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ABSTRACT

Individual and cross case analyses were employed to explore how the pursuit of career and life satisfaction was defined and resolved by 11 elite female scientists in the process of career establishment. A taxonomy which emerged from this procedure identified the following factors that influenced the aspirations and attainments of women at the threshold of top level careers: professional advancement structures in science, the funding climate for scientific research, dual career constraints, commitment to social change, and maintenance of friendship and family ties. Findings hold important implications for educators and counselors and for the overall goals of talent development. (Author)

Passing Through The Gates:

Career Establishment of Talented Women Scientists

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Abstract

Individual and cross case analyses were employed to explore how the pursuit of career and life satisfaction was defined and resolved by 11 elite female scientists in the process of career establishment. A taxonomy which emerged from this procedure identified the following factors that influenced the aspirations and attainments of women at the threshold of top level careers: professional advancement structures in science, the funding climate for scientific research, dual career constraints, commitment to social change, and maintenance of friendship and family ties. Findings hold important implications for educators and counselors and for the overall goals of talent development.

Just as the limited number of available positions in major symphony orchestras constitutes a quota system for talented musicians (Tannenbaum, 1983), young scientists compete for academic positions in a bleak funding climate (Browne, 1994; Hackett, 1990). Particularly scarce are openings at research universities that free professors for the contemplative life of scientific discovery and exploration. In this sense, gifted scientists now completing their arduous apprenticeships are coming to the brink of important careers at an inopportune time. Reservations about whole-hearted commitment to career at the expense of social relationships further complicates the situation for superbly trained women (and many men) on the path to eminence.

Some questions come to mind in viewing the current state of the talent development field. Do the narrow gates of science admit only the most brilliant minds? Are the quotas for research scientists determined solely by market forces or are those individuals who pace outside the gates qualitatively less talented? Must creative careers demand single-minded devotion? Most importantly, as educators and counselors, how shall we support gifted young women who seek a career in this intensely competitive domain?

Sources of Satisfaction in Science

The literature on scientists and their work, along with research on the career development of professional women, highlights several issues explored in this article. Productive scientists appear to be motivated largely by deep intellectual engagement and the recognition associated with influential discoveries (John-Steiner, 1985; Lederberg, 1990; Ochse, 1990). The degree to which women scientists resemble or differ from this largely male-derived profile has not been extensively researched. The literature does indicate that a potential mismatch exists between the single-minded devotion to science characteristic of eminent researchers and the desire to balance family and career that appears so prevalently in reports of professional women (Arnold, 1993; Betz & Fitzgerald, 1987; Noble, 1989; Zuckerman & Cole, 1987).

Mentors

Recognition by an influential mentor is the variable that most strongly correlates with competing in the fast lane of the science enterprise (Arnold, 1993; Subotnik, Duschl, & Selmon, 1993; Subotnik & Steiner, 1994). Mentors seek proteges who are, of course, extremely able. But a potential apprentice must also display other important social characteristics, including a happy combination of both humility and confidence (Blackwell, 1989; John-Steiner, 1985; Root-Bernstein, 1989; Weisberg, 1993). Proteges must be open to learning from masters, yet challenge those same masters in high level analytical dialogue. We know very little about where humility is learned and nurtured. However, confidence is derived from early academic success in mathematics and science (Bloom, 1985; Travis, 1993), and by recognition from respected mentors at various critical junctures

in secondary and post-secondary education (Arnold, 1993; Subotnik, Duschl, & Selmon, 1993; Subotnik & Steiner, 1994).

Women who need extensive encouragement to pursue their dreams of becoming a scientist do best in colleges and universities that offer formal opportunities for research with responsive mentors. Once in graduate or professional school, words of support and encouragement directed at building women's self-confidence are meted out less frequently. Some women are successful in finding male or female mentors with great prestige who can provide needed intellectual and emotional support, introduction to important contacts (Jacobi, 1991), modeling of professional conduct, and the tacit knowledge needed to identify important and fundable scientific questions (Zuckerman, 1977; 1988). Women who seek a female role model are at a disadvantage due to the small number of available female mentors in many quantitative fields. Female life role models with rewarding family lives and careers are in scarce supply at most higher education and research institutions.

