagda, Gregerman, Jonides, von Hippel, and Lerner 1998; Boenninger and Hakim, 1999). Nonetheless, these studies did not focus on the particular features of the student-mentor relationship. Further most studies of mentoring minority and or first generation students have focused largely on issues of retention and graduation (see Nnadozie, Ishiyama and Chon, 2001; Gregerman, 1999) rather than on student perceptions of the benefits of mentored undergraduate research.

The literature that examines the dynamics of the mentoring relationship mostly focuses either on ascertaining best practices by examining what “mentors” believe work, excluding the student perspective (see Monte, 2001; Schultz, 2001). Others that have examined student perceptions of the mentoring relationship have done so generally without examining differences between continuing generation, first generation and minority student perceptions of mentoring (Center of Inquiry in the Liberal Arts, Wabash College, 2004; Lopatto, 2003), concentrating more on noting differences between faculty and student perceptions of benefits.

Using data compiled from oral interviews of thirty-three participants in the Ronald E. McNair Post Baccalaureate Achievement Program at Truman State University, this study has two purposes. First, in contrast to most of the literature that examines the mentoring relationship in collaborative undergraduate research, this study explicitly examines the perceptions of mentoring and research held by first generation college students and African American students at a primarily white/Caucasian institution. Second, the lessons learned from this inquiry may serve to better guide

research programs in the process of mentor-student pairing that specifically target first generation college and other students from groups underrepresented in higher education.

Literature on Student Perceptions of Mentoring in Undergraduate Research

As a basic framework for this project, I borrow from the work of David Lopatto (2003). Lopatto was primarily motivated by the desire to learn what features both students and faculty believe are essential to the undergraduate research experience and to determine if there are shared perspectives. The study involved 41 faculty participants and 249 students who had participated in a collaborative undergraduate research experience at four primarily liberal arts undergraduate institutions. In examining the responses provide by both faculty and students, Lopatto differentiated between two sorts of responses, those that related to what he called *structure* items, and those that were *consideration* items (Muchinsky, 1990; Baba and Ace,1989). Structure items refer to those features “of the undergraduate research that contribute to the structure of the research problem or processes.” These items may include issues regarding facilities and equipment, assignment of tasks, scheduling, assistance with literature searchers, aiding in integrating the student into the profession, and a range of other academically oriented activities.

On the other hand consideration items refer to “those features of mentor behavior that contribute to the emotional and social needs of the student (Lopatto, 2003 p. 14) This includes consideration by the mentor by being available for consultations, acting helpful and concerned and open to the students’ views. These items also included being receptive to the personal concerns of the student and developing a continual personal relationship.

Lopatto investigated student responses (n=249), most of whom were in the natural sciences , the physical sciences, and a few in psychology. All were seniors that had concluded a collaborative research project mentored by a faculty member. Each student asked to comment on what were the

most important benefits they derived from the undergraduate research experience. The top five answers (in descending order) most provided were “enhancement of professional or academic credentials” “clarification of career path” “understanding the research process in your field” “learning a topic in depth” “developing a continuing relationship with a faculty member.” Interestingly, most of the responses related to academic benefits to the student rather than personal consideration benefits.

A study similar to the Lopatto study was conducted at Wabash College in 2003. As with the Lopatto study the primary goal of the Wabash project was to determine the degree of agreement between faculty and student perceptions of the research experience and concentrated primarily on those rising seniors who had completed a research project. When asked about the primary goals of the internship, the most common response of interns was to enable the students to have an authentic discipline experience—i.e., to discover what working in a field is like in a hands-on manner (which is similar to the “understanding the research process in your field” and the “learning in depth” responses in the Lopatto study. However, interns rarely mentioned consideration benefits such as developing a personal relationship with the mentor beyond work-related conversations (only 6% of the participants mentioned this as a benefit) (Center of Inquiry in the Liberal Arts, 2004, p. 8).

Although these works help frame this inquiry, there are some key omissions in both of these studies. In particular, neither of these studies reported results differentiated by race, nor college generational status. Indeed, the Wabash study was exclusively limited to male student participants (given Wabash College’s status as a highly selective male only liberal arts college). Further, the sample of student responses were taken from students who had completed a collaborative research project as opposed to examining differences between students beginning the process versus those who had finished their projects

There is also good reason to believe that there may be differences based on race and/or college generational status in student perceptions of a mentored research experience. There have been several studies that examined mentoring students of color, although most of these (like the work of Wubah, Gasparich, Schaefer, Brakke, McDonald and Downey (2000) and Gregerman 1999) examined the impact of participation in undergraduate research on the retention of minority students and students with low achievement. One exception that has partially examined student perceptions of the research mentoring experience is the work of Crawford, Figert, Suarez-Balcazar, Nyden and Reich, (1996). They found that the most often mentioned benefits (75%) included how to conduct a research project and better preparation for reaching their career and professional goals. Unfortunately the results were not broken down by ethnic/racial group, nor class rank.

