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# African Women Pursuing Graduate Studies in the Sciences: Racism, Gender Bias, and Third World Marginality<sup>1</sup>

JOSEPHINE BEOKU-BETTS

*This paper illuminates some of the factors that shape the educational goals and outcomes of African women who pursued graduate studies in scientific disciplines at western universities between the 1960s and 1990s. Based on a qualitative study of 15 African women scientists, almost all of whom are employed in academic institutions in their respective countries, I examine how racism, Third World location, and gender bias affected their graduate education experiences in scientific disciplines. The study also addresses the extent to which the women were aware of how these factors affected how they were perceived and mentored by professors, interacted with peer groups, as well as managed the demands of graduate school along with marriage and family relations. The study demonstrates why issues of diversity are salient to the discourse on ways to address the recruitment and retention of women in science.*

**Keywords:** African women / African women scientists / Third World women in science / graduate science education / international women graduate students / women in science

In recent years, there has been much discussion among social scientists, feminist scholars, and policymakers that, while some progress has been made for women in the sciences, in most societies there is still a gender gap and loss of women in science related-occupations (Etzkowitz, Kemelgor, and Uzzi 2000; Hanson 1996). In Third World societies especially, women have low enrollments in science courses, particularly outside the biological sciences, lower achievement levels, and increasingly negative attitudes toward science disciplines (Gender Working Group 1995; Harding and McGregor 1995). Studies in women's labor market participation in scientific occupations also suggest that while women are being hired, they are absent from specific high level talent pools (Hanson, Schaub, and Baker 1996; Rayman and Brett 1993). For example, women constitute less than one-third of the faculty in most universities and are significantly less likely than men to hold top level administrative or professorial positions in the academic hierarchy (Currie, Thiele, and Harris 2002, 35).

In identifying factors that influence these trends in women's science education and careers, scholars have focused mainly on the gender differentiated experiences of White, middle-class, North American and Euro-

pean scientists (Harding 1998, 1991). The main argument has been that differential access to the distribution of resources tends to favor men over women and that this fosters the maintenance of sex/gender based systems of inequality in the sciences (Hanson 1996). Discrimination on the basis of race, ethnicity, and class are also additional problems women of color from Europe, North America, and Third World societies face in gaining entry to, and promotion in, scientific fields. However, very little of the comparative research has addressed the needs and experiences of women of color in these diverse contexts (Beoku-Betts 2000; Harding 1991; Jordan 1999; Mukhopadhyay 1994; Sands 1993; Subrahmanyam 1998; Sur 2001).

Harding (1991) views the lack of representation and neglect of the experiences of Black women in discourses on gender and science as a consequence of racist practices that have silenced people of African descent in the practice of science. This has made it difficult to examine ways in which people in diverse social contexts have interacted and responded to western scientific and technological traditions and also to determine what people of European descent can similarly learn about themselves from the experiences of others. One of the consequences is that only partial and distorted accounts can be produced about American and European experiences as well as the experiences of historically dominated and marginalized societies in the Third World. Regarding this issue, Collins also points out that, "Gender analyses that rely too heavily upon the experiences of middle class White women in the West, inadvertently replicate structures of racial privilege while claiming to dismantle gender privilege" (1999, 271).

This paper examines the experiences of African women as graduate students in scientific disciplines. These women studied in universities in North America and Europe between the 1960s and 1990s and are currently in academic positions in their respective countries. I focus on how issues of race and gender bias and marginality as Third World subjects affected their experiences as graduate students in scientific disciplines. I also examine the extent to which the women were aware of how particular educational contexts such as mentoring, peer group interaction, and juggling the demands of marriage and graduate school affected their lives and shaped their ways of coping. I argue that the ability of women of color from Third World societies (specifically African societies), to succeed in scientific disciplines is based on multiple factors that go beyond gender bias within the patriarchal structure of science education.

African women face struggles for legitimacy in the scientific community as a result of the particular material and political conditions of their societies. As Subrahmanyam states, "these women are marginal Third World scientists" (1998, 41). For example, the increasingly poor quality of science training and shortage of good faculty in many African universities is one significant factor affecting opportunities for more women and

men to succeed in science in these societies. In many African countries, problems of economic recession and structural adjustment since the 1980s have led to an overall decline in educational budgets (Beoku-Betts 1998). On many university campuses, classes are overcrowded and students have to stand outside lecture halls or report early to their classrooms in order to secure a seat (Assie Lumumba 1995, 1). Studies also suggest that the academic qualifications of faculty at most universities have declined to a level where many of the faculty are not Ph.D. holders (Enos 1995; Sawyerr 2002). These problems are not only typical of African societies but are also shared with many other countries in the Third World (Altbach 1987; Subrahmanyam 1998).