Achievement and Extrinsic Factors

Beyond the enjoyment of intense intellectual engagement, other factors affect scientists' attainment. Public identity as a scientist helps novices persist through the strenuous training and career establishment periods (Bloom, 1985). The prestigious role of research scientist and its association with high-level intellectual power continues to be a source of satisfaction to individuals throughout their careers. Recognition by peers and the greater public also provides motivation and satisfaction (Ochse, 1990).

Factors external to the process of doing science can also constrain success. A highly competitive funding climate creates significant pressure for researchers to write grants, taking time away from intellectual work, and limiting ideas and projects to those that are fundable. Similarly, the tight academic job market in many fields limits opportunities for some scientists who are beginning their independent work (Hackett, 1990).

Life Roles

Many talented women do not pursue top level careers because they must juggle professional commitments with family, childrearing, and community participation (Jacklin, 1989). The disproportionate number of women scholars and scientists who remain single, marry late, or choose not to have children reflects the perception that "having it all" can be extraordinarily difficult (Zuckerman & Cole, 1987).

Career establishment during one's mid-20s to early 30s, after prolonged training, is the dominant pattern in the top echelons of the science enterprise. This professional sequence conflicts with normative social roles in which American women devote considerable time to family relationships. The typical period of infant and preschool age childrearing occurs concurrently with the most demanding period of publication and initial funding efforts. Many women choose to reduce their work hours or interrupt labor force participation for family

responsibilities (Fleming & Hollinger, 1994). Women who are ambivalent about parent or career roles face internal dilemmas, and women who strongly desire total commitment to creative production in science face social disapproval for their atypical gender role. In contemporary society, in sum, exceptionally able women experience considerable stress related to role conflict and overload (Csikszentmihalyi & Robinson, 1986; Noble, 1989).

Foundation Studies

The current investigation of young female scientist draws from two longitudinal studies of talent development. The Westinghouse Science Talent Search has, for the past 54 years, conducted a nationwide annual contest for high school seniors gifted in science, mathematics, and other quantitative fields. Students compete by submitting a technical paper describing an experiment or proof to a board of readers made up of eminent science professionals. Subotnik and her colleagues (Subotnik, 1988; Subotnik, Duschl, & Selmon, 1993; Subotnik & Steiner, 1994) have been following the 1983 cohort through interviews and questionnaires in order to explore the variables associated with retention and attrition in the science pipeline. As they began college all but 5 of the 146 winners expected to pursue science careers. By the 5-year follow-up nearly a third of the women (n = 37) had already left science. Of those who remained, eight planned to devote themselves primarily to science research.

The Illinois Valedictorian Project (Arnold, 1993; 1994) is a longitudinal study exploring the postsecondary educational and career achievement of academically talented students. Eighty-one high school valedictorians and salutatorians have been followed through interviews and questionnaires since their 1981 high school graduation in order to explore the consequences of academic success. The cohort includes 46 women, from diverse socioeconomic backgrounds, who attended varied types of high schools in Illinois. The group was strongly concentrated in science and engineering as they entered college. By 1994, 66% of the females had received graduate degrees, including 6 PhDs in science or mathematics, and 3 MD degrees. Attrition from science began during college and continued beyond. Ten women left science in their 20s, including two with doctoral degrees.

Methodology

Sample

Women were selected from the Westinghouse and valedictorian longitudinal study samples according to the following criteria: a) completed terminal degree in science, b) full time employment in science or medicine, and c) reported commitment to high level basic or applied science careers at the last data collection point (1991-1993). Eleven women met these criteria and were included in the current study.

The participants, between 29 and 31 years old, included eight White women, two Asian-Americans, and one Latina. Six came from upper middle-class families with at least one professional parent and the other five had working class backgrounds. Four of the participants, including three biologists and one chemist, are

post-doctoral fellows in research science. Another PhD is a tenure-track assistant professor in mathematical computing. Three of the 11 are medical doctors, including one MD/PhD. The remaining two are a doctor of veterinary medicine and a senior research associate in a biology laboratory.