In addition to race, there is good reason to believe that mentoring first generation college students (or those students whose parents did not graduate from a four-year college or university) is different from mentoring continuing generation students (Attinasi, 1989; York-Anderson and Bowman, 1991). In particular, several scholars have noted that there are significant differences between first generation students and continuing generation students, especially in terms of college expectations and the desire to seek a personal connection with a faculty member (London, 1989; Billson and Terry, 1982; Terenzini et al 1996).

Methodology

The thirty-three participants in this study were recruited from the Ronald E. McNair Post-baccalaureate Achievement Program at Truman State University. The national McNair program established by the U.S. DOE in 1987, was named in honor of the scientist and astronaut who died in the 1986 space-shuttle *Challenger* explosion. The primary purpose of the program is to provide effective preparation for entrance into a graduate school program leading to a doctorate by First generation low income (FGLI) college students and/or students from under-represented minority

groups. Students who participate in this program are provided with research opportunities and faculty mentors. Currently there are 156 programs, serving 3,641 students nationwide. The program at Truman State University, which was established in 1992, is designed to provide continuous research mentoring from the time the student enters the program as a first term sophomore student, until they graduate and, hopefully, enter graduate school.

Thirty-three students were orally interviewed, from November 2003 to May 2004. Only students from three groups serviced by the McNair program were interviewed—white/Caucasian students who were from First Generation, Low Income backgrounds; African American students who were from First Generation and Low Income backgrounds; and African American students who were from Continuing Generation backgrounds. Students from other groups (such as Asian First Generation and Hispanic/Latina students) were excluded largely because they comprised only an extremely small proportion of the McNair student population. Fifteen of those students interviewed were rising seniors and had completed the Summer Research Internship. Eighteen students had just begun the research process in April 2004 at the end of their Sophomore year. In addition, eleven (33.3%) of the sample were White/Caucasian First Generation College Students, twelve (44.5%) were African American First Generation College Students, and ten (30.3%) were African American Continuing Generation Students. Finally in terms of gender breakdown 60.6% of the sample participants were female and 39.4% were male. This breakdown corresponds closely to gender breakdown of the student population at Truman (which is 60% female and 40% male). Eleven students were from the natural and physical sciences (biology, chemistry, physics, agricultural science) 17 were from the social sciences and business (psychology, sociology, political science, economics, anthropology, business, health and human performance, and communication disorders) and five were from the humanities and arts (literature, art history, history, French)

Students were asked to participate in the study and once they consented to participate, each student was orally interviewed, and asked a series of questions over a twenty to twenty five minute period. The questions were generally open-ended, save for those items that comprised the career support benefits, the research support benefits, and the personal consideration benefits indexes..Each participant was asked three different sets of questions to ascertain how they perceived the mentoring relationship. The first set involved questions about what the student thought the mentor's role should be vis-a vis the student. The second asked the student to describe in an open ended way what they regarded as the benefits from the mentored research experience, and the third asked the student to describe a "good" mentoring relationship.

The first set of questions (which actually appeared in the middle of the interview) asked the student to respond in one of three ways to a statement on what a mentor's role should be—not important, somewhat important, and very important. Responses were coded from 0 to 2 with 0 representing not important and 2 representing very important. Eleven statements were used, two of which were not included in the calculation of the index scores. Three index scores were calculated from the responses—the career support index (compiled from the responses to item 1 "to help the student find internship opportunities" item 7 "to stand up for the student and work on his or her behalf" and item 8 "to give advice on careers and graduate schools"), the Research/Academic support index (compiled from the responses to item 2 "to provide the student with guidance in finding appropriate literature", item 5 "to provide student with guidance on appropriate research techniques" and item 6 "to provide the student with guidance on selecting a research topic") and the Personal Consideration Index (compiled from the responses to item 3 "to listen to the student's personal concerns" item 4 "to be a good listener" and item 11 "to be a friend"). A Cronbach's Alpha test of the three sets of items (at .75, .73, .67 respectively for each index) indicated that the items could be usefully combined into a set of additive measures. Thus each of the responses were added

together and divided by three to render a single score for career support index, the Research Academic Support index and the Personal Consideration Index, with a high score of 3 indicating very important and a low composite score indicating less perceived importance.