The issue of racial bias is another significant factor affecting the representation of African women and their struggle for legitimacy as Third World women of color in the scientific community. Studies have shown that many international students consider racial discrimination in host countries to be an important factor affecting their experiences, allowing for variations by country of origin (Lawley and Blight 1997, cited in Kenway and Bullen 2003). Rosser (1999) also illustrates this point when she describes the chilly environments women from Third World countries encounter in pursuing graduate work in science, engineering, and mathematics in the United States. She argues that North American scientists and engineers tend not to accept these women as qualified scientists, questioning their ability to undertake graduate work or professional scientific employment.

Although these conditions are constantly undergoing negotiation and change in local and global contexts, including the scientific community, their analysis provides a more complex understanding of the varying conditions that shape the academic goals and outcomes of women who pursue graduate training in scientific disciplines. In the case of African women, the experiences of race and gender bias are consistent with feminist discourses regarding the recruitment and retention of women in science. However, their location as Third World women of color from marginalized societies in the global economic system broadens understanding about the pervasive ways in which Western hegemony has continued to affect cultural relations throughout the global system (Kenway and Bullen 2003).

According to Collins (1999), issues of gender, race, ethnicity, class, along with other identities, have compound consequences for women's experiences in a variety of areas. Women's experiences as graduate students in scientific disciplines must therefore be examined in ways that reflect these various conditions of their lives, the power relations which structure them in various locations, and the strategies of negotiation and resistance they employ to address their concerns.

## Study and Method

The findings I report in this paper are selected from a larger study I conducted on the perspectives and experiences of African and Caribbean women in academic and administrative careers. I draw on a small sample of 15 doctoral-level scientists in research and academic institutions in the English speaking sub-Saharan Africa region. The criteria for selecting the particular group were that they must have attained their undergraduate degrees in scientific disciplines in their home countries, graduate degrees in other, preferably Western, countries, as well as experience teaching or research work in their own countries.

I found study participants through my participation at a conference on women in science, as well as through key individuals. As a result of these contacts, I was able to gain access to women scientists through the use of the snowball technique and by earning the trust and confidence of those who were willing to be interviewed. As an African researcher, I was also able to gain the women's trust and participation by explaining my interest in bringing the voices of African women to the discussion on women in scientific disciplines and careers.

I conducted semi-structured interviews to give the participants the opportunity to voice their opinions and relate their experiences on their own terms. The interview schedule allowed ample opportunity for the study participants to elaborate or to introduce issues considered relevant. Each interview was completed in 1.5 to 2 hours, although in some cases subsequent interviews were necessary. Interviews were conducted face-to-face or by telephone and were tape recorded. After transcribing the interviews, I searched for general themes and sorted them for relevance and order of importance. The purpose was to provide a descriptive map to show how African women perceived particular factors affecting their ability to succeed in graduate training in the sciences while studying abroad. The main themes identified in discussions about these experiences were mentoring, peer group relations, and coping with graduate work and marriage and family life.

### Characteristics of the Sample

Study participants ranged in age from 37 to 67 years. The 15 women came from various countries in sub-Saharan Africa: seven from Ghana, three from Nigeria, three from Sierra Leone, and one each from Cameroon and Zimbabwe. They included three professors, two associate professors, four senior lecturers/research fellows, four assistant professors/research fellows, one postdoctoral fellow, and one advanced-level Ph.D. student. The latter two were currently completing their studies at prominent universities in the United States. The fields of study were represented by two

physicists, one chemist, one mathematician, one plant pathologist, one plant physiologist, one horticultural scientist, one pharmacologist, three biochemists, two nutritionists, one infectious diseases specialist, and one zoologist. All of the study participants studied overseas for the Ph.D. Seven studied in the United States or Canada and eight studied in Europe. Among those who studied in Europe, six were trained in the United Kingdom and two were trained under "sandwich" programs arranged between their home universities and universities in Norway and Germany.

Among the 15 women, four had at least one parent who had never been to school and seven had at least one parent who had attended only primary school. In most cases, it was the mothers who had either not been to school or had completed at least primary school education. Five women had parents who had finished secondary school, mainly their fathers. Among those with university degrees, five women had fathers who had received a university degree, and only one person had both parents with a university degree. Eight of the women were married, four women were divorced or separated, and three women were single, but hoping to get married and have families while pursuing a career. Nine women had two or more children, two had one child, one was pregnant, and two had no children. Finally, the majority of study participants (12) were also responsible for raising the children of less privileged extended family members in their homes. All names used in this paper are pseudonyms.