Instrumentation and Procedures

The authors conducted one to two-hour audiotaped telephone interviews with all 11 eligible women in the Spring of 1994. The semi-structured interview protocol included the following questions based on the research literature and past longitudinal study findings:

-What kinds of sacrifices might you have to make to get to the top of your field?
-At this point in time, are these sacrifices worth the cost for you?
-What measuring sticks help you assess how you're doing in comparison to your peers?
-Who are your peers?
-How will you know that you have achieved your standards of success?
-What professional disappointments have you encountered, if any?
-How did you deal with those disappointments?
-Do you have any regrets?
-What aspect of your professional life gives you the greatest satisfaction?
-What aspect of your personal life gives you the greatest satisfaction?
-What advice would you give to young women entering graduate or professional school in your field today?

The authors audio-taped interviews and prepared transcriptions of relevant sections. Subject's answers to protocol questions as well as issues raised by interviewees were recorded in writing.

The analysis followed a grounded theory approach (Strauss & Corbin, 1990). Grounded theory moves fluidly between deductive examination of data based on the research literature and inductive exploration of issues and themes emerging from the data. Following this approach, themes from deductive and inductive analyses were examined for each case separately and categorized for comparisons across cases. A taxonomy emerged from this procedure which categorized women into career groups. The taxonomy was employed to identify independent variables associated with the career group categories.

Results

Interview Responses

Superbly trained, and with a history of notable achievements, this group of women possesses the talent and preparation to pursue eminence in their respective fields. At this point of early career establishment, all the women we interviewed said they were reluctant to give up personal relationships, recreation, or time alone for a future goal that

might not have a clear pay-off. "It's at a point right now where regardless of how hard I work or don't work, there's no guarantee that it will work out," one young woman said, adding that she would be willing to make considerable sacrifices if she were confident she could support her research over time. Several were cynical about whether success in science resulted from talent and creativity or politics and self-promotion. In spite of some serious reservations about committing their lives to the professional fast lane, all but one have thus far kept themselves in the running.

The scientists determined their current career successes by comparing themselves to their classmates, fellow residents, or post-docs. Over time, their identified peer group has been shifting to national competitors for fellowships, residencies, or grants.

Long term career success was described by our subjects in terms of three categories. The first was professional satisfaction. The women hoped that in the future their work would continue to be enjoyable, socially meaningful, and of high quality. The second category was related to status in the field. These young scientists and physicians aspire to be known as experts and role models, have many publications and grants, and be offered academic or leadership positions in professional organizations. Finally on a personal level, they dream of having satisfying private and social lives, to be free of cynicism and true to the values that initially brought them to science.

The disappointments some have experienced include unsuccessful grant or job applications, advisors or mentors who were unavailable or uninterested in their work, and competitors' work appearing first in the research literature. All who have experienced disappointments have struggled to prevent these events from dampening their career aspirations.

When asked if they had any regrets about the course of their careers thus far, four without hesitation said, "No." The others expressed regrets about taking too much or too little time between undergraduate and graduate/professional school, alienating some powerful people, wishing they had been better socialized on how to get ahead in science, or choosing the wrong post-doc. Many frustrations centered around the unavailability of good advice about the realities of big-time careers in science. One post-doctoral fellow, for example, poorly judged the reward system of science when she decided to pursue a doctorate.

> I originally went into the PhD program because I wanted to teach. I enjoy working with people and I enjoy the training process, the design of things. I want to be in academic science, yet teaching is currently considered a liability.

A few, like one of the physicians, already regret the loss of personal time.

> Usually I love what I'm doing. I think my biggest regret is just that I'm almost 31

years old and I feel like there's a lot of other things I'd like to do that I didn't because I spent so much time in medicine.

The most satisfying aspects of their professional lives were generally centered around problem solving, whether in the laboratory, in a patient clinic, or in the form of research published in a journal article. Each woman expressed how much she enjoyed resolving an intellectually challenging dilemma. The aspects of their personal lives that were most satisfying universally centered in the realm of relationships. Two also mentioned travel or pastimes such as marathon running or crafts.

When asked about advice they would give to young women entering their field, the messages were clear:

-Know that you're getting into a very demanding area, and only pursue this career if you really want to. Certainly do not go into a science career for your parents or for money.

-Be prepared to be intimidated or to be rejected at times. This happens to everyone; it's part of the socialization experience.