The second set of questions asked the students about what they regarded as the “benefits” from the mentored research experience. Lopatto (2003), in his study, identified several benefits and listed the top benefits identified by students derived from a mentored research experience as (in descending order) “Enhancement of professional or academic credentials”, “Clarification of Career Path”, “Understanding the Research Process in your field”, “Learning a Topic in Depth”, and “Developing a Continuing Relationship with a faculty member”. Using these categories I coded the open-ended student responses to correspond to each of the themes identified by Lopatto. For instance statements like “knowing my mentor helps me academically, he knows a lot of people in the field, he is well connected, and got some tricks to contact people and make connections; he is pretty well respected in his field” and “the research experience makes me more marketable and better connected when I go to a conference” were coded as “enhancement of the professional or academic credentials.” Statements like “it was the best thing I have ever done at Truman; helped sharpen my career goals and made me want to be a sociologist” were coded as “clarification of career path.” Further, statements like “getting to know someone who has done it all” and “having someone to watch out for you” were coded as exemplifying “developing a continuing relationship with a faculty member.” To check for the validity of the coding procedure, an additional coder was used to code the statements made by the 33 participants. The intercoder reliability coefficient was calculated at .91, which indicated a relatively high degree of agreement between the two coders.

The third set of questions asked the participants to describe the characteristics of a “good” mentor. The descriptors used were then categorized into five themes: “Expert in their field”, “Accessible”, “Friendly”, “Communicative of goals and plans”, “Personally concerned with

student's welfare", and "Helpful with project". All of the descriptors expressed by the respondents fit into one of the five themes.

Results

First, I ran a simple difference of means test regarding the first set of questions as to the mentor's role, by the three test groups (White/Caucasian, FGLI students, African American FGLI students, and African American continuing generation students). The results indicated that the perceived career support benefits for all three groups were roughly similar (the mean score differences were not statistically significant: $F = 1.907, p = .17$). This would suggest that there were no significant differences across the three groups in what students perceived as the proper role of the mentor. Further this was also the case for perceived research benefits ($F = .36, p = .70$). However, what is most striking is the differences in the perceived personal consideration scores, with White/Caucasian FGLI college students significantly less likely to think that personal consideration should be an important part of the mentor's role when compared to either African American FGLI or African American continuing generation students ($F = 9.60, p = .001$). This result indicates that African American students generally were much more likely to value a personal connection with mentors than were White/Caucasian FGLI students.

When examining these results again, but this time comparing students entering the program versus students who had finished the research program, White FGLI college students were significantly less likely to view the mentor's role as one of personal support when compared to African American FGLI students and African American Continuing generation students ($F = 3.74, p = .02$). Interestingly, for both African American FGLI students and African American continuing generation students the personal consideration score decreased over year in program and the difference was statistically significant ($F = 4.82, p = .01$, and $F = 4.62, p = .01$). Thus African American students who went through the research program were far less likely to consider personal

consideration as important to the mentor's role. This might suggest that as African American students become exposed to research mentoring they become less likely to view personal consideration important as part of the research project. However more conclusive evidence will have to wait until future panel studies following particular students over time can be completed.

I then examined the students' expectations about the role of the mentor by the racial makeup of the mentor-student dyad. The literature has suggested that African American mentor- African American student relationships are qualitatively different than mixed race dyads (see Crawford, Figert, Suarez-Balcazar, Nyden and Reich, 1996). Of the 33 dyads, only five involved African American faculty-student (AA-AA) dyads, so the results should be considered with some degree of caution. The results indicated that although relatively little difference exists in the expectations of students in mixed race and AA-AA dyads regarding career support and research support, students in AA-AA dyads expect far less in terms of personal support from mentors than students in mixed race dyads. This is a rather surprising finding, given the emphasis in the literature on mentoring minorities of the need for minority faculty mentors to mentor minority students (see Crawford, Figert, Suarez-Balcazar, Nyden and Reich, 1996) However, upon closer examination of the responses students provided to the open ended questions regarding why they made the choices they made, three of the African American students (all females) who had African American mentors (one male and two females) reported that they felt intimidated by their mentor, not because of personality conflicts, but because they felt greater pressure to perform well in the face of someone who, as one student put it "had made it."

In addition, I also examined the career support, research support and personal consideration scores by three fields- natural and physical sciences (biology, chemistry, agricultural science, mathematics) social sciences-business (psychology, sociology, political science, economics, anthropology, business, Health, and Communication Disorders), and the humanities-arts (literature,

art history, history, French). The results indicated that generally there are no major (i.e. statistically significant) differences when comparing across the three fields of study. The one exception is with humanities students, who tend to emphasize personal consideration more than other students (although this difference is not statistically significant).