## Findings

### **"I lost my identity, I became the Black girl": Experiences of Racial Bias**

One of the consequences of the failure of African governments to provide adequate funding for their higher education institutions is that after undergraduate education, many science graduates who have the opportunity or the means pursue further studies in Europe or North America. Among those who pursue graduate studies abroad, the experience of racism is a very distinctive factor affecting Third World women of color. In some ways, their experience of racial bias is similar to those experienced by other people of color in these societies (Jordan 1999; Kenway and Bullen 2003; Sands 1993). For example, the majority of the women in the study commented on the significance of racial bias during their graduate training. Specifically, they discussed how prejudice and discrimination against them as Black women had affected their experiences in graduate school. Among the issues they mentioned were doubts by White professors about their ability to do the work, feelings of exclusion, lack of support, perceptions about their inability to speak English, and negative perceptions of African societies. The following statements are representative of those made by study participants:

My graduate experience was very difficult. Being in a White institution, it was like, what is this girl doing here? I lost my identity. I became the Black girl. A lot of them assumed I couldn't understand English or [that I was dumb]. After the first semester, their attitudes changed.

—*Dr. Kona Bouya, Assistant Professor of Chemistry*

In the department, there was a bit of hostility from White students, but I am a mature person and my Christianity enables me to deal with it. It wasn't a woman thing, as there were White women students, but it was more racial.

—*Dr. Bola Kelfa, Senior Lecturer, Plant Physiology*

In graduate school it was a Black and White thing more than gender. X State University was the best land-grant university for the state; over 24,000 students and just 300 Black students. I always wore my [traditional African clothes]. The head of the department asked me to do a number of remedial courses in biochemistry, even though he was aware of my background. I got all A's and he was rather embarrassed. It was a "can she really do it attitude." In these White schools, you were expected to prove yourself. When you do, they become supportive. A lot of it was more racial than anything else. I am a confident person. Your thinking that I don't measure up does not mean that I don't measure up. If I were a Black American, I would have succumbed, if all throughout they have been putting you down, but I was sure of myself.

—*Dr. Effie Dogu, Professor, Biochemistry*

These comments reflect the complex ways in which the women experienced racial bias as graduate students. While none of them claimed to experience overt racism, they were aware that being asked to take remedial classes and comments on their "accents" and language skills were consistent with racial stereotyping of Black people. This is clearly reflected in the comments of Dr. Dogu regarding the psychological effects of racism on African Americans and how her self-affirmation and validation as an African (overtly displayed through her dress) would not allow her to succumb to that.

In addition to how they felt they were perceived as Blacks, study participants were also sensitive to the nuances of being both Black and of African identity and the compounding effects in terms of perceptions and racist behavior by the host culture.

I did my Ph.D. in Canada. That was a different story. It was an extremely cold environment. The people were as cold as the weather. For me, I was usually the only Black person in the class. That was a problem in itself. Most of the time they looked at you when you walked into class as if you were making a mistake coming in. Most times you go into a class and you are the only one. In almost all the courses I took, I was the only Black female graduate student. The perception was always bad. There was this perception that a Black woman in any aspect of science just cannot make it. It wasn't true for all the professors, but it was true for 90 percent of the professors I worked with. . . . In the

sciences I think we have two problems as African students, irrespective of whether you are male or female. Because of where we have come from, they often think it is impossible for you to do a good lab research. If you manage to cross the course-taking hurdle, you have that to deal with. . . . You have to prove yourself. You have no choice. When you prove yourself, you are taken more seriously.

—*Dr. Abiana Zimba, Post-Doctoral Fellow in Pharmacy*

While such experiences of racial discrimination were felt mainly in the academic setting, there were a few women who felt more socially isolated outside of the university setting than within it. Whether due to race or language or perceptions of their country of origin, it was therefore difficult for many to adapt and to make friends. One woman said that this may likely have affected the success of graduate students like herself, and there were some women she knew who had returned home because they could not cope. Many however did cope, either by drawing on their own self-confidence, their spiritual beliefs, or relying on the comradeship of other international students.