-Do not assume automatically that women professors or mentors will be especially supportive.

-Learn to question, to challenge, and to enjoy increasing responsibility, even when the consequences for being wrong are great.

Taxonomy of Career Categories

The subjects were grouped according to the degree to which they were pursuing a fast track career in their chosen field (see Table 1). The fast track was defined as the path leading to positions such as principal investigator of major grants, director of a research institute, professor at a medical school or research university, or leader of a professional organization. Four categories emerged:

- Women facing career dilemmas but who thus far remain on the fast track were labeled "facing in."
- Women trained superbly for competitive positions yet opting out of the fast track due to geographic decisions or funding problems were labeled as "peering out" of the top professional channels.
- Women choosing deep career involvement on the basis of opportunity and lack of competing relationship demands were categorized as "open to opportunity."
- Women subordinating career intensity to family and relationships were designated as "focusing on balance."

Insert Table One About Here

Facing In. Sharon, a radiology resident at a prestigious hospital, dreams of establishing a career in academic medicine, a situation she considers ideal for physicians who enjoy both research and practice. Her dilemma is how to pursue her professional goals while participating in a fulfilling marriage to a successful professional outside science. Her fiance's

advancement is tied to a specific location lacking high level fellowship opportunities for Sharon.

> We're trying to work out being together but he's not very flexible in his job opportunities... I've always been in the mode of going to the "best": the best college, medical school, and residency. To sacrifice all that for a relationship is so foreign to me.

Celia has completed her MD/PhD program and is beginning her residency in pediatrics. Like Sharon, she hopes to enter academic medicine. Celia is also attracted by the idea of spending a portion of her career providing medical care to small rural communities in Central America. Her husband is not a physician, but shares Celia's commitment to social service and her professional advancement.

> The point of going to Central America is to work with a population that needs help and where much of the technology associated with most American hospitals is absent... I'd become part of a community and get appreciation for my contributions. That's more valuable than any material rewards.

Celia is concerned, however, that her path to academia might be hampered by her commitment to community service, as it will take time away from the medical mainstream for months or even years.

Justine is a neurosurgery resident, married to another resident in her department. She dreams of influencing neurosurgery by way of technique, research, and the modeling of high level social skills. She sometimes wonders whether the reputation associated with neurosurgeons as cold and self-absorbed will cause her to lose interest in aspiring to a leadership position in the field: "People I thought I could have as role models have disappointed me with their greed, and that's what leads to cynicism--people striving for reasons of ego and fame don't care about patients."

Peering Out. Catherine enjoys her work as a post-doctoral fellow in a large city hospital. She acknowledges the fact that she might have found a more prestigious position had she been less tied to her location. She is very close to her family and has been involved in a serious long-term relationship that keeps her in the region. She hopes that she will find the opportunity she seeks there, and that grants and other promising positions will become available to her over time. Meanwhile she tries to avoid equating success with recognition: "It's not that important to me to be the best in the field, it's more important to me to do the best that I can at what I'm doing at the time."

Allie received her doctorate from one of the top research universities in the country. She is now a second-year post-doctoral biologist at a respected laboratory. She loves science and is eager to begin implementing her own research line as head of a team. She has been forced to extend her current position,

though, after failing to obtain grant funding or a tenure-track academic position. "I'was in it for the science because I liked it. But that's not all it takes -- not at this level." Knowing the bleak odds for financial support in her specialty, Allie is seriously considering business or law school. "I'll give science another year or two," Allie says, before giving up on the realization of her research ideas.

Jacqueline has completed the first of a three year post-doctoral fellowship. After several years apart, she is located in the same city as the man with whom she has been seriously involved. Next year, her partner will be on the job market with a humanities PhD. He and Jacqueline plan to marry and have agreed that because an academic position in his field would be more difficult to acquire, she will join him after her third year wherever he is located.

> Right now I'm trying to stay as competitive as I can. But I guess I don't have that 'killer drive' because I'm limiting my choices to a particular location, at least for the time being. It's something I feel guilty about because I'm qualified, but most of the time I think about quality of life.

Jacqueline hopes she will find satisfying work in a fine research university or laboratory, but is prepared to work in a less competitive university if necessary.