Turning to the issue of perceived “benefits” of participating in a mentored undergraduate research experience, I examined the frequency of mentions by six theme codes, five derived from the Lopatto (2003) study and one additional theme code. The themes most frequently mentioned (in descending order) by the students in the Lopatto study are illustrated for comparative purposes. The other three columns represent the three groups in this study, and the themes are ordered (in descending order) from the themes most mentioned to the themes least mentioned.

What is interesting about these results is that the rank order of the benefits most mentioned in the Lopatto study correspond very well to the rank order of the benefits most mentioned by students from the White FGLI college student group. Indeed the benefit of “Enhancement of professional or academic credentials” was mentioned by all 11 members of this group, which was also the most frequently mentioned benefit by students participating in the Four colleges in the Lopatto study. However, when considering the responses of African American students (both first generation and continuing generation) these students are much more likely to mention Clarification of Career path (making them comparable to the results reported in the Lopatto study) but are far more likely to cite “psychological benefits” such as “feeling more comfortable with faculty” or “feeling more confident about myself and my abilities” than either White First Generation students (who never mentioned psychological benefits) or the students in the Lopatto study.

I then examined the most frequently mentioned benefits that students said they derived or thought they would derive (in the case of the students first entering the program) from participating in a mentored research project by both group and year in program. The most frequently mentioned

benefit for White, FGLI entering students was the “enhancement of professional or academic credentials,” which was also the most frequently cited benefit for students concluding the program. Indeed the top three mentioned benefits (enhancement of professional or academic credentials, developing a continuing relationship with a faculty member, and understanding the research process) were the same for both the entering group of White FGLI students and White FGLI students concluding the program. However, for African American students (both FGLI and continuing generation students) perceptions regarding the benefits of the research experience changed considerably. Although “clarification of career path” and “understanding the research process” remained high on the list of benefits for both AA FGLI and AA continuing generation students, psychological benefits were far less important for students concluding the program for both groups. This might suggest that African American students undergo a greater transformation by participating in a mentored research project, at least in terms of both expectations regarding roles of the mentors and what they identify as the particular benefits.

I investigated the descriptors used by students to describe a “good” mentoring relationship. Interestingly, White FGLI students tend to use terms that describe a good mentor as “expert in the field” much more than any other descriptor. On the other hand, African American students, both FGLI and continuing generation, are much more likely to mention descriptors related to being “personally concerned with the student’s welfare” when describing a “good mentoring relationship.”

Finally I compared students who had just entered the program versus students who had finished the program. What is most striking is the remarkable degree of consistency in descriptors used by students entering the program and students concluding the program across all three groups. In particular white FGLI student consistently emphasized that a “good” mentor was expert in the field, whereas African American students frequently tended to emphasize “personal concern” as an important quality. Indeed, when queried further about the descriptors they used, students made

statements like “[a mentor] should take a personal interest in me and I can come by just to talk about stuff, beyond academics” or “I like it when a mentor asks me how my life is going.”

Conclusions

In sum the above results indicate that, in general, African American students participating in the McNair program at Truman State University, both FGLI and continuing generation, are much more likely than White FGLI students to emphasize the personal consideration role of mentors, psychological benefits from the research experience, and to describe a good mentor as someone who is personally supportive. However, over time African American students who participate in the McNair program tend to deemphasize personal considerations in the mentor role, and the psychological benefits derived from the research experience. Nonetheless, and perhaps somewhat paradoxically, African American students continue to describe a good mentor in “personal” terms. Perhaps this represents some tension between the ideal and the reality. That is, after experiencing the mentoring relationship African American students shift to recognizing benefits beyond personal consideration, but still strongly emphasize the notion that a good mentor is personally supportive.

It is tempting to offer some speculative explanations for these findings. For instance, it may be the case that one of the reasons why African American students tend to emphasize items that reflect personal support and growth is that since Truman State University is not racially diverse (and with a student body that is primarily white/Caucasian) and in a rurally isolated area. Thus, African American students seek out support and external validation from mentors to help “fit in” or what Vincent Tinto (1975) called “academic” and “social integration.” Perhaps this is one of the reasons why African American students in mixed race dyads valued personal consideration much more so than African American students with African American mentors. If this were the case then we would expect that African American students at institutions where there are many more African American students (and mentors) that this desire to seek personal consideration and support would be far less.

However, great care should be taken not to over interpret the results. Indeed it should be remembered that this was not a panel study following particular students over time. Thus, it is not possible to conclude that the students themselves have changed over time. In addition, any conclusions regarding whether African American students seek out personal consideration and support at Truman because the university is predominantly White/Caucasian would be merely speculative. Such analysis will have to wait until more cross institutional studies involving McNair students at other predominantly African American colleges and universities can be conducted.

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