### **“These things are subtle”:**

#### **Experiences of Intersection of Race and Gender**

While racial bias was perceived as a critical factor affecting how most of the women experienced their exclusion or felt differentiated from other graduate students, several were also aware of how the interconnections between their racial identity as Black and their gender identity as women positioned them as “outsiders.” Several women were cognizant of having to grapple with the intersectional effects of the two as they tried to articulate how they experienced particular situations. For some in specific situations, it was not always clear whether it was a race or gender effect or both. Consequently, in order to make sense of what they were encountering, some found ways of distilling which direction these effects were coming from by comparing if White women were affected by the same experience. An assistant professor of plant pathology and a Ph.D. candidate in infectious diseases, explained this difficulty in this way:

It wasn't immediately obvious. These things are subtle. And I was a capable student, so, part of the flack, you know, was covered by that. But you still feel that if you had been some other person, things would have gone better in certain issues, you know. So, it's subtle, you can't pinpoint it. . . . You know, you don't get praised as much and you know you are doing a good job, just as well as the other person, other people. And you openly see them getting praised for doing equal amounts of work, or even less than that, you know. It probably was racial. Okay, sometimes it was gender, sometimes it was race, and sometimes you can't separate the two—until you say, White women are suffering, then you know it's a gender thing.

—*Dr. Fatma Sago, Assistant Professor, Plant Pathology*

I believe my contribution to the field is not tied to my being a woman. It has to do with my being an African woman. In the academic setting where I am, there are adequate opportunities for women to be involved in research. For me what is important are the contributions I would make as a Black person. It's a different ballgame altogether, whether I am able to contribute in the capacity as a Black woman, not a woman. It takes time to establish yourself. It comes with commitment and hard work.

—*Ade Bodu, Ph.D. Candidate in Infectious Diseases*

For Dr. Sago and Ade Bodu, there was an element of awareness, if somewhat implicit, of how societal and institutional processes can function to negate and exclude Black women from science and the production of scientific knowledge. This is consistent with Barr and Birke's study (1998) on how nonacademic women perceive science and the scientific community. In their study, they show how institutionalized racism and sexism negatively have an impact on the lives of Black women who are made to feel excluded and to feel that they do not have the capacity to do science. Both narratives also indicate some element of "the burden of representation" (Brah 1996) that these women carry as they struggle to affirm and validate their ability as scholars. With this burden of representation comes a need to identify beyond that of self and to dispel misrepresentations of their capabilities as Black women. This misrepresentation of the Black woman and nonwestern woman of color as intellectually backward in contrast to their White counterparts is well documented in the works of postcolonial feminist and Black feminist scholars such as Avtar Brah (1996), Patricia Hill Collins (1999), Trinh Minh-Ha (1988), and Chandra Mohanty (1988). The comments of study participants in relation to their awareness and perceptions of these gendered racial misrepresentations are also consistent with findings on the intersections of race and gender in the studies of Wendy Luttrell (1993).

### **"I was always viewed as a Third World person": Third World Marginality**

While race and gender bias and the confluence of the two can be interpreted as shared experiences for different categories of women graduate students, the context of Third World marginality is a distinctive factor differentiating the experiences of African women graduate students in science. For example, Kenway and Bullen (2003) draw on Hage's (1998) identification of the category "Third World looking people" [TWLP] to differentiate between nonwestern people of color and people who are non-English speaking [NESB]. They explain that "when white people who embrace the white nation fantasy look at a migrant, what they differentiate between are not those who are NESB and those who are not, or those who are European and those who are not, but those who are Third World looking and those who are not" (12). The differentiating factor in

this case is the race specific nature of looking non-White and the legacy of colonization and postcolonial relations of domination that validate the position of those categorized as White.

The dominant model of education and research training in most African countries has remained European or American. This is because major issues and paradigms are conceived and developed in these societies and only marginal issues and problems are addressed in Third World contexts, such as African societies (Goonatilake 1993; Third World Network 1993). Assumptions and stereotypical behavior regarding what the future roles of people who are “Third World looking” are expected to be, such as in the global community of science, are therefore likely to be encountered in the educational institutions of host countries. Several of the study participants without respect to level of seniority encountered these experiences at some point in their studies. However, those who graduated since the 1980s were more aware of the negative stereotyping and low expectations that were embedded in the comments made to them. These are typical comments:

I remember when the grades came out. One professor came up to me and said, “Oh, for a person who comes from the Third World, you’ve done pretty good.” So it was like no matter what, I was always viewed as a Third World person, you know.