Open to Opportunity. Marilyn is in the midst of a second post-doctoral fellowship in animal science. When she failed to find a permanent position after her first post-doc, Marilyn took a second placement in human nutrition research. Marilyn hopes she will be more successful in the competitive job market with both human and animal research backgrounds. She is willing to move anywhere, to work in academia or government, and to tailor her research to the position she receives. "It's just me [who is affected by the decisions I make]...so I can be flexible." She wants to do basic research with "an applied aspect to it, where I can see that what I am doing will help somebody somehow down the road." Although content to stay single and fairly firm about remaining childless, Marilyn would prefer to be in a relationship. She longs to be geographically stable so she can stop leaving behind important friends.

Laura is aware of how fortunate she is to have won a coveted tenure track position in a mathematics department at one of the nation's finest universities. Although she sometimes is concerned that people will think that she acquired the job because of affirmative action--"every young guy who doesn't have a job thinks I got mine because I'm female"--she is confident that she is highly qualified and looks forward to the challenge of the position. Laura is not currently involved in a serious relationship, yet she plans to include marriage and children in her life and made certain to discuss related issues with her department chair as part of her job interview. She is poised to make the most of whatever opportunities come her way.

Focusing on Balance. Penny started a PhD program right after completing her bachelor's degree. She soon found that the expectations and life style required of a doctoral student were taking her away from her main interest, laboratory work. She completed a masters program that allowed her to conduct research in a respected laboratory working on important scientific problems. It is not critical to Penny that she generate her own research questions as she knows grant funding efforts would take her away from benchwork. Penny is married and the mother of a very young child. "Family is first on my list right now," she says. Penny continues to work as a senior research associate in a laboratory.

Vicky has just graduated from a very fine veterinary college and plans to begin a clinical practice in the region where her husband is working. They have been living apart this past year while Vicky completed veterinary school. She looks forward to developing her reputation as a competent and respected practitioner of animal medicine and being of service to her community. Vicky is unwilling to trade her dream of a large family for an all-absorbing career. "If I really wanted to get to the top of my field I'd have to sacrifice family."

Sarah is a medical doctor practicing family medicine in an inner city clinic she helped to establish. She is totally committed to working with medically underserved families in the United States and in developing countries. Sarah chose her residency over more prestigious placement in order to remain near her family: "When I was younger it was important to me to see if I could get into the best college or the best medical school. More recently I've asked myself, 'Is it really that important? Can I be just as fulfilled going someplace less big name but where I can still get a good education?' I make decisions now based on other things, like being close to family or friends." She seeks to balance her emotionally, intellectually, and physically stressful job with a relationship and children. She is not currently involved in a serious relationship but looks forward to a time in the future when her life will be more evenly distributed among medical practice, childrearing, and personal time.

Discussion

Family and career

Before this juncture in the lives of these talented scientists, balancing career and family was a theoretical contingency. Actual relationships now act as either brakes or supports to continuing professional achievement. A woman's own values concerning the relative importance of family and work and the relative priority of each partner's career form one axis of the intersection between family choices and professional attainment. The other determining factor is the specific nature of a woman's primary relationship, including job opportunities in both partners' fields, the attitude of spouses toward household and childrearing tasks, and mutual support for professional demands and career mobility. For women with partners who value

their wives' careers and who are prepared to make sacrifices themselves for women's attainment, relationships can be enormously positive career influences.

As Sharon's case demonstrates, real constraints face women who value their own and their partners' career advancements.

> I always thought of myself as a 'go-getter,' always aiming toward the largest success possible. Sometimes I long for the time for family, for the things that women have fought to get away from. I'm trying to perceive sacrifices as compromises, since what you lose in academia you gain in your personal life. But I'm not yet sure of this because I haven't yet made any irreversible decisions.

Sharon hopes to be spared these irreversible choices between her fiance's career and her own.

> In a way I hope that I'll go to all those places for interviews and they'll turn me down. Then I won't ever feel resentful of him, that he held me down in my career. Every day I am on the edge waiting to see what's going to happen for the rest of my life.

The genuine difficulties of balancing family and career are central preoccupations of talented young women affecting their potential for extraordinary achievement in science.