—*Dr. Fatma Sago, Assistant Professor of Plant Pathology*

Also [there were] people’s perceptions. If they met you with your African clothes, they asked you “what are you studying?” And if you say science, they’ll say “oh, home science?” I was doing biochemistry and my roommate who was Nigerian was doing chemical engineering. It’s like “these girls, they can’t be serious.” Nobody would believe people like us could be in those fields.

—*Dr. Effie Dogu, Professor of Biochemistry*

Even my landlord asked what I was doing. When I said biochemistry, he said “wow, biochemistry, I thought you were here for home economics.” Even at my church, they felt that as an African woman my place would be in home economics.

—*Dr. Ama Conteh, Associate Professor of Biochemistry*

It wasn’t my first time being in England, but as a student it was the first time. I was surprised at their attitude towards foreigners, especially Blacks. I was surprised that a lecturer who taught and worked with me in the lab would ignore you in the streets. But I knew what I was there for and I focused on that. Also, my husband was in Canada and so I had to work hard to finish and go. I had also been encouraged to work hard right from secondary school, so it wasn’t difficult for me. Because of this, I was able to finish in the three years I was given an award for. You had to work hard to make sure they accept you. My supervisor made it clear that he preferred to work with the English students.

His attitude was that the African brain was not as sharp as the European brain, so we had to work hard to prove that we could make it.

—*Dr. Sade Chad, Senior Lecturer, Horticultural Science*

Some scholars may rightly consider the grouping of these African study participants who represent diverse nation states in a large continent as essentialist. They might argue that more focus should be placed on the complexities of their national histories and trajectories, so as not to collude in the establishment and perpetuation of power differentials (Kenway and Bullen 2003). However, the experience of colonization under the British and postcolonial legacies of economic and political marginality that African countries continue to experience in the global economy provides some space for an interrogation of their shared marginality. This location of marginality in the global economic system, and particularly the scientific community, permits the opportunity to use that shared membership to explore some of the fundamentally different understandings Third World women of color bring to the analysis of graduate education in the sciences in Western societies. In examining the narratives of the women in the study, it is clear that while abroad, their self-representation is African, as opposed to, for example, Nigerian or Sierra Leonean. This may be a consequence of their continent's historical and geographical location in the global community and their perceptions of host country attitudes towards Africa as a "country" as opposed to a continent. Such an argument is made by scholars like Pratt (1999) and Bhabha (1994, cited in Kenway and Bullen 2003, 10–11), that a strategy of negotiation and survival can evolve in contexts whereby these international study participants may develop hybrid identities. Claiming such an identity would thereby enable them to adapt to the dominant culture by representing themselves in ways that engage with the colonizers on their own terms.

The ability of the study participants to struggle with these multiple layers of negative perceptions in the host country is something the women were prepared for prior to these encounters. It is something they learned from their national histories, in the ongoing trajectories of their societies in the global economy, and in their daily interactions and struggles as women in patriarchal societies, including those that are African. Their ability to survive these conditions is clearly articulated in their determination to work hard, to keep focused on their ultimate goal, and in their self-confidence in their ability to accomplish these goals. The following narrative of Ade Bodu captures this sense of determination very clearly:

In a nutshell, I don't think I'm a quitter. I have learned a lot of that from my mother. She has a lot of drive and tenacity that I have inherited. At first, I would spend hours in tears wondering what I was doing here. I just had to try not to give up and to find other ways of dealing with my problems. If you show people you are worried, they'll move away from you. I had to move on because I

could not set myself up for failure of any sort. For every five incidents that were negative, there was always one that was positive. I also realized that I was not alone. Other people were going through it and so I wanted to survive. I gravitated towards people who were helpful and who understood the constraints I was going through. These were all sorts of people and they encouraged me to just keep pushing forward.

—*Ade Bodu, Ph.D. Candidate, Infectious Diseases*

I now focus on ways in which study participants experienced, articulated, and negotiated patterns of exclusion on the basis of their race and gender and as Third World women of color situated in their African identity. I examine their experiences and perspectives around selected educational contexts including mentoring, peer group interaction, and juggling graduate studies and marriage.

### **“They are okay once they realize you are as intelligent as their other students”: Mentoring**

All study participants were asked the question: Who were your mentors and role models in graduate school and how did they help you? Most of the responses were consistent with the findings on student mentoring influences in Europe and North America (Chandler 1996). Eight of the 15 women said they had been mentored, although the type of mentor ranged from that of a major advisor to supportive faculty in other departments. The women who said that they had not been mentored, had relied more on self-motivation or support from other graduate students. Most of the senior and older study participants were less dependent on mentors during their graduate studies abroad, particularly those who studied in the United Kingdom. This may be due to the structure of the English educational system that expects a graduate student to be more self-directed. For example,

My supervisor was helpful. Most of the time he was away consulting with the FAO. When he came back he would set a timetable for me and I always tried to meet that deadline. In England, you had to do your own manual work without much help. I had to do everything without much help. If you are a lazy person, you can't do it. Most of the people I worked with were [other] international students. My supervisor encouraged us to write for publications and to present papers.

—*Dr. Sade Chad, Senior Lecturer, Horticultural Science*

A variety of explanations was given about other types of mentoring received. These included opportunities to attend conferences, advice on publishing, how to conduct research, as well as general encouragement and motivation to persevere, as the following narratives show.

I owe him [my advisor] a lot. Then at X State University, Blacks were very few and he was the only Black American on the staff. We talked every day and

planned my work and I had to report every day about my results. My supervisor wouldn't allow you to go your own way. If you were on the wrong track he would correct you, so as not to waste time. He gave me support to enable me to present at four international conferences. He would always read my first draft of publications. I really owe my gratitude to him and even now we still communicate.

—*Dr. Ama Conteh, Associate Professor, Biochemistry*

Mentor, you are definitely not talking about the supervising? I [did have] another mentor. Actually, they were a couple. They were good. They were faculty there, but I didn't work with them. He was a really good sounding board and he had great ideas and he understood the situation in [my country]. So, I got a lot of advice in terms of directions. Like the timing of flora and other local plants. He would reinforce how important and really, you know, point out where science was going and in what direction. So, I liked talking to him, all those great ideas. And X [also faculty and his spouse] was very supportive too and a really very talented woman. So, they were very influential and supportive.

—*Dr. Fatma Sago, Plant Pathology*

My own supervisor for my Ph.D. was a wonderful lady, with a lot of experience working in Ghana and Nigeria. She had insight into the African way of life and working with Africans. One thing that influenced the way we related was I realized she was a lady who did not suffer fools gladly. She would give support if it was needed. If you stayed away and came to see her with something worth showing, she was very supportive. This has influenced me a lot. I need to know that my work is well done.

—*Dr. Yinka Yasin, Senior Research Fellow, Nutritional Science*

These narratives indicate the importance of mentoring and the variety of ways in which it fosters academic achievement in the sciences, regardless of where a person might come from. African women clearly benefited from this mentoring even when they felt that they were being stereotyped or marginalized from positive mentoring relationships their advisors developed with other students. From these accounts, it seemed that those advisors who had prior international experience were more helpful in providing support and mentoring to their African students. Those women who lacked strong or willing mentors in their departments relied on self-motivation or found alternative ways of coping with the isolation, such as working with senior graduate students or finding faculty support in other departments.

### **“They just didn't think I could make it”: Peer Group Interaction**

Peer groups have also been found to be influential for the academic achievement of students in science, especially at the undergraduate level. However, women in male-dominated science courses have been found to more likely experience an unwelcoming environment (Seymour and

Hewitt 1994), particularly if they are from Third World societies (Rosser 1999). Such experiences, though annoying or constraining, have not necessarily been found to cause women to leave the sciences (Astin and Sax 1996). In my study of the experiences of African women as graduate students in the sciences, I found that the majority did not have positive peer group experiences or collegial support from other graduate students. Nonetheless, no matter how isolating this proved for those who experienced it, it did not cause them to leave the sciences but rather strengthened their determination to accomplish their goal and to resist the negative racial stereotyping regarding their African identity. Some of the accounts of peer group interaction are expressed in these narratives:

At times we had to go to the main university for seminars. Most of them [colleagues] had cars, but sometimes they would be reluctant to give me a ride and prefer that I take a bus. Sometimes I would be using the lab and they would want me to leave what I was doing for them to use. They would say negative things about Africa and I would want to correct them and they wouldn't be happy about it. For example, when we had civil wars in Africa they would want to attribute it to the fact that we were uncivilized and uneducated. But they too had their own social problems.

—*Dr. Bola Kelfa, Senior Lecturer, Plant Physiology*

Americans tended to see you and not think you can do anything. Even fellow graduate students would make comments that implied you were no good and capable of being there. They just didn't think I could make it, and I even qualified as a Ph.D. candidate before some of them.