The Social Context of Science

The top section of Table 1 describes three women who continue to aspire to the highest levels of their fields and who are confident that they will continue to do so. All three are medical doctors or, in one case, an MD/PhD. With only four physicians in the entire group, their dominance in the top track category is significant. Unlike most pure science research paths, the applied field of medicine attracts considerable numbers of women. Specialties within medicine may vary widely in gender representation and in the ease with which professional and family roles can be combined, yet females appear to encounter more comfortable professional settings as doctors than in many other science fields.

The structure of high-end laboratory science continues to be male-dominated with an invariably heavy work schedule. Whether the intrinsic nature of scientific discovery genuinely demands that the scientist devote nearly all her time to creative work remains an open question. It is possible that the social construction of science occupations rather than the nature of the scientific process itself stands in the way of more flexible arrangements for women's professional development.

Along with occupational structure, external economic factors strongly affect the achievement of women scientists. Despite more than a decade of warnings about projected shortages of scientists, new PhDs face an unfavorable job market in many

fields. Marilyn's statement, "Just because we can't get a job doesn't mean we're not qualified.... There are so many applicants out there. I never dreamed it would take this long," has been echoed by several other women in the study and by media accounts of harsh job markets for new PhD scientists (Browne, 1994).

External factors strongly affect the prospects of many women scientists who are poised to establish significant careers. The structure of occupations, and the economic realities of practicing and funding scientific research, are important variables in determining which women will continue in the highest levels of science.

Values that Drive Professional Careers

All of our study members are attracted to the problems and methodologies associated with scientific work. Each woman prizes the life of the mind. Westinghouse winners and valedictorians who were not personally engaged by these matters dropped out at earlier stages of the career pipeline. The preparatory training was too rigorous and demanding for the uncommitted, particularly in the basic sciences where financial rewards for persistence are not guaranteed.

At each stage of their socialization into the applied and research fields of science, women identified sources from which they derived recognition and other forms of extrinsic motivation. In high school they were often encouraged by their teachers and administrators. Wide-spread public acclaim greeted them at graduation for being valedictorian or a Westinghouse winner. Interviews in the local paper or on the national news celebrated their achievements. In college these women sought and received respect from classmates, graduate students, and professors. It was important to stand out among a crowd of pre-medical or biology majors, to get good recommendations and opportunities to develop valuable skills, and even to prepare a paper for publication. A professional reference group became even more important in graduate or professional school. Young scientists noted which classmates were asking the most perceptive and original questions, becoming advisees to the most brilliant professors, publishing their work, or speaking at conferences. We were fortunate to interview our study participants precisely at the moment when the ruler by which they measured their successes and achievements was expanding from the local to the national level.

Three of the women we interviewed are committed to a life of service through science. Sarah and Celia want to spend some portion of their professional lives working with underserved populations in inner-city and in rural Central American clinics. Justine is anxious to change the way neurosurgeons respond to their patients. The other eight women hope that their work will eventually provide some benefit to society, but do not identify this goal as their main source of career drive.

As discussed above, all the women seek life satisfaction from relationships with partners and possibly children. These young scientists say they will not sacrifice relationships in the

name of intellectual engagement, professional recognition, or service to society. Sharon sees the career and family dilemma as intractable: "Women have to be successful in their careers and they have to have the babies. We have the responsibility to tell employers what our goals are, but then we may not get the jobs we want." Thus far, however, only Penny, the sole parent in the group, has selected an occupation that allows her to place motherhood and family life as her primary responsibility.

Implications and Recommendations

Science careers can offer satisfaction derived from discovery, problem solving, and improving the human condition. At the highest levels, professionals acquire social prestige, financial rewards, and sometimes even fame. Although they prize such rewards, many extraordinarily capable women abandon the top tiers of science when they perceive fields of interest are closed to them or when a balanced, interpersonally-centered life becomes impossible to achieve.

The women profiled in this article completed graduate education and are working at residencies, post-doctoral fellowships, or their first professional positions. Several have slowed their career momentum because of severely reduced federal research funding and a poor academic job market. If analysts are accurate in predicting coming national shortages of scientists and engineers (Vetter, 1991; National Research Council, 1991), corrective measures are imperative. Expanding special funding programs for young scientists would keep many promising women in their disciplines, reintroduce the public recognition they enjoyed in college and graduate school, and bridge the transition between post-doctoral work and tenure track positions.