—*Dr. Balu Dabo, Associate Professor, Biochemistry*

In England, there were six of us working in the lab. Again, there was one Nigerian in this lab. The color brought us together and he was very helpful. Initially, there were [some] White boys in the lab who assumed that we didn't know much, but again with time, they did realize that we did know a lot and their attitude changed. But they were very conservative and wouldn't even say good morning to anybody. I didn't know if that was their system. Social life was almost zero. It was sort of the Nigerian and myself. I think there was another Nigerian on another floor. So, it was sort of all the Blacks together and all the Whites together.

—*Dr. Kona Bouya, Assistant Professor, Chemistry*

With the Ph.D. and when I was a post doc the kind of respect that you expect as a post doc sometimes didn't come. The recognition even by, say, the graduate students in the lab, that you are a post doc and the respect that it afforded other post docs, for instance, wasn't immediately there. And I was, I am, an independent person in the lab.

—*Dr. Fatma Sago, Assistant Professor, Plant Pathology*

These statements about experiencing a chilly laboratory or classroom climate are typical responses for most of the interviews undertaken in

this study. While the complaints were more likely to come from women who studied during the 1980s and later, there were a few among the senior level who shared similar sentiments about their graduate school experience. Implicit in many of these encounters between these women and their counterparts was the undertone of Western hegemonic systems of domination and subordination that continue to pervade relations between people of European descent and Third World people of color. The women were consciously aware of these power differentials and how these function to exclude people like them from the community of science. They were also aware that these situations are not necessarily based on gender, as they mention their male African counterparts in their commentaries. In sharing these encounters and showing how they responded to the negative representations of their African identity, it could be interpreted that these women were also voicing resistance.

### **“Where is your husband?”: Juggling Marriage and Graduate School**

Another aspect of graduate training that holds similar but distinctive constraints for African women as graduate students in science is the need to manage the demands of a marriage/family and graduate school. This is one experience shared worldwide by most married women who choose to pursue a scientific or professional career path. The distinct factor for African women, however, is that the majority of them are married with families as compared to their European or North American counterparts at the same stage in their careers (see, e.g., Hanson 1996, 78). In most African societies, men are privileged and do not expect to contribute to domestic labor and childcare. While this might be less of a problem for these women to handle in their own countries, given the extended family support system and common practice of child fostering, there are adverse implications for women who study in overseas institutions. Reluctance on the part of male spouses to share the domestic workload means that women are more likely to take longer to complete their studies or may even have to drop out of their programs before completion, when it is time to return home. When asked how they coped with the demands of marriage and graduate studies in a foreign country, several of the study participants commented on the emotional costs, loss of opportunities, the burden of domestic responsibilities, neglect of spouse and children, and shortchanging of their own leisure and study time.

Soon after my first degree I got married. And so, there were recommendations for awards. But you take what you get in our part of the country. So, I was recommended for a Fulbright award to come to the U.S. So, we went to the interview. The chairman of the interview in the usual probing that goes on at interviews asked me, “Where is your husband?” And I said, “He’s studying in the U.K.” And he said, “Well, look young lady, you are just going to be compounding your problems by taking a scholarship to the U.S. when your

husband is in the U.K. If you see me later, there are some short courses in the U.K. which you could go on." So, although I was really first on the interview panel, and this he told me several years later, although I was first, he didn't give me the Fulbright award. He gave it to somebody else, a male colleague who then came to the U.S for his Ph.D.

—*Dr. Rugi Turay, Associate Professor of Physics*

I could not perform to my maximum, because I was a mother and wife. My husband was supportive, but once he enrolled in school, things changed a bit. At the beginning of one academic year, I drew up a timetable to share household chores. I asked him what he would be able to do. He flared up and was very angry. He felt a woman should not dictate to her husband. He decided on his own volition to do the laundry, etc. I had to study hard, because with all the negative perceptions about me, I wanted to prove them wrong. I finished my Ph.D. in four and a half years.

—*Dr. Bola Dabo, Associate Professor of Biochemistry*

I got married as a student in Canada. The only reason why I was able to go through is because my husband wasn't with me. After that, when I got back, I thought I was dealing with someone who had an ego problem. He felt that because I had a Ph.D. that he needed to do one too. As an African woman, to be in the sciences, for you to be able to be successful in your career, you should have a husband who is understanding.

—*Dr. Abiana Zimba, Post-Doctoral Fellow, Pharmacology*

These narratives indicate that to be an African woman and to pursue graduate studies at an institution outside of one's country holds particular challenges, especially for women who are married or have children. The demands they face, such as being bypassed for certain scholarships because they would have to be separated from their spouses, are problems not often encountered by their male counterparts. The women in this study were very conscious of the constraints and barriers they had to face as graduate students juggling marriage and family life. At some level, it almost seems that this is a necessary sacrifice they had to make to hold up their part of the marriage and parental contract, which in most African cultures is still highly sanctioned. This is clearly demonstrated by the fact that only four of the 15 study participants were divorced or separated and that all the three single women were planning to get married and to have children while pursuing a scientific career. As some feminist scholars have pointed out (Harding 1991; Rosser 1990), the concerns of managing marriage, family and a graduate education in science are likely to discourage more women from entering and remaining in science, if more gender-sensitive policy initiatives are not fostered and instituted on a global basis.

## Conclusion

Although there is an increasing critique among feminist scholars regarding the need to develop greater awareness about diversity issues in the analysis of women's lives, this dialogue has not received much attention in discussions on women in science (Barr and Birke 1998; Birke and Whitworth 1998; Harding 1998; Rosser 1999). This study on the educational experiences of African women scientists as graduate students in universities in Europe and North America shows that we cannot assume that the road to success in pursuing graduate training is similar for all women. It reveals that the educational process for women in science is complex and requires a more nuanced understanding of how women are differently positioned according to the varied conditions of their lives, the power relations which structure their various locations, and the strategies they employ to address these concerns. The impact of racial and gender bias and negative perceptions of African societies, as a result of the marginality of these societies in the global system and international scientific community, have created very distinctive educational experiences for African women who undertake graduate studies abroad.

Racial and gender bias and the ways in which they intersect are experiences African women share in common with their counterparts of color in Western societies. For example, almost all of the study participants commented on how racism had affected their experiences in graduate school. In some cases it was the lack of good mentoring, in others there were perceptions of their inability to do the work, and in still others it was the social isolation they experienced in their interaction or lack thereof with White counterparts in their host institutions. Similar experiences are reported in studies addressing the experiences of African American women in science (Jordan 1999; Sands 1993).

An experience shared by the African study participants and their Western female counterparts in science was the challenge of juggling the demands of graduate studies and a family. As women, they were expected to be the primary caregivers in the home, regardless of the fact that they were also students. As married women with families, many felt a personal guilt in not being able to meet the demands of their spouses and children. While emotional costs such as divorce were not as prevalent for the African women as for their Western counterparts, at least four of the women in the study were divorced or separated from their spouses. These experiences are similar for women in science in North American and European societies. For example, a study of Finnish women in science found that one-quarter of the scientists had conflicting feelings or a bad conscience because they neglected their children and families, regardless of how many hours they devoted to them (Luukkonen-Gronow and Stolte-Heiskanen 1983).

Both race and gender bias situate women of color, irrespective of who they are, in less powerful positions relative to their male or White counterparts, in how they acquire scientific knowledge and in their lived experiences. Their structural position and the exclusionary practices they encounter in the scientific community are shaped by a racialized and gendered social order, supported by institutional systems and processes. What distinguishes the situation of African women, as international graduate students in science, from their Western counterparts is the historical legacy of subordination arising from the colonial experience and the marginal position of their societies in the global economic system, including the international scientific community. This "peripheral" status in international science, as described by Altbach (1985), has particular implications for African women in terms of their representation as graduate students in the scientific community. African women in this study were very conscious of the negative stereotyping they received within the university community. This negative stereotyping and misrepresentations of Africa and its peoples were not just in terms of their appearance as "Third World looking," but in terms of the low expectations that were embedded in comments made to them. The women were also cognizant of the lack of respect they received from many of their peers, as well as their isolation from key social interactions.

In spite of the many challenges and the "burden of representation" confronting the women in this study, it is important to take note of their ability to resist and survive their hostile environments. Many of the women clearly articulated their determination to work hard, to keep focused on their objectives, to be self-confident, and to draw on spiritual beliefs or support from other international students as strategies for survival. The legacies of their national histories, and struggles to overcome patriarchal systems of domination in their own societies, provide them with the framework to validate their own abilities to succeed in these educational environments.

In conclusion, this study indicates that an understanding of the multiple locations of struggle within intersecting relations of racial and gender bias and location as Third World women of color is fundamental to any analysis of the factors that influence the educational success of women in science. Furthermore, a more complex understanding of the varied educational contexts and hierarchical systems of power relations within which women are trained to become scientists is relevant to the development of educational initiatives to increase the numbers and retain women in scientific careers.

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