Mentors and fellow professionals teach aspiring scientists grant-getting, job hunting, laboratory start-up, and research team supervision through informal communication and modeling. At the post-doctoral and early career stages, mentors seek proteges who can assist and enhance their investigations or clinical operations. With fewer women researchers available in doctoral and professional environments, a young female scientist is less likely than a male to find a professional and life model. Clearly, this dilemma calls for rewarding senior women who are interested in nurturing junior scientists through formal or informal means.

Like other male-dominated occupations, research science adheres to an unforgiving professional clock. If laboratories and universities welcomed women after a period of intensive childrearing, many dropouts from science might be retained for several decades of productive work. Opportunities for high level part-time practice, extended leaves, job sharing, and the slowing of the tenure clock are solutions that have enhanced the contributions and satisfaction of women in other fields, including medicine. Such approaches merit further attention in the research professions.

It is vital that spouses or partners encourage and actively assist in women's careers by understanding the need for long

hours of laboratory work, solitary contemplative time, and geographic mobility. Chien-Siung Wu, eminent physicist, "...listed a 'nice' husband, a home close to work, and good child care as three requisites for the successful married woman in science" (McGrayne, 1993, p. 267). Further, job security and ample funding must be in place for a woman who seeks to balance science, marriage, and childrearing.

Many women are genuinely committed to teaching as well as to conducting research. The current structure of American higher education offers few opportunities to do both, at least simultaneously and at a high level. Arrangements for more fluid movement from teaching colleges to research universities and industrial and government laboratories would enable scientists to reinvigorate themselves professionally. Opportunities such as mid-career post-doctoral fellowships would be of particular advantage to women who are either geographically constrained, ready to resume full time work, or desirous of reemphasizing research.

According to Nobel laureate Rosalyn Yalow, "It's difficult in a field that changes as rapidly as science to drop out for a number of years and then hope to return without major retraining" (McGrayne, 1993, p. 355). Science may indeed require single minded, full time devotion over an adult lifetime. If this is the case, we ought to discourage family-centered women from aspiring to the top levels of science. However, reconceptualizing the work of scientists has not yet been carried out, and innovative child care and work arrangements point to possible directions for the future. Female valedictorians and Westinghouse Science Talent Search winners have emerged at the top of a long, competitive educational process. These women love science and show exceptional promise for important scientific contributions, but only a few consider it possible to continue in the elite tiers.

The status of funding and creative job opportunities are dismal for both talented men and women scientists. For contemporary women, the career/family dilemma adds a complicating factor to an already difficult situation. Aiding the advancement of our most talented and committed scientists is important for them and for a nation that sorely needs their gifts and fresh perspectives.

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Table 1

Career Track	Name*	Professional Status	Marital Status**	Career Dilemma
Facing In	Sharon	MD, Radiology Fellow	Committed	Dual-career relationship
	Celia	MD/Phd Pediatric Resident	Married	Activism or academia
	Justine	MD, Neurosurgery Resident	Married	Peer characteristics
Peering Out	Catherine	PhD, Chemist, Post-Doc	Committed	Location near family
	Allie	PhD, Biologist, Post-Doc	Single	Funding opportunities
	Jacqueline	PhD, Biologist, Post-Doc	Committed	Dual-career relationship
Open to Oppor-tunity	Marilyn	PhD, Animal Science, Post-Doc	Single	Opportunities driving choices
	Laura	PhD, Mathematics, Assistant Prof.	Single	Opportunities driving choices
Focus on Balance	Penny	MS, Biology, Senior Research Associate	Married, one child	Remain in lab and balance with family
	Vicky	DVM, Veterinarian	Married	Balance with family, rounded life
	Sarah	MD, Physician, family practice	Single	Balance with family, service via practice

*pseudonym

**None of the married women, except Penny, have started families, but most expect to do so. Among single women, all anticipate marriage, and with the exception of Marilyn, children. Committed status includes women who are in relationships they expect will lead to marriage.